Category, Title, Product description, Rationale, Market potential, Raw materials, Technology, Investment cost total, Land cost, Machinery cost, Working capital, Benefits, Location

Category, Title, Product description, Rationale, Market potential, Raw materials, Technology, ~~Investment cost total~~, Land cost, Machinery cost, Working capital, Benefits, Location

Category, RG[Project Title, Product description, Rationale, Market potential, Raw materials, Technology, Land cost, Machinery cost, Working capital, Benefits, Location])

Categories(Category)

Products(**Category**, Project Title, Product description, Rationale, Market potential, Raw materials, Technology, ~~Land cost~~, Machinery cost, Working capital, Benefits, ~~Location~~)

Landen(name)

Cost(machinery,working capital,land)

3 NV

Categories(id,name)

Products(id,title,description,rationale,potential,rawmaterials,technology,**catagoryId,landId,costId**)

Landen(id,name)

Cost(id,machinery,labor,land)

Beverages

(' Coffee Processing :Roasting, Grinding & Packing',1),

(' Molasses Based Alcohol Production Plant',1) ,

(' Processing or Fruit-Based Drinks',1) ,

(' Production of Malt for Breweries',1) ,

(' Purified Water Bottling Plant',1) ,

(' Soft Drinks Bottling Plant',1) ,

(' Wine Production',1) ,

(' Laundry Soap Making Plant',2) ,

(' Insecticide Aerosol Making Plant',2) ,

(' Wax Candle Manufacturing Plant',2) ,

(' Acid Slurry Making Plant',2) ,

(' Activated Carbon Making Plant',2) ,

(' Animal Glue Making Plant',2) ,

(' Basic Pharmaceutical Products Making Plant',2) ,

(' Bleaching Powder Production Plant',2) ,

(' Cleaning Powder (Vim Type) Making Plant',2) ,

(' Coated Abrasives Making Plant',2) ,

(' Cosmetics Products Making Plant',2) ,

(' Disinfectant Making Plant',2) ,

(' Formulated Perfumery Compound Making Plant',2) ,

(' Hair Cream Production Plant',2),

(' Hair Oil Making Plant',2),

(' Industrial Adhesives Making Plant',2) ,

(' Liquid Detergent Production Plant',2) ,

(' Mosquito Coils Making Plant',2),

(' Mosquito Repellants Making Plant',2) ,

(' Oxalic Acid Production Plant',2) ,

(' Oxygen Producing Plant',2),

(' Paints, Varnishes and Pigments Making Plant',2),

(' Plant for Organic Sulphonation',2),

(' Plant for Reprocessing of Waste Batteries',2),

(' PVC Resin Production Plant',2),

(' Safety Match Making Plant',2),

(' Sodium Silicate Making Plant',2),

(' Sodium Sulphide Making Plant',2),

(' Sulphur Powder Making Plant',2),

(' Synthetic Detergent Powder Making Plant',2),

(' Toilet Soap Making Plant',2),

(' Tooth Paste Production Plant',2),

(' Veterinary Medicine Production Plant',2),

(' Agricultural Mechanization Services',3),

(' Agro forestry Project',3),

(' Apple Production Farms',3),

(' Assorted Vegetable Production Farms',3),

(' Banana Plantations',3),

(' Broom Corn Production Farm',3),

(' Cattle Breeding, Fattening and Marketing Enterprises',3),

(' Coffee Plantations',3),

(' Commercial Production of Sesame',3),

(' Commercial Rice Production',3),

(' Cut Flower Production',3),

(' Fish Harvesting, Farming and Marketing',3),

(' Fodder Production and Distribution',3),

(' Natural Gum Production and Marketing',3),

(' Oranges and Other Citrus Fruits Plantations',3),

(' Popcorn Production Farm',3),

(' Poultry production Farm',3),

(' Rubber Tree Plantations',3),

(' Seedlings Production and Distribution',3),

(' Seed Multiplication and Distribution Centers',3),

(' Small Scale Pineapple Plantation',3),

(' Soybean Production Farm',3),

(' Table Grape Production Farm',3),

(' Tea Plantation',3),

(' Tree Farms or Plantations',3),

(' Aggregates Production Plants',4),

(' Bleaching Earth Production Plant',4),

(' Burnt Clay Bricks',4),

(' Cemental Products Making Plants',4),

(' Centrifugal Reinforced Pipe Making Plant',4),

(' Chalk Sticks Production Plant',4),

(' Compressed Soil Blocks',4),

(' Concrete Pole and Pile Making Plant',4),

(' Cut-Stone Production Plants',4),

(' Graphite Crucibles Making Plant',4),

(' Grinding Stone Production Plant',4),

(' Gypsum Board Making Plant',4),

(' Gypsum Powder Production Plant',4),

(' Lime Production Plants',4),

(' Marble',4),

(' Mini Cement Plant',4),

(' Mosaic Tiles Making Plant',4),

(' Plaster Board Production Plant',4),

(' Plaster of Paris Making Plant',4),

(' Production of Ambo Type Stones',4),

(' Production of Gemstones',4),

(' Production of Water Filter Candle',4),

(' Reinforced Concrete Cement Pipes',4),

(' Roof Tiles from Clay',4),

(' Sheet Glass Making Plant',4),

(' Simple Glass Mirrors Making Plant',4),

(' Sprayed Polymer Mortar',4),

(' Wall Tiles Making Plant',4),

(' Electrical, Switches, Socket and Plug',5),

(' Assembly of Small Transformers',5),

(' Computer and Photocopiers Assembly',5),

(' Computer training center',5),

(' Dry Cell Battery Making Plant',5),

(' Electrical Dividers and Other Accessories',5),

(' Electric Backing Ovens Making Plant',5),

(' Electric Bulb Holders and Fluorescent Fixtures',5),

(' Electric Bulbs Making Plant',5),

(' Electric Iron Making Plant',5),

(' Electric Kettles & Egg Boilers Making',5),

(' Electric Stove Assembly Plant',5),

(' Fabrication of Electric Water Heaters',5),

(' Immersion Heaters Making Plant',5),

(' Low Cost radio Assembly',5),

(' Printed Circuit Boards Making Plant',5),

(' RUM, VERMOUTH AND VODKA',5),

(' Television Assembly Plant',5),

(' Ultra Violet Fly Repellant',5),

(' Welding Electrode Making Plant',5),

(' Floor covering & mat',6),

(' Animal feed',7),

(' Baby meal',7),

(' Baking powder',7),

(' Biscuits',7),

(' Brown sugar',7),

(' castor oil',7),

(' Commercial starch',7),

(' Composite flour',7),

(' Confectionery Making Plants',7),

(' Cornfleaks',7),

(' Dehydrated veg',7),

(' Dry milling',7),

(' Essential oil',7),

(' Fertilizer',7),

(' Fish meal',7),

(' Fruit processing',7),

(' Fruit and veg',7),

(' Gelatin',7),

(' Glucose',7),

(' Ground nut oil',7),

(' Honey',7),

(' Intravenous Solutions',7),

(' Iodized salt',7),

(' Jam and Jelly',7),

(' Maize starch',7),

(' Margarine',7),

(' Meat processing',7),

(' Milk',7),

(' Milk powder',7),

(' Modern Abattoirs',7),

(' Mushroom production',7),

(' Pasta',7),

(' PEA CANNING',7),

(' Peanut butter',7),

(' Pickling',7),

(' Potato',7),

(' Poultry feed',7),

(' Pulses',7),

(' small scale bakery',7),

(' soya bean processing',7),

(' Soya sauce brewing,7),

(' Spices',7),

(' starch derivative',7),

(' Sugar',7),

(' Tomato ketchup',7),

(' Veg oil',7),

(' Aluminum Household Utensil',8),

(' Blacksmith’s Hearth',8),

(' Chaff Cutter',8),

(' Chisels',8),

(' Galvanized Iron Bath Tubs',8),

(' Galvanized Iron Buckets',8),

(' Hammers',8),

(' Hand Sewing Needles',8),

(' Hand Stapling Machine',8),

(' Hospital Beds, Stretchers and wheel Chairs',8),

(' Insecticide Sprayers',8),

(' Iron and Steel Cots',8),

(' LPG Container and Pressurized Fire Extinguisher',8),

(' Metal Cabinets',8),

(' Metallic Buttons & Buckles',8),

(' Metal Safe Boxes',8),

(' Mouse Trap',8),

(' Pilfer Proof Bottle Caps',8),

(' Razor Blade',8),

(' Rural Household Hand Tools',8),

(' Safety Pins',8),

(' Saws',8),

(' Screw Drivers',8),

(' Shovels &Spades',8),

(' Sickles',8),

(' Snap Fasteners',8),

(' Solder Wire',8),

(' Spanners',8),

(' Stapler & Puncher',8),

(' Steel Storage Bins',8),

(' Steel Vaults, Safes and Cash Boxes',8),

(' Tin Containers',8),

(' Transmission belt,8),

(' Various Hand Tools',8),

(' Water Filter Containers',8),

(' Weights',8),

(' Wheel Barrow',8),

(' Wick Stoves',8),

(' Urban Amusement and Recreation Park',9),

(' Center for Cultural and Musical Shows for Tourists',9),

(' Clean Hotels and Restaurants for Tourists',9),

(' Convention/Conference Centers',9),

(' Establishment of a Zoo at Bahir Dar',9),

(' Hotel and Restaurant at the Blue Nile Falls',9),

(' Information Centers for Tourists', 9),

(' Modern Hotels & Restaurants', 9),

(' Physical Fitness Centers and Gymnasiums', 9),

(' Production of Handcrafts for Tourists', 9),

(' Special Bus Services to Tourists', 9),

(' Training Center for hotel and Restaurant Services', 9),

(' Training Center for Hotel & Restaurant Management', 9),

(' Training Center for Tour Guides', 9),

(' Wild Life Parks/Sanctuaries', 9),

(' Canvas Shoes Making Plant', 10),

(' Chrome Tanned Hides and Skins Preparation Plant', 10),

(' Finished Leather Making Plant', 10),

(' Laminated leather belt, 10),

(' Leather Footwear Making Plant', 10),

(' Leather Garments Making Plant', 10),

(' Leather Goods Making Plants', 10),

(' Leather Shoe Uppers', 10),

(' Leather Sole Making Plant', 10),

(' Lining Leather from Goat & Sheep Skins', 10),

(' Aluminum Frames Making Plant', 11),

(' Barbed Wire Making Plant', 11),

(' Bolts and Nuts Making Plans', 11),

(' Capped Nails Making Plant', 11),

(' Corrugated Iron Sheets Making Plant', 11),

(' Cupboard and Drawer Locks Making Plant', 11),

(' Curtain Rails, Stoppers & Runners', 11),

(' Door Locks Making Plant', 11),

(' Draft (Drawing) Machine Making Plant', 11),

(' Gabion Making Plant', 11),

(' Galvanized Iron Sheet Products Making Plant', 11),

(' Hinges Making Plant', 11),

(' Metallic Doors, Windows & Frames', 11),

(' Metallic Sanitary Fittings Making Plant', 11),

(' Metal Polishes Making Plant', 11),

(' Pad Locks Making Plant', 11),

(' Reinforcement Iron Bars Making Plant', 11),

(' Sieve for Building Materials Making Plant', 11),

(' Steel Fabrication and Ironwork Factory', 11),

(' Steel Pipes Making Plant', 11),

(' Steel Profile Making Plant', 11),

(' Water Flow Meter Making Plant', 11),

(' Water Line Fittings', 11),

(' Wire and Wire Products Making Plants', 11),

(' Wire Gauge Making Plant', 11),

(' Wood Screw Making Plants', 11),

('Newsletter', 12),

(' Ball Point Pen Refills', 13),

(' Blue Print Papers Making Plant', 13),

(' Carbon Paper Making Plant', 13),

(' Clips and Paper Pins', 13),

(' Corrugated Board and Boxes Making Plant', 13),

(' Egg Trays from Waste Paper', 13),

(' Envelops and Other Paper Bags Making Plant', 13),

(' Exercise Book Making Plants', 13),

(' Gummed Paper (Other than Stamps) Producing Plant', 13),

(' Hand Made Paper', 13),

(' Kraft Bag Making Plant', 13),

(' Paper Bobbins and Tubes', 13),

(' Paper Ruling Plant', 13),

(' Pencil Sharpener Making Plant', 13),

(' Printing Ink Making Plant', 13),

(' Printing Plant', 13),

(' Production for Paper Cups and Plates', 13),

(' Production of Paper from Straw', 13),

(' Re-Pulped Waste Paper Making Plants', 13),

(' Sanitary Napkin Making Plants', 13),

(' Screen Printing Making Plants', 13),

(' Sensitizing Paper Making Plant', 13),

(' Straw Pulp and Yellow Board Making Plant', 13),

(' Toilet Paper (Rolls and Sheets) Making Plant', 13),

(' Transparent Sheet Making Plant', 13),

(' Writing Pads Making Plant', 13),

(' Plastic Sanitary Fittings Making Plant', 14),

(' Rigid Polyvinyl Chloride Corrugated Plastic sheet Making Plant', 14),

(' Recycled Plastic Products Making Plant', 14),

(' Paraffin Wax Making Plant', 14),

(' Plastic Gutters down Pipes and Conduits Making Plant', 14),

(' Black Insulating Tape Making Plant', 14),

(' Disposable Surgical Gloves Making Plant', 14),

(' Erasers (Rubber) Making Plant', 14),

(' Fiber Glass Reinforced Plastic Products Making Plant', 14),

(' Formica Sheets Making Plant', 14),

(' Hard Rubber Battery Container Making Plant', 14),

(' H.D.P.E Woven Sacks Making Plant', 14),

(' Infusion and Transfusion Kits Making Plant', 14),

(' Injection Molded Products Making Plant', 14),

(' Injection Moulded Plastic Educational Materials', 14),

(' Latex Foam Products Making Plant', 14),

(' Melamine Table Wares Making Plant', 14),

(' NRP Ballistic Helmet Making Plant', 14),

(' Paint Brushes Making Plant', 14),

(' Medical facilities making Plant', 14),

(' Plastic and Polyester Zippers Making Plant', 14),

(' Plastic Buttons Making Plant', 14),

(' Plastic Chairs and Tables Making Plant', 14),

(' Plastic Combs and “Midos” Making Plant', 14),

(' Plastic Containers Making Plant by Blow Molding', 14),

(' Plastic Filament Twine and Rope Making Plant', 14),

(' Plastic File Covers and Folders Making Plant', 14),

(' Plastic Helmets/Hats Making Plant', 14),

(' Plastic Plates, Dishes and Lunch Boxes M. Plant', 14),

(' Plastic Products by Rotary Thermoforming of Plastomers', 14),

(' Plastic Raincoats Making Plant', 14),

(' Plastic Tanks (Sintex Type) Making Plant', 14),

(' Polyester Spin Fiber and Filament Making Plant', 14),

(' Pvac (Polyvenyl-Cetate) Wall Coating Making Plant', 14),

(' PVC Cables Making Plant', 14),

(' PVC Flooring making plant', 14),

(' PVC Foot Wears Making Plant', 14),

(' PVC Pipes, Conduits and Other Fittings Making Plants', 14),

(' PVC Wall Covering Making plant', 14),

(' PVC Windows Making Plant', 14),

(' Rubberized Fabrics Making Plant', 14),

(' Rubber Shoe Soles Making Plant', 14),

(' Self-Adhesive Labels Making Plant', 14),

(' Spectacle Frames by Fabrication Plant', 14),

(' Synthetic Marble Producing Plant', 14),

(' Toothbrush Making Plant', 14),

(' Plastics', 15),

(' Building Condominiums for Rent', 16),

(' Building Houses for Rent', 16),

(' Private High Schools', 16),

(' Private Hospitals', 16),

(' 3-Wheelers Assembly Plant', 17),

(' Assembly & Fabrication of Bicycles', 17),

(' Assembly & Fabrication of Mechanical Seed Cleaners', 17),

(' Assembly & Fabrication of Walking Tiller & Tractor', 17),

(' Assembly of Centrifugal Pumps', 17),

(' Assembly of Small Diesel Engines', 17),

(' Assembly of Water Pumps', 17),

(' Boilers Manufacturing Plant', 17),

(' Citrus Juice Extractor Making Plant', 17),

(' Compressors Assembly Plant', 17),

(' Crown Cork Making Plant', 17),

(' Express Coffee Maker Machine Making Plant', 17),

(' Fabrication and Assembly of Grain Mills', 17),

(' Fabrication and Assembly of Oil Crushers', 17),

(' Fabrication & Assembly of Hand Pumps', 17),

(' Fabrication & Assembly of Small Mechanical Threshers', 17),

(' Fabrication & Assembly of Welding Machines', 17),

(' Fabrication & Assembly of Wind Mills', 17),

(' Sunlight Energy in to Electrical Energy', 17),

(' Fabrication of Household Hand Knitting Machines', 17),

(' F.H.P. (Fractional Horse Power) Motors Making Plant', 17),

(' General Purpose Engineering Workshop', 17),

(' Manufacture of Bench Grinders', 17),

(' Poultry Equipment Making Plant', 17),

(' Sewing Machines Assembly Plant', 17),

(' Small Scale Foundry Plant', 17),

(' Small Scale Steel Plant', 17),

(' Solar Cookers Producing Plant', 17),

(' Solar Water Heater Making Plant', 17),

(' Solar Water Heaters Making Plant', 17),

(' Winnowers up To 5.H.P. Making Plant', 17),

(' Absorbent Cotton Making Plants', 18),

(' Acrylic Yarn Production Plant', 18),

(' Bed cover, sheets & table linen', 18),

(' Carpet Making Plant', 18),

(' Children Garment Making Plants', 18),

(' Cotton Blankets Making Plant', 18),

(' Cotton Ginnery Plant', 18),

(' Cotton Under-Garments Making Plant', 18),

(' Cotton yarn', 18),

(' Grain Mill Belt Production Plant', 18),

(' Inner fabrics', 18),

(' Jeans Garments Making Plant', 18),

(' Knit Wear Making Plants', 18),

(' Mattress and Pillow Making Plants', 18),

(' Military Supplies Production Plant', 18),

(' Modern Garment Making Plant for Export and Re-export', 18),

(' Nylon Yarn Production Plant', 18),

(' Plant for Dyeing, Pointing and Finishing Fabrics', 18),

(' Polyester Fabrics Production Plant', 18),

(' Self- Gripping Woven Fabric Tapes', 18),

(' Sewing Thread Making Plant', 18),

(' Silk fabrics', 18),

(' Small Scale Weaving Plant', 18),

(' Socks Manufacturing Plants', 18),

(' Stove Wicks Making Plant', 18),

(' Surgical Bandages Making Plant', 18),

(' Surgical Dressing Making Plant', 18),

(' Sweater Making Plants', 18),

(' Terry Towel Making Plant', 18),

(' Textile Welding for Garments Making Plant', 18),

(' Umbrella Assembly Plant', 18),

(' Bamboo Furniture Making Plant', 19),

(' Briquettes from Coal Making Plant', 19),

(' Charcoal Making Plant', 19),

(' Chip or Particle Board Making Plant', 19),

(' Fuel Briquette from Biomass Making Plants', 19),

(' Mobile saw mill', 19),

(' Modern or High Standard Office and Household Furniture', 19),

(' Organic Fertilizer', 19),

(' Pallet Production', 19),

(' Pencil Making Plant', 19),

(' Plywood Making Plant', 19),

(' Production of Brushes from Natural Bristles/Fibers', 19),

(' Production of Chemically Treated Wood Poles', 19),

(' Seasoned Wood Producing Plants', 19),

(' Straw Board for Building', 19),

(' Tongue Depressor, Tooth Pick and Ice Cream Spoon Making Plant', 19),

Beverage

Chemicals

Commercial Agriculture

Construction

Donate

Electrical and Electronics

Floor covering and mat

Food Processing

Hand tools

Home based businesses

Hotel and Tourism

Leather

Metal Based Construction

Miscellaneous

Newsletter

Paper, Printing, Stationery

Plastics and Rubber Products

Projects for the poor

Real Estate

Small Machines

Textile

Wood Products

Addis Ababa,4000

Nazret,2000

Dire Dawa,2000

Bahir Dar,2000

Dese, 2000

Harar, 2000

Gonder, 2000

Awasa, 2000

Jīma, 2000

Giyon, 2000

Shashemene, 2000

Adigrat,1000

Mekele, 3000

Hosa’ina, 2000

Asela, 2000

Nek’emtē, 2000

Debre Mark’os, 2000

Arba Minch, 2000

Sodo, 2000

Debre Birhan, 2000

Jijiga, 2000

Aksum, 2000

Dila, 2000

Hagere Hiywet, 2000

Yirga Alem, 2000

Goba, 2000

Gimbi, 2000

Asosa, 2000

Dembi Dolo, 2000

Bati, 2000

Dolo Bay, 2000

Negele, 2000

Gore, 2000

Semera, 2000

Gambela, 2000

(' Coffee beans are sold to the consumer either as “raw” beans or roasted, ground (made to powder) and packed. Usually roasted coffee is sold to hotels, coffee shops, restaurants, pastries, etc. and “raw” coffee beans are sold to households where the roasting aspect of coffee making is as important as the coffee drinking itself. This project idea is to establish coffee roasting … enterprises in the Amhara region where roasting of coffee on commercial scale is virtually unknown. ' ,

' ',

'The main consumers of roasted coffee are restaurants, hotels, coffee and tea shops, etc. While there are hundred of coffee roasting, grinding and packing enterprises in Addis Ababa and in areas south of Addis Ababa, there are no such enterprises in the Amhara region. Like the “raw” coffee, the Amhara Region also imports roasted coffee from other regions of the country. With 2.1 million people living in the urban areas of the Region, the consumption of processed coffee (roasted and ground) is substantial. It is understandable why the Region imports the “green” coffee beans, but it does not give economic sense to import the processed coffee while it is possible to do the processing in the region. The present consumption of processed coffee in the urban centers of the Amhara Region is estimated to be about 4015 tons, and this consumption level will grow with further urbanization and increased population. ' ,

'The principal raw materials are coffee beans; and the beans will be imported from other parts of the country. Until the Region becomes self – sufficient in coffee production. ',

'Major processing stages include cleaning of the beans, grading, roasting grinding and packaging. Major machinery units will include cleaning machine, roasting, grinding and packing machines. ',

' More value added, promotes self sufficiency, saves financial resources'),

(' Industrial alcohol is an important input in the manufacture of pharmaceutical and veterinary spirits, perfumes and alcoholic beverages. One major “raw material” for producing alcohol is molasses which is a by product of sugar factories. ',

' ',

' Alcohol is in demand in pharmaceuticals, veterinary services, health care institutions such is health centers, clinics and hospitals, perfume producing factories, liquor producing beverage factories. Alcohol is also needed in households for emergency purposes, in barber shops and beauty salons. Many developing countries meet their alcohol requirements from imports. Molasses from which alcohol is produced is a by product of the country’s sugar factories. Domestic production of alcohol between 2000 and 2004 was on the average 14,400 hectoliters per year. On the other hand, average annual production of molasses during the same period was 50,300 tons; Molasses is used for alcohol production and as an ingredient in animal feed. Some portion of the product is exported. For a long time there has been a surplus in the production of molasses and the surplus product is dumped into streams or is used to maintain roads within the factory and plantation sites of the sugar factories.

All alcoholic beverages produced in the country are manufactured in and around Addis Ababa. These beverages are put in glass bottles and are distributed to all parts of the country near or far. The Amhara Region which is on the average about 500 km from Addis Ababa receives its share of alcoholic beverages from Addis Ababa. As the beverages are packed in glass bottles they are heavy, cumbersome and expensive to transport long distances. Between 2000 and 2004, the liquor consumption share of the Amhara Region was about 10,000 hecto liters per year on the average. Beverage products which use bottles for packaging are located near major consumer centers to avoid excessive transportation costs.

Currently, it is estimated that more than 20 thousand hector liter of ethyl alcohol per annum is used in Ethiopia. Here, this figure is taken as a base for the future demand projection. And, in line with the economic growth, it is also assumed that for the coming ten years the annual utilization of ethanol will increase at 10 % per annum. Based on these assumptions, the future demand for ethyl alcohol is projected as follows.

These products are produced in different consumer centers and distributed regional or local markets. The liquor market in the Amhara region can justify the establishment of a liquor factory in the region. This factory will require alcohol as one of the major inputs. To supply the liquor factory with the required amount of alcohol, a factory that will refine molasses to produce alcohol will be needed. The raw material- molasses will be transported in big containers to the factory site to be used as input for the alcohol factory. The remaining part of the molasses will be used to produce animal feed which is in short supply in the region. Molasses for the alcohol factory will be transported from the existing factories until such a time that the Amhara Region establishes its own factory. The alcohol to be produced will not only used to make liquor; it will also be used for other purposes in health care institutions, barber shops, beauty salons, etc. ',

'The main raw materials are molasses, sulphuric acid and nutritive salts (ammonia phosphate). For every 100 liters of alcohol distilled about 1.5 kgs of sulphuric acid and 0.35kg. of nutritive salts are required. The acids will be imported and the molasses will be obtained from domestic sources.',

'The process of alcohol production is based on the fermentation of molasses and extracting the alcohol there from by using column distilleries. The molasses is diluted with water and allowed to ferment. From the fermented molasses, the alcohol is finally extracted. The required equipment and facilities include equipment for receiving and diluting molasses, pre-fermentation and fermentation equipment, distillation equipment, storage tanks, steam boiler and electric generating nit, laboratory equipment, truck mounted tanker for transporting the molasses. ',

'Similar to other projects. '),

(' There are a number of fruit types from which drinks or juices can be made. The common fruits from which fruit drinks or juices are made are organizes, grapes, pineapples, mangoes, papayas and other fruits of the citrus family. The juices or drinks are consumed usually during breakfast time or in refreshment hours. Processed fruits and drinks are normally packed in cans, bottles, plastic pouches or even in cartons.',

' ',

'Currently, there are three main sources for the supply of fruit-based drinks and juices in the country. The largest supply comes from households, snack shops, pastries, coffee shops, restaurants, hotels and “juice houses”. It is almost impossible to estimate the volume of supply from scattered sources. The other domestic source is Merti Fruits Processing Plant located in the Awash Valley. This plant has produced an average of about 1300 tons of fruit drinks per year between 1986 and 1995; and during this period production by the plant had grown by 1.5 percent per year. The third source of supply is import. During the last 15 years, because of related foreign exchange control, imports of fruits drinks and juices have been growing fast. Now all the so-called super-markets and even small and large grocery stores are filled with imported fruit drinks and juices. In fact, this has negative impact on domestic production. Some newly established “milk Processing” enterprises supply what they call “fruit juices” to the market. (How a milk, processing plant can produce fruit juice is not clear.) The main determining factors for the demand of fruit juices and drinks are income and population size especially urban population. Admittedly, consumption of fruit juices and drinks in the Amhara Region is confined to a small section of the urban population. If we assume only 20 percent of the 400,000 urban families in the Region consume fruit juices and drinks regularly, the size of consumers in the Region is about 80,000. if we assume that a family of five consumes at least two liters of fruit juice or drink every day, the annual consumption of these products in the Region is 58,400 tons = (80,000X2 lit. X 365/100Kgs; 1000 lits.=1000Kgs.). One can feel this is optimistic estimate. To be on the safe side, let us say the estimated demand is one-half of the above estimate. This leaves us with a potential demand of 26000 tons per year. This can justify the establishment of medium size fruit-based drinks and juices producing plant. (project ideas have proposed the establishment of citrus fruits plantations in the Region.) ',

' Citrus fruits plantations in the Region and outside the Region.',

'It is assumed that orange juices and drinks will be the main products of the plant. The Process of producing these products require cleaning of the raw material (organs), warming the fruits peeling, juice extracting, pre-heating and cooling, centrifugalization, deaeration, seasoning, sterilization, filling, cooling, labeling and packing.The main plant and machinery required are, receiving line and bins, inspection, washing and sizing, juice, extractors, finishers, pasteurizer, filler and sealer, cooling machine, labeler, centrifuge, evaporator, vessels with pumps, boiler, conveying unit, laboratory, concentrate production machinery and equipment. ',

' Saves foreign exchange and regional financial resources, stimulates regional production of citrus fruits promotes self-sufficiency in food production'),

(' Malt is the major input to produce beer. It is what is known in Amharic as “bikil”. The raw material from which malt is made is malt barley which can be grown in many localities of the Region. Basically, malt is prepared by soaking barley in water for a period for germination, drying it and making it into flour before it is used as an ingredient to make bear or whisky. ',

'There are two large breweries in the Amhara Region (Dashen and Bati) established in the last 10 years. These breweries either obtain their malt requirement from the Asella Malt Factory or they import it from abroad. Most likely they import the malt. This requires foreign exchange which has always been in short supply in our country. The type of barley needed for malt production is being grown in Arsie and Bale. This barley can be grown in the highland areas of the Amhara Region. Hence it is possible to produce malt in the Region. ',

' Domestic production of malt between 1999/200 and 2003/2004 was on the average 13,650 tons per year. This production volume is perhaps one-half of the malt requirements of the existing breweries. Subject to detail market study, the existing deficit in the supply for malt is estimated to be between 5000 to 8000 tons. The proposed malt producing plant is to fill this supply gap and to make the Region self-sufficient in the production of malt.',

' The raw material which is malt barley could be obtained from the high-land parts of the Region provided that malt barley seeds are distributed to farmers so that they grow the barley.',

'Malt barely is fed into grading machines to obtain uniform malting parameters; germination is carried out in “germinating boxes”, adding water from time to time to keep the product moisture constant. The germinating process normally lasts five to six days; kilning process takes place; after clearing, the malt is stored in silos. Main production machinery include barley intake and pre-cleaning, barley main cleaning and grading, germinating boxes, kiln conveyors, cooling plant, silos, etc. ','Saving in foreign exchange and regional financial resources, stimulating the farming sector of the Region, introduction of new skills and technology, self-sufficiency in this particular product. '),

(' Purified water has become popular among foreigners and high-income groups during the last 5 to 7 years. Now there are more than five purified water bottling plants in the country clustering in and around Addis Ababa. The product has in some areas become a conspicuous consumption item. ',

' When factory bottled purified water appeared in the market for the first time, many people doubted about the market success of the product because they believed that with low per capita income, not very many people will buy the product. But because of robust demand not only there is one bottling plant but more than 5 in a matter of six years. However, like many other factories, bottling plants of purified water are concentrated around Addis Ababa. Bottled water is one of those products which is expensive to transport long distances. Because purified water can be processed from springs, rivers, wells, etc., the bottling plant could be established any place where there are these water sources. So far, except for one or two bottling plants in North Shewa, there are no new purified water bottling plants in the Amhara Region. Consumers in the Region get their plastic bottled purified water from Addis Ababa which makes the price of the water almost twice that of Addis Ababa. The Region should be self-sufficient in the supply of purified water that people consume; and one or two bottling plants should be established in the region.',

' The main consumers of bottled purified water in the Amhara Region are the urban high-income groups and outsides who travel through the Region, such as tourists, businesspeople and civil servants. If we assume that at least five percent of the urban population (95,000) of the Region consumes one bottle of purified water per day, this amounts to an annual consumption of 35 million bottles which is more than one half of the production capacity of the Ambo Mineral Water Bottling Plant. With increasing population and modest annual increase of income, annual consumption of purified bottle water will also increase. In short, the current demand for purified bottled water will justify the establishment of about two bottling plants.',

'Springs, wells, creeks, rivers where the plant is to be established. ',

'The main stages of purification and bottling are pumping water from source to storage tanks, passing the water through a series of purification tanks, adding some chemicals at certain stages to further purify the water and bottling the water. Main machinery include water pumps with accessories, storage tanks, purification tanks, and bottling machine. ',

'Economic utilization of a natural resource, promotion of self-sufficiency, introduction of new skills and technology, saving of regional financial resources. '),

('A soft drink is a type of man-made drink mainly composed of water (87%), sugar (12%), citric acid, color/essence, and sodium, benzonite. A bottling plant is a plant which mixes and bottles the above ingredients in a factory set-up. Non-alcoholic drinks or beverages like Coca Cola, Pepsi Cola, Fanta, etc are some examples of soft drinks. ',

'There are two old and small soft drinks bottling plants in the Amhara Region- in Dessie and in Gondar. These plants are not only old but they produce only Pepsi products which limits the choice of consumers. Besides, their production capacity is small and does not satisfy the demand for soft drinks in the Region. Considering the volume of soft drinks which the Region imports from Addis Ababa, it can be concluded that there is a need to establish one soft drink bottling plant in Bahir Dar. ',

'Annual production of soft drinks in the country is about 300 million bottles of which only 16 million bottles are the production of the Amhara Region. Annual consumption of soft drinks in the Region is about 80 million bottles which is 5 times the production capacity of the two soft drinks plants located in the Region. Regional deficit of soft drinks supply is compensated by supply from Addis Ababa. The current demand of soft drinks of the Region which is satisfied through imports can absorb the production of a new bottling plant and this will replace imports of the products from outside the Region.',

'The two major raw materials- water and sugar will be obtained from domestic sources while others such as essence will be imported. If possible, the new plant should be affiliated with the two giant multi-nationals Coca Cola or Pepsi Cola. ', 'The main processing stages are washing of bottles, premixing with concentrate, mixing of the sugar and syrup, carbonation of the mix, filling, cap fitting, inspection, and packing. Main machinery includes, automatic bottle washer, automatic filling machine, blending and carbonating unit, syrup concentrate mixing unit, water treatment plant, carbon dioxide supply equipment, cap fixing machine, etc. ',

' Self-sufficiency, saving of financial resources,'),

(' Wine is an alcoholic beverage product made from grapes which grow in Mediterranean type of climate. The product is consumed by people of different age groups, income and social classes. Though at an early stage, there is a new culture developing in large urban areas where people drink wine during meal times and in the evenings. There is growing medical evidence that drinking wine moderately is good from normal blood circulation and for regular hear beat.',

' ',

'The supply of wine to the national market is composed of domestic production and imports. Some quantities of wine are also exported. Domestic production of wine is concentrated in and around Addis Ababa. The Amhara Region imports all its wine consumption from Addis Ababa and from abroad. Endowed with different types of soil and climate, the region has the potential of growing grapes from which wine is made of. The region has the potential not only to be self-sufficient in wine production for regional consumption but also for export. ',

'For the first few years, grapes will be imported and then much of the grapes will be produced in local farms. ',

' Like many other beverage products with alcohol content the main process of producing wine includes preparing the raw material by making it undergo different processes, fermentation addition of sugar and other additives, purifying or clearing the final product and bottling. There are a series of machines and tanks needed for producing wine.',

'Saves regional financial resources, promotes self-sufficiency ');

(' ', ' ', ' ', ' ', ' '),

Projectline(machineryCost,workingCapital,projects\_id,products\_id,Landcost\_id)

(1000000,300000,1,1,1),

(1300000,800000,2,2,1),

(22000000,2000000,3,3,1),

(4200000,750000,4,4,1),

(3000000,500000,5,5,1),

(900000,300000,6,6,1),

(7500000,800000,7,7,1);

('Acid Slurry Making Plant',

' Acid slurry also known as Dodecyl Benzene Sulphoric Acid is extensively used for the manufacture of detergent powder and washing soap. It is prepared by sulphonation of dodecylx benzene with sulphuric acid.',

' All the washing soap and detergent powder consumed in the Amhara Region are imported from Addis Ababa and from abroad. With 19 million people living in the Region, the consumption of the above products is relatively large; and this will increase with population growth and improvement of income. Acid slurry being the basic input for producing detergent powder and washing soap should be produced in the Region to start production of the two items.',

'The supply of soaps and detergents in the country is composed of domestic production and imports. Domestic production of soaps and detergents between 2000 and 2004 was about 15,600 tons per year. All the domestic production of soaps is concentrated in and around Addis Ababa. The rest of the country is dependent on Addis Ababa. In terms of consumption, the share of the Amhara Region from domestic production was about 3120 tons. During the last 10 years, following the trade liberalization policy of the country, imports of soaps and detergents have been increasing every year. Though specific figures are not available for the time being, a look at the market for soaps and detergents indicates that imported soaps and detergents are much larger in quantity than locally produced soaps and detergents. With 26 percent of the county’s population, the Amhara Region can absorb the production of soaps and detergents by a medium size plant. The acid slurry project will supply the basic inputs for soap factories in the Region and also for other similar factories in other parts of the country. ',

' The main inputs for the plant will be dodecyl benzene and sulphuric acid. The sulphuric acid will be obtained from domestic sources while the dodecyel benzene will be imported.', ' There are two processes for the manufacture of acid slurry-continuous and batch. For small scale plants, the batch process is more appropriate and it is more economical. As mentioned earlier, the two inputs required are dodecyl benzene and sulphuric acid. Dodecyl benzene is made from benzene and a propylene polymer. For sulphonation of 100 parts of dodecyl benzene, 80 parts of sulphuric acid are required. 100 parts of dodcyl benzene is charged into a stainless steel reactor equipped with an agitator which is used to mix dodecyle benzene and sulphuric acid. Dodecyle benzene is heated to about 450C and sulphuric acid is added slowly in such a way that the temperature of reactor should not exceed 500-550C. As soon as sulphuric acid (H2SO4) is started to be added, cold water should pass through a jacket. Mixing takes about 2-3 hours. After completion of reaction, mass is taken to the settling tank made of lead lined with mild steel. 26.5 parts of ground ice is poured into this settling tank, then spent acid and dodeyle benzene sulphonic acid or acid slurry are separated.

Main machinery needed include dodecy benzene dozing tank, made of mild steel, sulphuric acid and oleum dozing mild steel tank, reactor (s.s) separator (M.S) lead lined, air compressor, storage tank for D.D.B (M.S.) storage tanks for acids (M.S.), spent acid storage tanks (M.S) lead lined transfer pumps, pipes, valves and fittings',

' ',

'2 ', '1 '),

('Activated Carbon Making Plant ',

'Activated carbon is used for adoption of gases and vapors, and for purification and decolonization of several products of chemical, pharmaceutical and food industries. The product is manufactured in granular and powdered forms. The powdered form is used for purification and decolorization purposes. This project idea considers the production of powdered activated carbon which can be used in the sugar, vegetable oil, alcoholic, beverages, etc. factories in our country. ',

' ',

'The major end users of activated carbon are the chemical, pharmaceutical and food industries. The demand for powdered activated carbon is closely related to the need for purification and dicolorization of several industrial products. So far all the requirements of activated carbon in the country are met through imports. Between 1984 and 1993, average annual import of activated carbon who about 82 tons. However, annual imports of the product vary considerably. In 1985 import was 336 tons and in 1987 it was only 3 tons. Based on the average annual import, and expected growth rate of the manufacturing sector. (12.5), the demand for activated carbon was projected to be about 540 tons by the year 1013. ',

' the raw material for the production of activated carbon is charcoal. Sawdust, lignite and other carbonaceous materials can also be used as raw materials. Lignite is available in North Gonder, North Wollo and North Shewa of the Amhara Region.',

'The raw material charcoal or lignite should be crushed to the desired size and exposed to high temperature, 800-9000c. It will be allowed to cool and screened to separate extraneous materials associated with the raw material, and then the grading process, according to wize will be carried out. After the combustion process is completed, the product will be grounded to powdered carbon, and then washed to produce washed activated carbon and dried. Finally the finished Product will be packed in plastic bags. About 19 units of machinery and equipment are needed for the production of powdered activated carbon. The main ones are silos for charcoal or lignite charge, conveyors/elevators, crusher, feed hoppers with feeding system, rotary kiln for activation, cooler for activated product, screening machine, grinding machine, acid pumps, slurry pumps, centrifuge, blenders/misers, etc. ',

' Similar to the other projects.',

'2 ',

'1 '),

('Animal Glue Making Plant ', 'Glue can be obtained either from plant or animal sources. Glues obtained from boiling animal hides or bones are called animal glues. Animal glue is insoluble in cold water but absorbs 6 to 8 times its weight of water at temperatures below its congealing point. Glues are mainly used as adhesive materials whereas gelatin is valued mainly according to its stiffing jelly and emulsifying properties. It is also used as one ingredient for colloidals, in sizing and coating. ', 'One of the main inputs for producing glue is animal bone. This input can be obtained from abbiatores, meat processing factories and from other traditional sources where livestock are killed for consumption. The natural death of cattle is also a source of animal bone. With all these sources, however, no attempt has been made to produce glue on a commercial scale. One exception is the unit within the Addis Ababa Abbiatores which produces a modest quantity of glue for domestic consumption. The supply of animal bones outside Addis Ababa is not used for any economic purpose; it is simply thrown away. Since animal glue is used by many types of industries such as shoe making, wood working, packaging, etc, the product has market as well as raw material. ' , 'The number of industries which use animal glue is increasing. The leather shoes industry alone consumes a large quantity of animal glue every year. So is the wood working industry. Practically all the animal glue requirement of the country is met by imports. Even in the absence of quantified figure as to the amount of animal glue consumed in the country annually, one could safely assume that there is a market for the product which can sustain the viability of a small animal glue making plant. This plant can be established in the Amhara Region which contains more than 28 percent of the livestock resources of the country. ', ' Cattle bone can be collected from the slaughter houses of the Region as well as from other traditional sources.', 'The main processing stages are preparation of stock, extraction or boiling, treatment and jellying and drying the solution. Crushed bones are first treated with lime to dissolve and remove unwanted materials. Lime reduces the bulk of the fat inactive by saponification. After the liming process, the alkali and other chemicals are completely removed by washing with pure water. Sometimes weak acid is added to neutralize the lime and reduce the washing period. For boiling the mass of the glue, if steam is not available, double jacketed pans which utilize cheap minerals oil or caster oil can serve the purpose. Glue solution is now steam evaporated by using multiple effect evaporators under vacuum and low temperature. Machinery needed include mini boiler, storage and mixing tanks, boiling tanks, evaporator, driers, paddles for liming, vacuum pump and motors, disintegrator, weighing machine, tools and testing instruments. ', ' ', '2 ', '1 '),

('Basic Pharmaceutical Products Making Plant ', ' Basic pharmaceutical products are medicines considered essential for meeting the basic health needs of a community in the context of the health care standard of our country. The list of these essential medicines or popularly known as essential drugs are usually prepared by the Ministry of Health. In the importation of pharmaceutical products, priority is given to these essential drugs. Drugs can be classified on the basis of medicinal uses or on the basis of their sources of origin. Based on their medicinal use, drugs are classified into twenty-eight groups. On the other hand, drugs are classified into five groups based on their sources of origin. These are (a) drugs of vegetable and plant origin (b) hormones and glandular products (c) antibiotics (d) synthetic drugs and (e) vitamins and biologicals. The essential drugs are composed of the various groups of drugs just mentioned.', ' For a long time the country has had one pharmaceutical factory which is located in Addis Ababa. This factory was supplying part of the drug requirement of the country. Like other regions, the Amhara Region was getting its domestic drugs from the

Addis Ababa factory. During the last ten years, a number of pharmaceutical factories have been established the Country. Some Region’s have in fact been self-sufficient in the production of some essential drugs. However, the Amhara Region is still dependent on other regions for the supply of basic pharmaceutical products. Since the Amhara Region contains about 26 percent of the countrys population, one could have expected that at least 25 percent of the drugs are produced in the Region. But this is not the case. Drugs are one of those basic and essential products on which the health and welfare of a people depend on. Any region should strive to be self-sufficient in the production of basic drugs. The Amhara Region should promote the establishment of a pharmaceutical factory to make itself self-sufficient in the production of essential drugs. ', ' Among the various medicines required for health care services, only six types were being produced in the country and the production volumes were not sufficient to meet domestic need. These are capsules, tablets, antibiotics, syrup, ointment, and injection. This must be augmented by imports every year. Of the total production of each type of drug, about 25 percent was assumed to be consumed by the people in the Amhara Region. This consumption share is sufficient to absorb the production of a medium scale pharmaceutical factory in the Region. ', 'The chemical industry is the basis for the development of a pharmaceutical industry. In the absence of a well- developed chemical industry, the alternative to operate a pharmaceutical factory is to import the various inputs from abroad. ', 'The manufacturing processes of drugs differ on the basis of their sources of origin or medium use. Different approaches of formulations and manufacturing are used for different groups of drugs. Presenting the various processes involved in the preparation of various drugs is beyond the scope of this project idea. Specific processes for specific drugs will be presented when project profiles are prepared. ', 'Promotes self-sufficiency in the area of health-care, saves regional financial resources, introduces new skills and technology to the Region, and creates export potential to other parts of the country. ', '2 ', '1 '),

('Bleaching Powder Production Plant ', ' Bleaching powder or “chlorinated lime” is a pale white powder of pungent odor slightly different from that of chlorine. The powder is unstable and rapidly deteriorates in hot tropical climates. It is mainly used for bleaching cotton yarn, textiles and paper pulp. It is also used as a disinfectant, especially for sterilizing wounds, surgical dressings, etc. and in water purification and sanitation. Some times it is also used as a source of chlorine in the preparation of chloroform.', 'The two big textile mills located in the Amhara Region produce about 4000 tons of yarn and their combined annual fabrics production capacity is more than 30 million m2. Part of the yarn and fabrics production needs bleaching powder for whitening purposes. The urban water supply systems, the health care facilities and the various sanitation works of the Region all need bleaching powder. Since the main raw material for bleaching powder (which is lime) is found in the Region, it makes economic sense to promote a project which will produce bleaching powder for the Region and also for other parts of the country. ', 'The requirement of the Region for this product and the potential of exporting the product to other parts of the country will justify the establishment of a small plant which will produce bleaching powder. If the plant is established in the western part of the Region, it will be possible to export the product to the neighboring country. ', ' Lime will be obtained from local sources while chlorine will be imported.', 'There are two main processes for producing bleaching powder-these are Krebbs Beckman Towers Process and Hasen Clever Process. In the Hasen Clever Process, there are cast iron cylinders operating in series with hydrated lime and chlorine being fed counter current to each other. The cylinders are provided with rotating blades and are arranged horizontally one above the other. The blades act both as mixers and conveyors of the inside mass. Hydrated lime is charged at one end of the top most cylinders while chlorine is introduced at the other end of the bottom must cylinder. With the rotation of the blades there is a through mixing of the chlorine and lime. The chlorinated lime is discharged from the bottom cylinder and the unreacted chlorine is recovered from the top cylinder and recycled along with fresh chlorine. Machinery needed for the plant include cast iron cylinders, feed hopper, chlorine cylinders, lime storage tanks, piping instrumentation accessories, laboratory equipment. ', 'Close to the area where lime is to be found. ', '2 ', '1 '),

('Cleaning Powder (Vim Type) Making Plant ',

' Powder cleaners and detergents are important sanitary chemicals. Powdered cleaners have their major application in every household service stations, institutions and industrial establishments. In household application cleaning powders are used for cleaning cooking utensils, glass wares, and ceramic wares. Etc.',

'The Amhara Region with a population of 19.2 million is the second most populous region in the country. It has more than 25 percent of the country’s population. Considering its population size, one could have expected that the Region has also a considerable share of the industrial production of the country. But at present, the Amhara Region has only 5 percent of the country’s industrial production. This indicates that the Region has a long way to go in industrial development before its share of industrial production matches its population share. Until then the Amhara Region will be a net importer of industrial products from other Regions of the country. To be at least self, sufficient in some basic industrial products, the Amhara Region has to promote the development of industries by providing various incentives for potential investors. The production of cleaning powder is related with the improvement of household hygiene and as a result the health of the population of the Region. In view of this, promoting the establishment of a plant that will produce cleaning powder can be considered as one of the priorities of the agency responsible for industrial development. ',

'Cleaning powder is used by households, hospitals, hotels restaurants, schools, offices and other institutions. For the time being it is only households in the main urban centers which use cleaning powder. In mid-2006, there were about 384,000 urban households in the Amhara Region. If we assume that at least 20 percent of the urban households cleaning clean in powder, this means that 76,800 households use the product. Suppose the average annual consumption of cleaning powder per household is about 5 kgs. Per year, total annual consumption will be 384000 kgs or 384 tons, Consumption of cleaning powder by other entities such as hospitals, hotels, restaurants, etc could be about 50 percent of household consumption. This translates into 192,000 kgs, or 192 tons of cleaning powder per year. Hence, estimated total demand for cleaning powder will be around 576 tons per year. This will absorb the production of a medium size cleaning powder plant. ',

'Ingredients that make up cleaning powder include basic alkalis (soda ash, caustic soda and sodium bicarbonate), phosphates, silicates, surface active agents and other chemicals, Some of these ingredients such as soda ash, caustic soda, etc. can be obtained from domestic sources. Others will be imported. ',

'Ingredients are ground and taken according to desired formulations, these ingredients are mixed in a ribbon blender. In this mixer, the helical ribbon moves the ingredients incorporated according to the specified formulation. Thoroughly mixed powder is passed through a 200 mesh screen. The screened powder is then packed as per the requirement of customers.

Plant and machinery needed include grinder with all accessories, ribbon blender with all accessories, screening equipment, polythene bag sealing machine, miscellaneous laboratory equipment and weighing machines. ',

' saves foreign exchange and regional financial resources, contributes to self sufficiency, has potential to bring financial resources to the Region, introduces new skills and technology, contributes to the improvement of health and hygiene in the Region.',

'2 ',

'1 '),

('Coated Abrasives Making Plant ',

'Coated abrasives are products manufactured by coating paper, cloth or vulcanized fiber sheet with such powder abrasives as aluminum oxide, silicon carbide and garnet for use in various types of grinding work. Coated abrasives are generally used in processing a wide range of products such as metal products including the stainless steel pipe, steel material and cast iron, wood, etc. ', ' ',

' Coated abrasives are essential products for the metal or works hop and wood working industries. For all the wood working and metal industries in the country, the required quantity of coated abrasives is met by imports. As there is no a single plant which produces coated abrasives, there is sufficient market for making a medium size plant viable. The number of the wood working and metal industries in the country clearly indicates the need of establishing a coated abrasives making plant.',

' Main inputs include abrasive cloth, abrasive paper, abrasive disk, aluminum oxide, silicon carbide and garnet. The first two could be obtained from domestic sources; the others will be imported.',

' For making abrasive cloth, the following operations are undertaken. Cloth processing-after treating with chemicals, the surface to be fixed with abrasives is smoothed-out with steam-heated roller. The reverse side of the cloth is also treated with reinforcing materials to supplement its strength. Following the treatment of the cloth the subsequent processes are first adhesive coating, grain coating, drying and second adhesive coating, flexing, cutting to desired sizes and packing. The preparation of water proof paper sheets and dry paper sheets follow these stages:- printing, water processing treatment, first adhesive coating, grain coating and drying, second adhesive coating and drying, cutting and inspection. Abrasive disc making takes the following steps:- fiber cutting, first adhesive coating, grain coating, second adhesive coating and drying, flexing, inspection and packing. Main machinery and equipment needed for making abrasive cloth include mangle, back surface treating machine, adhesive coaters (rollers), grain coater, drying furnace, printing machine, winding machine, curing furnace, flexing machine, winding machine, curing furnace, flexing machine, cutting machine, slitter, skiving machine and press. Machinery required for abrasive dry and water-proof paper sheets include printer, grain coating machine, drying furnace 1,2 and 3, roller coater 1 and 2, winders and cutting machine, Machines for abrasive disc include fiber press, printer, roller coating machine, curtain coating machine, grain coating, drying furnace and flexing machine.',

'Similar to the other project ideas. ', '2 ', '1 '),

('Cosmetics Products Making Plant ', 'The word cosmetics refers to articles intended to be rubbed, poured, sprinkled or sprayed or introduced into or otherwise applied to the human body or any part of it for cleansing, beautifying, promoting attractiveness or altering the appearance. Generally, cosmetics can be divided into four groups: skin, nail, hair and teeth cosmetics. Skin cosmetics include face powder, talcum powder, vanishing cream, color cream, lipstick, cold cream, Vaseline. Nail cosmetics include nail polishes. Hair cosmetics covers hair dye, hair shampoo, coconut oil shampoo, shaving cream, hair fixer, after shave. Cosmetics for teeth include tooth powder and tooth paste. Different cosmetics require different ingredients and different preparation formulas. ', ' ',' The Amhara Region is home to 19.2 million people. In countries where the standard of living is high, 19.2 million people could have supported a multi-million dodder cosmetics industry. However, since the standard of living of the people in the Amhara Region is very low the market for cosmetics is limited to few brands like Vaseline, vanishing cream, cold cream, hair oils. These cosmetics products are widely used in the urban areas and to some extent in rural areas. Other cosmetics products such as tooth paste, nail polish, after shave, shaving cream, etc. are used by people of higher income in the urban areas of the Region. Women are the main consumers of many types of cosmetics products. Potential customers of cosmetics products in the Amhara Region are female between the age of 5 and above. The number of female in this age group in the Region is about 8 million of whom 11.5 percent or 921,000 live in urban areas. If we assume that at least 70 percent of the urban potential customers and 40 percent of the rural customers, total customers will be about 3.5 million. If on the average one consumer consumes about 400gm of cosmetics per year, annual aggregate consumption of cosmetics in the Region could be 1,400 tons. Up to now, all these cosmetics have been imported partly from Addis Ababa and partly from abroad. The purpose of this project is to substitute imports by regional production, and the regional demand is sufficient to absorb the production of a number of small scale cosmetics producing plants.

', 'Different cosmetics use different types of inputs with varying proportions. Basically there are about 6 types of inputs which constitute the components of many types of cosmetics. These are waxes, fatty acids, vitamin zed oil, lecithin bentonite and petroleum jelly or vase lines. Depending on the type of cosmetics to be made, other inputs are also added to the basic ingredients. Some of the main inputs such as wax, fatty acids can be obtained from domestic sources; others have to be imported. ', 'The formulation and production processes of different groups of cosmetics are different. Hence, since there is no one common process for all cosmetics, no process description is given in this section. Machinery and equipment for cosmetics also differ based on the type of cosmetics to be produced. The following are the basic types of machines used for different categories of cosmetics. Heating equipment: electric heaters; boilers, steam stills, water baths and distilled water heat stills. Equipment for creams:- meters for waxes, greases and fats, mixers for waxes, greases, fats for milling and mixing operations. Equipment for liquids:- mixers, filters and filter presses, liquid filling machines of vacuum type, bottle capping machine. There are also different types of machines for powder cosmetics. ', ' Saves foreign exchange and regional financial resources, contributes to better health conditions of individuals, and introduces new skills and technology to the Region.', '2 ', '1 '),

('Disinfectant Making Plant ',

'In addition to sterilization and steady cleaning, disinfection is the most important necessity in the field of medical treatment for avoiding infections and interrupting bacterial transfer of infectious and contagions diseases. A range of disinfectants are developed to cope with medical, clinical or surgical requirements. Many of them are on alcoholic basis with additional inhibitors for a specific use. For example, skin disinfectants must be microbicide, quick drying, un greasing and in general suitable to patients and health personnel regarding small, fluid, etc. A typical skin disinfectant is composed of ethanol (80%) demineralized water (20%) and total chemicals (0.1%). Hand washing lotions usually consist of about 65% demineralized water, 15% chemicals and 20% solid additions. ',

' ' ,

'All type of disinfectants used in health institutions, in hotels and restaurants, in homes and in other places are imported. The volume of annual imports of the different types of disinfectants is estimated to be in the range of 40,000 to 60,000 tons. Most of these disinfectants are used in the country’s health institutions. The demand for disinfectants is closely tied with the expansion of health care facilities, modern hotels and restaurants and in general with improvement in the health standards of the population. Factors which increase the demands for disinfectants have been growing during the last 10 to 15 years; and this creates a need for producing some of the most widely used disinfectants here at home. ', 'The main ingredients for producing disinfectants are ethanol, total chemicals, solid soap additives, demineralized water and granulate PE for bottles. Except water, the other ingredients will be imported. ', ' The production process of disinfectants has three main stages. These are water treatment, preparation of the disinfectant solutions and filling, closing and packaging, (If the plastic bottles are to be produced within the disinfectant making factory, this constitutes another production process.) The manufacture of disinfectants depends to a great extent on the appropriately prepared water component. Therefore a full demineralization treatment has to be carried out. Such treatment includes prefiltration, active carbon filtration, sterile filtration and demineralization via ion exchanger (anion/cation columns). Proper storage before entering the solution preparation is provided by a suitable storage tank. Preparation of the disinfectant solutions involves melting and mixing of the ingredients and feeding them in to the main preparation tank for final mixing. Other components like alcohol, easy-soluble chemicals and demineralized water are filled directly into the main preparation tank for mixing. Finally the product is fed to a filling machine under a specific level of pressure. An exhaust system should be installed above the filling machine to withdraw the fumes by suction. After closing and labeling the bottles will be packed and cardboard boxes for delivery.', ' Similar to other projects.', '2 ', '1 '),

('Formulated Perfumery Compound Making Plant',

'Perfumes are essential oils which are produced in various internal and external glands of certain flowers, leaves, barks, woods and roots. Chemically these oils are mixtures usually of very complex terpenes, sesquiterpenes and other aromatic compounds. Many contain 20 to 30 constituents covering the entire range of organic materials. ',

' ',

'Most plants from which different types of perfumes can be extracted are found in our country. However, almost all perfume compounds that are consumed in the country are imported. One small perfume making plant tries to produce some types of perfumes from some plants. But it production quantity is small compared to the need of the market. With over 37.5 million women population in the country of whom 6 million living in urban areas, the volume of perfume consumption could justify the establishment of a perfume formulating and producing plant. The plant could be organized in such a way that it grows the plants from which the perfumes will be extracted, formulated and produced. ',

' Different plants are the sources of the different perfumes. Based on the type of perfumes to be produced, the plants will be identified in parts of the Region.',

' All perfumes are manufactured from natural essential oils in which other additives are also incorporated. The essential oils may be obtained from any natural flavoring plant such as flowers, leaves, stems, barks, grass seeds, wood, roots, liquor us and musk. There are basically three types of processes. They are distillation process, expression process and extraction process. Required machinery include distillation tower, essential oil extractor, condensers for cooling the vapors, receiving tank, baby boiler, other accessories.',

' similar to other projects ',

'2 ', '1 '),

('Hair Cream Production Plant ',

' Cosmetic products encompass a wide range of products from perfumes and lipsticks to Para-pharmaceuticals like hair creams and oils and face creams, tooth pastes and shampoo oils. As their variety, cosmetics do have different applications. Perfumes and lipsticks are used for aesthetic reason i.e. to impart fragrance and to beautify parts of the body. On the other hand, the Para-pharmaceuticals are applied to preserve the healthy conditions of parts of the body where they are applied. About 50 percent of Ethiopia's 75 million people are female. If we assume that at least 10 percent of them use hair cream, there are about 3.75 million consumers of hair cream. Again if we assume that one consumer uses 0.3 kg per year, annual consumption of hair cream is 1,125 tons. This estimated consumption will grow very year as the number of consumers increase through further urbanization and population growth. The projected demand for hair cream in 2008 will be about 1200 tons per year. Limited quantities (with questionable quality) of hair cream are being produced locally. But the bulk of hair cream consumed in the country is imported. This can be replaced by additional domestic production.',

' ',

' The main raw materials required is petrolatum white (Vaseline) for hair cream. In addition, aromatic essence is added to give attractive fragrance. The main raw a material will be imported.', 'Production of hair cream requires simple manufacturing processes. The processes include bathing of ingredients, thorough mixing, emulsifying, filling and packing. At the initial stage, raw materials both ingredients and fillers as well as solvents will be weighed and prepared according to desired proportions. ',

' The prepared batch is thoroughly mixed in a mixing vessel to get a homogenized mix. The mix is then introduced into the filling machine where it would be discharged into suitable containers within limited dosages. The main pieces of equipment needed are weighing balance, mixing vessel, filling machine and inspection and labeling tables. ',

' Similar to other projects.',

'2 ', '1 '),

('Hair Oil Making Plant ', ' hair oil is an essential item for every day use. It is used almost daily especially by women to give the hair luster, good appearance and moisture. Like all other cosmetics products, the use of hair oil increases as more and more women starts using the product. Growing urbanization boosts the consumption of hair oil. ', ' ', 'The main consumers of hair oil are women who live in urban areas. About 1.1 million women live in the urban centers of the Amhara Region of whom about 968,000 are above the age of four. At the minimum one urban woman consumes about 0.3 kg of hair oil per year. Consumption of hair oil by urban women (above age 4) in the Amhara Region is about 290000 kgs per year. Currently the hair oil need of the Region is met by imports both from Addis Ababa and abroad. But the consumption volume of hair oil by the urban women of the Region alone can justify the establishment of small scale hair oil formulation plants in the Region. ', 'The main raw materials for hair oil are coconut oil, castor oil, perfume and color. For the first phase these raw materials will be imported, but at later stage, castor oil will be produced locally. ', ' Hair oil is prepared by mixing perfumes and oils like coconut and castor oil. First coconut oil and castor oil are blended or thoroughly mixed in a mixing tank. Then perfumes and colors are added in an appropriate ratio. The most commonly used perfumes are flower essence like lavender, rose and jasmine. The ratio of addition of perfume and oil is 2:30. After adding perfumes and colors, the product is thoroughly mixed and continuous stirring is done. Then it is filtered and packed in bottles. The bottles are sealed by cap sealing machine. Main plant and machinery required include mixing tank with stirrer, filling machine, sealing machine, bottle washing machine, bottle dryer, filter press, testing equipment.', ' Similar to other project ideas.', '2 ', '1 '),

(' Industrial Adhesives Making Plant', 'Starch is a polymeric carbohydrate. It is found abundantly in the natural world where the main sources are plants. Among the plants which produce starch, only a limited number of species can be used for industrial manufacture of starch. Corn, wheat, rice, potato and casava are the main sources of starch. Starch is used in the textile industry as a sizing agent. It is also used in the paper, beer, sugar, etc—; manufacturing industries. ', 'The Amhara Region is one of the regions in the country where starch producing cereals are produced in large quantities. In fact more than 35 percent of the country’s cereals production comes from the Amhara Region. On the other hand, even at this stage of development there are starch consuming industries like textile and beverages. These and other starch consuming industries will also expand in the future increasing the demand for industrial starch. Currently, there are no industrial starch producing factories in the country even though there are factories which need starch as inputs for their operations. It is ironic that there is demand for starch and also there are enough raw materials in the country but the product is not produced in the country but it is imported. The production of starch can also support the development of parts of the pharmaceutical industry such as the production of glucose, bandages and gauze. Given these factors, production of starch for industrial adhesives and for other purposes should be promoted by the concerned authorities of the Region. This project idea is the start of this promotion. ', 'The starch requirement of the textile, sugar, beverages and other industries as well the demand for industrial adhesives will definitely absorb the production of a medium scale starch producing plant. Industrial adhesives from starch are also used in the packaging and wood works industries. ', 'Domestic i.e. local production of cereals, potatoes, etc. ', ' If we take maize as a source of starch, we can illustrate the technological process of producing industrial adhesives from maize starch. The maize kernel is composed of five parts. The hull of the thin outer skin is fiber. Next to the hull is a shallow layer of glutten- a substance rich in protein. Inside the layer of glutten, a mixture of starch and glutten bulges towards the center filling the glutten. The germ is level with the float front of the kernel. The germ contains protein, most of the oil and a large share of the minerals. The process of extracting starch and other components starts with separating the constituents of the seed. The germs is washed in hexagonal copper or monel metal cloth covered with reels in which it is freed of adhering starch. Finally starch is derived on trays on kiln dryers, or in continuous mechanical dryer. Main plant and machinery can be divided into three main sections – weighing section, belt bucket conveyer and steeping section. Machines in weighing section include truck weighing scale, intermediate scale, washing vates. Machine in the belt bucket conveyor section include screen vibrating, sieving and blasting machine, magnetic separators. Machines in the steeping section include automatic weighing scales, hydraulic conveyor, steeping tanks, vibrating screen, crushers, germ separator, washing tables, dewating machine, dryer and sulphur burner. ', 'Promotes the development of other industries, utilizes local raw material-cereals which in turn will stimulate the their production, introduces new skills and technology to the Region. ', '2 ', '1 '),

('Insecticide Aerosol Making Plant', ' Insecticide kills mosquitoes, flies and other harmful or undesirable insects.It contributes to maintenance of a sanitary living environment. Insecticide is sprayed from an aerosol can. The aerosol insecticides are convenient for domestic or any indoor use (in the house, hotel, offices.... etc).', 'Mosquitoes and other flies are attacking large section of the Region and are hazardous to the health of many section of the population. At present there is no pesticide factory in the region that produces chemical to fight the hazardous health problem. The establishment of an aerosol insecticide making plant in the region will contribute a lot to reduce the crises. The people can purchase the aerosol insecticide in the nearby market and spray it in their homes, which will kill all undesirable insects including mosquitoes. Hotel and office can also use the insecticide. ', 'Current demand of aerosol insecticide is met from imports and some amount from domestic production in other regions. There is large demand by the population to reduce the effects of hazardous health problem derived from insects inside the houses. The demand for aerosol insecticides grows with growing urbanization and rising income of the population. The establishment of an aerosol insecticide making demand will have sufficient market in the region and can also trade it product outside the region. ', 'The main raw material of the factory insecticide, synergist, perfume, propellant can valves and caps are imported. Refined kerosene and packing material are available locally. ', 'a) Production Process product making involves inspection, cleaning of empty cans and placing them on filling line mixing of prescribed volume of insecticide and other ingredient, filling of mixed solution on to cans; mounting of the spray mechanism valves, filling of propellant into valved cans, hot water bathing of cans, cleaning and weighing of cans, mounting of cap, serial numbering, inspecting and packing. Production Equipment

Mixing tanks with agitator (for insecticide solution), Pumping units for gas filling machines, Automatic aerosol filler, Filtration system, Hot water bath, Compressor unit, Storage tank (for solution), Control equipment, Inspection equipment, Ventilation system, Other (spray test and packing conveyors, gas containers work tables, racks... etc)

Except work table and racks all the machinery and equipment are assumed imported. ', ' ', '2 ', '1 '),

('Laundry Soap Making Plant ',

'Laundry soap is a cleaning product for use in household laundry for washing and cleaning cloths and other material. It is produced by the action of caustic soda and fats, or by saponification. ',

'The health of the population of the region depends in consistent up keeping of cleanness. The laundering and cleaning of cloth and other textile material should be maintained to fight disease coming from dirt and insects. Laundry soap is used mainly for cleaning cloths. But the consumption of soap both in urban and rural area is very low in the region and the country at large. The level of consumption is rated among the lowest in the world. So there is high need of manufacturing of laundry soap in the region. There is no sufficient laundry soap making plant that can satisfy the demand of the population. ',

' The demand of laundry soap is satisfied from domestic supply from other regions and import. There is high existing and potential demand for soap and is increasing at rapid rate with the rise in population and improvement of income level. A laundry soap making plant that will be established in the region will partially satisfy the huge demand of soap. ',

' The input requirements of laundry soap are both from domestic and import sources. Oil and soap are available in the region. Tallow, which can be found in the region may not be sufficient and has to be imported. Salt and caustic soda are available from local source. The main inputs are: tallow, oil, caustic soda, salt, sodium silicate etc.',

'a) Production Process

Soap is produced by the action of caustic soda on fats, or by saponification. The production prepared here is the batch (open kettle) process which involves the following. Heating separately, the main ingredients caustic soda and fat, continuously storing the mix until the reaction (or soaponification) is complete. Pouring of the hot mixture into blocks (metal or wooden) frames where it cools, cutting of the soap blocks into bars of required size, drying of the soap bars and wrapping.

b) Production Equipment

Fat melting vessel (or barrels), Soda mixing containers, Boiler kittle with electric power driven strier, Frames or pans and moulds, Soap cutting plate, table and bars, Measuring equipment ',

' ', '2 ', '1 '),

('Liquid Detergent Production Plant ',

' Liquid detergent is a chemical compound produced from synthetic substances and used for washing and conveyor lubrication. The concentration of the solution could vary according to consumers demand or preference. For washing, the volume of concentration may be up to 60 percent and it could be as low as 30 percent for conveyor lubrication. Liquid detergents are delivered in plastic bottles and plastic jerry cans. Standard sizes are one liters and two liters for bottles and 25 and 35 liters for jerry cans.',

' ',

' The main users of liquid detergents are households, hospitals, hotels and restaurants, boarding schools, offices and factories. There is no local production of liquid detergents in the country. Some types of powder detergents are being produced by one or two plants located in and around Addis Ababa. It is believed that consumers prefer liquid detergents to powder detergents because of more convenience to use and effectiveness to remove dirt.

Demand for liquid detergents has been met largely by imports. Between 1984 and 1994, average annual import of the product was about 384 tons and projected demand for liquid detergents was about 593 tons in 2000, and this is estimated to reach 729 tons by 2007. The Amhara Region imports all its cleaning materials requirements (toilet soap, laundry soap, powder and liquid detergents) either from other parts of the country or from foreign sources. The demand share for liquid detergents of the Amhara region might not justify the establishment of a liquid detergent making factory in the region. However, a plant located in the region could supply its products to other parts of the country after meeting the demand of Amhara Region. With this understanding a viable liquid detergent making plant could be established in the region.',

'Caustic soda from the caustic soda tank, and alkyl benzene sulfuric acid from the ABSA tank are mixed in a mixing vessel in a ratio of 1 to 6 respectively. Then the mixture is diluted with water to a standard concentration either in the mixing vessel or in a booster vessel. The solution in then pumped and filled to plastic containers for distribution. The main plant and machinery required include caustic soda tank, ABSA tank, mixing vessel, booster vessel and packaging machine. ',

'The main raw materials for making liquid detergent are alkyl benzene, sulfuric acid and caustic soda. Alkyl benzene will be imported while the others will be obtained from local sources. ',

'Similar to other projects. ',

'2 ', '1 '),

('Mosquito Coils Making Plant ', ' Mosquito coils are insecticides and effective mosquito repellent made from powdered dried pyrethrum flower. In the early stage of use, mosquito coils took the shape of an incense stick used in households, but they were gradually improved to the present spiral form so that they could keep burning for as long as possible. The spiral coil has a burning time of more than seven hours. The raw material of the mosquito coils is pyrethrum (vermifuge chrysanthemum) in which the effective component for killing mosquitoes is pyrethrum. Pyrethrum is efficaous against insects such as mosquitoes, flies, etc. But it is also completely harmless to warm-blooded animals including human beings.', ' ', ' malaria is one of the major killer diseases in the Amhara Region. More than 40 percent of the area of the region is prone to be a breeding ground of mosquitoes that cause malaria. After many years of being under control, malaria has been affecting large parts of the region during the last 10-15 years. For example, the Bahir Dar area was relatively free from malaria during the 1960’s, 1970’s and 1980’s. But during the 1990’s up to now, malaria has been a serious problem in Bahir Dar. This is true in malaria prone areas of the Region; Now all the “Kola” and lower “woinadega” climatic zones of the region are seriously affected by malaria. Every year, thousands of people and tens of thousands get sick die from malaria. Given this situation, people want to use every type of preventive measures against malaria. Mosquito coils are probably the most convenient and least expensive means of protection against mosquitoes. About one third of the populations of the Amhara Region live in malaria prone areas. This amounts to close 6.5 million people. With this number of people under the danger of being infected by malaria every year, there is enough demand for mosquito coils in the Region. ', 'The main ingredients for making mosquito coils are extracted residue of pyrethrum or powdered dried pyrethrum flower, Machillus Thunberg and saw dust of cedar or cypress. These main ingredients could be produced at home. ', ' The main stages of preparing mosquito coils are preparation of raw materials, blending of sub-materials, kneading, punching and moulding, drying and packing. Main machinery and equipment required include atomizer, mixer, kneader, crusher, extruding machine, size cutting machine, mould punching machine, conveyor, dust collector carts, boiler, wire nets, etc.', ' saves the lives of tens of thousands of people every year, protects hundreds of thousands of people of the region from being infected by malaria, keeps the people of the region healthy and productive.', '2 ', '1 '),

(' Mosquito Repellants Making Plant',

'Repellants are materials that affect insects and other organisms in disrupting their natural behavior. For blood sucking insects, the desired result is to disrupt the biting of human by the insects to spread the spread of the disease. Repellants can be prepared in the form of cream or they can be burned to deter mosquitoes from coming near people. ',

'In the last 15-20 years, malaria has spread in most parts of the Amhara Region. Areas which were malaria-free are now malarial infested. Areas like Bahir Dar where malaria was supposed to have been eradicated long time ago are now malaria infested. Malaria has become one of the major killer diseases in the Amhara Region. Malaria does not only kill but it also makes those who survive it very weak and extremely susceptible to other diseases. As a result, ex-patients of malaria are less productive in any effort. Different approaches are being used to control malaria. In addition to these, the production of repellants in the Region will contribute to the control of malaria. The need of this plant is, therefore, too obvious. ',

'Of the 19 million people who live in the Amhara Region, more than 65 percent or 12.35 million live in areas where malaria is prevalent and the potential market for the repellant is 12.35 million people. Different types of repellants can be manufactured; one type is a cream which is sold in a small plastic container with about 50 gm weight. If only one million people buy two containers a year, total annual demand for the repellant cream will be 100,000kg or 100 ton of cream. Even with this low assumption the market can absorb the production of 20 mosquito replant plants in the Region. ',

' the raw material are chemical products including white Vaseline and these inputs are imported raw or in semi finished form.',

' If the plant is to produce repellant to be made in a form cream, the following are the main production processes. The main ingredients of the of repellant are melted in a melting tank, the melted ingredients are mixed; in the mixing stage other ingredients are added. Finally, the paste is mixed homogenously by continuous stirring until it is ready for packaging. The main machinery and equipment is an automatic chemical mixer with a stainless steel mixing tank, wet grinder with washing tank, extruder with winder and electric dryer.',

'protects people from being attacked by mosquitoes thereby saving them from dying of malaria or being sick and weak due to malaria; maintains the physical and mental energy of people so they become as productive as they could be; maintains productivity and production, saves people from spending their meager financial resources for medical treatment to cure themselves from malaria, etc. ',

'2 ', '1 '),

(' Oxalic Acid Production Plant',

'Oxalic acid which is the simplest dicarboxylic acid is an important organic chemical having wide applications in various industries such as textile, dye-stuff, pharmaceuticals and other. It occurs naturally in many plants like wood sorrel, rhubarb, spinach …etc. Oxalic acid used in the textile industry centers upon its calcium iron removal and reducing properties and as such it is widely used as bleach for removing iron stains. The product also finds applications in automobile radiator cleanser. In dye-stuff industry, it is mainly used as an intermediate substance. It is a starting raw material for the manufacture of diethyl oxalate which in turn is being used as a starting raw material for the manufacture of sulphame thaxazole which is the latest sulpha drug used in combination with trimethoprim in various formulations and has broad spectrum antibacterial range. Oxalic acid also finds use as a purifying agent, as a catalyst, as a stripping agent for permanent press resins and also in the processing of rate earths. In short, oxalic acid is used for metal and equipment cleaning, as chemical intermediates for textile finishing and cleaning, in leather tanning and for miscellaneous purposes like purifying agent, a catalyst, stripping agent for permanent press resins, etc. ',

' ',

'All the chemical inputs of the textile, leather tanning, metal, chemical industries are imported which is a manifestation of the low level of industrial development of the country. There very weak linkages between branches of the manufacturing industry which makes the industry much dependent on foreign inputs such as chemicals. Oxalic acid which can be manufactured using domestic inputs is one of those chemical products which is imported. An annual import of this product is to the tune of more than 50,000 tons. With the expansion of the above industries, the demand for the oxalic acid will grow. The Amhara Region has its share of textile industries. A few tanneries are established which may constitute the foundation of a leather processing industries. In addition to the regional demand, the national demand for oxalic acid could justify the establishment of a plant which can produce this chemical product. ',

'Oxalic acid is prepared by the oxidation of carbohydrates such as glucose, sucrose (sugar), starch, dextrin and cellulose by nitric acid. The alkali (Potassium and sodium hydroxides) fusion of carbohydrates also yields oxalic acid. The fusion method is particularly applicable in the utilization of waste cellulosic materials such as saw dust, corn cobs, cornstalks and oat halls. These raw materials can be collected from various areas within the Region. ',

'The production process described here uses sugar/molasses/jaggery and nitric-sulphuric acid mixture as the basic raw materials. "Mother liquor (consisting of residual oxalic acid, sulphuric acid, nitric acid and catalyst) of previous batch is taken into reactor". To this sulphuric acid is added which increases the temperature of reactor. The increased temperature is brought down with chilled water circulation through the cooling coils. Then nitric acid is added into the reactor. After this, sugar is added very slowly to avoid rapid increase in temperature and the rate of adding sugar increases gradually. Oxides of nitric acid generated during reaction are absorbed in a series of three absorbers using counter current principle. Oxalic acid obtained after centrifuging is then further purified by recrystallization using water a solvent. Then recrystalized material is again centrifuged and dried. Basic equipment required include storage tanks, mother liquor tanks, pumps, feed vessels, reactors, absorption columns, centrifuges, dissolving tanks, crystallizers. ',

' Saves foreign exchange, supports other industrial sectors, has the potential of generating income to the Region.',

'2 ', '1 '),

('Oxygen Producing Plant ', 'Oxygen (O2) is a gaseous element which constitutes about 20% of the atmospheric air. The gas is consumed in iron and steel industry, gas welding shops, hospitals and waste water treatment, etc. ', 'The oxygen requirement of the whole country is produced by an old plant located in Addis Ababa. Oxygen is packed in a heavy metal cylinder which is expensive transport and which is also difficult to load and unload. However, despite this drawback, even the oxygen demand of Gambela, Mekele, Asosa, Jijiga and other far off places is met by transporting the product from Addis Ababa. This, obviously, entails additional costs which results in higher prices for the product. Oxygen is a life-saving product in hospitals and clinics for people with serious respiratory problems. The product has to be available in sufficient volume in every health care institution at any time of the day. Considering the nature of the product, it will be to the benefit of consumers if production facilities are decentralized. At the minimum there must be one oxygen plant in each of the major regions of the country. ', ' Average annual production of oxygen by the Addis Ababa plant between 1986-1995 was 162000 m3; and production had been growing at an average rate of six percent per year. On the other hand, demand for oxygen for the country was projected to be 571000 m3 in 2006. The share of the Amhara Region is about 148,460m3. This demand share will increase in the future due to population growth and expanding economic activities. Even the current projected demand of oxygen for the Amhara Region will be sufficient to absorb the production of a medium size oxygen producing plant.', ' Major raw material is ambient air for which no cost will be incurred.', ' By means of a fan or blower air is blown into the first of three vessels prepared for this purpose. Artificial or natural zeolite is first packed in the vessel. This zeolite absorbs nitrogen from the content of the atmospheric air thereby leaving about 90% pure oxygen. This oxygen is let to go out via the top of the first vessel. And it is introduced to the second and third vessel respectively to get further rectification. During the introduction of the oxygen in the third vessel, the first vessel is kept at low pressure in order to allow regeneration of zeolite. In this way, all the three vessels repeat by turns the production of oxygen and regeneration of zeolite. Major plant and machinery for the plant include absorber columns, air flower, vacuum pump, pipe and valves and control panel.', ' Saves regional financial resources, self-sufficiency in a very critical and important industrial product, lowers the price of the product at regional level. Supports the metal fabrication, repair and maintenance industries of the Region. ', '2 ', '1 '),

('Paints, Varnishes and Pigments Making Plant ', ' Paints are largely organic coatings applied to surfaces to provide both protective and decorative functions. Paints are fluid finishing compositions containing coloring substances dispersed in a suitable medium called the “vehicle” which may be a drying oil, varnish or a dispersion of glue or casein in water. When the paint is spread on the surface of a metal or any other surface as a thin film, it forms a solid adhesive protective or decorative coat.', ' Paints are industrial products which are bulky and consequently expensive to the transport. Usually the ingredients are produced in large scale and centralized chemical industries. But the formulation (mixing) of the ingredients to make paints can to be done in small scale operations in sites located close to consumption centers. But in our country all the factories are located in Addis Ababa; and the regions have to pay high transport costs for buying paints from Addis Ababa. This situation can not go on forever. As long as they are viable, factories should be established in other parts of the country; and one of these factories that should be established in the Amhara Region is a paint and varnish factory. ', ' Practically all paints used in the construction and metal fabrication industries are formulated in the country. In 2004, total consumption of paints in the country was 8.95 million liters; and the share of the Amhara Region was 2.3 million liters. These Again paints were transported from Addis Ababa. Similar to some other regions in the country, construction is expanding in many parts of the Amhara Region; and this is expected to increase in the future. With 2.3 million liters of consumption a paint factory will have sufficient market if established in the Region. ', ' All the ingredients except water are imported. ', 'Major processing stages include mixing, grinding, thinning, tinting, refining and filling and packing. Main plant and machinery include, ball mil, planetary mixer, triple roll mill, filtration equipment, storage barrels, etc. ', ' self- sufficiency, conservation of financial resources, new skills and technology.', '2 ', '1 '),

(' Plant for Organic Sulphation', 'Sulphonated and sulphated products, in the form of solutions of their sodium salt, are main components in the manufacture of detergents. These products have found applications in many processes of the textile and leather industries. But the use of detergents in solid and liquid form has been the main reason for the production capacity growth in sulphonated organic substances. Currently, a large number of organic substances can be sulphonated and neutralized, namely-hard and soft dodecyl benzene, primary alcohols, ethoxylated alcohols, fatty alcohols, alkyl benzene and petroleum refinery products. Suphonated alcohols have side application in the textile industry as wetting agents in fiber preparation, dyeing, printing and finishing. They are also used in leather industry in creasing and promoting the tanning and dyeing of high quality leather. In addition, they are used as effective surfocant in herbicide, insecticide and fungicide spray as well as in polymerization processes and for plastic coating and laminating. Sulphonated dodecyl is one of the main raw materials for the production of detergents. At present, detergent factories use sulphonated dodecyle benzene as the main raw material of their products. ', ' ', ' The demand for Dodecyle Benzene Sulphonated Acid (DDBSA) which is a product of organic sulphonation depends on the demand for detergents. With 75 million people, Ethiopia has the lowest per capita consumption of detergents. For a long time, the country had only one detergent factory (Reppi Soap Factory). During the last 10 years, one or two small scale detergent factories have been established. In 1997, the consumption of DDBSA was estimated to be 1800 tons per year; and the projected demand of the product for 2009 will be 5135 tons per year. Given the low base of per capita consumption, there is a huge potential to increase the consumption of detergents and DDBSA is Ethiopia. This indicates that there is a large captive market that could absorb the DDBSA production of a number of plants.', 'The main raw materials are sulfur, caustic soda (solid), linear DDB and dry air. Sulfur and caustic soda could be obtained from domestic sources. ', 'The productions precess of dodecyl benzene sulfuric acid involves air drying, burning of sulfur, catalatic conversion of So2 to So3, sulphonation and gas scrubbing. Dry air is fed to sulfur burner where molten sulfur is burned to So2. The gaseous product, sulfur dioxide, is then led to the catalatic reactor where it is converted into sulfur trioxide. This intermediate product is pumped to a tabular film where it reacts with DDB to form the desired product. The gas scrubbing unit is used to remove traces of sulfur dioxide which did not react to form SO3 for SO2 is one of the hazardous air pollutants. This process is a thermal process. Hence once it starts operation, it has to operate on 24 hour 300 days work schedule. Machinery and equipment needed include air drying unit (11items), sulfur combustion SO2/SO3, conversion, film sulphonation (12 items), double step neutralization (3items), exhaust gas scrubbing (5 items). ', 'Similar to other projects. ', '2 ', '1 '),

(' Plant for Reprocessing of Waste Batteries', ' This project idea is about rehabilitation of old batteries by replacing old or damaged component in order to use the batteries are made of different components and parts. Some parts have to be replaced after a certain period of use, others have to be modified or maintained. The process of rehabilitating used batteries is also called reprocessing of waste batteries.', ' ', ' Practically all the cart batteries used in the country are imported. With the lifting of import restriction and foreign exchange control, import of car batteries to the country has increased substantially during the last 15 years. At the same time, disposal of waste batteries in the county has also increased. Though not recognized at present, throwing away old batteries causes serious environmental problems. Hence every means should be employed to reprocess waste batteries and reuse them. It is difficult to estimate the number of waste batteries thrown away in the Amhara Region. Probably it is in the thousands. No one knows how much environmental damage this has caused in the Region. To reduce the damage to the environment in the Region (which is already in a very precarious position due to deforestation and soil erosion) and to maximize the use of batteries, the establishment of a waste battery reprocessing plant is necessary. Given the growing number of old batteries being disposed in the region, the reprocessing plant could be a financially variable plant. ', ' Different types of chemicals, plastic and metal parts are needed to reprocess waste batteries. These inputs will be imported.', 'The main processes for reprocessing waste batteries include dismantling the waste battery, examining each component and part, determining which part to replace, and fixing new parts or components and reassembling the reprocessed battery ', 'Saves foreign exchange, contributes to the protection of the environment, saves regional financial resources. ', '2 ', '1 '),

('PVC Resin Production Plant ', ' Polyvinyl chloride mostly known by its abbreviated name PVC is a product produced as a result of polymerization of vinyl chloride. PVC is a very useful thermoplastic resin having extremely good characteristics. In Ethiopia PVC is used in plastic factories to produce hoses, pipes and boots. In the recent past, its application has extended to shoe sole manufacturing. PVC has the potential of having wide application to produce high pressure pipes for water distribution and for making a wide variety of furniture thus saving wood.', ' ', ' In 1996 consumption of PVC resin by different plastic industries was estimated to be about 7000 tons per year. Since then many small and medium plastic factories have been established in the country. This has increased the consumption of PVC resin. In the late 1990’s, a plant which was planned to produce PVC resin was established in Addis Ababa. However, the capacity of the new plant is only 200 tons per year. This is a small capacity which leaves a big gap between demand and supply for PVC resin. More than 95 percent of the country’s needs for PVC resin has been meet by imports. Assuming an annual growth rate of 5 percent, the demand for PVC resin is projected to reach 16,000 tons in 2013. This projected demand can absorb the production of a number of PVC resin producing plants, and one or two of these potential plants can be established in the Amhara Region. ', ' The major raw materials are vinyl chloride monomer (VCM) and catalyst chemicals. Both of these raw materials will be imported.', ' The production process to be employed in the envisaged plant is a simple polymerization of vinyl chloride monomer (VCM) which would be imported. The upstream process which would normally involve production and subsequent chlorinating of ethanol to produce vinyl chloride is not included here for it requires a higher economies of scale which needs a much larger market size. At the initial stage of PVC resin production, VCM, demineralized water and suspending agents are added into the polymerizer. The contents are heated up to 560C before adding the initiator emulsion. The polymerization takes place in a water phase inside a reactor (polymerized). The reaction proceeds for about 8 hours with a continuous recovery of non-reacted monomer. In the next step, the product is introduced in to a centrifuge to dewater it and the cake from the centrifuge is let into a fluid bed dryer to get dried. The final product is sieved and bagged in sacks of 25kg. machinery required include reactor (polymerizer), centrifuge, fluid bed dryer and others. ', ' similar to other projects.', '2 ', '1 '),

('Safety Match Making Plant ', 'Safety matches are house old consumer items of daily use in both urban and rural areas. They are used to light fire for cooking and heating. ', ' When establishing industrial enterprises was the principal responsibility of the State, a safety match project was planned to be established in Bahir Dar. The main reason was that the raw material soft wood is found in the western parts of the Amhara Region. While it is possible to produce matches economically home, the country still imports matches- draining its foreign exchange resources. The Amhara Region must revive the safety match project and promote it so that investors take up the project and implement it.', 'Annual import of safety matches into the country is in million of boxes gross. This volume will increase in the future. The current market potential for safety matches can easily sustain the viability of a medium size safety match making factory. ', 'Matches are unique products because to use them one has to use their packaging material- the boxes. The raw materials for matches are not only what constitute the matches but also the boxes. Hence the main raw materials for matches are wooden splints and the combustible chemical for the matches and kraft paper, glues and chemical for boxes. The wooden splints will be produced from forest resources of the Region, the kraft paper may be bought from other parts of the country and the chemicals will be imported. ', 'Matches to be made from wooden splints follow the following processes of manufacturing. Lumber is cut and splitted to make splints. Match is made by feeding of suitable polished splints into the splints selecting and feeding machine. Match boxes are prepared by a paper box making machine or manually. The matches are filled into the box by an automatic filling machine or manually. A chemical coating machine applies chemicals to the match boxes. ', 'saving of foreign exchange resources to the country, resource flow to the Region if product is distributed to other parts of the country, development of new skills, transfer of the technology because the plant will be the first in the country, plus the other common benefits. ', '2 ', '1 '),

('Sodium Silicate Making Plant ', ' Sodium silicates popularly called water glass or soluble water are generally classified according to their Sio2 :Na2o ratio which varies between 0.5 and 4 and with various proportions of water. Sodium silicates serve as joining, cleaning, bending and cementing agents in many industries. Large scale applications of the silicates are in the chemical, soap, adhesive and cement industries. Large amounts of the silicates are employed as adhesives in the manufacture of glass products, veneer products, fireboards and corrugated paperboard. In their applications, the silicates are used as syrupy solutions which set by loss of moisture. Silicates are used as fire-resisting binder for asbestos and other similar insulating materials as a binding material in coal briquettes, in paints for plaster, stucco and cement. They are also employed in the preparation of cores and moulds for casting molten metals. ', ' As stated above, sodium silicates are important inputs for many branches of industries. Though in a modest scale, many industries which use sodium silicates are established in our country and more will be established in the future. Among the existing industries which use sodium silicate, the most important ones are the cement factories, the glass factory, the fire-board and the corrugated paper board factories which are located in different parts of the country. While there are a number of factories which use sodium silicates, there is no any single plant which produces these products. All the sodium silicates needs of the country are imported. One basic objective of industrial development for any country or region is to substitute imports by domestic production. And this must be particularly true when the product to be produced at home is used as inputs for other industries.', ' Sodium silicates are used as inputs for many types of factories and they have a wide variety of applications in other fields also. The existing demand for sodium silicates by various users will create sufficient market for at least one sodium silicates factory in the country. The factory could be established in the Amhara Region and the product could be distributed at the national level.', 'The main raw materials are soda ash, sand, gas, and water. Except gas, the other raw materials can be obtained for domestic sources. ', ' Sodium silicates are prepared commercially by continuous feeding of a mixture of pure sand and soda ash into oil or gas fired glass melting furnaces and heating the mixture up to 1450oC. The fused silicate mass is removed from the furnaces by means of bucket elevators and is transported to storage bins where it is cooled and dried to obtain anhydrous sodium silicate. The hydrates are obtained by either treating the anhydrous salt with steam at a pressure of 5 atmospheres at 140oC in autoclave or by passing the molten silicate directly into water in a slowly rotating drum. The diluted solution is settled in settling tanks, passed through filter presses and the clear liquid stored in storage tanks. The hydrates in solid state are prepared by evaporating seeded solutions of sodium silicate in multiple effect evaporators under regulated conditions. Main machinery required includes furnace, conveyer, rotary dissolver, settler and boiler.', ' As stated earlier, sodium silicates are used as inputs in the cement, chemical, soap, glass, wood paper board, etc. industries. The domestic production of sodium silicates promotes the development of the above industries. Other benefits include utilization of domestic natural resource such as soda ash, introduce new skills and technology to the Region, saves foreign exchange and regional financial resources.', '2 ', '1 '),

('Sodium Sulphide Making Plant ', ' Sodium sulphide is widely used in the leather industry for removing hairs from hides and skins. The product also finds extensive use or application in the textile industry as well as in the synthesis of sulphur dies and reduction of amino compounds. Sodium sulphide is also used in the paper industry, lithography and engraving manufacture of sulphur black dies. It is flammable, dangerous, fire risk, strong irritant to skin and tissues.', ' Two major potential sources of industrial development in the Amhara Region are the leather and textiles industries. The livestock and cotton resources of the Region can generate enough output which can be converted to different industrial products thereby enhancing the industrial development of the Region. Even now, the main industrial outputs of the region are textiles and semi-processed leather. There is also a potential to develop a paper industry for the Region’s consumption using the Region’s natural resources. For the existing as well as for future textile, leather and paper factories, the presence of sodium sulphide plant in the Region will be necessary.', ' The textile, paper and leather industries of the county use imported sodium sulphide for their operations. Every year a substantial amount of foreign exchange resource is spent for importing this product. The two branches of manufacturing-textile and leather have the highest potential for development in the country. To enhance the development of these and the paper industry, domestic production of sodium sulphide is necessary. The existing demand for sodium sulphide in the country is more than sufficient to absorb the production of a medium size sodium sulphide making plant.', ' Sodium sulphide can be manufactured from (a) caustic soda and sulphur (b) barytes and soda ash and (c) sodium sulphite and coal. Of these groups of inputs, soda ash, coal and sulphur are found in our country in their natural state. Caustic soda is being produced by a plant in Oromia Region. Hence, it is possible to obtain the major raw materials for sodium sulphide from domestic sources.', 'The process described here is based on sodium sulphate and coal as inputs. In the ratio of 2:1, sodium sulphete and coal are mixed together thoroughly and pulverized properly. The mixture is transferred to a reverberate furnace. At about 1000oc, sodium sulphate is reduced to sodium sulphide and carbon-non-oxide, which again reacts with the remaining molecule of sodium sulphate to give sodium sulphide and carbon di-oxide. The material is now transferred into cooling bogies. After cooling it is crushed in a jaw crusher and then transferred to leaching tanks containing hot water. After leaching the clear liquid is run into evaporators. Then the material is crystallized to get yellowish brown crystals. Plant and machinery needed include disintegrator with all accessories including 7.5 H.P motor, jaw crusher with 7.5 H.P motor, evaporators (steam heated), reverbratory furnace with chimney and other accessories, M.S trolley settling M.S thank, leaching tanks, tube-well for water with pump overhead tank and pipe fittings, steam boiler with accessories, fire extinguishers…., tools and equipment. ', 'Stimulates the development of the textile, leather and paper industries in the Region, saves foreign exchange and regional financial sources, introduces new skills and technology, and utilizes natural resources of the Region. ', '2 ', '1 '),

(' Sulphur Powder Making Plant', ' Sulphur powder is widely used in agricultural insecticide and fungicide in dust form or in the form of wet table sulphur in spray mixture along with other insecticides. Sulphur powder is also used in the manufacture of fertilizers, rubber vulcanization, medicines, and explosives and in the manufacture of other chemicals. Sulphur powder is applied as insecticide in crops like tobacco, rubber, groundnuts, chilies, cumin seeds, etc.', ' The Amhara Region is predominantly an agricultural region where productions of crops play a very dominant role in the economy of the Region. The predominance of this sector will continue for the coming 15 to 20 years. All the chemical requirements of the agricultural sector of both the region and of the country are imported. Every year tens of thousands, of tons of insecticides, pesticide, etc are imported to the country and the share of the Amhara Region is about one-fourth of the national requirement. Given the importance of the agricultural sector at the national and regional level, it is economic wisdom to facilitate the modernization and development of this sector by supplying the necessary inputs for the sector. One essential input of the sector is the sulphur powder whose uses are indicated above. Establishing a sulphur powder making plant is one step forward to improve the development of the agricultural sector at the national and Regional level.', 'The need of insecticides and pesticides in the country and also in the Amhara Region can be visualized from the size of land devoted to the production of crops. In countries where modern agriculture is being practiced, the amount of chemicals needed for crops is enormous. In 2005, total cultivated land in the country was estimated to be 9.811 million hectares of which about 0.9 million hectares was provided with pesticide chemicals. This was only nine percent of the total cultivated land. To improve the productivity of agriculture, more fertilizers and more pesticides and other chemicals are needed. Up to now the limited use of agro-chemicals is caused by the perinneal shortage of foreign exchange. To improve the supply of agro-chemicals to the country’s agricultural sector, one option would be to produce the essential chemicals here at home. And the demand for the major chemical inputs is sufficient to absorb the production volume of medium size agro-chemicals such as sulphru powder. ', 'The main raw material is crude sulphur containing 80% fines with lumps up to 10’’ size. There are possibilities of securing the raw sulphur at home. ', ' The process of manufacturing sulphur powder requires simple equipment mainly size reduction and material handling equipments. The size reduction equipment mainly used are jaw crusher and the Raymond mill. The other accessories are feed hopper, a bucket elevator and screening equipment. The raw sulphur is feed into the hopper of the jaw crusher where it is crushed to the feed size required by the crushing roll mill. The crushed material coming out of the jaw crusher is to be fed to the roll mill for further grinding. (In sulphur grinding, there is a danger of explosion. Two important factors basically determine explicability. These are concentration of dust in the air, and particle size of the dust. Various steps are taken to prevent dust explosion and these are included in the equipment. They are (a) reduction of the air present in grinding system and (b) use of inert gas.

Main plant and machinery include roller mill equipped with double cone separators, exhaust fans, syclone collector and other accessories, jaw crusher, bucket elevator, feed hopper and roller feeder, storage tanks, miscellaneous equipments and accessories. ', 'Promotes the development of the agricultural sector of the Regions economy, saves foreign exchange and regional financial resources, introduces new skills and technology, utilizes the natural resource of the region, potential of export. ', '2 ', '1 '),

('Synthetic Detergent Powder Making Plant ', ' Detergents are industrial products having surface active properties like foaming, lowering of surface tension, emulsification, penetration, etc. They are capable of cleaning a surface and making it free from dirt. In many countries, synthetic detergents are increasingly being used in place of washing soap. Synthetic detergents are available in the form of liquid, cakes and powders. Soaps are manufactured from oils and fats, which are also used for other purposes; and this causes them to be in short supply or expensive. Synthetic detergents. Powders have become effective substitute for washing soap. The scarcity of edible oil which is the basic raw material for making soap has become an incentive to the growth of synthetic detergent powder. The advantage of synthetic detergent powders are that they are stable in hard water and can be formulated to suit different fabrics and varied washing conditions like hard water and different water temperatures, etc.', ' While there are a number of soap and detergent making factories in Addis Ababa and Oromiyia, no similar factory exists in the whole Amhara Region which contains more than 25 percent of the countries population. The Region receives it toilet and laundry soap requirement from imports. As pointed out earlier, due to shortages of edible oil and fat, producing soap is becoming very expensive. The alternative has become synthetic detergent and this can be produced anywhere by importing the basic inputs. The Amhara Region with a population of more than 19 million has a market potential which can make a synthetic detergent plant a viable venture.', ' With a population of 19.2 million people and where there are shortages of cleaning material (traditional and modern), there is a captive market of synthetic detergents which will replace imports from aboard and other parts of the country.', 'Many inputs are needed to produce synthetic detergents, They include alkyl benzene, sulphonating agents such as sulphuric acid, neutralizing agents like soda ash, ammonia, detergent builders like phosphates, foam regulators like coconut, and others inputs such as sodium per borates, silicates perfumes, colors and dyes. Almost all the inputs will be imported. ', ' The required chemicals and formulations are chosen depending upon the desired properties in the finished product. The main processes generally adopted for the production of detergent powder from alkyl benzene are rum drying absorption process, combined neutralization and adsorption process, spray mixer process, spray drying process. Each major process has a number of sab-processes which are too detail to describe here. Besides there are different formulation depending on the type of use the detergent is intended for list of machinery and equipment required for the manufacture of synthetic detergent powder includes ribbon binder (heavy duty mixer), trays, weighing machines, weighing balance for packing, miscellaneous items like trolleys, bags, sewing machines, sieves …. and screw conveyor.', 'Saves foreign exchange and regional financial resources, promotes self sufficiency, contributes to the improvement of public health and hygiene, and introduces new skills and technology to the Region. ', '2 ', '1 '),

('Toilet Soap Making Plant ', ' Toilet soap is an indispensable household or domestic item of daily use. The products daily necessity appears to have grown primarily with he growing level of urbanization and raising income, with which improvement in the way of living is normally associated.', ' The up keeping of personnel health care is a modern necessity of living. Each individual has to wash his faces, hands and other parts of his body very frequently. Toilet soap is the main products to wash our body. It has to be available in every household. Presently soap toilets are mainly imported from Addis Ababa market. There is no plant that makes toilet soap in the region.', ' Demand for toilet soap is enormous particularly in urban areas of the region. Currently demand in the country is met from domestic production and imports. Demand for the products is increasing due to growing level of urbanization, rising income increasing use of it and growing population and use by rural areas.

', 'The main raw materials are tallow, oil, sodium hydroxide, salt, perfume, coloring, wrapping and packaging materials. ', 'a) Process The process of making soap toilet involves basically:

Boiling of the basic ingredients (the fats and oils akali used and salt in kettles), Drying, Mixing of pigments, perfumes, Extruding, bar cutting and stamping, Wrapping and packing ', ' Production Equipment:- Boiling pans/kettles, Extruder, Steam boiler, Cutting/embossing machine, Chipping machine , Stamping press, Drying chamber, Wrapping equipment, Milling machine Other moulds, work tables etc)', '2 ', '1 '),

('Tooth Paste Production Plant ', 'Tooth paste is a smooth, soft, viscous and usually white dentifrices used for cleaning and preserving the teeth. The soap material of the paste cleans the teeth while the compounds like fluorine and calcium protect the teeth from decay and cavitations. Tooth paste is delivered in aluminum foil tubes whose standard sizes are 50ml. and 75ml. ', 'The rationale or the need of using tooth paste is the same with the need of using toothbrushes; and this is explained in the project idea section of tooth brushes. ', 'There are about 19.2 million people in the Amhara Region. Of these, close to two million live in urban centers. Currently probably not more than 25 percent of the people in urban center use tooth paste regularly. The rest of the population in the Region do not use tooth paste. But, tooth paste is essential for protecting the teeth from decay and infection. Ideally all the 19.2 million people should use tooth paste. Hence, the potential demand for tooth paste in the Region is about 115.2 million tubes. This is with the assumption that one person consumes 6 tubes of tooth paste per year. If we assume that about 50 percent of the population will use tooth paste, the demand for the product will be about 58 million tubes. This is much more than the production capacity of five or more tooth paste making plants. ', 'The basic raw materials for the manufacture of tooth paste are calcium carbonate, water and glycerin. There are possibilities of obtaining these basic raw materials from domestic sources. ', ' Basic ingredients are mixed in a vessel. The raw materials are homogenized in the vessel. The mixture is then led to the processing plant where glycerin, perfume, preserving agent and mustering agent are mixed with powder material. Then the mixture is pumped to a storage tank and cooled. Finally, the paste is pumped to the tube filler where the product is filled to standard tubes and then sealed. Main machinery and equipment needed include premix vessel with propeller, powder vessel. Processing plant, floor scale, table scale, storage tank, discharge pump, pumps and tube filler machine.', 'Saves foreign exchange, generates financial resources to the region, contributes to the improvement of dental health of the population, and introduces new skills and technology. ', '2 ', '1 '),

(' Wax Candle Manufacturing Plant ', ' Candles are sources of light for homes during evenings and as such they are items of necessity especially in rural areas. Commercial candles are made from paraffin wax which is one of the by- products of petroleum refineries. ', ' Only about 3-5 percent of the people in the Amhara Region have access to electric light and energy. The rest of the Amhara people about 17.5 million of them use traditional sources of energy for getting light and heat. Two main sources of light for homes (where there is no electric power supply) are fuel wood and kerosene. Fuel wood made in a form of “kitkit” provides light during the evening. Kerose in “kuraz” also provides light for homes. But due to widespread deforestation, the type of fuel wood where “kitkit” is made is not available practically in all parts of Amhara. Keroses because of its price, is only used by “well-to –do” farmers mostly in holidays. For these reasons, more than 95 percent of homes in the rural areas of the Amhara Region do not have lights during the evening especially after meals are cooked. Hence Amharaland is as dark as darkness itself after sunset. This is one manifestation of the backwardness of the Region.

The production of candles in the Region (and if they are sold at prices which the majority of the people can afford,) could reduce the problem or lack of sources of light in the Region. ', ' All commercial candles produced in the country are produced in and around Addis Ababa. Between 1999/2000 and 2003/2004, average annual production of candles was about 610 tons is equivalent to to 12.2 million of candles. The share of the Amhara Region in the consumption of candles was about 165 tons which is equivalent to 3.3 pieces of candle. If this was the average level of consumption of candles in the Amhara Region during the period mentioned above, the current consumption could have grown at least to reflect population growth. This consumption level could justify the establishment of candle manufacturing plant in the Region. ', ' Paraffin wax from which candle is made is a product of the petroleum industry. As all petroleum products are imported, paraffin wax will also be imported. ', ' Major production stages include melting of the paraffin wax, putting the molten wax into moulds, calling the wax in the moulds, trimming the candles and packing. Major machines required are vessels for melting wax, monldling machines, oil fired or electric furnace, spare moulds, pistons and accessories. ', ' any major urban center in the Region ', '2 ', '1 '),

(' Veterinary Medicine Production Plant ', 'There are many types of medicines used for livestock. In the Ethiopian context, the most commonly used medicines are albendazone, besenil, flukazol, strepto penicillin and to ', ' In 2001 the livestock population of the country was estimated to be about 76 million of which 41 million (53 percent) were cattle. All the veterinary medicine requirements of the country, with some exceptions, are imported. Having the largest livestock population in Africa, one could have expected that the country has at least one veterinary medicine producing plant. But this is not the case. Probably one reason for having problems in the quality of our livestock a resource is the lack of dependable domestic supply of essential medicines for out livestock. The Amhara Region has over 28 percent of the livestock resources of the country. If we want to maximize the economic benefits of these resources, we should provide adequate feed, medicine and other modern animal husbandry practices to our livestock resources. In this case the Amhara Region alone needs one small size plant which formulates and produces essential veterinary medicines. The plant could also supply such medicines to other neighboring regions and countries.', ' An average import of veterinary medicines between 1984 and 1994 was 4185 tons. Of this average import figure, the above essential medicines constitute about one percent. This means about 41.85 tons of these medicines was the average import volume between 1984 and 1994. Projected demand for these medicines in 2006 is more than 66 tons. Medicines are taken in milligrams and grams dosages. Hence 66 tons or 660 quintals or 66,000 kgs is a large quantity for a medicine producing plant. We all know that veterinary services with full supply of required medicines has not covered all parts of the country and the medicine needs of all domestic animals are not met adequately. Had veterinary services been expanded to cover all rural areas, the consumption and projected demand for veterinary medicines would have been much larger than the figures indicated above In other words, the projected demand is underestimated.', ' all the raw materials or the ingredients will be imported.', ' The major operations of the plant are tablet making, syrup making and filling of capsules. The manufacturing of tablets consists of formulation, mixing and milling granulation, drying, lubrication, compression and coating. The syrup making consists of making consists of mixing the various ingredients in a jacketed kettle. The bottles to be used must be separated, washed, sterilized, dried and lab led. The modern die capsule machine is a self contained unit capable of continuously and automatically producing finished capsules from a supply of gelatin mass and filling material. There are about 17 pieces or sets of machinery and equipment to be used for the tables, capsule and injection liquid sections of the plant.', ' Saves foreign exchanges, improves the quality of livestock resource and increases their number, increases income of farmers who raise livestock, stimulates the meat hides and skins, and leather industries, and introduces new skills and technology.', '2 ', '1 ');

T, Intr, rati, mark, RM,Tec,Ben

('Agricultural Mechanization Services ', 'The other familiar name of agricultural mechanization service is rental service of agricultural machinery, equipments, tools and technical advices. These services include the provision of modern agricultural machinery and equipment for ploughing, harvesting, processing, transporting and storing on rental basis and the acquisition of technical know-how through technical advices by paying fees for advisors. Services that are provided through agricultural mechanization are substitutes for mechanization of farms and other agricultural activities performed by owning the machinery and equipment. These types of services enable farmers to use modern farm machinery and equipment with out burdening each farmer or group of farmers in owning expensive farm machinery and equipment. Agricultural mechanization services reduce farming time and enable farmers to plow, harvest and store their farm produce in optimal periods of each season thereby increasing productivity and production volume. These agricultural machinery rental centers could also have middle level technical advisors who will consult farmers on the different activities of farming and livestock raising. The consultation will be done with the payment of reasonable fees. The main advantage of these rental centers to farmers is, they enable group of farmers with adjacent farms to rent (in group) agricultural machinery such as a tractor for plowing the adjacent farms as a unit. This will reduce the rental cost for each farmer and will also minimize the operation expenses of the farm mechanization service center.

', ' ','More than 3 million hectares of land in the Amhara Region is under cultivation. Under normal conditions, One tractor plows about 10 hectares per day. For one cycle of plowing, 300,000 tractor-days are needed to plow the 3 million hectares of farm lands of the Region. This is the highest potential demand for tractor services in the Region. But many farms in the Region are too steep and/or too rugged for using tractors for plowing. In addition many other farms are also filled with small and big boulders which make them unsuitable for tractor plowing. Given these unfavorable conditions, we can assume that about 40 percent of farms in the Region are suitable for tractor plowing. This means about 120,000 tractor-days are required to perform one cycle of plowing in the Region. This is the highest realistic potential demand for tractor rental services. Let us get closer to the ground and see the potential zones of the Region which will use tractor services with the highest economic and financial benefits. The first candidates are most parts of East and West Gojjam and Awe zones, areas around Lake Tana in North and South Gondar Zones and West Gojjam, some valley plains in North and South Wollo zones, and the highland platen of North Shewa. These areas of the Amhara Region can have sufficient demand for agricultural machinery rental services which will make the center financially viable. ', 'This project idea deals with the provision of services and as such it does not require the use of "raw materials". However, the main inputs for the provision of the services will be working hours of the various types of agricultural machinery and equipment to be rented/hired by clients. ', ' The main process or activities for providing agricultural machinery rental services are establishing the center, constructing machinery shades and a small repair and maintenance workshop, purchasing the most important pieces of machinery and equipment (such as tractors, harvesters...), developing and implementing an effective and appropriate marketing strategy and finally providing dependable machinery rental services. ', ' Enables farmers to perform agricultural activities on optimal periods of the various farming cycles, increases agricultural productivity and production, releases farmers from some farm work and creates the opportunity to work on other income generating activities, decreases the need of oxen for plowing and increases the possibility of fattening and for sale.', '3', '1'),

('Agro forestry Project ', 'Agro forestry is a farming system or land use system that integrates crop and /or livestock with trees and shrubs. The resulting biological interactions provide multiple benefits, including diversified income sources, increased biological production, and better water quality, improved habitat for both human and wildlife. Farmers adopt Agro forestry practices for two reasons. They want to increase their economic stability and want to improve the management of natural resources under their care. The components of agro forestry practices and the resultant benefits / product depend on specific agro ecological areas where the practices take place. An agro forestry system might produce firewood, biomass feed stock, fodder for grazing animals, producing mushrooms beekeeping etc together with crop production such as maize, wheat soybeans, haricot beans etc can be cited a examples of the component products. ', ' Natural resources in the Amhara Region have been subject t degradation for centuries; more seriously in the highland areas. The highland of the region, characterized b rugged and undulating terrain with easily erodible soils and low natural vegetation cover is highly exposed to land degradation. Soils in the highlands of the region have lost their productive capacity. On the other hand population pressure in these areas has pushed farmers to fragile and hilly areas. Hence land degradation has become a serious threat to agricultural productivity; Soil erosion as a result of seasonal intense rainfall is decreasing soil depth, water holding capacity and fertility and increasing the frequency of drought in the marginal areas. Deforestation has taken place at an alarming rate. Fuel wood is a critical problem for most rural households; forcing them to use dung, weeds and crop residues. These have further worsened the soil fertility and organic matter base.

Erosion and runoff form overexploited and fragile areas are particularly critical in highland areas watersheds. Originate land mismanagement in the highlands has adverse effects on both and lowland agroecologicla systems. Therefore, there is an urgent need for an agro ecologically and socio economically sustainable and viable farming or land use. System; that is, agro forestry practice.', ' Agro forestry systems are much more complex than single purpose farm or forestry enterprises. Products from each component of the system will require specific markets. Therefore, selecting the components of ago forestry systems must be on the basis of careful marketing plan. The demand for fuel wood, house construction by the rural households and rural towns is a great potential to be considered. Demand for timber, log and pulpwood by local household manufacturing industries is also very high. For most of forestry products, the markets must be close to the site. Otherwise the transportation costs will eat up the potential profit.', ' Seedlings of various trees and shrubs species are the basic raw materials required which must be multiplied or raised b the regional bureau of agriculture. Fertilizers may be required in the early stages of the seed lines which are also available in the region.', ' Alley cropping involves growing crops (grains, forges, vegetables) between fruit trees, palm trees, or wood tree species planted in rows. The spacing between the rows is designed to accommodate the mature size of trees while leaving room for the planned alley crops. When sun-loving plants like corn, soybeans wheat or herbs will be alley cropped, the alleyways need to be wide enough to let in plenty of height even the trees have matured.

Another practice of agro forestry is called silvopature where tree and pasture crops and grown in combination. Hardwoods, nut trees and pines are planted in multiple rows, and livestock grazing between them. In early years of (trees) establishment, crops or hay are harvested from the planting. Grazing begins after two or three years, when the trees re large enough so that the livestock can't damage them. Well-managed grazing will increase organic matter and improve soil conditions. Windbreaks or shelterbelts are also practices of agro forestry. Tree species (for various land use) and planted in multiple rows along the edge of a field to reduce wind effects on crops or livestock. In this practice wind and water erosions re reduced, crating moist, more favorable microclimate for the crop this, beneficial insects find permanent habitat in windbreaks, benefit wildlife by providing shelters and safe movements. Windbreak or shelterbelts can also generate income by selective timber harvest, fruit harvest, firewood sales etc.

Other practices of agro forestry may include home garden of fruit trees, inter planting firewood species on coop land, agriculture with honey producing trees, multipurpose trees on bunds or terraces for soil conservation etc. All these practices of agroforetry will establish sustainable agricultural production and the interaction of the components of agro forestry systems will increase production better than the single component practices.', 'Agro forestry practices established sustainable and environmental friendly production systems. The biological interaction of agro forestry components gives higher production or biomass per unit of area than any single component production system. This is because the system (agro forestry) improves soil fertility soil porosity, aeration, and controls soil erosion by providing ground cover, exploit more soil volume, and regulate microclimate. It also provides year long employment opportunity and diversified income. ', '3', '1'),

('Apple Production Farms ', 'Growing apple trees in the home garden or as agro foresting production system can be financially rewarding. There are several varieties of apple to be considered for selection before planting for successful apple production. The four major varieties which dominate the world production are red delicious, Golden delicious, Rome beauty and galas. Apple fruits are round in shape with juicy flesh and skin, green, red or yellow in color. An apple’s primary nutritional benefit is in the pectin and fiber. Apples contain as much as fiber as whole cereals. They also contain chemicals that play a role in prevention of certain cancers and heart diseases. ', ' Apples provide bulk in the diet for the proper functioning of the body’s digestive and regulatory systems. Pectin and hemicelluloses and the acid-base ratio contribute to this pectin and mild acids help fight body toxins, aid digestion and pep up the whole body system. Apples are rich in pectin. Pectin has been associated with helping to keep cholesterol levels in balance and in this connection it is felt to be significant in helping to reduce the incidence of certain types of heart diseases. The high potassium, low sodium ratio in apples is also important in certain cardiac and  renal problems as well as in diet for over weight persons. Some studies have indicated that persons eating apples regularly have fewer headaches and other illness associated with nervous tension. Other studies have also shown an association of regular apple consumption with a reduced incidence of colds and other upper respiratory sickness. Apple juice is also preferred for infant due to its mid nature and low acid content. In general, apples contain modest amount of nearly all of the most important nutrients. They have universally accepteel flavor, appeal, versatility and convenience for use. They can also be available through out the year due to their long shelf life. They are good for teeth, stomach, skin, nerves, smiles and good health.', 'Most apples produced in the world are packed and sold fresh, some are produced for the processing market for apple juice production. Apple production in Ethiopia in general and in the Amhara region in particular mainly will play an import substitution role. Most apple consumption of the country are satisfied through imports. Hence, domestic markets will be the main sales outlets for the Amhara Region’s apple production. In the long run as production grows international markets are still very significant due the potential of higher returns, but require higher quality. Red delicious and Rome beauty apples have the largest share in the world market. In recent years organic food production has been growing drastically on the world market. In this in the highlands of the Amhara Region can easily produce organic apple and get higher return per unit of land than producing grain crops.  ', ' Trellis material tape and twine, free training material, mulching material compost, fertilizer, chemicals, beehives for  cross pollination are required for the process of apple production which are available locally. The only material that is not locally available in sufficient quantity and quality is apple tree seedlings. Seedlings or good nursery sources should be identified from major apple producing countries eg. USA Europ, Asia etc. But pilot project could start with seedlings from Arba Minch. When buying apple trees (seedlings) they must be of recommended varieties from a reliable source. The seedlings must be 1 year old with vigorous root system. Small agricultural tools such spale, rakes, disks, auger, mower, sprayers etc are required. Roots on the loose soil making sure they are not twisted or crowded in the hole. As you cover the roots press and make firm the soil to be sure it surrounds the roots and to remove air pockets. Do not add fertilizer at planting time as the root can be burned. When you have finished planting the tree water well to eliminate air pockets and provide good contact between the roots and the soil. Apple trees requires pruning for better and faster production. Proper training and pruning of fruit trees is essential to the development of a strong tree framework that will support fruit production. Properly shaped trees will yield high quality fruit much sooner and will live significantly longer. Regular pruning and training will also maximize light penetration to the developing flower buds and fruits. Apple trees often set  a heavier crop of fruits than the branch (limbs) can withstand. To ensure good fruit size, to return bloom for the following year, and to prevent tree breakage, it is necessary to thin the fruit  
Adequate tree nutrition is essential for quality apple production. To maintain the required level of nutrition status, follow the fertilization guidelines provided by the soil test. Controlling weeds and grasses around young apple trees minimizes competition for soil nutrients and moisture, en coverage vigorous tree growth and increases fruit size. Avoid mechanical weed cultivation. ', ' Apple tree growing can be rewarding for both small scale farmers as well as commercial growers. Several factors are important to be considered for a successful apple production. Apple variety and root stock, site selection, proper planting, training and pruning, adequate fertility, and pest control contribute to healthy and productive trees.

Well-drained, sandy loam with a PH below 6.5 is best.  Finer-textured-loamy clay soils will suffice if they are well drained. An elevated slope or hilltop is best to minimize frost damages. Good quality irrigation water should be available for moisture stress period. Fencing the site is advisable to protect from animal damage. Apple trees require full sun and big trees shade should be avoided.Land should be well prepared for planting the apple trees. One year old nursery trees with good root systems should be ready. To plant the apple trees, first dig a hole 60 cm deep and sufficiently wide for the diameter of the root system. Place some of the loose soil back in to the hole and loosen the soil on the wall of the planting hole so the roots can easily penetrate the soil. Spread the roots to protect shallow root damages. Good sanitation practices are necessary to control pest problems. Diseases and insects can cause serious damage to apple frees and fruits. A regular spray program is essential for high fruit quality and healthy trees. Apples reach maturity at different times, depending on variety and climate. When apple fruits’ skin color changes from green to yellow it indicates maturity and it will be crisp and juicy with pleasant taste if one takes a bite. Proper storage conditions help prolong the shelf-life apple. Depending on the conditions of storage, apples can be stored up to 12 months.', 'Apple production in the Amhara Region will save foreign exchange by substituting imported apples. Apples contain most important food nutrients and are good for health. Apple production is a labour intensive, hence will create employment opportunity throughout the year. Apple production can initiate apple juice processing industries. It can also generate income to all stakeholders. ', '3', '1'),

1. ('Assorted Vegetable Production Farms ', 'Horticulture coves a wide range of products which can be grouped into vegetables, herbs, mushroom and flowers. The Amhara region has great potential and suitable natural resources for the production of these groups of horticultural crops. Infact this project refers to only assorted vegetable production which includes cabbages, lettuce, Tomato, Beans, Green pepper, asparagus, Cauliflower, Broccoli, Carrot, Beetroots, Spinach, and Pap-rika etc. These products can be supplied s green and fresh, chilled or frozen and packed depending on the market location and requirement. Combining different kinds of vegetable production creates better opportunity for crop rotational practices and gives advantage of utilizing common faculties such s washing, cleaning cooling and storage facilities. Plus marketing assorted vegetables facilitate an increase marketable volume by attracting more customers. ', ' The Amhara Region has large areas and water resources suitable for the production of assorted vegetables. Compared to cereals, pulses and oil crops, vegetables are very high in productivity per unit of land which can play substantial role to increase the food supply of the region. With a growing urban population, which is totally market dependent, and the current food supply shortage, expansion in vegetable production will play a significant role in increasing food supply of the region.

On the other hand, unbalanced and inadequate nutritional status of the people is still a central problem in the region. Deficiency of essential food elements, such as protein, vitamins and minerals are widely observed s basic food intake is below the minimum requirement in the region. Increase in blindness due vitamin a deficiency is an alarming circumstance in region. Therefore, vegetables are important source of vitamins, minerals and also good sources of protein as well.

', 'The Amhara Region has a total population of 19.40 million of which 12 percent or 2.2 million is urban population. The urban population is growing at 4.25 percent per annum. There is already a food supply shortage in the region, which aggravates the unbalanced and inadequate nutritional status. Hence there is a huge potential market for vegetable production. Currently very limited traditional vegetable crops such as cabbage, green pepper, onion, potato, produced in limited quantities for local consumption. Awareness for the important of vegetable consumption is very low, but can be quickly raised through aggressive promotional works, through television, and the extension system. ', 'Seeds, seedlings, plant protection chemicals and fertilizer have to be imported or could b accessed form local dealers. In most cases they are available locally. ', ' Most vegetable crops can be produced under rain-fed and irrigation systems. The rain-fed production system is highly seasonal, quality and productivity is low. With irrigation production system the production cycle can be twice or more per year, and supply throughout the year is possible. Depending on the market requirement and location, vegetables can b e supplied green and fresh or chilled, frozen and packed. The production process requires tractors, irrigation structures small agricultural tools and implements. The marketing side may require cold trucks, stores and cool display facilities. Incase exporting to other regions or foreign market is required washing, cleaning, cooling, frozen and packing facilities are required depending on the distance and the customers requirements', 'Investment in assorted vegetable production will help increase food supply in the region, alleviate food deficiency problem and hence reduce or eliminate the prevalence of blindness in the region. Because vegetable production is labor-intensive in nature, both in the primary production and the processing stage, it will create ample employment opportunity in the region. In addition to this, it will generate incomes to all stakeholders in the form of wage and salary, profit, income tax and VAT. ', '3', '1'),

('Banana Plantations ', ' Bananas are tropical fruits widely consumed as fresh, processed and dried in all countries of the world. Ironically while bananas are produced in the tropics, per capita consumption of the fruit is much bigger in temperate lands than in tropical countries. The highest concentration of banana consumption is in western Europe and north America where the standard of living is much higher than in any other parts of the world. Bananas are one of the fruits believed to maintain good health for people who consume it regularly. its main nutrition contents are carbohydrates and proteins which are essential for good health.', ' ', 'With about 2.1 million people living in the urban centers of the Amhara Region, there is a potential of high consumption of bananas provided that the fruit is supplied to the market at affordable prices. If we assume that at least 30 percent of the urban residents of the Region can afford to consume 2 kgs of bananas per head per week, the annual consumption of the fruit will be 655,200 quintals or 6552 tons of bananas. This is about the most reasonable and realistic estimate given the low per capita income of the majority of the urban population. The Amhara Region covers an area of 170,000 sq. km. of land and has among the best suitable climate and soils for growing bananas. In fact before banana plantations were established in the Awash Valley in the 1950's and 1960's, there were many batches of banana orchards in many parts of the Amhara Region. Unfortunately these banana growing localities were not expanded to be large banana plantations. Consequently, almost all the bananas consumed in the Amhara region are transported from Awash Valley about 800 km away form Bahir Dar:- the major consumption center of the region. This increases the price of bananas in the region which makes the fruit out of the reach of the majority of potential consumers. With growing urban population and modest increases in per capita income, the demand for bananas and other fruits and vegetables will increase. For now there is sufficient demand for bananas in Bahir Dar, Gondar, Dessie and Combolcha to absorb the production of medium scale plantations to be established near the above major consumption centers.   ', ' The main inputs for banana plantations are smi-skilled and unskilled labor, land and water. These three main inputs can be secured from many localities of the Region.   ', ' Once suitable land is secured, the main stages of producing bananas are preparing and producing seedlings, planting the seedlings on the plantation, watering, seeding and in general nurturing the stands of banana trees, harvesting and packing the bananas for distribution. Planting and harvesting bananas do not require much machinery and equipment. Only tractors for preparing the land for the first planting and irrigation equipment are needed for the project.', 'Promotes self-sufficiency in the production of fruits and vegetables in the Region, improves the nutrition standard of the people, and saves regional financial resources.  ', '3', '1'),

('Broom Corn Production Farm ', 'The long fibrous panic of broom corn plant is a type of sorghum that is used for making brooms and whisk brooms. A ton of broom corn brushes makes 80 to 100 dozen of brooms. Therefore quality broom corn brush is a pea-green in color and free from discoloration. The fibers should be straight, smooth, pliable and approximately 50.8 cm long. Brush that is overripe, reddened, bleached, crooked, coarse, or flat is considered poor quality. ', 'Broom corn is one of the sorghum. Unlike other sorghum varieties which are grown for grain, fodder and making molasses, broom corn is grown only for broom making. It is cultivated like any other ordinary field crop. It is well adapted and widely grown in areas with 500 to 700 mm rainfalls and temperature range of 27 0c to 400c; soil PH from 5.0 to 8.5. The best brush is produced on warm and moist weather and fertile soils. From planting to harvesting crops and preparing it for broom maker require a great deal of manual labor. Hence the production process of broom corn is labor intensive.

In the light of the crop's natural conditions and production requirement the Amhara region has both resources in abundance. In fact, it has a comparative advantage in terms of cheap labor availability and suitable land resources. The region has over 85,000 hectares of land in the lowlands of North Gondar and West Gojam zones. ', 'Broom corn brush is used as raw material for broom and whisk broom making industries in the USA and European Countries. A broom made of broom corn is the best for heavy duty sweeping in warehouses and roads. Infact, no other fiber equals broom corn for picking dust and sweeping. Because of its unique quality of the brush, broom corn is highly demanded by the broom industries in developed countries. On the other hand because its production process is labor intensive, it is becoming very expensive to produce it in the developed countries. Therefore, the broom industries are looking for cheap supply of broom corn. Infact, there are some companies in Ethiopian already established and engaged in the production of broom corn and exporting to the USA. ', 'Like any other field crops, broom corn production requires seeds, fertilizers and agro-chemicals as raw materials or inputs. These inputs are adequately available locally. At initial stage probably, importation of certified seed from USA, may be necessary. ', ' Broom corn can be produced with rain-fed or irrigation system. With irrigation it can be produced twice on the same field. Land development and seed bed preparation are per requisite before planting. Broom corn is planted in rows at 60 cm by 10 cm between rows and plants respectively. Seed rate is 3-4 quintal per hectare. The crop is cultivated like any other field crops and matures from 75-80 days after planting. When it is pea-green it should be harvested and for seed production the crop may last up to 100 days. For fiber or brush production it should be harvested before the seed matures and the fiber becomes brittle. Brush is cut off just below the crown and piled in batches on wooden table. The brush is spread on racks in a drying shed. After curing for 2-3 weeks, the dried batches are hauled to a machine called seed remover with whirling spiked cylinder which knocks of the seed. The seedless brush is compressed in to bales weighing 40-50kg each. All this must be done carefully to yield good, untangled and straight fiber for use in broom.', ' The Broom corn production and processing project will generate a gross return of Birr 4500/ha per year. This earning capacity will reward the investors in the form of profit and generate revenue to the regional state in the form of income tax and vat. The project will also earn foreign exchange for the country. Because of its labor-intensive nature, it will create employment opportunity for the people in the region.', '3', '1'),

('Cattle Breeding, Fattening and Marketing Enterprises ', ' These are enterprises which aim at large commercial scale breeding, fattening and marketing of goats and sheep. Better quality off breeds will be selected from indigenous and foreign stock, will be made to breed and fattened for local and foreign markets. Mutton from goats and sheep is very popular in the Sudan and in the Middle East', ' ', 'Sheep and goats have huge demand for their mutton in the domestic market especially during holidays and at the end of fasting period of the Christian and Muslim religions. Tens of thousands of sheep and goats are also exported to the gulf countries every year. Recently, Sudan with its newly fouled oil wealth has started importing large number of cattle, sheep and goats from the Amhara region. And this demand will grow in the future. The domestic market for sheep and goats is supplied by merchants who buy the animals from individual farmers and bring the animals to major urban center to sell. The traditional system of raising sheep and goat is characterized by the presence of large numbers of small scale farmers who practice stock rising as secondary activity next to farming. Each farmer may own a small flock of sheep or goats with five or six heads per flock; and a farmer may sell one goat or sheep in a year. This traditional system is extremely inefficient in terms of supplying good quality sheep and goat. The animals are not properly feed and cared for. Selective breeding and cross breeding are not practiced. As a result the quantity of mutton obtained from each sheep or goat is relatively small. The export market for sheep and goats is dominated by supply from the eastern parts of the country. The regional states of Afar and Somali are the main supplies of sheep and goats to the Arabian Gulf states. The Amhara and Tigray regions can be major supplies of these livestock resources to the Sudan, Egypt, Yeman and Saudi Arabia if there are modern farms for breeding and fattening sheep and goats. Exporting these animals along the Metema and Humera boarder could be relatively and shorter. In brief, there are sufficient domestic and foreign markets for absorbing large number of sheep and goats to be raised by modern and efficient livestock management systems. This project idea is to establish a number of medium scale livestock breeding and fattening farms in selected sites of the Amhara region for supplying the domestic and the export market. ', 'In the context of rising sheep and goats, "process" refers to the steps to be taken to breed, fatten and market the livestock's. The first step is to select the most appropriate locations for the project. For the domestic market these locations should be closer to the major urban centers of the region. For the export market, the best locations will be not far from the Ethio-Sudanese boarder. Once sites are selected, the next stage is to construct the necessary infrastructures for the breeding and fattening phases. This will involve building shades, barns, water points, etc. The third stage is stocking the farms with the necessary number of sheep or goats for breeding. After breeding feeding, the young animals until the reach certain age and attain a certain weight will be undertaken. Finally, the animals will be ready either for local or export sale. The technology of sheep and goat rising is simple. It requires simple tools and implements.   ', ' ', 'Increases food production, earns foreign exchange, and stimulates the livestock sectors. ', '3', '1'),

('Coffee Plantations ', 'Coffee plantation a commercial farm where coffee trees are grown for harvesting coffee beans for the domestic and for foreign markets. The plantation is run on the basis of modern farm management system with the purpose of maximizing production and profitability. ', ' ', 'According to some estimates, the Amhara Region has more than 400,000 hectares of land suitable for coffee production. But only a tiny fraction of this land is under coffee cultivation and coffee production of the Region is negligible. As a result the Region is a net importer of coffee. Every year huge amount of money leaves the Region for buying coffee. This is a negative factor in the trade balance between the Region and other parts of the country. Traditionally, the Amhara Region has been a cereals growing region. In fact more than one-third of the cereals is produced in this Region. Cereals, important they are, are not cash crops as coffee and this negatively affects the income level of the population. Besides bringing cash to its growers, coffee growing protects the soil from erosion as the coffee trees prevent rain drops from hitting the ground directly. If the Amhara Region has the land which is naturally suited for growing coffee, it is high time that this land be made grow coffee. In the structure of the country's agriculture based economy, there is no crop better than coffee for generating cash for its growers. Potential investors in the Amhara Region should be encouraged to establish coffee plantations to produce coffee to meet at least the regional demand for the crop. The fact that there will be enough demand for the crop is too obvious too analyzes. ', ' The main inputs for coffee plantations are land, coffee seeds/seedlings, and farm machinery and labor. All these inputs can be obtained within the Region and in the country.', ' Choosing the most suitable localities, securing the land, preparing the land, planting the coffee seedlings, nurturing the trees, harvesting and marketing the coffee beans. Machinery required includes one or two tractors, and other farm tools.', ' self sufficiency, saving of financial resources, possibility of export.', '3', '1'),

('Commercial Production of Sesame ', 'Sesame is one of the oil seeds which is considered as a cash crop in all parts of the country. The western and the northwestern parts of the Amhara Region are naturally suitable for the production of sesame. The crop is usually produced for the export as there is always demand for it in foreign markets. ', ' ', 'As an oil seed, edible oil is extracted from sesame crop. The by- product of the extraction process is used as animal feed. In further processing the oil, it is also possible to obtain vegetable ghee from sesame. In our country sesame is mostly exported to foreign countries. During the last 10-15 years, the production of sesame in the northwestern parts of the country has been increasing every year. As a basic consumption commodity there is always a market for sesame in foreign countries. Even in our country, the market for edible oil from sesame will grow as the income of the people increases. Apart from some ups and downs in prices, the international market for sesame is rarely affected by supply glut like other agricultural commodities such as coffee or cacao. As a cash crop, commercial production of sesame will reduce units costs thereby increasing the profit to the farmer. At the national level, producing and exporting sesame will generate much needed foreign exchange. ', ' In the context of this project idea, "Source of raw material" refers to source of land to produce the crop. Suitable land for sesame farming is available in the northwestern parts of the Region.', 'The process here involves the acquisition of land preparation of the land, sawing, weeding (if necessary), harvesting cleaning and packing. Tractors and other farm implements and tools are what are required for growing sesame. ', ' Generates foreign exchange, increase income of farmers in the Region.', '3', '1'),

('Cut Flower Production ', 'The wide range of agro ecological conditions of the Amhara region is suitable for floriculture production. High quality, long stem, and big budded rose flowers can be grown in the high land of Misrak Gojam, Awi, and Semen Gonder zones. Small budded and short stem rose flowers can also be grown in the lowland areas of Mirab Gojam zone (Bahir Dar Zuria and Merawi areas). In the category of cut rose flowers, there are several varieties of flowers with distinct shapes of petals, colors and known by different commercial names e.g. Aroma, Havanna, Dream, Kings Pride, Fidibus, etc. These flowers fetch better prices in the world markets than any other cut flowers. ', ' Ethiopia is considered as one of the potential countries in the world for flower production. The country has a wide range of agro-ecological condition that is conducive for varieties of flower growing. The highlands are suitable for long stem and big bud rose flowers and the lowlands are also suitable for short stems and small bud rose flowers. In additions to this because of the proximity of the country to Europe, the Amhara region has a comparative advantage in freight cost over other producing countries of the African continent. There are three major export market options for the Ethiopian cut rose flowers; i.e., Europe, North America and Japan. The biggest flower importing countries are Germany, the Netherlands, France, UK, USA, and Japan. Market for rose flowers is growing due to the quality demanded and the new market development of Eastern Europe. That is why, recently, floriculture has become one of the fastest growing export industries in Africa. For example Kenya, Zimbabwe, Tanzania, Uganda and South Africa are significant floriculture producers for export. Recently, Ethiopia is coming in to picture in the floriculture. In less than half a decade about 18 companies have been established and engaged in this business; but limited only to Oromia Region having similar agro-ecological conditions of that of Oromia, the Amhara region has to encourage investors to take part on the floriculture industry. As investment in the floriculture expands, the industry will generate substantial income to all stakeholders and provide employment opportunity to many job seekers of the region. ', ' Because of location proximity and seasonal variation of production season, European countries re the major consumers and producers of floriculture products in the world. But their consumption is much higher that their production; the gap is filled with imports from developing countries (mostly form tropical regions). Plus their production is declining due to decrease in acreage. In addition to this, European countries could not produce flowers during October-February, but have critical demand for important occasions besides to the regular requirements. Hence, the Amhara Regional State, being in a tropical country, can take part in filling the huge demand gap of European countries.', 'For floriculture production, root stocks are the basic inputs both at initial establishment stage and for periodic replacement. Netherlands, Israel and Kenya are major sources of this basic input; hence root stocks can be imported from these countries depending on costs of purchase and the specific varietals requirement. ', 'Root stocks of selected varieties will be planted on raised seed beds in rows at a specified spacing between plants and rows under green house conditions. Rose flower production without green house is inconceivable. From planting date to harvesting time the plant will be supplied with water and fertilizer through drip irrigation system. Depending on the varieties and environmental conditions the flower stem will be ready for harvest in 90-120 days.

Cut flowers stems will be collected in buckets, transported to packing houses with out exposing them to direct sunlight. In the packing house cut flower stems will be packed in batch of 20 stems and 18 batches will be again packed in carton boxes which contain 360 stems each. These carton boxes will be stored in cold rooms until shipment. ', 'In the case of highland roses Misrak Gojam and Awi zones will be good sites and for lowland raised production Mirab Gojam zone (Bahir Dar and Merawi) will be best sites. ', '3', '1'),

('Fish Harvesting, Farming and Marketing ', ' If available and affordable, fish diet is a major source of protein which is essential for the development and growth of bones and the brain. Fish harvesting is the collection of mature fish from lakes and rivers and distributing the catch to consumers. Fish farming is growing or breeding fish in man-made ponds and marketing the harvest to consumers. This project idea is for harvesting fish in and around Lake Tana and for growing fish in ponds near the Lake and marketing the harvest from both sources for consumers in major urban areas.', ' The Amhara Region has the largest water bodies in the country and large quantities of fish are harvested every year from the lakes and rivers of the Region. Potential annual fish harvest from Lake Tana is estimated at 15000 tons, but actual harvest in 2002 was 1,450 tons. Up to now the harvesting of fish from lakes and rivers is done by traditional and sometime very destructive method of fishing which results in low production and whole sale destruction of young fish not ready for harvesting. In addition, fishing is done on natural lakes and streams. The method of harvesting fish from man made ponds which is common in many south East Asian countries is practically unknown in Ethiopia including the Amhara Region. If farmers and potential entrepreneurs are made aware about the possibility and benefits of fish farming using man-made ponds, the production of fish would have increased substantially there by increasing the supply of animal protein to the population. This project idea is to undertake moden fish harvesting in Lake Tana and to prepare ponds to grow fish for commercial purposes.', ' Considering the popularity of fish especially during fasting months and days, the market for fish in the Region is more that current fish harvest. In the context of the Ethiopian economy, demand for any food type is not a problem. It is the supply that has been the problem.', ' Fish harvesting on Lake Tana will be done using modern technology and in such a way that only fish of certain sizes will be caught leaving small and young fish to breed and to get matured. In this way the fish population of the Lake will be replenished through breeding which will ensure continuous supply of marketable fish. Harvesting of fish from man made ponds will be done by employing the latest technology and practice in the field. In addition to the immediate benefits, growing fish in man-made ponds will have demonstration effects. These effects will initiate other people (farmers and entrepreneurs) to start breeding fish by preparing man-made ponds in many localities. For harvesting fish and for preparing the harvest for marketing, the following physical assets will be required. Motor boat, freezer unit, condensing unit, evaporator, compressor deep freeze, ovum meter, fish cutter, plastic packing, floor balance, table balance and other tools.', ' ', ' sustainable utilization of our fisherys resources, increase in food production, introduction of new method of producing food,', '3', '1'),

('Fodder Production and Distribution ', 'Fodder is animal feed to be given to domestic animals especially to cattle. Fodder is usually prepared from grass, straws, lucks and seeds. This project idea is to produce animal feed from grass in the form of lay or from leaves in the form of alpha. ', ' Throughout the Amhara region, the sizes of grazing lands have been diminishing every year/ due to the fact these lands are being converted to farms. In almost all parts of the region, there are extreme shortages of both cultivable and grazing land.

About twenty years ago, it was common to see domestic animals grazing in open areas in all parts of the Amhara region both in the dry and rainy seasons. Now in many localities of the region during the people are forced to keep their animals at home during the day because there are no open places (grazing areas) where they can send their animals. It is pity to see these animals tied to poles in the back yards of their owner's homes and crying for food or for want to be released. in the Amhara region, domestic animals usually get their food supply by for aging for food in open "grazing" areas. It is only during the rainy season that owners of domestic animals provide some feed for the animals especially for oxen. Hence if animals do not get sufficient food from open areas, they are starved and this happens mainly during the months of February, March, April, May and June. As a result many animals such as horses, cows, and oxen die during these months.

To increase the supply of animals feed in the Amhara region, a new system of producing such feed should be introduced and developed through out the region. And this system is the commercialization of lay/ fodder production in the region. Given the shortage of animal feed in the region, a business venture which will supply hay/ fodder for urban and rural communities will be financially viable. It will be similar to a business entity that produces and distributes grains. Production of hay will take place in fields which the investor will acquire through lease. Using quality or sprinkler irrigation system, hay could be harvested at least three times a year from one field. The source of water could be a reservoir (pond) well or a nearly stream. Distribution of the feed could be done by compacting and tieing the hay. In some cases, the hay could be cut to smaller pieces and bagged for delivery. Hay may not be the only feed to be produced by such farms. Other plants fit for animal feed could also be produced. With more than 25 million domestic animals and extreme shortage of animal feed in the region, it is safe to assume that production of hay/ fodder on commercial basis will be a viable venture.', ' ', ' ', ' ', ' Increases the supply of animal feed, improves the quality of the livestock resources of the region, helps the further development of the livestock sector, increases the income of farmers.', '3', '1'),

('Natural Gum Production and Marketing ', 'Natural gum is a type of gum which we call “etan” in Amharic. The gum is obtained from a tree which grows in low land areas characterized by warm to hot temperature and limited rainfall. The domestic use for natural gum is for making incense by burning the dry gum and creating smoke. In foreign countries, the gum is used for different purposes and this may be the main reason why natural gum is exported. ', ' ', 'There is a strong demand for natural gum both at the last 10 years; the volume of natural gum export from Ethiopia has increased substantially. As a result, finding natural gum trees in remote areas, protecting, the trees and growing now trees have increased. Natural gum trees grow naturally in the Western parts of the Amhara region. These trees grow in Awi, West and East Gojam and North Gondar zones. Since there are captive markets (domestic and foreign) for natural gum, growing natural gum trees in a commercial scale can be a financially rewarding nature. ', ' A plantation farm for growing natural gum trees is similar to any other tree plantation nature. It will require acquisition of land preparation and development of the land, planting and nurturing the trees, harvesting the gum which is done by extracting a semi liquid substance form the trunks (steams) of the trees, drying, grading and packing the gum.', ' ', 'Earns foreign exchange, reutilizes the natural resource of the region, and brings financial resources to the region. ', '3', '1'),

('Oranges and Other Citrus Fruits Plantations ', ' Oranges and other citrus fruits are essential food items for the physical will-being of people. In high income countries the fruits constitute part of the daily diet of the people. In less developed countries, there is limited consumption of the fruits due to the low per capita income of the people.', ' ', 'The demand potential of oranges and other similar fruits and vegetables is similar to the demand potential of bananas in the Amhara Region which is explained in the project idea with proposes the establishment of banana plantations in the Region. In short, with 2.1 million people in its urban centers, the Region has a great potential for the consumption of fruits and vegetables. However, these products are not grown in the Region on large scale commercial basis. As a result, the demand for fruits in the Region is met by imports from other parts of the country. The Region has may localities suitable for growing oranges and other similar fruits. There is also a growing demand for these fruits. Establishing commercial plantations for producing oranges and other similar fruits near Bahir Dar, Gondar and Dessie at the initial stage and moving to other localities will be financially viable ventures. Growing these fruits on the north western parts of the Region will make it possible to export the fruits to north Africa and the middle East. ', 'Plantations for growing oranges need water, appropriate soil and climate. These are available in may localities of the Region especially in the central, western and northwestern parts of the Region. ', '  Growing fruits even on a large scale is relatively a labor intensive activity. As such there is no minimum size of economies of scale to operate. A ten-hectare fruit plantation can be a financially viable venture as much as a 100- hectare plantation. The size of investment is also determined by the size of plantation. Given the shortage of land in many parts of the Amhara Region, this project idea considers a 30 – hectare plantation as an average size. To develop and operate this size of plantation.', ' self-sufficiency in the production of oranges and other similar fruits saves financial resources of the Region, high potential for export', '3', '1'),

('Popcorn Production Farm ', 'Three types of seeds or kernels of popcorn are known in the world market, i.e. white, small yellow and large yellow, i.e. white, small yellow and large yellow. White popcorn has a rice shaped seed, are pearl-shaped. The three types are required in the market for different purposes, and growers and /or markets must take that in to consideration when selecting seeds. Popcorn is produced commercially for human consumption as versatile and nutritious snack and enjoyed both sweet and savory by fans around the world. Popcorn is the only type of all corns that actually pops.

To be high quality, popcorn must be free of any contaminations, insect and rodent damage. The volume of popped corn produced form a given weight of unpopped seeds is the most important factor influencing the economic value of popcorn. Research results have indicated that maximum popping from 13.00 to 14.5%, with 13.5% being optimum. Hence popcorn at 14.5% moisture can be safely stored for six months. ', ' There are several thousand of corn (maize) grown through out the world. These cultivars can be grouped in to seven types; namely, dent, flint, sweet, pod, waxy, and popcorns. Hence popcorn is one of the cultivars of maize that can be grown in maize growing areas of the region. Like another maize cultivars, popcorn in a warm weather loving crop. It can be best grown where mean temperature vary between 21-27 0c with annual rain fall range of 600 to 1000mm. Popcorn is reasonably drought tolerant crop at early stage of growth than at later stages. Such suitable areas are available in the region where investors can profitably grow popcorn.', ' Cereals can supply sufficient quantities of carbohydrates. Being one of the cereals grain, popcorn contains mainly carbohydrates. Humans consume popcorn as versatile and nutritious snack and enjoyed both sweet and savory by fans around the world. Hence one factor which makes it popular is its nutritional value. One cup of air-popped popcorn contains 31 calories, 1 gram protein, 6 grams of carbohydrate 1 gram of fiber and a trace of fat. Plus it is a favorite sneak of all consumers of all age. In Ethiopia it is very common snack served at coffee ceremony of every household, bars, restaurants and big hotels.

On the other hand, popcorn is not significantly produced locally s it's widely consumed. So far consumption is supplied by import. The current retail price of popcorn (un popped) indicates that consumption is constrained by supply. Popcorn retrial price is birr 10.50 per kg whereas the current price for maize is not more than Birr 2.00 per kg. This signals the need for local production. The Amhara Region has large suitable areas for popper production as indicted in the rational section.', ' The basic raw materials for the production of popcorn are seeds, agro chemicals, fertilizers and packing materials. Except popcorn seeds all are locally available. Improved or hybrids seeds should be imported from USA or any other popcorn producing countries. In the long-run, improved seed producing farms should be encouraged to be developed in the region.', ' Useful seedbed preparation (plowing and disking) is important because the seed size is small a clod -free seedbed with good filth will ensure coverage of the seed placed deep enough to be in contact with moist soil. Hence, popcorn should be planted in clod-free seedbed in a well drained soil. Early planting will assure full maturity of the seed at harvest. Early to Mid-May is an ideal time for popcorn planting and plating population of 50,000 plants /ha for rain-fed and 70,000 plants /ha for irrigation is recommendable to attain high yield.

A soil test is recommended to determine the application rate of fertilizers. With application of irrigation popcorn gives best yield, chemicals commonly used as herbicides are atrazine and lasso or sandoz. Other disease and pests control chemicals can be applied as deemed necessary (consulting the extension service of the region).

In 90-110 days time, popcorn is ready for harvest. Popcorn is mature when the stalks and leaves are brown and dry, the seeds are hard. Popcorn can be harvested with a combine or labor depending on the scale of operation, costs, and the quality of seeds required with combine costs may be less but there will be more damaged seeds reducing in popping volume. The quality of popcorn will be high with labor but may increase costs.', ' Popcorn is a favorite snack of all consumers of all ages and it is popular for its nutritional value. It is an excellent source of carbohydrate and widely consumed. Hence investment in the production of popcorn will reward investors in the form of profit, generates revenue to the regional states in the form of income tax and VAT.', '3', '1'),

('Poultry production Farm ', ' In general poultry refers to all domestic birds of fowls; but in this project profile it refers only to chicken. Chicken are most popular, widely raised and consumed birds in Ethiopia. Hence the major purpose of poultry production in the country is for food as meat and egg. In commercial poultry production system broiler meat is marketed in the form of live birds, whole dressed, portions such as leg quarter, thighs, whole breast, drumsticks, etc, which may be polybagged or tray packed depending on the requirements of the customers. Two kinds of eggs are also supplied to the market; i.e. table eggs for direct consumption and hatchery eggs for further rearing.

', ' Poultry production practice in the Amhara Region is a traditional type; just as a backyard business in which producer's rear small number of domestic birds. Production is, basically for home consumption, with a small percentage and seasonal marketable surplus. According to the livestock sample survey of 2005/06, the Amhara Region had 9.40 million poultry population which accounts for 29.2% of the national flock. The marketable surplus is only 20% of the region flock whereas mortality rate is over 60% and the balance is consumed at home.

Urban population in the region is estimate 2,195,000 and relating this figure with the marketable surplus of poultry in the Region, poultry meat consumption level is less than one bird per person per year. This is extremely low by any standard. The low level of marketable surplus is constrained by a host of factors. Traditional producers raised their own stocks which are low p-productive, they take 12 months to gain 1 kg weight whereas improved breeds gain 1 kg body weight in 2 months time. The local breeds give 20-30 eggs per layer per year and the improved breeds gain 200-280 eggs per layer per year. In addition to this in the traditional production system mortality rate is very high due to high incidence of diseases and predator as there is no provision of housing. Birds are properly fed, left to scavenge for food, no provision of veterinary services. There is no differentiation between layer and broiler breeds. As a result poultry production is low. On the other hand urban population is increasing at the rate of 4.25% per year. With the current unsatisfied demand population increase will create addition pressure on poultry meat and egg supply. Hence it is timely to encourage investment in the poultries.', ' Base on statistical Abstract of 2005, total regional population is estimated at 19.12 million of which 12% resides in urban centers. The urban population of the region is growing at more than 4% per year. On the other hand poultry population in the regions is estimate at 9.40 million of which only 20% marketable which indicates a consumption level of less than one bird per person per year.', 'Day-old chicks for both layers and broilers' breeds have to be imported from well recognized breeding stock sources. In commercial poultry production feed is the most important variable cost component accounting fort 75-80 percent of th4e production cost. The basic components of feed are maize, Soya bean and oil cakes which can easily be produced and supplied to the poultry industries within the region. ', ' Poultry houses are designed for growing pullet (egg layers), broilers (birds of meat) parent stock (birds for breeding) and each cage house is equipped with automatic feeders, drinkers, controlled heating and light system where temperature and humidity are controlled. Day-old chicks are vaccinated and the same day delivered to their respective cage house by an environmentally controlled delivery van. Chicks are carefully brooded and fed until they reach their respective production stages layers will start egg-laying in 20 weeks time. Eggs will be collected, stacked in trays and stored for sale. Broilers will gain marketable body weight in 45 days time ready for sale live or dressed.', ' Poultry meat and eggs are relatively cheep but healthy animal protein sources. Because productivity of poultry birds per unit of is very high, its contribution to the food self sufficiency effort will be great. The industry is highly profitable as long as it secures cheap supply of row materials. It will reward the investor in the form of profit and generate income for the regional Government in terms of income tax and VAT. It will also generate employment opportunity in the region.', '3', '1'),

('Rubber Tree Plantations ', ' These are tropical broad a leafed tree from which to a material called latex is extracted from the trunk of the trees. Latex is used for producing different types of rubber products including, rubber tires crashers, shoe soles rubberized fabrics Malysia and Brazil have huge rubber tree plantations and they produce the largest volume of natural rubber latex.

', ' ', 'The raw material for the sole tyre making factory (matador Addis Tyre Factory) comes for foreign sources. To produce natural rubber latex in the country, a rubber tree plantation scheme was established in the former Illubabor province.

Up now not much latex production has been achieved by the plantation.The use of different types of rubber products in Ethiopia will increase and this will necessitate the importation or domestic production of natural rubber latex. Tires are strategic products from the point of view of national security and economic independence. If imported supplies of red made tires or latex are disrupted by causes beyond the control of the national government, the whole economy and the capability of national defense will be adversely affected. This is because the movement of people and goods will be disrupted.

Given this, it is imperative that every attempt should be made to produce both the raw material and the final product of this strategic item here at home.Ethiopia imports some 3000 tons of different types of raw rubbers (costs Birr 60 million) annually. In contrast to this, however, the report of the National Project of Rubber Plantation and Processing (NPRPP) suggests the country's rubber import amounts to 6,000 tons annually.

Currently, Ethiopia has expanded its plantation by over 10 folds during the past three years. According to the report of the National Project of Rubber Plantation and Processing under the Ministry of Agriculture and Rural Development, the pilot project launched in southwest Ethiopia on 46 hectares of land has jumped to 500 hectares. The pilot project is expected to yield up to 30 tons of latex annually. Although the trend is encouraging, as compared to the country’s need, this output is insignificant. In order to meet the country’s demand for raw rubber locally, thousands of hectares of land need to be cultivated.

Some localities in the Amhara region have the necessary climatic conditions to grow rubber trees. Localities in West Gojam and Awi Zones are identified to be suitable for growing rubber trees. If this case, plantations for growing rubber should be established to produce the foreign dependency of this critical product.According to the report of Ministry of Finance and Economic Development, the country’s economy is growing at 10 % growth rate annually. It is realistic if we assume that the country’s demand for raw rubber will increase in the future by the same rate. Moreover, this project profile takes the CSA’s import statistics (i.e. 3000 tons of rubber import per annum) as a base figure to project the country’s rubber demand under the lowest scenario and that of NPRPP (i.e. 6000 tons of rubber import per annum) to project the demand under the highest scenario.

', 'Through the years the process of growing rubber improvements. Basically the process requires selection of the best plantation site, acquiring the land, selection of the most appropriate type of seed or seedlings. (For the first phase seeds or seedlings could be imported.)The next process will be the preparation of the land, planting the seeds or seedlings, maturing the rubber harvesting stage, extracting the rubber latex from each rubber, collecting the latex and packing the latex for sale. ', ' ', ' Reduces dependency on foreign supplies, saves foreign exchange, promotes self-sufficiency on a critical product, and generates financial resources to the region.', '3', '1'),

('Seedlings Production and Distribution ', ' Seedlings are very young plants grow from seeds (not cut from trees and planted to grow). Seedlings re prepared in designated places for selling them after they reached a certain age. The seedlings could be trees for supplying timber, fruit trees for harvesting fruits, vegetables or plants wanted for their flowers. What ever their purpose, in advanced countries seedlings re grown and distributed on commercial basis ', ' ', ' Prompted by the ever increasing deforestation going on in the country attempts are being made to restore and conserve the forest resource of the country. During the last 25-30 years, afforestation activities have been under taken in almost all parts of the country. State agencies at the local level have been responsible of supplying seedlings for the reforestation programmers. But seedlings provided by local state agencies have been limited both in number and variety. In almost all cases only seedlings of eucalyptus trees were supplied to farmers and other people involved in tree planting. In addition, not enough number of seedlings was produced for the reforestation activates. The fact that production and distribution of seedlings is limited to local state agencies has to some extent hampered the expansion of the reforestation activities in the countries. To increase the Varity of plant species to be planted and to increase the quality and quantity of seedlings to be produced, the private sector must be involved in the production and distribution of seedling on commercial scale.

Such commercial venture will be under taken as a small scale business enterprise and will operate in many localities through out the Amhara region.

The major consumers for seedlings will be peasant farmers, urban dwellers, schools, churches, municipalities, NGOs, state local agencies, fruits and vegetable growers, commercial farmers and any entity interested in the rehabilitation of the regions plant resources.', ' In this case "raw materials" refers to seeds from which seedlings grow. These seeds (of different variety) will be obtained from local and foreign sources.', 'The process of establishing and operating a seedlings production and distribution enterprises includes acquisition plots of land (preferable near water sources), preparing and developing the plots, obtaining the seeds, planting , watering, and nurturing the young seedlings, uprooting and selling the seedlings. For operation a seedlings production farm different types of farm tools, small water pumps and other implements are required. ', 'Contributes to the rehabilitation of the regions plant resources, increases the supply of fruits and vegetables, increases the supply of timber ', '3', '1'),

1. ('Seed Multiplication and Distribution Centers ', ' Seed multiplication and distribution centers are production, storage and marketing enterprises where selected seeds (natives and foreign) are harvested and stored in selected locations of the Region and distributed to farmers in the Region. These centers could have specialized seed multiplication functions in different agri-ecological zones depending on the type of seeds required in each zone. The seeds to be multiplied will be those of high yielding varieties and/or disease resistant or which in general have a superior quality than seeds being used in current farming practices. ', ' ', 'One of the major complaints for lower farm productivity in the Region is the lack of seeds which are high yielding, disease resistant and less susptible to drought. To overcome this major problem, research and seed multiplication centers have been established in a selected number of sites in the country. However, these centers do not supply enough quantities of seeds to farmers. Consequently, selected seeds are imported to meet existing demand. Even the existing seed multiplication centers are located in areas which are far away from the central parts of the Amhara Region. Currently, there are a number of agricultural research centers in the Region. These centers are engaged in testing and determining the most appropriate types of seeds for the different agro-climatic zones of the Region. Once seed varieties are selected they should be multiplied, cleaned, stored and distributed to farmers. These functions can only be done effectively if there are enterprises which undertake seed multiplication and distribution activities on commercial basis. These enterprises will receive selected seeds from the research centers and multiply them on their commercial farms and also on farms owned by individual through out-growers schemes. The potential demand for selected seeds of different variety in the Region is huge. These seeds can be grouped as cereals, pulses and oil seeds. The demand for selected seeds of cereals could be in tens of thousands of tons every year. The Amhara Region usually produces about one third of the cereals production of the country. For example, in 2004/05, national production of cereals was 106.5 million quintals and the share of the Amhara Region was about 35 million quintals. If we assume that the average input- output ratio of cereals is 1:20, the total seed requirement for cereals in 2004/05 was about 1.75 million quintals. This was the potential demand for selected varieties of cereal seeds in the Region. If we assume that at least 50 percent of the seed requirement will be selected seeds, the aggregate demand for these seeds would have been about 0.87 million quintals in 2004/05. As more and more farmers realize the benefits of using selected seeds, the demand for these seeds will increase every year. ', 'The main "raw materials" for a seed multiplication center is a variety of selected seed or seeds of different crops. These seeds could be obtained from the Region's agricultural research centers from seed multiplication centers of other Regions or from imports authorized by the appropriate authority.  ', 'The main stages of establishing and operating a seed multiplication center are securing the land for growing selected seeds, selecting and contracting with out growers and distributing the selected seeds, organizing and undertaking the farming and harvesting activities, cleaning and storing the seeds and finally marketing the seeds. For operating a seed multiplication farm, farm equipment and implements such as tractors, harvesters, etc will be needed. ', ' Increases farm production of the Region, contributes to food self-sufficiency and food security, decrease the dependence on imports for selected seeds.', '3', '1'),

('Small Scale Pineapple Plantation ', 'Pineapples are one of the most favorite fruits in many countries. The fruits can be consumed as they are in their ripened natural state or they can be processed to make desserts, fruit salads, cakes, certain dishes, dried and stimulating drinks. Pineapples grow in temperate zones and in the highland areas of the tropics. Besides local consumption, the fruits can be exported to generate foreign exchange. ', ' ', 'Among the major fruits sold in the urban areas of the country, pineapples are relatively the most expensive and with limited supply. One kg. of pineapple is sold for Birr 34 while the same quantity of oranges are sold for about Birr 3.50. In fact it is only in Addis Ababa that the fruits are sold. While some quantities of pineapple are produced in areas like Gamo in the South, most of the pineapple supplied to the Addis Ababa market is imported. Separate data on the volume of imports of pineapples is not available as they are included with other fruit imports. However one can safely assume that there is a captive market for locally produced pineapple in Addis Ababa and in a few major urban areas. Introduced by foreign missionaries, pineapple is being produced in the highlands of the former Gamo and Goffa province which is now part of the Southern Nations, Nationalities and Peoples Region. many highland parts of the Amhara Region have very similar climatic conditions with those existing in the South. With the introduction of pineapple seeds to the highland areas of the Amhara Region and the appropriate assistance by development agents, farmers can grow pineapple trees in their backyards like other perennial tree-crops. Production from these backyards could generate substantial cash income to the growers and could also meet local demand. However to have large production volume for the national market and replace imports of pineapples, commercial farming of the fruit is necessary. These commercial farms of 5 to 20 hectares could be established in the highland lands of the Amhara Region. With Birr 36/kg of pineapple in the Addis Ababa market, pineapple plantation on a commercial scale has all the potential of becoming a highly financially viable economic venture. ', 'In the context of a pineapple plantation, the main inputs are the seeds/ seedlings of the plant, suitable soil and appropriate climatic conditions. The seeds will either be imported or brought from the current pineapple growing localities of the country. The other natural "inputs" are found in many localities of the Region. ', ' The stage of producing pineapple fruits on a commercial scale include securing land obtaining seeds, producing seedlings, preparing the land and planting the pineapple seedlings. Pineapple trees like other fruit trees take a few years to mature and produce fruits. This requires providing proper care for the trees by applying the technical advice of agricultural technical advisors. The final stage is harvesting and marketing. As pineapple fruits are mainly consumed fresh, the marketing and distribution activities should be planned before the fruits are ready for picking.', ' increases farmers income, saves foreign exchange.', '3', '1'),

('Soybean Production Farm ', 'Soybean is one of the grain legumes cultivated as a field crop for human consumption. Grain legumes in general and soybeans in particular, contain high quality protein. However mature soybean seeds cannot directly be used a food without first fermenting, sprouting or extracting the oil. Denatured mature soybean seeds can be used as food either boiled or roasted. The young soybean seeds in pods can be used as green vegetable without treatment. Soybean flour made form Soya meal can be mixed with wheat flour to producer backed well. It is also used in to the making of candies and ice cream. The mature seeds can also be processed to give Soya milk, curds and cheese. Soya sauce is made from mature and fermented soybean seeds which are mainly used as cooking and salad oil. The oil is also used in the manufacturing industries for several purposes. ', 'Cereals are the major component of food in take in the region which is rich in starch but poor in protein and other essential minerals. Unlike cereals, legumes or pulses are rich in protein but poor in starch contents.

The protein requirement of the people of the region can be satisfied with the provision of cereal- legume diet. Such a balanced diet will prevent the prevailing constraints of malnutrition is the region. As a source of quality protein soybeans are much better than any other grain legumes. The protein content of other legumes varies from 20-25% while that of soybeans is 40% which is comparable to some animal source protein. Soybean protein is much cheaper than protein from animal sources. Despite this wide range of benefits from the crop, there is no supply of soybean in the region.

On the other hand, the Amhara region has large potential areas suitable for soybeans growing. All maize, sorghum and millet producing areas in the region are also suitable for soybeans production. Hence, soybeans can be widely produced in mid and low altitudes of Awi, West Gojam and North Gondar zones of the regions.

', ' The region has a total population of 19.4 million. Unbalanced and inadequate nutrition is prevailing on the region. The food intake of the people is dominated by cereals which is rich starch but poor in probe in content. Soybean is a grain legume with very high quality protein requirement of the people if it can be provided with cereal food. For example, soybean with maize, soybeans with wheat or rice could provide a balanced diet to the people of region. In this regard soybean has great potential markets in the region.

On the other hand, soybean can be supplied a raw materials to several industries. Soybean seed could be used by flour mill to make soybean flour which could be mixed with wheat flour to produce several kinds of baked good. Soybean flour can be also used in the making of candies and ice cream soybean seeds can also be used to process Soya … which can be used in infant feeding. Soya sauce is also produced from soybean seeds to be used as a sauce.  Mature soybean seeds are also required by oil industry to produce Soya oil. The oil can be used as cooking and salad oil. The oil is also used industrially in the manufacture of paints printing ink, soaps, synthetic fiber adhesive etc.

All these kinds of agro food processing and manufacturing industries could have been initiated in the country as well as in the Amhara region if there was adequate supply of soybean.

The by-product of say milk and oil is Soya Cake which is rich in protein Soy-cake is highly required as animal feed. It is one of the basic constituents of concentrate of animal feed. There are already constraints or big short fall in soybean supply in the poultry industry in the country. The poultry industry is at its beginning stage yet, almost there is no soybean cake supply. Therefore, there is a large demand for soybeans supply in the country.

', ' Basic raw material required for the production of soybean seeds are seeds, fertilizers, and packing materials. All these inputs and packing materials are available locally.', 'Soybean field requires ploughing, disking and harrowing and be firm seed bed. There should be enough moisture in the soil at the time of sowing planting date for the Amhara region may be during May to early July in which the rating care well established. The recommendation seed rate is 75 to 100kg per hectare at desired spacing between rows and plants. Germination will take place withing 3-4 days based on soil test results of the field, fertilizer could be applied of at a recommended rate and time intervals. At early stage soybean should field be clean of weeds. The crop is relatively free of insect pests. In five months time soybeans is ready for harvesting. Harvesting can be carried out by manual labor or tractors but labor is preferred labor is cheap and abundant in the region. Seeds are bagged with polybag in 50 or 100 kg depending on the market requirements. Soybean can be grown both with rain-fed sand irrigation but a gives better yield irrigation. ', ' Soybean is an excellent source of protein to the regional people where unbalance diet and malnutrition is still a major constraint in region. It will also facilitate and expedite investment in agro processing and manufacturing industries. All these chain effects of Soya bean production will create great employment opportunities in the region. It will also generate income to investors in the form of profit and revenue to the regional government in the form of income tax and VAT.', '3', '1'),

('Table Grape Production Farm ', ' Selecting the proper variety is a determining factor to the success of a table grape vineyard. There are seeded and seedless varieties of grapes and the later is preferred for table grape production. Three important species and one hybrid group comprise most grape production in the world. The muscandine species primarily used as table grape or fresh fruit is a vigorous and disease tolerant type compared to the two types. The second species known as the concord American bunch or fox grape is primarily used for sweet grape juice and associated products. The third is called the old world grape or wine grape. All grape types can be used as wine, table, and raisin grapes. However, seedless grape types are preferred for table grape production. There are over ten seedless varieties for table grape production of which flame seedless and Glenora varieties have excellent barry quality. Thompson seed less, Blush seedless, radiance, Romulus and Vanessa varities have good berry qualities. These varieties could be tested for adaptability to the Amhara Region and selection could be made for further production.  ', 'Grapes can be grown at altitude of 900 to 2000 meters above sea level. The crop needs dry weather with no rainfall summers, low humidity and mild winter temperature. It requires 400 to 500 millimeter of rainfall per season. The optimum temperature for good production ranges from 20 to 320C. Very deep, well drained, sandy loam texture soil is best for grape production. Such suitable natural conditions are prevalent in the Amhara Region. Having such conducive environment, table grapes can be successfully grown in the region.

1. ', ' Table grapes can be consumed as fresh fruit and raisin. Fresh table grape consumption is widely known in the country better than any other fruits. It is also demanded by big hotels to be served as versatile and convenient for use and even it can be served after main meal. Church will be the sole market for raisin. Hence domestic sales will be and continue to be the main market in the introductory stage of table grape production. At initial stage the vineyard size should be very small until the optimum production system is worked out. As experience is gained and production expanded, export markets can be developed.', ' Table grapes markets require high quality standard at the point of sale. As a result, table grape production demands hand labour, technical knowledge and experience. All initial plantations should be very small until optimum production system and many specific details are worked out. Marketing, finance labour and knowledge will be very important factors in determining the vineyard size. Knowledge of the grapes natural requirements (Climate, soil, site, and planting materials), crop management plan (vine training, pruning systems, varieties selection, weed control, disease and pest control etc) should precede planting. Healthy one year old root stocks should be used for planting. Vines should be ordered from a well known source well in advance of the planting date. A hole as large as the root system is required to plant the vine. After planting, pack the soil tightly around the vine and water it immediately with sufficient water. From the second to the fourth year pruning and canopy management should be practiced. Fertilization weed and pest control measures should strictly be followed. Irrigation water application will double production average table grape production is expected to be 150 quintals per hectare. Birds and other predators can be a serious problem at harvest time. Table grapes are harvested when they taste good.', ' Planting materials for table grape production are not locally available. Flame seed less, Reliance, Glenora and Blush seedless varieties should be imported from Italy. France, USA Spain or South Africa. Other materials required for table grapes production such as fertilizer, chemicals and small agricultural tools are locally available.', ' A vineyard business has a capacity of generating an annual average net profit or income of Birr 97000 per hectare Vineyard will give production at least for 15 years and during this period, it will generate a total of Birr 3.59 million per hectare which is much higher than any other field and horticultural crops except flower.', '3', '1'),
2. ('Tea Plantation ', 'Tea leaves are used to make a kind of hot drink which is popular in all parts of the world. The drink is believed to have a stimulating effect on the body. Tea leaves grow in tropical countries where there is plenty of rainfall and adequate sunlight. Harvesting of tea leaves is done throughout the year with some intervals allowing the plant to reproduce or replace the leaves cut during previous harvest. This project idea is included by the suggestion of the Investment Office of ANRS. ', ' ', 'Almost every person living in urban areas of the region has developed a habit of drinking a glass/cup of tea at least during breakfast. Even in rural areas some families consume tea occasionally. If we assume that at least 90 percent of the urban families and about one percent of the rural families drink tea at least in the morning, total number of families who consume tea in the region will be about 238,000 with 5 people in each family. This means number of people who regularly drink tea every morning in the region will be about 1.2 million. If each family consumes about 50 grams of tea every morning, total consumption of tea in the region for each morning will be 11900 kgs, and annual consumption of tea for morning drink only will be 4.34 million kg or 4343 tons. If we add 40 percent for consumption in other hours of the day, total annual consumption of tea in the region will be 6080 tons or 60800 quintals. All this tea is either imported from abroad or brought in from the tea growing regions of the country. ', ' material Tea production requires adequate amount of rainfall. Among the zones in the region, the most appropriate zone for the production of tea will be the Awi zone followed by some isolated localities in East and West Gojam zones. ', 'The process of establishing and operating a tea plantation is similar to that of any other commercial farm. It involves identification of suitable land, securing the land through lease or by making farmers share holders in the commercial venture, preparing the land, planting and harvesting the tea leaves, drying the leaves and packing. Main pieces of machinery needed include tractors, farm implements and tools and others machines for drying and packing the tea leaves. ', ' Self sufficiency in tea production, saving of regional financial resources.', '3', '1'),

('Tree Farms or Plantations ', ' These are commercial projects intended to grow trees of different species, harvest and process them for sale. Such projects are common in many countries. For example in North American countries there are many and large tree plantations or farms for the purpose of producing "Christmas trees" alone. Tree farms or plantations can be used for producing timber for the lumber industry, wood for the paper, particle board and other similar industries. These farms can also produce logs fuel. Other purpose of tree plantation can to be to produce fruit and seeds, to keep animals, to obtain feed for domestic animals, to make the sanctuaries for engendered animals, to protect the soil from erosion, etc.', ' Due to extensive deforestation the Amhara Region has lost practically all its natural forest resources. A region which had large forests and huge tracts of land covered with shrubs just fifty years age is now almost barren. Amhara land has not only lost it forests, but it is also losing its soils fast. And soil is the only known natural resource Amhara land has, and this dwindling resource is the source of life of its 19 million people. Hence tree plantations can be justified by the mere fact that it protects the soil from being lost for ever through erosion. In addition tree plantations or farms can have commercial benefits to investors through the sale of timber, logs, fruits and seeds, fodder, etc. Planting of trees on a commercial scale does not only benefit investors, it also benefits the whole people of the Amhara region.', ' Type of products which could be obtained form tree farms or plantations is listed above. All the products have sufficient market in the region. For example, there is an extreme shortage of timber for the existing wood processing industries. There is a shortage of fuel wood throughout the region. Wood products such as poles used in the construction industry are becoming more expensive and more scare. All these indicate a shortage of forest products in the region which shows the existence of captive markets for products of tree farms or plantations.', , ' ', 'Land which is not suitable for cultivation, nurseries for seedlings, hand tools for planting trees, manpower (unskilled labor). ', ' Protects the soil from erosion, contributes to the conservation of the ecological balance, adds natural beauty to our land- our region, produces wood and related products to the economy of the region, and creates export potential.', '3', '1'),

( 'Aggregates Production Plants ', '  aggregate is crushed stones of different dimensions used widely in the construction industry.  It is one of the inputs in the construction of buildings, dams, roads and other civil engineering works. In buildings and dam construction aggregate is mixed with sand and cement to make concrete, and in road construction, aggregate is mixed with sand asphalt for road surfacing.  Size of aggregate or crushed stones range from 80-60mm to 5- 2.5 mm.', ' Similar to other parts of the country, the Amhara Region has been experiencing some expansion in the volume of construction works during the last few years.  This has increased the demand for construction materials- one of which is aggregate or crushed stones.  In the two or three major urban centers of the Region, there are small units of aggregate production plants of which some belong to the city administration.  These plants do not have sufficient capacity to meet the growing demand for aggregate.  Bahir Dar, aggregate is beling produced manually.  Construction activities in Amhara Region will expand because what is constructed is negligible compared to the need.  Hence, it leat 3-4 medium sized aggregate plants in will be needed in the Region.', 'Compared to its size, the Amhara Region is the least constructed and built region in the country.  The need for additional public and private buildings (schools, health centers, offices, factories, garages, stores, shops, etc. and additional civil works (roads, dams, irrigation canals, etc) is obvious if one visits Amharaland.  Even for the present level of construction activity, part of the demand for aggregate is met by manual production which can not produce the type of aggregate (in terms of dimensions) that the construction industry needs.  This indicates that there is unsatisfied demand for aggregate in practically all parts of the Region. ', 'The raw material are rocks such as basalt, landsite, hard sandstone, hard limestone or rocks of similar properties.  These stones are found in practically all parts of the Region. ', ' Major machinery and equipment needed are single toggle crusher, cone crusher, vibrating screen and vibrating grizzle feeder.  Main process includes (a) getting stone or boulders from quary sites (sometimes explosives are  used), (b) crude and medium crushing on a crusher (c) crushing the stone for grain forming and (d) screening.  In between the processes of explosion, crushing and screening and the storage, there run conveyers or belts to transport the material from one stage to the next', 'accelerates the expansion of the construction industry, creates employment, utilizes the resources of the Region. ' , '4 ' , ' 1'),

( 'Bleaching Earth Production Plant ', 'Bentonite as a bleaching earth is a particular kind of clay derived from volcanic ash and consists mainly of montmorillonite with minor amount of illitc, kaolinite, cristobalite and other minerals. Bentonite has strong colloidal properties and, when in contact with water, increases its volume several fold by swelling, forming a tixotropic, gelatinous substance. The main characteristics of bleaching earth is its decolorizing power, that is the property of the earth to absorb selectively certain pigments rather than others according to the characteristics of the product to be decolorized (acidity, oxidation degree, origin and biological state, etc.) Bleaching earth as a filtering and decolorizing agent which is used mainly in the production of mineral oils and greases, in the production of vegetable oils and fats, fish oils and animal fats, in the regeneration of exhausted tube oils and solvent as used in dry cleaning machines. ', ' ', ' The bleaching earth requirements of the country are met through imports. The main users of bleaching earth are the edible oil mills of the country. The growth of edible oil production increases the demand for bleaching earth. Demand projection for this product can be made on the basis of projected growth of edible oil production. Demand for edible oil is projected to reach 60800 tons in 2007 and 91000 tons in 2012. About 30kgs. of bleaching earth is required to produce one ton of edible oil. This means that to produce 60800 tons of edible oil, about 1824 tons of bleaching will be required; and this will be the demand for this product by 2007. Following the projected growth for the demand of edible oil, the demand for bleaching powder will reach 2730 tons in 2012. The projected demand for bleaching powder could be sufficient to absorb, the production of a small size plant; and this plant could be established in the Amhara Region.', 'The main raw materials for producing bleaching earth are raw bentonite, sulphuric acid and calcium oxide. The first two raw materials can be obtained from local sources; while the east one will be imported. ', 'The natural decoloring power of raw bentonite is very low. It can be greatly increased by an acid treatment which generates the so-called “activated earth”. The acid treatment of bentonite eliminates alkalis and calcium, reducing the contents of magnesium, iron and aluminum in it. The acid treatment can be carried out by using either sulpyhuric acid or hydrogen chloride. Calcium oxide is used for the neutralization of the spent acid. The Production process of bleaching earth from bentonite essentially involves the following operations. The crud clay is mixed with water to form a suspension to which sulphuric acid is added. The mixture is then heated by steam in a mixing tank up to a temperature of 40oC and kept at this temperature for about 4 hours. Then the mixture is heated to 1800C for one hour. After cooling the suspension is filtered through a filter press and washed in order to eliminate excess acidity. The cake of the activated earth is then dried through a pneumatic conveyor by hot air (7000C). The product is collected in a depot and then packed. The product is packed in craft paper bags of 25kgs. To avoid pollution of the final product by ordour or other impurities, natural gas or LPG is used for drying. The main machinery and equipment needed for the plant include feeding hopper, band coveyor, mixer (suspension forming), steam reactor (mixing tank), cooler, filter press, washer, drying pneumatic conveyor and storage tank. ', ' Saves foreign exchange, utilizes domestic natural resource, introduces new skills and technology.' , '4 ' , ' 1'),

( 'Burnt Clay Bricks ', 'Clay bricks are major inputs in the building industry. They are mainly used to construct outside and inside (partition) walls of small and large buildings. Brick products are also used for roof tiles. Common wall bricks have standard dimension of 25X12X6.5 cm. Most wall bricks are solid, but there are also hollow bricks with different dimensions. Hollow bricks are relatively light and have good insulating properties. In general buildings made of clay bricks are cool in summer and warm in winter. Compared to building materials such as hollow blocks asbestos, and other synthetic wall making products, clay bricks have long durability. ' , ' Clay bricks are made from clay soil which can be found in many localities in the Amhara Region. But there is not a single clay bricks making unit in the whole Region. Alls the bricks requirement of the Region is transported form Addis Abab. Clay bricks are one of those construction materials which are expensive to transport long distances. They are usually produced in location close to major construction sites such as main urban centers. Building construction has been expanding during the last few years; and it seems this trend will continue during the coming years. To be self-sufficient in this important building material, at least two or three clay bricks making factories should be established in the region.', ' According to CSA figures, 1991-1996 E.C annual average production of clay bricks by medium and large factories was 14 million pieces. The survey did not include small scale industries which include small units of brick making plants established during the last ten years. If these are included, annual production of bricks in the country could reach close to 20 million pieces. However, more than 90 percent of this production is concentrated in the around Addis Ababa. Since there are no brick factories in the Region and bricks are expensive to transport, the use of clay bricks is not as common as it is for hollow blocks. But considering the advantages that the use of brick has over the use of hollow blocs (long life, absorption of sound, regulating heat, no need of plastering…) there can exist sufficient demand for bricks in the Amhara region which justifies the establishment of at least two small size factories in the region.', ' Clay soil is found in many localities in the Region. For example, the Bahir Dar and Debre Markos areas have clay soil in many sites.', ' The main processing stages for the production od clay bricks are the following:- Getting clay from the ground and transporting it to factory, preparation of the clay and forming the shape of the brick, drying the “green” clay and finally firing or burning the clay. Main machinery includes tractor and trailers, intermittent chamber kiln, shovels and spades.', 'Makes the region self-sufficient, saves regional financial resources, introduces new skills and technology, facilities the expansion of the building and construction sectors. ' , '4 ' , ' 1'),

( ' Cemental Products Making Plants', ' Floor, wall and roof tiles are all essential building materials.  They are produced from cement, sand and fiber mixture, sand/aggregate is available in abundance in the region.  The roof tiles substitute import of corrugated iron sheet. ', 'Modern dwelling which use construction materials mostly cement products is growing rapidly with the growth of urbanization. Construction material from wood have created problem of deforestation with the consequence of draught and famine. Cement product contributes to the resolution of the problem by replacing wood items.  A roof tile also substitute corrugated iron sheet imported which has supply problem when there is shortage of foreign exchange in the country.  The region has no modern and well organized cemental products manufacturing plants.  ', 'The demand for cemental products grows with the demand for buildings growth of income of the population.  The durability of houses constructed by cement products, particular by cement floor and wall are durable and comfortable.  There is huge and existing and potential demand for cement products.  The supply of this products not sufficient and needs additional production facility of cement products in major towns of the region.  ', ' The main raw material and sand gravel cement and fiber are available locally.  The sand aggregate is found in locality of the proposed project location.  Cement is brought from Addis Ababa.  ', 'Production of cement product items involves the process of fiber chopping weighing and proportioning mixing, forming, drying polishing and curing. The major machinery and equipment:    Fiber chopping machine,  Mixer,  Press and  Moulds.', 'The total investment required for cement products manufacturing can range from Birr 200,000 to Birr 350,000. ' , '4 ' , ' 1'),

( 'Centrifugal Reinforced Pipe Making Plant ', 'Centrifugal reinforced concrete pipe is a kind of concrete pipe which is manufactured as follows:- concrete is compacted by huge centrifugal force (30-40 times the acceleration of gravity) of a rigid reinforced steel cage rotating at high speed to form  the body of the pipe. The sizes of pipes range from 150mm inside diameter up to 3000 mm inside diameter. The standard length of the pipes vary between 2000 mm to 4000 mm. The main uses of this type of concrete are for (a) sewer system (rain, sewage, drainage), (b) waterworks (service water), industrial water conduit, (c) agricultural water works and water supply, (d) cross channel duct for freeway (e) cable duct and (f) well wall. The product can also be used as huge foundation material by employing the post-tensioned method of prestress construction. ', ' ', ' As mentioned above, centrifugal reinforced pipes are used for a variety of purposes. Constructions of sewers, drainages, water supplies, irrigation tunnels, cable ducts culverts, etc are being undertaken in the Amhara Region. All these civil engineering construction works require reinforced concrete pipes. Up to now, such concrete pipes are transported from Addis Ababa to construction sites in the region. As each pipe takes relatively large vehicle space, only few pipes can be transported by one vehicle at a time. This makes the pipes more expensive. The best alternative is to establish a plant which can produce these pipes in the region for meeting the regional demand for such pipes. When one considers the volume of civil engineering works being undertaken and which should be undertaken, there is a very high probability that the plant will be financially viable.', ' The main raw materials required are cement, sand, gravel, mixing material and steel reinforcement. All the raw materials will be procured from domestic sources.', 'The main production stages for producing reinforced concrete pipes are (a) construction of the reinforced steel cage, (b) manufacturing of concrete (c) concrete conveying system, (d) pipe making facilities (e) steam curing, (f)  disassembling and assembling of mould frame and (g) product storage. Main machinery and equipment required include batcher plant, cement conveying equipment, and cage material conveying. Equipment, steel rod drawing machine, reinforced cage making machine, overhead crane, centrifugal force pipe making machine, mould frame assembling and disassembling equipment, boiler, compressor, pump for water supply, draining pump, and other auxiliary equipment and tools. ', 'Similar to other projects. ' , '4 ' , ' 1'),

( 'Chalk Sticks Production Plant ', ' Chalk sticks are used in all schools and colleges everywhere.  They have an indispensable role in the teaching and learning process being the medium through which the knowledge of the teacher is transferred to the students.', 'In theAmhara Region there were 3,509 schools, 2.2 million students and about 34,000 teachers in 2004.  Annual consumption of chalk sticks could be as high 8.5 million sticks.  All these chalk sticks is bought in Addis Ababa and transported to the Amhara Region.  May be the transport cost is one quarter of the price of the chalk stick.  Chalk sticks are made mainly from gypsum which is found in the Region.  There is every economic reason for producing chalk sticks in the Region.  The Region has enough market to absorb the production of a chalk stick producing plant. ', ' The consumption of chalk sticks will increase as the number of students and schools increase. The annual consumption of about 8.5 million sticks of chalk will justify the establishment of a viable chalk stick making plant.', 'The main raw material for chalk sticks is plaster of Paris or calcium soleplate hemi-hydrate which is obtained by calcing gypsum. Gypsum is found in many parts of the Region in abundant quantity. ', 'The main stages of preparing chalk sticks are: preparation of plaster of Paris powder, preparation of moulds, formulation of chalk mixture, filling of moulds, drying of moulded sticks and packaging.  Main machineries include mortar pan, aluminum molds, raw jaw crusher, furnace, boiler, baking oven storage tanks. ', ' Self sufficiency, utilization of the Region’s natural resource.' , '4 ' , ' 1'),

( ' Compressed Soil Blocks', ' Compressed soil blocks are low cost building materials made from clay (20%), silt (30%) and sand (47%) and small amount of cement or lime. The blocks are used for making walls of low cost houses.', ' Considering the wide scale deforestation in the region, the use of compressed soil blocks for building houses could reduce the pressure of the use of wood for constructing houses especially in rural areas.This project idea is to promote the establishment of compressed soil blocks making units in the region. Since the use of compressed soil blocks is to be new in the region, a marketing strategy which could convince potential customer will be essential.', ' A new product usually faces not problem of demand but a problem of being unfamiliar to the potential customers. Compressed soil blocks if they are demonstrated to be useful for building a house will certainly have enough demand in many localities of the region where there are shortages of wood.', 'local soils with characteristics mentioned above. ', 'The soil will be taken out form the round using manual labour and appropriate hand tools; this soil will be mixed with a small amount of cement. The mixed material will be put in to a mixer. Then it will be conveyed by a feeder screw into a press where it is molded into blocks and compressed at 90 bar. Finally the molded blocks are taken out to dry for 2 to 7 days. Main plant and machinery include a mixer, feeder screw, a hydraulic press, a diesel engine and other hand tools such as spades, shovels and wheel barrows. ', ' Decreases the pressure on forest resources of the region and introduces new skills and technology, ' , '4 ' , ' 1'),

( 'Concrete Pole and Pile Making Plant ', ' Concrete poles and piles are made from cement, sand, gravel reinforcement or prestressing wire and some additives. Concrete poles are used for transmission and distribution lines, for communication lines, for trolley lines and for lighting poles. Concrete piles are used for foundations of buildings, piers for bridges, foundations for heavy machinery, elevated bridges and high ways, parts for concrete structure.', ' In most cases concrete poles are substitutes for wood and iron poles. In our country transmission, distribution, communication lines and street lights use wood or iron poles. Cutting trees for harvesting wood poles further aggravates the deforestation problems of the country. Iron poles are imported from abroad thus consuming our scarce foreign exchange resources. The use of concrete poles, therefore, saves out forests and conserve our foreign exchange. Besides these poles serve for a much longer time than wood poles. Use of concrete poles for transmission and distribution lines has been expanding in many parts of the country during the last 10 years. This trend should continue for conserving our forests. Concrete poles are extremely heavy and as a result are very expensive to transport. Thus, if economies of scale allow, their production should be distributed in different areas to avoid excessive transport cost. As the Amhara Region is one of the largest regions in the country, it requires many and long transmission, distribution and communication lines and also many lighting poles, The existing and future demand for concrete poles will justify the establishment of one or two concrete and pile poles making plant in the Region.', ' The main raw materials are cement, gravel, sand and wire. The first three will be secured from local sources and the last will be imported.', ' ', 'There are two technologies for producing concrete poles and piles-vibration process and the pre-cast spinning (centrifugal compaction) process. The spinning process is believed to be better than the vibration process. For this project idea, the spinning process is taken to estimate costs and production volume. The main stages in this process are mixing of cement and aggregate; wire straightening, cutting and assembling; mould setting; concrete feeding; spinning; steam curing; stripping; indicating water curing; air curing and inspection. More than 22 sets of machines are used for producing concrete poles and piles. The main ones are batch plant, concrete injection plant, spinning machine, wire straightening and cutting machine, wire-caging stand, wire heading machine, mould rolling device, overhead cranes, etc. ', ' saves foreign exchange, contributes to the conservation of forest resources, utilizes local resources (sand and gravel) introduces new skills and technology.' , '4 ' , ' 1'),

( ' Cut-Stone Production Plants', 'Cut stone is an important building material made from soft limestone or any other similar rock. The original or “mother” rock is cut and shaped to produce cut stone which has a relatively smooth surface and a regular shape like rectangle, square, diamond, triangle, etc. The use of cut stones enhances the quality, appearance and durability of buildings. It is usually residential buildings especially villas which are constructed from cut stones. ', ' In the Amhara Region stone is a major construction material especially in the rural areas. However, the stone is used for building walls without much improvement in its irregular shape. In the urban areas, masons use hammers to give some regular shape to the stones and this enhances the appearance of the building. Recently, cutting and shaping of stones for constructing buildings have become popular mainly in the big urban centers. However, the cutting and shaping of the stones are done manually which makes the final product not of high quality. Besides, productivity is low and the price of each cut stone expensive. There are also very few people in the Region who make cut stones. The use of cut stone for building material will increase with the expansion of the building industry which will be caused by rising population and income. The raw material for producing cut stone is available in almost all localities of the Region. To produce more cut stone with improved quality and possibility to reduce the current price, the process of making cut stone has to be mechanized. This project idea is to establish plants which will produce cut stones using machines.', ' A big indication of the existence of a captive market for cut stones is the fact that people in the Region buy Ambo stones and transport them more than 750 km to Bahir Dar. The main users for cut stones will be residential buildings, churches, fences of homes, some government buildings, some hotel buildings, etc. As the construction of these buildings will expand in the future, the demand for cut stones will also expand. If cut stones are to be supplied with comparable prices, people will prefer them to hollow blocks and bricks. ', ' The limestone or any similar rock from which cut stones are to be made is found in any locality in the Region.', 'The production process of cut stone involves cutting of the “raw” stone into prescribed shapes and dimension using cutting machines. Production equipment includes stone cutters, water pumps, coolers, other tools and accessories. ', 'Saves cement which has a large input of foreign exchange (fuel), utilizes the resource of the Region, introduces new skills and technology, stimulates building construction, enhances the appearance and durability of buildings ' , '4 ' , ' 1'),

( ' Graphite Crucibles Making Plant', ' Graphite crucibles are extensively used in small and big industries for melting metals and alloys of copper, zinc, aluminum, tin, iron, nickel, gold, etc. These crucibles are mostly used for melting and casting smaller quantities of metals in small scale foundries.', ' ', ' Small scale melting of metals takes place in large repair and maintenance workshops. One notable example is the big repair workshop of the Ethio-Djibouti railway company which has a foundry unit for melting and casting different types of ferrous metals. This foundry unit consumes many types of graphite crucibles every year. There are many other foundry units attached to factories or operating independently. These units consume large quantities of crucibles. So far all the requirements of graphite crucibles are met through imports. Since all the raw materials for making the crucibles are found in the country, it is possible to produce graphite crucibles here at home both for domestic consumption and for export.

', 'The main raw materials used to make graphite crucibles are natural graphite, bond clay, ferro-alloys, borax and other minor chemicals, and silicon carbide. Most of the raw materials are found in different localities of the Amhara Region.

', 'Flaky graphite graded to suitable size is mixed with clay and grog in suitable proportion Silicon carbide and borax and water are also added at this stage and pan mill is used for mixing. The mixed mass is allowed to age for a few days. The mix is then pugged manually or passed through a dearing pug mill to ensure good mixing. Water is also added to make a dense mass which can be directly worked on jigger and jolly or crucible press. The formed crucibles are mostly sun dried and glaze coated and loaded into a round up draft kiln fired with coal. After firing, the crucibles are left to cool and thin removed from the kiln. Main machinery needed include disintegrator, pan mixer, ball mill (porcelain lined), pug mill, crucible press, hand press, screen, dies, moulds and testing equipment, direct fired round furnace. ', 'similar to other projects. ' , '4 ' , ' 1'),

( ' Grinding Stone Production Plant', ' Grinding stones are mainly used for grinding of cereal into starch and flour. Grinding stone is made of hard tough and sharp abrasive material. The stone are used in small scale grinding mills frequently used by the rural population. ', ' Traditionally rural village women use ordinary stone to grind their grain. This method is a hard way for flour making and is tedious and hazardous to the health of the women. Currently in the rural villages the people use small scale grinding mills to process their grain. A small scale grinding mill serves a large number of households. There are many grinding mills in the region bought from Addis Ababa. However, there is no plant that produces the grinding stone. Since many people live in the rural region the production of grinding stone and constructing small scale grinding mills is very important to the development of the rural areas of the region.

', 'The demand of grinding stone is related to agricultural outputs particularly cereals production. Presently all grinding stone are imported in the country. There is however high demand of small scale of grinding mills by the rural population of the region. It is very important to encourage small scale grinding mills and particularly establishes a grinding millstone-manufacturing unit in the region.

', ' The main raw materials for grinding stone manufacturing are imported items and are: Silicon carbide, Graphite, Ferro Silicon, Other material like binders. ', ' Process The production of grinding stone involves: Required ingredients are prepared as per designed application and purpose of the grinding stone and are mixed with resign to prepare coated apprasive. Moulded millstone are baked in oven at required temperature and allowed to cool after baking. Millstone wheels are trued for outside diameter and finish. Wheels are finally tested. Machinery and Equipment: Crusher with fitting, Weighing scale, Ball mills with 7.5 HP motor, V through kneading mixture, Vibrating screen with dust accumulator, Hydraulic press, Testing equipment, Down draught kiln, Furnace/oven. Miscellaneous tools like kettle, mixing shovel. ', 'similar to other projects ' , '4 ' , ' 1'),

( 'Gypsum Board Making Plant ', ' Gypsum board is made of gypsum which makes up the core of the board and paper which covers both sides of the board? The product is widely used as a construction material. Gypsum board is commonly used for the construction of inside walls, ceilings and partition walls. The product has specific properties which makes it convenient as a construction material. It is light in weight, good for heat insulation and fire resistance, easy to handle during construction, does not deform or warp. Products of gypsum board include wall board, lath board, acoustic board, waterproof board and print board.

', ' ', 'Building construction is expanding in almost all parts of the country. Considering the volume of construction works the country has to undertake to reach a certain level of development, there will be huge construction works to be undertaken in the future. This will increase the demand for every type of construction materials including gypsum board. The main raw material is found in the country; hence the production of gypsum board should be encouraged.

', ' As mentioned above the main raw materials for making gypsum board are gypsum and paper. Gypsum is a non metal mining resource such as sand and limestone is found in many localities of the region. Paper will be imported. ', 'The main processing stages of gypsum board production include drying of the gypsum, gypsum calcining and forming and drying. The raw material gypsum is dried in a dryer, and then calcined to form a plaster. The calcined product is stocked in silos after milling. Heavy oil is usually. ', 'Increases supply of building construction materials, there by stimulating the building industry, utilizes a natural resource of the region, introduces new skills and technology. ' , '4 ' , ' 1'),

( ' Gypsum Powder Production Plant', ' Gypsum is a quarry material which in its various form has several and other uses.  It is widely used in construction industry (it is for instance one of the extender pigments in the paint industry), agriculture (in treating soil) and other section (for making plaster of parts) ', ' This important product obtains a relative advantage in its divers applicability and can enjoy a diverse (numerously & segmented) market.  The raw material quarry gypsum is widely available in the region, particularly in the Gorges of Nile River and various mountainous areas. It has not been exploited yet for use in different product manufacturing and there is no single factory that produces Gypsum powder in the region.  It is highly advantageous for the region economic development to manufacture Gypsum powder and other industries related to the product. ', ' Current demand of Gypsum powder is met from limited domestic production in other places and imports.  The need of it however, appears growing with the growth of construction and related industries.  Various building under construction in the region consume large quantity Gypsum powder in different form of products like in paints and plaster of paints for glass windows.  The quarry will develop the mining industry of the region and create employment for many people.   ', 'The main material, found locally are: Quarry gypsum (or gypsum stone), Packing material (3 ply paper bags) ', ' ProductionProcess**:**Gypsum powder production involves basically the process of preliminary crushing of gypsum ore or quarry gypsum stone, pre baking, crushing (to prescribed size) screening baking (calcening) milling and bagging.  The product obtained is semi hydrated or hydrous gypsum.ProductionEquipment :  Quarry equipment, Crushing equipment (with all accessories),  Kiln, Mill,  Packing machine,  Loaders,  Other (weigh scale, laboratory and workshop equipment tools ...etc)

', 'Similar to other projects ' , '4 ' , ' 1'),

( ' Lime Production Plants', ' Lime is used in different industries. For example, it is used as a gravel material for road construction, cement block making, burnt lime for agriculture and as inputs in the chemical industry.', ' Deposits of limestone are known to exist in some localities of the Amhara Region.  However, these deposits are not exploited to produce lime that could be used for various purposes.  As a result, all the lime requirement of the Region is met by imports from other parts of the country or from abroad.  Lime is one of those bulky products whose transport cost becomes prohibitive for transporting it long distances.  It is a local product for localized use.  Considering its importance in the construction industry and in agriculture, lime is one of those products that the Amhara Region should become self- sufficient.', ' Annual Production of lime and burnt lime in the country is about 11,000 tons.  If we assume that 25 percent of the production is the share of the Amhara Region, demand for lime will be 2,750 tons in the Region.  Hence this is the minimum demand of the product in the Amhar Region.', ' Limestone is a type of rock found in many localities of the Amhara Region. Sufficient deposits of limestone are found in most of these localities. The most appropriate sources of limestone are those which are close to major urban centers and located along main roads. ', 'Crushing of limestone from a quarry, separating the crushed limestone by size using sieve machines in to three grades of grain size.  One grade with smallest grain size is used for road construction, and in the concrete industry, agriculture and chemical industry.  The other grade with grain size of 30-80mm is used as a raw material for the processing of burnt lime.  The third grade with grain size 80-400mm is further crushed to a size of 0-80 mm which then is moved back to the intake sieve.  If the plant is to produce burnt lime another process will follow after the production of lime of size of 30-80mm.  Required machinery and equipment for the limestone quarry operation only with a capacity of 30 ton/hour include frontloader with 1.5cm.m shovel, compressor with 3 hammer drills, bunker, serve- machine, jaw-cousher and conveyor belts. ', 'Support the construction, agriculture and the leather industry sectors, utilizes a natural resource of the Region, saves financial resources of the Region, introduces new skills and technology to the Region. ' , '4 ' , ' 1'),

( 'Marble production ', ' Marble is the most durable, beautiful or attractive but also expensive building material.  Marble is mainly used for public buildings and monuments.  It is also used in the building of houses of the wealthy.  Marble is used for the construction of exterior walls and for flooring.', 'Outside Addis Ababa, the use of marble for building construction is of recent origin in the country.  It is during the last five to ten years that some public and private buildings were constructed from marbles.  In the Amhara Region, some new buildings, hotels, the head office of the Regional government, etc. are built from marbles.  The floors of many more buildings are made from marble.  The use of marble for some buildings will continue in the Region.  While imported processed marble is being used in the Region, the raw material-marble rock is found in some parts of the Region.  Up to now this marble rock is brought to Addis Ababa, processed and sold in processed and sold in Addis Ababa.  If the Region requires processed marble for building and if the raw material is available, it is simple common sense to promote a project which will process marble in the Region. ', 'Between 2000 and 2004, average annual production of marble (as reported by CSA) was about 187,000m2.  In the last few years, production of marble has increased substantially due to the establishment of Saba Marble in Tigray, and other plants located in Addis Ababa and Awash.  The main sources of marble rocks are Tigray, Wollega, West Gojam and Beneshangul-Gumuz.  Though new marble processing plants are being established, there is limitation in production capacity which forces buyers to wait for up to four months to get marble from the factories.  This indicates that demand is not being met on time due to production limitation. ', ' West Gojam and Awi Zones.', '  Big pieces of marble rocks are taken out from the “mother” rock either manually or by blasting operations.  The marble rocks are further cut into smaller pieces for processing.  The pieces are screened and polished to give them the final luster and smooth surface.  Finally the marble is inspected before shipment.', ' promotes self sufficiency, utilizes the natural resource of the Region, saves regional financial resource, will bring in financial resource to the region, introduces new skills and technology.' , '4 ' , ' 1'),

( 'Mini Cement Plant ', ' A cement is a material which binds together solid bodies (aggregate) by hardening from a plastic state.  Cementing is an essential ingredient of virtually every type of construction.  To be self-sufficient in cement production is one basic requirement for the development of the building and other construction industries.', ' All the cement requirement of the Amhara Region comes either from Muger or Mekele which are more than 500 km each from Bahir Dar.  Transporting cement from these areas increases the price of cement in the Amhara Region by at least 40 percent.  This makes the cost of cement more expensive than in any other larger region of the country.  The high cost of cement in the Region, retards the growth of the construction sector.  The recent upsurge in construction activities in the Region clearly indicates the need of establishing cement factory (ies) in the Region.  This project idea proposes the establishment of a small scale cement plant in the Amhara Region.', ' Between 2000-2004, average annual production of cement was 972,000 tons.  Since there were no imports of cement, domestic production of cement was equivalent to domestic consumption.  The share of cement consumption of the Amhara Region could be about 20 percent which was close to 243,000 tons per year.  This annual consumption has increased substantially during the last two years.  Partly due to increased demand, the price of cement has increased to an unprcented level and this has seriously affected the construction industry especially in the Amhara Region where the price increase has been the highest.  In the long-run, the best solution for the Region is to establish a large cement factory with conventional technology and production processes.  This will require huge investment perhaps close to Birr billion which can be beyond the financial resource of investors in the Region.  The alternative will be to go for a small scale technology which requires less investment.  Until such a time that large scale investment is undertaken in the Region to produce cement, small scale production of the product will satisfy part of the demand for cement in the Region.', 'Raw materials used to produce cement are lime stone, clay, bauxite, iron ore and gypsum.  Except the iron which is required in very small quantity, the other raw materials are found in the Region. ', 'The technology to be used is the vertical shaft kiln process which is appropriate for small scale production.  The main process is as follows.  Limestone, clay and coal, after primary crushing are proportioned and finely ground in a ball mill and then nodulized in a dix nodulizer.  The nodules then falls by gravity in to the vertical shaft kiln, where they come into contact with pre-heated air.  The fuel in the nodules ingnites providing the necessary heat for clinker formation.  By the time the materials leave the conical portion of the kiln and enter the cylindrical portion, they have already been converted into cement.  The clinkers are mixed with gypsum and finely ground in a tube mill to give Portland cement.  Main plant and machinery include: jaw crusher for lime stone, blender, ball mill, jaw crusher for clay, vertical shaft kiln, coal dust burner with pulveriser, clinker and cooler, ball mill for finishing grinding, filling machine, sealing machine, and testing equipment. ', ' Promotes self-sufficiency, stimulates the development of the construction sector, saves regional financial resources, introduces new skills and technology.' , '4 ' , ' 1'),

( ' Mosaic Tiles Making Plant', ' Mosaic tiles are major input in the building construction industry. Mosaic tiles are small square tiles used to cover floors, interior walls of bath rooms and exterior walls of buildings. The files are made from clay, silica, feldspar and cement. All these raw materials are found in the country. Compared to mortar plastering and painting of exterior walls, mosaic files have longer life before they need repair and maintenance. They have also decorative purposes.', ' ', ' There is no domestic production of mosaic tiles. All the need of the building construction industry for these tiles is met by imports. Imports of mosaic tiles are not registered separately; it is included in the plastic tiles import figures. An average annual import of the two types of tiles between 1987 and 1993 was about 110000 kgs or 110 tons. The demand for mosaic files has been projected to be 48615m2 in 2007. On the average, about 20 kgs of mosaic tiles cover one m2 of floor or wall area. This means that the projected demand is 972300 m2 of mosaic files.', 'The basic raw material for producing mosaic tiles include Portland cement, white cement and sand, marble chips, mineral colors and chemicals. Except the colors and the chemical (which constitute a small fraction), the other raw materials will be obtained locally. ', 'A series of operations are undertaken produce mosaic tiles. These include crushing, pulverizing, drying, ageing, forming, glazing, calcinations, screening, back mounting on paper and packaging. Crushing:-  the mined mineral raw materials are crushed by hammers to the size of about 20cms; Prior to primary crushing in a jaw crusher. It is then further crushed in an impeller breaker to the 4 mesh size and below. Pulverizing:- the crushed materials are blended in a fixed ratio for pulverization in a ball mill together with water. The pulverization continues for about 17 hours at a rotation speed of 17 rpm. Drying:- the mixture of the raw materials and water is called slip. This slip is sprayed on a spray dryer and dried at a temperature of about 450-5000C. Ageing:- the dried powder is left for ageing for 48-72 hours to facilitate subsequent forming:- the powder is put into metallic moulds according to sizes and formed by applying the pressure of 300-350kg/cm2. Glazing:-  materials are produced outside the plant. The glazes are sprayed on to the formed semi-finished products until the glazing reaches a prescribed thickness while moving on a net conveyor. Calcination:- this is to put the glazed semi-finished product into a refractory box and then place it on a cart. The cart is then placed into tunnel kiln at 12500C for about 33 hours. Screening, back mounting and packing:- The products calcinated in the kiln are screened, back mounted and inspected. Required machinery and equipment include jaw crusher, impeller breaker, vibrating screen conveyor belt bucket elevator, fret mill, ball mill, dryer, friction press, high pressure press, glazing machine, tunnel kiln, tile moulds. ', 'Similar to other industries. ' , '4 ' , ' 1'),

( 'Plaster Board Production Plant ', 'Gypsum plaster boards are a low cost substitute for play wood and fiber board for insulation, light weight partition and false ceiling.  Due to their low cost plaster boards can be used in the construction of homes, schools and other buildings. ', 'There is extreme housing shortage in the urban centers of the Amhara Region and prices of construction materials are becoming very expensive excluding the majority of urban dwellers from building their own houses.  Plaster boards which are relatively cheap can reduce the cost of building houses to some extent.  Production of this type of building material should promoted to be established in the Region.  The production of plaster boards could substitute wood and wood products thereby contributing to the conservation of the remaining forest resources. ', ' Due to increased construction activities in practically every part of the Region, there pare shortages in most types of construction materials which have translated into high prices for these materials.  The production of any construction material with relatively low price will be a welcome development in the construction industry of the Region.  In fact this product could enhance the expansion of the industry by removing some bottlenecks in the material supply of the sector.', ' The main raw material is gypsum and this is found in the Amhara Region.', ' First gypsum is calcined in the furnace and the material is cooled.  Then it is ground to fine powder and screened to remove any foreign material.  Moulds of desired design and size are made from wooden for casting of boards.  Plaster of pairs is mixed with measured quantity of water and made into paste.  The paste is then poured in cleaned and well lubricated marble slabs.  The boards should not have a thickness of less than half an inch and may be reinforced with coir fiber, sisal fiber, sisal fibre, jute or cane lambor to increase its strength.  Any excess plaster is removed by crossing the mould with a wooden stick or iron pipe.  The board gets set in 15 to 20 minutes time when it is removed from the mould and air dried for 3 to 4 days after finishing.  Main plant and machinery include disintegrator, pulveriser for fine grinding, magnetic separator, wooden tables fitted with highly polished marble slabs, wooden moulds, calcinations kin.', ' enhances the development of the construction industry contributes to elimination of bottlenecks in the supply of construction materials, utilizes domestic natural resource, creates new skills, introduces new technology.' , '4 ' , ' 1'),

( ' Plaster of Paris Making Plant', ' Plaster of Paris is a white powder which hardens after coming in contact with water. The most important use of this product is in plastering in broken bone surgery. It is also used in making decorative tiles, sculpture, etc. Other uses of plaster of Paris include making slip cast refractory blows, architectural decoration for the formation of decorative friezes, cornics, columns, and other decorative features in interior finishes, making impression for dentures, inlays and for the casting of metal fillings, etc... Plaster of Paris is made from gypsum which is a non-metallic mineral. When gypsum is heated to 1210C, it loses a property of its water of crystallization and forms a quick setting cement of plaster of Paris.', ' During the last 10 years, the building industry of the country has been expanding greatly. As a result all building materials hare been experiencing rapid growth in demand. Along with the expansion of building construction, the need for plaster of Paris has also bean increasing, Many new buildings. now use plaster of Paris for interior decorations with intricate and attractive designs in ceilings and columns. Though the raw material for making plaster of Paris is available in the country, commercial production of plaster of Paris has been non-existent. The domestic demand for this product is still being met by imports. Given the increasing demand for this product and the availability of the raw material, it is only economic common sense to promote the production of this product in the country. The Amhara Region is an ideal place for the plant since the raw material is found in many places.', 'The great expansion of building construction in/all parts of the country is a clear indication of the existence of a substantial demand for plaster of Paris. The other uses of the product also increases its demand Plaster of Paris can be produced by any scale of operation and this will make a small scale plant financially viable. ', 'localities where there are gypsum deposits. ', 'Raw gypsum is first broken into small pieces in a disintegrator. Lumps of white gypsum up to a maximum of 10cm sizes are washed with water to lower the silica, iron, aluminum oxide and carbonate in an open cement drying yard. If the raw material is marine gypsum, then it must be washed with water followed by further washing by dilute sulphuric acid to remove the chloride. Then the gypsum is pulverized and sieved and taken to the calciner for calcinations. The temperature of the calcining kettle is maintained between 1200C to 1400C to 3 hours with continuous mixing of the powder. Later the powder is ground in a ball mill to 200 mesh. The product is packed in airtight containers like polythene bags or drums. Main plant and machinery include ball mills, tray dryer, wash tank, filter pans, humidification chamber, calciner. ', ' ' , '4 ' , ' 1'),

( 'Production of Ambo Type Stones ', ' ', ' ', ' ', ' ', ' ', ' ' , '4 ' , ' 1'),

( ' Production of Gemstones', 'Ambo type stones are stones which have different natural colors in on slab (piece) of stones. The most well-known stones having different colors are those found near Ambo town about 130km from Addis Ababa. Because of their attractive colors, Ambo stones are used to build residential houses of high income families, high class hotels, fences of large villas in Addis Ababa and in other urban centers of the country. Ambo stones are cut from large rocks found under the surface of the ground. Reach slat of stone is chiseled and made generally in to rectangular shapes. ', ' ', 'Because of their attractive colors, if available people will use Ambo-type stones to build their houses and even their fences. In many urban centers of the Amhara region, one finds houses and hotels guilt from Ambo stones. These stones are transported from Ambo in the Oromiya region to Dejen. Debre Markos, Bahir Dar, Dessie and to the other urban center of the region. The stones are heavy which makes them very expensive to transport. The transport cost makes the stones price of the stone to be extremely high which discover age’s people form using these stones for building their houses. At present, it is only people with high income who con afford to buy these stones. There are many localities in the Amhara region where Ambo type stones can be found. For example there are sites near Qusquam in Gondar where these stones can be excavated. The terminal building at the Azezo airport is built from Ambo type stones. Red is the dominant color of stones found around Qusquam in Gondar. There are also sites in Checheho (along the Woreta Woldiya road about 15 km from Nefas Mewcha town) where Ambo type stones are found. Some of these stones are sold in Bahir Dar. There can be hundreds of other sites in the region where Ambo type stones can be found. It is a question of looking for these sites by asking the local population and also by traveling through parts of the region. If these stones are produced in the region, their prices will be low and the demand for the stones will increase. ', 'A potential investor will look for sources of these stones. To start with Qusquam in Gondar and Checheho near Nefas Mewcha will be initial sources of raw materials. ', ' ', ' Stimulates construction of houses, hotels, restaurants, etc, utilizes the natural resource of the region, and saves financial regional financial resource.' , '4 ' , ' 1'),

( ' Production of Water Filter Candle', 'Water filters are devices used for filtering water for the purpose of dinking or for laboratory tests. Water filter candle is an element which filter candle is an element which filters the water by detecting foreign materials and ----- from the water. There are different kinds of water filter candles. They are available in circular bar form and can be easily cleaned. ', ' ', 'Water filters are used in homes, hospitals, restaurants and in hotels. Recently the use of water filters by households has increased. Projected demand for water filters will reach around 30,000 units in 2010, and demand for water filters candles is expected to reach about 60,000 with the assumption that one water filter will use two water filter candles. Of the projected national demand for water filter candles, about 26 percent will be the share of the Amhara Region. ', ' The main raw materials are chin clay, starch, silver nitrate, common salt, insulation brick powder, saw dust and plastic nipples. Some of the basic inputs such as china clay, salt, starch, frick powder and saw dust will be obtained form domestic sources. ', ' The major processes are mixing moulding and saw dust and insulation fire brick are sifted and their sizes reduced to the desired level. Then the raw materials are mixed together and the candles are carted in the moulds. Then the wet candles will be dried in two stages- sun drying and firing in a kiln at 1000%c to 1100%c. The dried candles are then fixed with plastic nipples with white cement. Finally the candle surface is rubbed with sand paper to make a smooth surface machinery required include pulviriser, sieve shaker, dies, and hot plate, furnace and lab equipments.', '  Improves the health standard of consumers, saves foreign exchange, and brings in financial brings in financial resources to the Region.' , '4 ' , ' 1'),

( 'Reinforced Concrete Cement Pipes ', ' These pipes are made from cement, sand, metal stone and mild steel rods which are used as reinforcement for increasing strength. The pipes are used to carry drinking as well as irrigation water. They are also used for drainage and sewerage systems in road and building constructions. The pipes are replacing canals for carrying water to fields which reduces loss of water due to seepage and evaporation.', ' ', ' Reinforced concrete cement pipes are used in the drainage system of urban areas, in rural and urban road construction, in the construction of buildings for different purposes, in irrigation and sewerage disposal projects. In short, they are major inputs in almost all types of civil engineering and building construction works. As mentioned in many other project ideas, these works have been expanding in the country during the last 5 to 10 years. This is manifested in the number of urban and rural roads water supply, drainage and sewerage and building works undertaken throughout the country. These cement pipes consuming engineering works have also be undertaken in the Amhara Region. Like many other construction material, cement pipes are transported from Addis Ababa to all construction sites in the Amhara Region. By the nature of their shape, cement pipes takes a lot of vehicle space when they are transported. It is a common sight along the major roads in the country to see one large truck carrying  a small number of large pipes and moving them From Addis Ababa to construction sites hundreds of km. from Addis Ababa. This makes the pipes more expensive. However, if cement pipes are produced at least in the major urban centers of each Region, the pipes will be less expensive and this will stimulate the construction activities of the Region. More drainage, sewerage, irrigation and water supply systems will be built. Given the tempo of construction activities in the Amhara Region, establishing at least three modern reinforced concrete cement pipes making plants could be viable. ', ' Cement, sand and metal stone can be obtained from sources in the Region. Mild steel rods can be imported from Addis Ababa until the Region produces its own metal based construction materials. ', 'The first step is the preparation of reinforcement on a winding machine. Size of these rods depends on the size of the pipes to be made. Next, the reinforcement cage is placed inside the pipe mould which is then mounted on the trunnians horizontally. The mould is roated slowly and cement concrete mixture, prepared in a mechanical mixer by mixing one part of cement, 2.5 parts of stone metal and 2.5 parts of sand of proper size with the required quantity of water is fed from the open ends of the mould. After the required quantity of the concrete mixture has been fed, the mould speed is increased and after about 15 to 20 minutes, the inside of the pipe is smoothened with the help of a long rod which also throws out any excess water present inside. To produce additional finish of pipe from inside and reduce coefficient of friction, cement is sprinkled and mould rotated for some more time. Then the pipe mould is removed from the trunnian along with the concrete pipe and put in the curing place for one day and the mould is removed. The "green" pipe is rolled into a curing tank and allowed to remain standing in water for about 15 days. The cured pipe is tested for strength, porosity, dimensions, etc. on the basis of nationally accepted standards. Pipes below standards are rejected and considered as scraps. The list of machinery and equipment required for producing reinforced concrete cement pipes include pipe moulding machine complete with trunnions and driving arrangements, concrete mixer, reinforcement winding machine, lifting tackle rails with frame, etc. pipe and collar moulds and end rings, testing machine and other testing apparatus, etc. ', ' Promotes self-sufficiency in a key construction inputs, stimulates agricultural production through the development of irrigation.' , '4 ' , ' 1'),

( ' Roof Tiles from Clay', ' Roof tiles are non-metal construction materials made from clay soil and used of using roof tiles from clay is that they last longer than any other roofing material and they are also cheaper. But the tiles are also heavy and they need stronger load carrying structures.', ' ', 'Currently in the urban areas of the Amhara Region only galvanized corrugated iron sheets are used as roofing materials. They are made from imported rolls of iron sheets which are imported. Similar to many other products made from imported inputs, corrugated iron sheet are becoming more and more expensive. Roof tiles from clay to be made from clay soil will be   less expensive and it will not require the use of foreign exchange for acquiring the main input. The demand for roofing material is a function is population growth of per capita income, volume of housing replacement and roofing improvement, price of other substitute. All these factors have positive impact on the demand for roof tiles from clay. The 420,000 families (2.1 million divided by 5) living in the urban areas of the Amhara Region require at the minimum 50m2 of roofing material per family. The population of urban areas grows at the rate of five percent per year. This means the demand for roofing material also grows at the same rate. The current stock of roofing material is,) about 21 million m2..Following the pattern of the growth rate of the urban population, the demand for new roofing material will be 1.05 million m2?Additional demand for roofing materials will come from replacement and improvement. If these constitute about 25 percent of new demand, total demand for roofing material in the urban areas of the Amhara Region will be around 1.3 million m2.Per year. Considering the possible price advantage that roof tiles from clay will have over corrugated iron sheets, these tiles will take a portion of the market of roofing materials in urban areas. If we assume that at least 10 percent of the market will be taken by the tiles at the initial stage, demand for roof tiles from clay will be 130,000 m2.(1.3 million m2.x 10 percent). One piece of clay tile might measure about 0.4 m2..Hence total demand for these tiles will be 325, 000 pieces per year. This volume will justify the establishment of a plant which will produce roof tiles from clay. ', '  Clay soil is the main raw material and this is found in many localities of the Amhara Region.', 'The major processing stages for making roof tiles from clay are preparation of the clay soil (i.e excavation of the soil from the ground, removing “foreign” materials, probably grinding or breaking the soil into finer particles, moving the soil to molding section, adding water to the soil and making it into a “dough”, putting the “dough” into moulds, firing the “green” roof tiles in a specially designed “oven”, removing the fired tiles from the “oven”, and finally staking the finished clay. Main machinery needed includes heavy duty trucks, excavators, water and clay mixing units, molding unit, firing chamber, fork lifts and other auxiliary machines and tools. ', 'Saves foreign exchange and regional financial resources, utilizes local natural resource, stimulates better urban housing construction ' , '4 ' , ' 1'),

( ' Sheet Glass Making Plant', 'A sheet glass is a rigid, brittle, transparent material which is produced by fusing mainly silica sand, lime and soda ash. It can be produced in a wide range of sizes with a thickness of 2 to 12 mm. Sheet glass is used in the building industry for making windows and doors as well as for furniture, show cases, mirrors, green houses, etc. ', ' ', 'The major users of sheet glass are the building and furniture industries. The total demand for the country is currently met through imports as there is no plant that produces sheet glass. The demand for sheet glass mainly depends on the expansion of the building industry. And this industry is experiencing its robust expansion since modern building construction started in the country. One can observe this expansion in every major urban center of the country; and this is despite the high costs of construction materials. The building industry is believed to grow at the rate of six percent per year. The demand for sheet glass is assumed to grow at the same rate. Accordingly, the current demand for sheet glass is estimated to be 2.734 million m2. In 2012, projected demand will reach about 3.63 million m2. If the main raw material silica sand is available in the region, the demand for sheet glass can justify the establishment of a sheet glass making factory. ', ' The main raw materials for making sheet glass are sand (64%) lime stone (7%), soda ash (14%), dolomite (14%) and some other minor inputs. Sand, lime stone and dolomite can be found in the region. Soda ash can be brought from Oromyia Region.

', 'Major ingredients are proportionally fed to a batch mixer. The small ingredients are dosed on the belt conveyor which feed the ingredients to the batch mixer. The mixed batch from the storage bin is fed to the furnace via a belt conveyor with the batch distributor so that it can be distributed uniformly in the furnace. There the mixed ingredients melt and the molten glass is homogenized as it slowly flows through the regaining vessel, and then its viscosity gradually drops. This molten glass is drawn vertically from the furnace through a so-called “dibiteuse” by means of a drawing machine. The glass is continuously drawn upward in ribbon form and its surface is chilled by adjacent water coils. Then it passes through the annealing chamber. After cooling down completely the glass is cut to required sizes and packed in an appropriate way. The major machinery and equipment required include sand crushing and refining unit, storage and mix preparation machines, melting furnace facilities, cooling system, finishing line, compressor station and other auxiliary equipment. ', 'Saves foreign exchange, generates income to the region, promotes self-sufficiency, introduces new skills and technology and utilizes domestic natural resources. ' , '4 ' , ' 1'),

( ' Simple Glass Mirrors Making Plant', ' Silvered glass is popularly known as mirror and it is used for seeing the image of any physical body.  Mirror is very useful item in our daily life.  It is used in every home and almost by every individual.  In addition, mirror is used in automobiles, trucks, trains and in so many other areas.', 'About 19.2 million people live in the Amhara Region of whom close to 1.92 million are urban residents.  Considering the difference in urban and rural culture, we can say that almost all of the urban residents and 50 percent (women) of the rural people of the Region use mirrors.  All the mirror requirement of all these people is imported through Addis Ababa.  Producing the glass that could be converted to mirror in the Region might take sometime.  But it is possible to import the glass, make the coating and the preparation of frames and cases in the Region and make the Region self-sufficient in the supply of mirrors.  This is why this project idea is included in this document. ', 'As indicated above, total number of people who are potential customers of mirror is about 10.6 million.  This is about 2.12 million families.  If we assume that there is at least one mirror in every family, that means there are 2.12 million mirrors (of different shapes and sizes) in the Amhara Region.  If twenty percent of these mirrors are replaced every year and the demand for new mirror is about 3 percent per year, total annual demand for mirror in the Region will be 488,000 (20% of 2.12 million + 3% of 2.12 million).  This conservative demand estimation for mirrors indicates that there is sufficient market for mirrors in the Region which can absorb the production of a number of mirror producing plants. ', 'To be imported. ', 'Cleaning of the glass surface to be polished or to be silvered.  The glass surface is cleaned with the help of anionic detergent.  After washing the glass is applied in a blow of hot air.  (The solution for coating one side of the glass is prepared separately.)  For preparing the first solution the silver nitrate and ammonium nitrate are dissolved in distilled water.  Equal volumes of the above solutions are mixed; the mixture is then made to 80 percent larger by adding water.  The cleaned glass plats are put on a table and silvering or coating is done one one side of the glass. ', ' Saves foreign exchange and regional financial resources, promotes self-sufficiency in industrial production, and introduces new skills and technology.' , '4 ' , ' 1'),

( ' Simple Glass Mirrors Making Plant', ' Sprayed Polymer Mortar', '"Gascon" Polymer mortar is an intermediate construction material used for the construction of low cost housing and  other building structures such as barns, stores, cattle shades, etc. It is a light weight (100 pcf) structural (3000 psi) mortar made by adding a liquid polymer additive known as Gascon to standard batches of cement, sand and water. The main advantages of this construction material are it eliminates cold-joint delamination and shrinkage cracking during spray application; it is an excellent thermal insulator; it does not require forms in the construction of conventional and thin-shell reinforced concrete structures; it requires 30% less material than do conventional methods; it results in a 30% reduction of gravity loads as well as a 30% reduction of earth quake forces; and it is fireproof, termite-proof, dry rot proof and earthquake and typhoon resistant. The material can be widely used for constructing houses for low income people both in the rural and urban areas of the Region.  ', 'Except in some sections of the urban centers, all houses in the Region can be considered as substandard. If the standard of living of the people permits, almost 90 percent of the houses need upgrading or replacement. But forced by poverty, the overwhelming majority of the people in the Amhara region live in houses unfit for human habitation by the standards of even recently developed countries. One of the major constraints for the poor or sub-standard housing in the Amhara Region is the lack or shortage of affordable modern construction materials such as mortars, roofing products, doors, windows, etc. Practically all the industrial construction materials consumed in the region are either imported from abroad or from other parts of the country. On top of increasing prices of these materials, the transportation cost makes them very expensive to house builders of the region. Building materials such "Gascon" polymer mortar will reduce the cost of construction thereby increasing the number of people who can build better homes with improved standards. In every urban center of the Region, there are extreme shortages of residential houses for every class of people:- civil servants, merchants, young couples and other social groups. As a result, people are forced to pay exorbitant rents for small rooms or "houses". If construction costs decrease due to inexpensive building materials, more and more people will be able to build their own houses.  Of the 19.2 million people (2006) living in the Amhara Region, about 2.2 million (11.5 percent) live in urban areas. Of these urban residents, it is safe to assume that at least 50 percent do not have their own houses. This means that about 1.1 million people or 220,000 families do not own their own houses. If we assume that one family needs 50m2 of a house (at the minimum), the housing requirement for the 220,000 families will be 11 million m2 or 220,000 units. To build a 502 house, about 25,000 m3 of "Gascon" polymer mortar is needed. Hence to build 11 million m2 of houses, about 5.5 million m3 of the product will be needed. This is the potential demand for "Gascon" polymer mortar in the Region. If we assume that these housing units will be built in the next 10 years (with out considering additional annual demand), the annual demand for the mortar will be 0.55 million m3. This demand can absorb the production capacity of many polymer mortar producing units to be located in the Region.   ', ' The main inputs are cement, sand and a liquid polymer additive called Gascon. The liquid polymer will be imported while the two other inputs will be obtained from national and local sources.   ', ' The process involves the mixing, pumping and spraying of the mortar using a standard plaster mixer pump. The machinery and equipment needed for the project will be taken to the construction site where the houses are to be built. The main machinery and other equipment needed are mixer pump, hoses and couplings, water quick fill tank, miscellaneous equipment.', ' increases the number of better housing units in each urban center fo the Region, reduces the extreme shortage of housing in the Region.' , '4 ' , ' 1'),

( ' Wall Tiles Making Plant', ' Wall tiles which are used to cover building walls are made in various types - porcelain, semi-porcelain, fine earthenware, etc. Wall tiles are mostly made from quartz, feld-spar, kaolin, clay, etc. The tiles may broadly be classified into those for external and internal decoration. Porcelain tile is used for exterior and earthen tile for interior purposes. Unglazed tile is used for the coverage of floors and glazed tile is used for the purpose of decoration.', ' ', 'In the past wall tiles were used to cover the walls and floors of bath rooms, kitchens, etc. In recent years wall tiles have been used to cover the outside walls of multistory buildings. The interiors of hospitals, clinics, pharmaceutical buildings, food factories and the like are covered with wall tiles. A trip through the major streets of Addis Ababa reveals that the outside walls of many new high rising buildings are covered with tiles. This indicates that the demand for these building materials will increase and the building industry expands as it has been doing for the last 10 years. There is only one factory (located at Awasa) which produces wall tiles. But most of the wall tiles used by the building industry of the country are imported, and the import volume has been increasing at increasing rates. The wall tiles consumption of the Amhara Region is meet by the supply of the products from Awasa (more than 850 km from Bahir Dar) or from imports. As the demand for the product will certainly increase in the future, the Amhara Region has to produce its requirement of wall tiles within the Region. Production of wall tiles in the Region could also be a source of supply for the Beni-Shangul Gumuz Region and for eastern Sudan. The demand for wall tiles of the Region and of adjacent areas will justify the establishment of a wall tiles producing plant.   ', '  The main raw materials for making wall tiles are mentioned above. All of the raw materials are found in the Region but their deposits must be studied further to determine the location of the proposed plant.', ' The main production stages are blending, crushing, grinding, molding, drying and firing. Tiles are made either glazed or unglazed. Main machinery needed include crushing and needed include crashing and preparation unit, forming and glazing unit, firing unit sager making unit other miscellaneous units. Please not that process descriptions given in a very summarized form. ', 'promotes sell-sufficiency, utilizes regional natural resources, and facilitates the development of the building industry, potential export to neighboring regions. ' , '4 ' , ' 1');

( Electrical, Switches, Socket and Plug', 'Electrical switches sockets and plugs are made from electro plated metal and their thermosetting plastic.  They serve mainly in building construction sector for and control of electric power supply. ', ' Majority of building, mainly dwelling units, are electrically lighted.  The electric power supply needs switches, socket and plug for use of electricity to different purpose.  Presently there is high usage of electricity in urban houses and the spread of rural electrification has been intensified. New customers of electricity users are increasing.  It is necessary to have a plant that produces the electrical components.  The region has no single plant that produce electrical switches socket and plug and it is necessary to establish a factory that serves the potential and existing demand. ', ' Demand for electric switch, socket and plugs in the region is currently met entirely from import. Construction of electrically lighted building/dwelling office and others is rapidly increasing in all urban towns of the region.  The building require large amount of electrical components.  There is also potential demand of the non-dwelling building constructions (institutional, commercial, industrial etc).  The supply of the electrical products can service the demand and will have sufficient market in the region. ', 'The major raw materials are imported.  They are:   Plastics, Metal sheets,  Nickel plating material, Zinc platting material, Other chemicals, Packing materials', 'The production of the Electrical products basically involves the process machining (lathing and punching of metal parts, and spring making) galvanizing, molding of plastic parts, assembling, inspection/testing and packing Machinery and Equipment: The production equipment is: Presses, Cleaning (scouring) equipment Trimming machine, Furnace, Sheering equipment, Electric planting equipment, Milling machine, Injection molding machine, Lath (Bench), Air compressor, Drills (Bench), Other (vise, carriage storage boxes work tables, Grinders,  racks and etc. The major machinery and equipment are imported. ', ' ' , '5 ' , ' 1'),

( Assembly of Small Transformers', ' A transformer is a device which is used to transfer electrical power between two electric circuits which operate with alternate currents of different voltages.  Transformers are extensively used in almost all electronic and electrical devices.  Transformers are used to step down and step up the voltage of alternating current.  In radios to step down the voltage from 220 volts to 110 volts.  In transistors to step down the voltage from 220 to 1.5- 12 volts.  Transformers are also used in nigh lamps, voltage stabilizers, eliminators, televisions and so many other devices.  Transformers are of various types and make.', ' Making transformers at least of the smaller types does not require advanced technology and highly trained and skilled technicians.  However, there is no any single transformer making/ assembly entity in the whole country.  All types of transformers that the country needs are imported.  To be fair, there are some workshops in Addis Ababa which repair and maintain some types of transformers mostly the smaller ones.  Again the Amhara Region will have an advantage if it starts assembling transformers (even small ones) ahead of other regions.  This is why this project idea should be promoted and supported by the Region.', ' Assembly of small transformers is partly an import substitution activity and this is usually done stage by stage.  The initial stage would be to import the main components of the transformer and assemble them here for the Regional and National market.  The existing domestic market for small transformers can absorb the production of a new plant that will assemble small transformers.', ' Basically, a transformer is made of a core, a primary and secondary coil.  The core or the magnetic circuit is made of steel.  The steel used for the core is generally a silicon iron alloy which has been cold rolled.  The coils are made from copper or aluminum in the form of strips or foils.  Copper wire is insulated with a high temperature resistant insulating material.  These components to be assembled will be imported.', 'Main process is as follows: winding of the primary and secondary coils, insulating the coils with insulation paper, packing the stampings with the former, providing connection joints at the transformer for the primary and secondary coils.  Main plant and machinery include winding machines, multimeter, stabilized power supply units, oscilloscope, testing jigs. ', 'saves foreign exchange to the country, saves financial resources to the Region, beginning of and electrical  industry, introduction of new skills and technology. ' , '5 ' , ' 1'),

( Computer and Photocopiers Assembly', 'Computers and Photocopiers have become indispensable office equipment since the beginning of the 1990’s. This equipment has invaded the offices, the class-rooms, the libraries etc. of practically every part of the world. Today it has almost become unthinkable of an office without a computer and even a photocopier. Computers have also become part of household fixtures in many countries.   ', ' ', ' So far our country is one of the least computerized countries in the world. It has one of the lowest per capita ownership of computers. It is also one of the least connected to the global information super highway. But the level of computer use has increased during the last five years; and the use of this machine is increasing at an increasing rate. Every year tens of thousands of computers are either being imported or assembled here at home. But there is a long-way to go. If we assume that at least 15 percent of the families of the country should have one computer each, the total demand for the machine by households will be about 2.3 million units. And this figure will increase as more and more families want to own computers. This, added to the demand by schools, offices and other institutions will boost the aggregate demand for computers and photocopiers. The Amhara Region with about 27 percent of the population of the country may constitute at least 20-25 percent of the demand for computers by the household sector. Compared to some other regions of the country, the schools of the Region are not provided with the minimum computer requirement. When this problem is addressed properly, the school system of the Region may absorb thousands of computers. Preliminary potential demand estimates of computers by the various users of the Region put the figure at about 500,000 units. Even if we reduce this figure by 50 percent, the demand for computers in the Region will be around 250, 000 i.e 0.012 computer per inhabitant of the Region. Even this conservative demand estimate will justify computer and photocopier assembly plant in the Region.', 'The parts and components of the machines will be imported. ', ' Process of an assembly operation is simply the fixing, joining, riveting connecting of parts and components and the final testing of the product. Technology refers to tools, instruments and implements used for the assembly work.', ' Promotes self-sufficiency, saves foreign exchange, saves regional financial resources' , '5 ' , ' 1'),

( ' Computer training center', ' The computer software is divided into two groups viz. System software and Application Software. The system software is used for application development. It operates and interfaces with system software. Application software has wide scope for development than system software.  
The widely used application software are word processors, spread sheets and databases. Software like spreadsheets has simplified task of budgeting financial analysis, forecasting less time consuming, efficient, accuracy, simple and easy job. The database software has revolutionsed the data management of storing, organizing and retrieving information from large source of data.', ' ', 'Information processing has become one of the most significant indsutries in the world in the recent past. In view of its tremendous potentialities for information processing, data management, design, production, management and other numerous application for overall development of the economy. There is a growing need for trained manpower in this area. As such there may be a large potential for software experts in the coming years. ', ' The programs being conducted by the center are advertised regularly in the local newspapers, etc. The selected candidates are guided by professional counselor for the course suitable for them depending on their background. They are also provided with the detailed program indicating content of the course, duration, course fees, etc. The course material will be given to the selected candidates. Students get normally 50% of the course time on computers. The institute will also provide additional computer time for undertaking projects. The center may also offer placement assistance to the students in various corporate sectors. Besides the training, the center can also undertake separately data  
processing work.  
  
The center can offer 4 to 12 weeks duration short term courses and long term courses like Certificate Course in Computers, Diploma in Computer Applications, Advanced Diploma in Computer Science, Post Graduate Diploma in Computer Science, etc.', ' 1. Computer system of Intel P-III (500 Mhz) CPU, 128 MB RAM, 20 GB hard disk drive, 1.44 MB floppy disk drive, CD ROM Drive, 64 bit PCI sound cord speaker system, internet card PS/2 Mouse 14" SVGA colour monitor with AGP cord PS/2 mouse, 8 MB VRAM 2 serial and 11 parallel ports, 104 computer key board modem 2. Computer system of Intel P-III (500 Mhz) CPU, 64 MB RAM, 8 GB hard disk drive, 1.44 MB floppy disk drive, CD ROM Drive, PS/2 mouse, SVGA colour monitor with AGP cord with AGP cord, 8 MB VRAM, 104 computer key 3. Uninterrupted power supply 1KVA 4.Overhead projector 5. Laserjet printer, 6. Installation and electrification, 7.Computer software (MS Office, Visual Basic, Studio, OOPS (C++), UNIX, Oracle, etc) 8. Computer furniture', ' ' , '5 ' , ' 1'),

( ' Dry Cell Battery Making Plant', 'Dry cell batteries are mainly household and professional applicable products for use in providing energy for lamps, radios tape recorders, cassette players etc.   ', 'The product is handy and is used in urban and rural areas by each household.  In areas particularly of darkness the flashlights and in absence of electricity transistor radios and lamps use dry cell batteries.  They are demanded by large section of the population both in the rural and urban areas.  However, there is no a battery cell making plant in the region and it is important to have a dry cell battery making plant to serve the huge existing demand.  ', ' The demand for dry cell batteries is increasing as its one of the main basic items needed by the population.  Currently demand is met by small number from local production and imported in large quantity from abroad.  The demand has not been adequately met and there is a shortage in supply by local production.  It will be necessary to establish a dry cell battery making plant in the region. ', 'The main raw materials are all imported.  They are:-  Manganese,  Zinc,  Carbon rod,  Zinc plated bottom,  Polyethylene cup,    Nick plated cups ', 'Dry cell battery manufacturing industry is essentially an industry based on assembly of constituent parts.  Most of the constituent parts are, for economic reasons, obtained from other manufacturers, product assembly envisaged involves basically the zinc pellet trimming, lining with electrolytic paper sizing and pressing into bobbins, assembly of the various components fittings of printed cylindrical metal jacket testing under open and closed circuit, coating with anticorrosive (polypropylene) film; packaging. Machinery and Equipment,   Zinc can making equipment, Paper lining machine, Electrolytic solution (composed agent) making equipment, Assembling equipment, Seal injection press, Inspecting equipment, Packing machine, Others (conveyors, work tables ... etc). All machinery and equipment, except tables are assumed imported.', ' ' , '5 ' , ' 1'),

( ' Electrical Dividers and Other Accessories', ' these products are essential for the proper and economic utilization of electric energy in the provision of light, heat and power for homes, factories, offices, hospitals, shops, transport facilities, etc.  Basically the products are made of electric conductive and non-conductive materials such as copper and hard plastic.', 'The generation, transmission and distribution of electric energy has been increasing in the country during the last 25 years.  Today more than 1.5 million homes are supplied with electric city.  But all electrical accessories are all imported.  Some of the accessories do not need sophisticated technology and heavy investment to produce.  With modest investment, it is possible to produce the electrical accessories mentioned above.  The Amhara Region can have advantages if a plant to produce electrical accessories is established in the Region. ', ' All electrical accessories which the whole country uses are imported.  One can imagine the size of the market for switches, sockets, plugs, dividers, etc by visualizing all the homes, factories, offices, shops, etc of the country.  There is enough markets for at least three or four medium size plants.  Even though the plants are to be established in the Amhara Region, the market area will be the whole country.', ' The main raw materials which are hard plastic and copper (prepared in a form sheets) will be imported in bulk and the parts are to be fabricated in the factory.', 'The manufacturing process can be divided into three stages:- a) manufacture of metal parts, b) manufacture of plastic parts and c) assembly of the two sets of parts.  The metal items include screws, pins, terminals, flaps and springs.  The manufacture of the plastic parts and assembling of the fittings is done in two steps- compression molding of phenol formaldehyde resin and insertion of pins at their proper places.  For the metal and plastic manufacturing about 13 different types of machines are required. ', 'if the plant becomes the first in the country, the Region will gain financial resources from other Regions by exporting the products.  It will also save foreign exchange of the country and introduce new skills and technology to the Region. ' , '5 ' , ' 1'),

( ' Electric Backing Ovens Making Plant', ' It is a small portable oven.  It is used to make bread and cakes at home.  The product basically consists of electrical heating elements.  It has thermally insulated casing for protection purposes.  Thermostat control is used for setting desired temperature level.  For indicating the supply of electric, an indicator lamp is provided.  For temperature control a regulator is attached.', ' The use of kerosene and electric baking ovens for the purpose of cooking food and drinks such as tea and coffee saves a lot of wood from being used for producing heat.  This, in turn, saves trees from being cut down for fuel wood which conserves our forests and our soil.  The Amhara Region is one of the Regions of the country, where deforestation and soil erosion are so severe.  The Region should promote any measure that promotes the protection and conservation of its forest and soil resources.  Production of baking ovens in the Region will save our forests and hence it should be promoted.', 'A pre-condition for using electric baking oven is the presence of electric supply in the area. Most of the larger urban areas of the Region are connected with the national electric power grid system; hence they have electric power supply. About 300,000 families live in these larger urban areas. If we assume that at least 20 percent of these families will use electric baking ovens, there will be a demand of 60,000 units for these products. As other sources of fuel become more expensive (kerosene, fuel wood---) and as the electric power supply expands to other urban areas, more people will shift to the use of electric baking ovens. This expected demand and its future increase will justify the establishment of an electric baking oven making plant in the Region. ', 'Most of the inputs are metals such as aluminum, steel sheet, copper, etc. These will be imported. ', ' Electrical heating elements are fixed in the aluminum body.  Then the aluminum body is fitted into a steel frame.  Different components like regulator, thermo-states, indicator lamp, etc. are fixed into appropriate places.  Finally the unit is tested and the outer case is painted.  Machinery required include center lathe hydraulic press, welding unit, shearing machine, bending flanging machine power hacksaw, bench drill, coil winding machine, bench grinder, spray painting unit, tools, dies and accessories.', 'Contributes to the conservation and protection of the Region’s forest resources, saves foreign exchange resources by replacing imports, saves regional financial resources, introduces new skills and technology, possibility to export to other regions. ' , '5' , ' 1'),

( ' Electric Bulb Holders and Fluorescent Fixtures', ' Electric bulb holders and fluorescent fixtures are used as terminals for electrical connection to electrical bulbs and fluorescent lamps. The bulbs and the lamps are periodically replaced as they burn-out after their operating life is over. The bulb and lamp holders are fixed or suspended on ceilings, walls or any other supporting structure and provide terminals both for the lighting circuit and the lamps. The holders allow easy replacement of the lamps and bulbs by providing slots or screw type connections.', ' ', 'The demand for electrical fittings and accessories is heavily influenced by the expansion of electric power supply and building construction. During the last 10 years, these sectors have been expanded at average rate of more than five percent per year. Demand for electric bulb and a fluorescent holder in 2006 is estimated to reach about 200,000 pieces. This demand is projected to grow to about 260,000 in 2012. This indicated that there will be enough market to absorb the production of a plant which will produce electric bulb and fluorescent holders. ', 'The main raw materials or inputs for making electric bulb holders are steel sheets, thermoplastic granules, brass bars, paints, starters, ballast and electric wire. Almost all the inputs will be imported. ', ' Basically there will be two lines of production one for producing fluorescent fixtures and the other for producing electric bulb holders. For the fluorescent fixtures, the light sheet metal is cut to size, punched and folded to the desired shape. The slots housing the lamp contact points are made from thermoplastic material on the injection moulding unit. Wiring terminals and the ballast are mounted in position. The inter connection of the ballast, the lamp and starter terminals to the terminal strip is done. The fixture is tested and padded for dispatch. On the second line of production, the brags components of the electric bulb holder are turned on the automatic lathe. Drilling and thread cutting are made.  The components are then degreased and are either embedded on the thermoplastic component during the forming of the bulb holder by injection moulding or assembled with it after the moulding process. Main machinery and equipment required include automatic lathe machine, injection moulding machine, power press, bench drilling machines, degreasing tanks, pneumatic screw drivers, centrifugal drier, compressed air system.', ' Similar to other projects.' , '5 ' , ' 1'),

( ' Electric Bulbs Making Plant', 'Electric bulbs are devices for producing a steady light while connected to an electric flow. . They are essentially used as daily necessities for providing light in houses, offices, factories, streets, commercial buildings, schools, libraries, etc. Among the various types of electric bulbs, this project idea is to manufacture general lighting service (GLS) lamps as they are the most dominant bulbs in the Ethiopian market. ', ' ', 'The demand for electric bulbs depends on the expansion of electricity in the country. During the last 10 years, many urban areas are provided with electric power increasing the consumption of electric bulbs. Currently, there is a program to provide electric power to many rural areas in the country. In 2006, consumption of electric bulbs is estimated to be about 14.66 million; and this consumption is projected to grow to 18.71million in 2011. With the expansion of electric power to rural areas, demand for electric bulbs could be larger than the projected figures. ', ' Raw materials or inputs to produce electric bulbs include flaring tube, exhausting tube, solid gas rod, glass shell, filament, lead in wires (electrodes), cap (aluminum), capping, cement, solder wire, argon gas, oxygen gas, and LPG gas. Most of these raw materials will be imported. ', ' Manufacturing of electric bulbs passes through the following processing stages. Shell washing and drying; glass tubes and rod cutting; flaring; stem making; pig tailing with gas burner, mounting, guttering; sealing; exhausting; ageing; capping; soldering and testing. Main machinery and equipment required include flare machine, stem making machine, capping machine, glass preparation machine, mounting press, ageing machine, vacuum pump, air flower. ', ' Similar to other projects.' , '5 ' , ' 1'),

( ' Electric Iron Making Plant', 'The electric iron consists of a heavy base plate heated by means of a coil of nichrome wire.  It is provided with an insulated handle and a control by means of which the heat can be regulated.  Some models which are provided with a thermostat to control the heat at the desired level are called “automatic irons”. ', 'It is safe to assume at least 50 percent of the urban families in our country have one electric iron each. This translates into about 1.21 million electric irons being present in the country. If we assume that at least 10 percent of these electric irons are replaced every year and additional demand is about 4 percent per year, total annual demand for electric irons in the country will be 169,400 (10% of 1,221,000+4% of 1,210,000). Up to now all the electric iron needs of the country have been met by imports spending a substantial amount of foreign exchange. The manufacture of this electrical appliance is not complicated and it does not require huge production machines. For some time we might not be able to produce “elegant” electric irons like the ones produced by Philips of Holland and exported to our country. But we can produce electric irons which are functional, dependable and durable. Improvement in product quality, style, shape and esthetic value is achieved through time and experience. What is important is to start producing the product if it can be done with financial viability. The potential market of electric iron in Ethiopia is indicated above.  The share of the Amhara Region from the estimated demand is about 44,000 per year.  This quantity alone could justify the establishment of an electric iron making factory in the Region.  The national and the regional demands for electric irons are more than sufficient to sustain more than one electric iron making factories. ', 'Mostly to be imported, but some insulation materials can be obtained from domestic sources. ', ' In assembling parts of an electric iron, the following technical parameters should be observed.  The input at rated voltage and at normal operating temperature shall not deviate from rated input by ± 10 percent.  Handle grips of iron shall be designed so that they may not rotate even in the event of slackening of their means of fixing.  The provision of the thermostat or thermal output is optional in case the sole plate temperature does not exceed 2600C.  Machines needed for the plant include power press, spray gun, drilling machine, shearing machine, dies and hand tools besides test and measuring instruments.', ' ', 'Saves foreign exchange and regional financial resources, brings in financial resources to the Region, introduces new skills and technology, contributes to industrial self-sufficiency, etc. ' , '5 ' , ' 1'),

( ' Electric Kettles & Egg Boilers Making', ' These are electrical household devices used to boil water for different purposes and also used as egg boilers. The devices are of two types (a) ring type and (b) sauce pan type. In ring type electric kettle, there is an container which is fitted with a tabular heating element fitted inside for heating the fluid. A spout is provided to the vessel to facilitate pouring out of the liquid. In sauce pan type electric little, the heating element is fitted in the base or the vessel and does not make contact with the fluid. The kettle is provided with a thermostat that automatically maintains the level of heating to the desired temperature. Egg boilers consist of aluminum container which is shopped in the form of an egg. Generally up to six eggs can be boiled at a time. Heating is provided by means of a mica plate.', ' ', 'In a region where the natural vegetation is decimated by deforestation, the traditional source of fuel energy i.e. wood has become extremely scarce. Substituting wood by electricity and solar energy is the only option left to the Region to get its energy supplies, electric kettles and egg boilers are devices which use electric energy for preparing food thus conserving wood which could have been consumed for producing fuel. This electric device can be used in areas where there is electric power supply. About 350,000 families live in urban areas of the Amhara Region where there are electric power supplies. These families are the potential users of electric kettles and egg boilers. If we assume that about 26 percent of these families will purchase these devices, total initial demand will be 70,000. As income improves, as more people are aware about the benefits of these electrical devices and as electric power supply expands in the Region, the demand for electric kettles and egg boilers will also expand. Given this, establishing a plant which will produce electric kettles and egg boilers will be financially viable. ', 'The main inputs or components are aluminum add steel sheets, thermostat, heating elements, non-mental handles, etc. These inputs will be imported. ', 'Making electric kettles and egg boilers requires sample operations. It involves cutting metal sheets, welding, fixing heating elements and attaching accessories machine required are welding machines, drilling machine, shearing machine, press, hand tools, test and measuring instruments. ', ' Saves forest resources, foreign exchange and regional financial resources' , '5 ' , ' 1'),

( ' Electric Stove Assembly Plant', 'Cooking is an indispensable function in food preparation.  There are several types of fuel used for cooking purpose.  Electricity can be used in an electric stove.  Electric stove can be used for the preparation of different types of food.  ', ' The problems of fuel and charcoal scarcity and associated rising cost are prevalent in the Region.  There is an acute problem of deteriorating natural forest condition due to deforestation.  The main reason for deforestation is usage of wood as fuel for preparation of food.  It is highly essential to have an alternative fuel resource to tackle the problem.  The manufacturing of electric stove will reduce the problem at large.  Presently there is no factory that produces Electric Stove in the Region. Electricity mainly from hydro-electricity domestic dams is available in almost all major towns sufficiently.  The government is also launching electrification of rural areas in the region.  As fuel from wood and charcoal became more expensive, the alternative of an Electric Stove demand will increase in the near future. ', ' The Electric Stove is manufactured from steel and refractory base which are available locally.  The main fuel source, electricity is available from domestic supply.  Main raw material of electric stove: Mild Steal flats and angles - Cast iron plates,  Mild steel rods,  Chemicals,  Nichrome wire, Switches bolts and nuts', 'Electric Stove making involves basically the process of shearing /cutting mild steel/ iron plate pressing (blanking and deep drawing) of mild steel places cleaning and painting, preparation of refectory base, baking of refectory base straightening of Nichrome wire, coiling of the wire, fitting of coils into refectory base, assembling, inspection, and packing.  ', ' -  Shearing machine, Bench grinder,  Circular cutting machine, Reel carrier,    Presses (power, fly, screw, hydraulic), Air compressor, Coil winding machines, Other (hard sheering equipment, coil, Bending/forging equipment                 cutter spray guns tools work tables), Lathe, Welding sets (spot, gas), Bench drilling machine, All machinery and equipment with the exception of work tables are assumed to be imported. ', ' ' , '5 ' , ' 1'),

( ' Fabrication of Electric Water Heaters', ' Electric water heaters provide a ready supply of hot water at not more than 85%c temperature. Water is electrically heated and the temperature is thermostatically controlled. The normal capacity of electrical water heaters is between 50 to 200 litters. Electrical water heaters are installed in home, hotels, hospitals, restaurants and in other places where there is need of hot water for washing and cleaning.', ' ', ' With the exception of urbanization, the urban population of the country increases every year. This increases the need of washing and cleaning facilities which in turn stimulates the demand for water heating apparatuses. Given the present form of energy available in almost all urban centers of the country, the most common water heating apparitions is the electric water heater. All the electric water heater requirement of the region comes from imports via Addis Ababa. Producing electric water heaters is a fabrication process which is not subject to economies of scale operations. The demand for the heaters in the Amhara and other neighboring regions could justify the establishment of a small scale electric water heater making plant in the Region.', 'The main inputs for fabricating electric water heaters are, heating elements, asbestos, metal sheets and some other electric pats except the sheet metals, the other inputs will be imported. ', ' First the metal sheets which house the heating components will be fabricated i.e. measured, cut and welded. The heating elements and other accessories are assembled and put in the metal case. Test are undertaken to ensure proper working and safety. Finally the outer part of the metal sheet case is painted.', 'save foreign exchange and regional financial resources, improves the level of hygiene of users ' , '5 ' , ' 1'),

( ' Immersion Heaters Making Plant', ' An immersion heater is an electrical domestic or household appliance used to warm water in a container by transferring electric heat/energy from a socket to the water.  Immersion heaters are used to warm water for taking bath, for washing clothes and for other purposes which need warm water.  The appliance is a very convenient household item for improving personal hygiene in homes where there are no electrical water heaters.  Immersion heaters are relatively less expensive that water heaters and they can be acquired by people of modest income.', 'Over 95 percent of urban homes which are supplied with electric power do not have water heaters in their bath-rooms or kitchens.  One main reason for this is that the majority of the homes do not have in-house water and plumbing systems.  As a result, people are not provided with proper facilities for taking bathes in their homes.  This is a serious hygienic problem which has negative consequence on the health situation of people living under such conditions.  Immersion heaters are very convenient gadgets both in terms of price and handling for facilitating the shower and bath needs of people.  Promoting the production and distribution of immersion heaters can not be considered from the point of industrial development, but it should also be seen from the stand point of health care development.  Hence, production of immersion heaters should promoted on a priority basis by the Region. ', ' Considering the size of the urban population without water heaters, market limitation will not be a problem for immersion water heaters. The potential market for the product is much greater than the production volume of a viable plant. If we assume that only 10 percent of the urban families in the Amhara Region use immersion water heaters, this translates into a demand figure of about 40,000 units. This will sustain a viable immersion heater producing plant.', ' The main raw materials are copper or brass and magnesia.', 'In the manufacturing process of immersion heater, copper or brass tube are used.  The diameter of the rod should be of proper size as the service life of the heater depends on it.  The tubes are then filled with fused magnesia and element.  The element should be in the center and no air gap remains there.  After filling, the thick copper lead is welded on both ends.  At one end the rods are shaped into coils and these are immersed into the water intended to be heated.  Finally electric cable is attached to the rods.  Machinery required include swaging machine, gas welding equipment, slitting saw, pipe bending fixture, vibrating platform and H.V. tester. ', 'Saves foreign exchange at national level and financial resources at region level, contributes to the improvement of health in the Region, introduces new skills and technology to the Region, and facilitates the follow of finance to the Region through the export of the product. ' , '5 ' , ' 1'),

( ' Low Cost radio Assembly', 'A radio is becoming a basic consumer item even rural areas.  Rural families want radio mostly to listen to music and songs.  Radios come in different sizes, shapes and capacity.  ', 'Many decades have passed since radios were introduced into the country and millions of radios have been imported.  But no attempt has ever been made even to assemble radios in the country.  Still the county is being flooded with all sorts of radio brands–many of them with poor qualities.  With increasing population and growing popularity of the Radio, there is a strong need to fabricate/assemble some brands of radios in the country.  With a population of 18.5 million, the Amhara Region is the second largest consumer of radios.  The volume of radio purchase in the Region can justify the establishment of a radio assembly plant in the Region. ', 'Assembly works are not subject to the rules of economies of scale. They do not require heavy investment in expensive plant and machinery which require large production volume to minimize units cost of production. the assembly of radios need small machines and tools with minimum investment cost and highly trained manpower. Radios can be assembled in homes with a limited number of hand tools. A radio assembly plant can be financially viable if it assembles about 10,000 per year. And the demand for radios in the Amhara Region is definitely more than 10,000 per year. Of the 3.7 million families in the Region, probably more than 60 percent do not have radios; If a plant produces low cost radio in terms of original price and operation expense, there is a big market for radios in the Region. ', ' Assembly work involves purchase of parts and components.  These parts and components will be imported during the initial years and gradually they will manufacture in the plant.', 'A modern transistor radio essentially consists of a “printed circuit board” on which the components are mounted; and a battery of step down transformer with rectifier unit (for mains operations); a cabinet fitted with a loudspeaker and knobs and dial.  The machinery that would be required would include soldering iron, multimeters, coil winding machine, oscilloscope, power supplies, drilling and grinding machines together with other regular hand tools. ', 'Saves foreign exchange and regional financial resource, introduces new skills and technology, improves information access to the people. ' , '5 ' , ' 1'),

( ' Printed Circuit Boards Making Plant', ' Printed circuit boards (PCB) are widely used in both electrical and electronic equipment and appliances as they provide a base on which other components can be easily mounted. PBC circuits are reliable as there are few interconnecting wires and all the components are firmly mounted. PCBs. consist of an insulating material. Metal is deposited or clad upon that. The insulating materials usually used are fibrous sheet material like cellulose, paper glass or nylon impregnated with a thermosetting thing resin binder and then consolidated under high temperature and pressure into solid sheets. The metal used is generally copper. PCBs are used to transmit power from one end to another. PCBS are largely used by manufacturers of electronics components like. T.V sets, transistors, radios, amplifiers, ampligrams, Voltage stabilizers, calculators, telecommunication equipment, power suppliers, public address equipments, computers. etc.', ' Printed circuit boards are needed in almost all electrical and electronic products and these products are many both in kind and number. One can witness the type and quantity of electrical and electronic products that are available in the market by going through some market areas in Addis Ababa and all other large and small urban centers in the country. There is too much in variety and too many in number. Most of these numerous electrical and electronic products use printed circuit boards for their operation. They can not repartee without CPBs. The volume of imports of electrical and electronic products certainly justifies the establishment of plants which can produce some of the major electrical and electronic products such as radio, tape recorders, television, etc. PCBs are the brains of these and other products.

In our country, there are expanding markets to justify the establishment of radio, tape recorder and other household electronic and electrical products making plants. The PCBs are the most essential components of these products. Hence any attempt to develop the electrical and electronic industries should be accompanied by the development of PBCs components, With its surplus labour force, the Amhara Region is ideal for the development of industries which require extensive assembly and fabrication works of which electrical and electronics are parts of these industries. ', 'The market for printed circuit boards is based on the markets for electrical and electronic products which are partially listed above. The markets of these products have been expanding in the country mainly due to growing urbanization, population increase, growing awareness about the benefits of using electrical and electronic products and to some extent increase income. Even with this growing demand, the per capital consumption of electrical and electronic products Ethiopia is one of the lowest in the world. With 75 million people, Ethiopia has a long way to reach world average level of consumption in electrical and electronic products. This indicates that the market for these products will further expand. With 19.2 million people, the Amhara Region has also a good market for electrical and electronic products and also for printed circuit boards. If we assume that the potential demand for radio is one radio for one family, the potential demand for radio is 3.84 million. This means that 3.84 million printed circuit boards will also be required. These indicative figures give a general picture on the potential demand for PCBs. ', ' About 18 different inputs are required to produce printed circuit boards almost all of them will be imported.', 'PCB is a board of insulating material which is given a coating of conducting material such as copper/gold. This conducting material is removed or etched away from certain places so as to form conducting and insulting paths as required. Holes are dilled through the board at desired points so that components may be mounted through them. After suitable processing, the board is dipped into a tank containing a solution of ferric chloride or cupric chloride with sulphuric acid or hydrogen peroxide to etch those portions of the copper layer which are not covered by protective materials. The etching agent reacts with the copper and is removed to reveal the insulating material below.

For the manufacture of PCBs, photo resist is first applied to the surface of the PCB where the copper is to be etched. Then a photograph is taken of the drawing made on cellophane paper of the circuit with tracks covered by tape. The negative of the photograph will have the areas covered with track markings in tape which is a shade lighter than the rest of the board. (Other processes follow for the completing the PCBs.)

The list of plant and machinery includes about 21 pieces of machines, equipment, instruments, tools, etc. Some of these are negative making equipment, negative retouching and art work equipment, positive making equipment, stencil making and photo resist printing equipment, metal halide reproduction lamps for printing down set of two, screen printing system and 15 other machines, tools and instruments. ', ' Saves foreign exchange resources, promotes self sufficiency, stimulates the development of the electrical and electronic industry, introduces new skills and technology, has the potential of earning financial resources through export.' , '5 ' , ' 1'),

( ' Rum, vermouth and vodka ', 'Rum is alcoholic beverage produced by the distillation of various fermented cane sugar products. The most common mixtures used in making rum consist of molasses and water or sugar and water. Another type of rum is made by fermenting a mixture of the scum formed when the raw juice of the sugarcane is heated with molasses, water, and “dunder,” the residue left after the refining of sugar. Vermouth is aromatized wine consisting of a combination of 4 types of natural ingredients: wine, botanicals, sugar and alcohol. Vodka, distilled alcoholic beverage known traditionally as the Russian national drink. It is distilled usually from a wheat mash and sold in concentrations of 40 percent alcohol, or 80 proofs, and of 50 percent alcohol, or 100 proofs. ', ' ', ' The annual average level of import during the period 1998-2000 was about 28,113 liters.  This has increased to an annual average of 94,137 liters during the period 2001-2003, which is more than three times higher than the previous three years average.   The annual average quantity imported in the last three recent years, i.e., 2004-2006 has shown a slight increase and reached to 94,642 liters.', ' Grains especially wheat is the basic raw material as a source of carbohydrate for the fermentation. Wheat is grown in most parts of the country mainly in Oromia, SNNPRS, and Amhara regional states by state farms and peasants.  Malt can be obtained from Assela Malt Factory while yeast and flavouring will be imported. Bottle and label can be obtained from Addis Ababa Bottle and Glass S. Co. and from the printing presses operating in the city.', 'Mash preparation, Keeping the mash sterile, Vodka fermentation, Distillation, Liquefying the alcohol gases,   Filtration, Packing and labelling, Environment ', ' ' , '5 ' , ' 1'),

( ' Television Assembly Plant', ' Television is an electric and electronic indium of communication by which images and voices are transmitted from a specific location (station) to viewers. The device is made up of electrical and electronic components usually enterprises but assembled in one place.', ' ', 'Of the 400,000 urban families in the Amhara region only 20 percent are believed to have television sets. The other 80 percent want to own this particular electronic device but they are not able to posses the device mainly because they can not afford. One factor that makes television sets unaffordable to Ethiopian families is that the imported sets are too expensive. The reason for this is that labor cost for television assembly is expensive in television exporting countries. On top of this, there are transport costs and various taxes levied on imported electronic devices.

Considering the labor cost in our country, assembling television sets locally could be much cheaper than importing them. Of course this assumes that labor force will be intensively trained and have the necessary discipline which will insure higher productivity.

A television assembly plant in the Amhara region will have young and educated labor which needs only training. Wages could be lower than in most other countries. There is a huge market for television in the region if the prices affordable. Hence, a television assembly renter could be a profitable renter in the region. ', ' Almost all the inputs or components will be imported. Process and Technology: A sort of an assembly line will be established. The line will operated both mechanically and manually. Components will be distributed to workers sitting or standing at specific locations. Stage by stage components will be fitted in the various parts of the sets until complete sets are assembled. Different types of hand tools, some drilling cutting and grinding machines will be required.', ' ', ' Saves foreign exchange improves the general knowledge of the public' , '5 ' , ' 1'),

( ' Ultra Violet Fly Repellant', 'Ultra violet fly (insect) repellant is a device which operates with a principle of attracting the flying insects with an ultra violet light and killing them with electric shock. Photo positive flying insects which are attracted with ultra violet light source can be flies, mosquitoes, moths, etc. These insects cause annoyance, contamination and diseases. They can not be cleared or controlled by the conventional method of chemical spraying as the poisonous chemical would contaminate the food or medicine and pollute the atmosphere. The device is provided with a grid made of steel wire rods which is electrified at 3000 by means of which the insects are electrocuted when they come in contact with the system. The dead insects are collected in try at the bottom of the machine. The device can be made in different sizes and models. Ultra violet fly repellant can be used in hotels, restaurants, food shapes and factories, pastries and in any place where food, drinks and medicine are stored or distributed. ', ' ', 'Go in to any hotel, restaurants, pastry coffee shop and butcheries in the small and even large urban centers in the country in most cases you will find swarms of flies hovering in the ceilings and walls and sitting in all places on the floors. It is very unpleasant scene for customers. Customers complain about the lack of neatness of the hotels, restaurants coffee ships, etc, and owners are frustrated about their insects. Installing ultra violet fly repellants in one sure method of getting rid of these insects. In the Amhara region, there are thousands of small hotels, restaurants, pastries, coffee ships, beer houses, etc which have serious problems with flies and other insects. The presence of ultra violet fly repellants will improve the hygienic standard of these places by killing of the flies and other insects. Thus, this device will have captive market in the Amhara region and also in other regions of the country. In fact considering   the health hazard that flies pose to the consumers, installing ultra violet fly repellant in every restaurant, hotel, pastry, coffee shop butchery, etc, must be obligatory by public health authorities. This will insure the demand for the device. ', ' The main inputs for making ultra violet fly repellant are mild steel sheet, mild steel rod, weld mesh, wire ropes, chalk, H.T. transformer, electrical component, UV tube and other miner components. Most of these inputs will be imported.', ' The manufacturing process includes fabricating a sheet metal structure for housing and supporting the various electrical components. The structure is then painted a special grid is also fabricated from steel wire rods and nickel. A protective guard made from weld mesh is provided to prevent accidental contact with the grid. Various electrical components like transformer, ballasts, switches, fuses, etc are attached to the structure and the wired. Finally the product is inspected and dusted. Plant and machinery needed include power shearing machine, press brake, hacksaw machine, spot welding machine, manually operated press, are welding machine, bench grinder, special tools and dies and others assorted tools and implements.', 'Presents consumers from consuming contaminated food or drinks, improves the hygienic standard of catering enterprises in the region. ' , '5 ' , ' 1'),

( ' Welding Electrode Making Plant', 'In metal fabrication and mechanical engineering industries, welding is a very indispensable operation.  In welding process the localized coalescence of material is achieved through the application of heat and pressure.  Mainly three types of welding:- arc welding, resistance welding and gas welding are common.  Are welding achieves coalescence of metals through intense heat of electric arc which establishes between the base metal and an electrode.  The electrode is consumed by melting and becomes part of the weld, acting as a filler metal.  This is a project idea to produce the welding electrode which is essential for arc welding. ', ' Welding takes place in garages, factories, construction sites, metal fabrication workshops, in technical training centers, etc.  And for all these welding activates, thousands of tons of electrode are imported to the country every year.  Though welding operations is known to increase as the economy grows, no attempt has been made, so far, to produce sufficient quantities of electrodes in the country.  This is an activity which has been neglected and which an investor in the Amhara Region can take the initiative to produce electrode not only for the Region’s market but for the market of the country as a whole.  Even with current level of economic development, a country with 75 million people can have a viable welding electrode making plant.  Can the Amhara Region be the first to establish this plant?', 'The present level of consumption of electrode in the country is more than the capacity of a medium size electrode making plant. ', ' The main raw materials for welding electrodes are- wire, potassium/ sodium silicates, rutile, beneficiated illuminate quartz, china clay, ferromanganese, cellulose, and titanium dioxide, etc.  Most of these materials will be imported; some such as sodium or potassium silicates, china clay, quartz—can be found in the country.', 'The main production processes are:- mixing all the raw materials to be used for coating, pressing into briquettes feeding the meter wire and the flux briquettes into an extrusion press.  The core wire unites with the coating compound by a nozzle system within the press; and the coated electrode is electrically dried before packing.  Main machineries include dry and wet mixers, briquetting press, extrusion press, pumping unit, automatic wire feeder, conveyers and brushing equipment, drying oven ', 'Flow of financial resources to the Region, saving of foreign to the country, transfer of technology, development of new skills ' , '5 ' , ' 1'),

( ' Animal feed', 'Assorted animal feed is used for feeding domestic animals like cattle, sheep and goats, poultry and hogs.  The feed is prepared by modern industrial production method and the main ingredients are mito, wheat bran, molasses, soybean grounds, fish meal and some vitamins.  Depending on the availability of other inputs, the above inputs could be substituted without affecting the quality of the animal feed. ', 'With a livestock and poultry population of 31.9 million, the Amhara region has the second largest livestock resources of the country.  But due decreasing size of grazing land caused by the expansion of farmlands and lack of modern animal feeding system, the livestock population of the Region is increasing at a very decreasing rate and in some areas; there is an actual decline of the livestock population.  Besides, because of poor and inadequate feeding, the quality (meat, hides and skins) of the livestock resources of the Region has been declining during the past 25 years.  The traditional feeding of livestock by letting cattle and other domestic animals to wander in an ever decreasing grazing land is no longer practical; simply there is no enough grazing land for the animals.  If the Amhara Region has to maintain and further develop its livestock resources for domestic use and for export, the system of feeding the animals should be modernized and at the same time economical.  One option for providing feed for the animals is the establishment of a number of small to medium scale animal feed making factories in the major urban centers; and if infrastructures allow, in the major cattle growing areas of the Region.  The animal feed from the factories may not be the only source of feed for the animals; at least it can be used as supplementary food. ', ' Current livestock and poultry population of the Region is about 31.9 million.  If we assume that about 5 percent (1.6 million) of these animals will be provided with assorted animal feed (6 kg per day) total demand for animal feed will be 3.5 million tons or 35 million quintals per year.  This demand will justify the establishment of small scale animal feed making plants in the Region whose capacity will be 400 quintals per day working 300 days a year.', 'All the raw materials, except molasses, for the factories can be obtained within the Region.  Molasses can be brought from the existing sugar factories or from the Region if these factories are established. ', ' The main production stages are (a) mixing the raw materials (b) 1st stage crushing (c) assorting and measuring (d) Mixing (e) molasses mixing (f) fine crushing (g) pellet making (h) packaging.  Main required machinery and equipment include pre-mixer, 1st and 2nd crushers, pellet manufacturing equipment, boiler and other auxiliary equipment such as silos, tanks, packing machines, etc.  ', '(a) reduces the pressure on the remaining grazing land thus decreasing the problem of soil erosion and destruction of vegetation (b) enhance the development of the livestock resources of the Regions (c) improves the quality of the livestock (d) increase foreign exchange income due to quality improvement (e) increase protein (meat, mutton, milk, cheese, etc) supply to the people of the Region which will improves the physical and mental well-being of the people. ' , '4 ' , ' 1'),

( ' Baby meal', 'Baby or infant food is a supplementary food prepared for children below the age of two. The main ingredients in the preparation of infant food are pulses, soybeans, milk, potato, corn and fruits. The mixture of these ingredients is kept in such a way to fulfill the nutrition requirements of infants. Carbohydrates and proteins are the major nutrient elements. Sweetness, palatability and tenderness are the basic requirements for infant food. Infant food is served diluted in water and boiled to form a stew or soup. It is also served as batter for spoon feeding. The main objective of preparing baby food is to give the necessary nutrition to infants in addition to their mother milk so that the babies are healthy and fit both physically and mentally. ', ' In mid 2006, there were 3.2 million children between the age of 0-4 years in the Amhara Region. These children constitute about 17 percent of the population of the Region. Supplementary food for children in the Amhara Region is needed for 3.2 million children. But there is no a single plant or factory in the Region which prepares baby food even though the ingredients for making such food is available in the Region. Given the low level of standard of living of the people in the Region, supplementary food for children is greatly needed. Providing this food for children on regular basis will compensate the nutrition deficiency the children experience due to inadequate breast feeding or insufficient and unbalanced supply of diet to the children. Children who are not provided with adequate nutrition during their formative years will be stunted physically and mentally. This will have serious and negative consequence on society at large. Studies have shown that a very large percentage of children in the Amhara Region do not get adequate diets and as a result have below standard weights in relation to their ages. The establishment of plants which will produce supplementary food could reduce the problem of inadequate diets that children face in the Region. ', ' As stated above, there are more than 3 million children in the Amhara Region. If we assume one child will need at least 0.25 kg. of supplementary food every day, annual requirement of one child will be 91 kg per year. Total yearly requirement for all the children of the Region will, therefore, be 273,000 tons. If we assume that only 25 percent of these children will be provided with supplementary food during the initial period, annual demand for the product will be 68250 tons. This will be more than sufficient to make a new plant financially viable.', 'All the raw materials needed for preparing supplementary food will be obtained in the Region. ', 'Raw materials are purchased and stored in silos. They are first conveyed to respective separation and cleaned for external matter. Then they are weighed and processed in their individual machines. Beans and peas are roasted and milled. Others are scoured and milled. After milling, the processed materials are stored in their individual bins. Once all the ingredients are prepared, they are conveyed (according to the proportion of mix) to the mixer. At this stage, mixed fruit and dehydrated milk are added in the mixer. Finally they are led to the rotary distributor where the product is ready for packing or the finished product is stored in silos. ', ' Improves the physical and mental well-being of children in the region, makes the foundation for having a healthy population which is a source of a productive labor force, stimulates agriculture production and increases the income of farmers, introduces new skills and technology.' , '4 ' , ' 1'),

( ' Baking powder', 'Baking powder is a mixture of sodium bicarbonate, one or more arid ingredients and an inert ingredient which serves to keep the reactive components physically separated and which minimizes premature reaction in the dry mixture. The inert ingredient is usually starch dried to 5-7% moisture. calcium carbonate are sometimes used instead of starch. ', ' ', ' The domestic requirement of backing powder is met through imports. Between 1984 and 1994, average annual import of baking powder was about 650 tons. Projected demand for the product for 2008 will be about 120 tons; and this will increase primarily do to population increase and a change in dietary patter from “enjera” to bread. To meet it share of baking powder need, the Amhara Region should establish its own baking powder making factory.', 'The main inputs are sodium acid pyro-phosphate, sodium bicarbonate and starch. ', 'Maxing of various components by adding proportionate input from each component, granulating the mixed components. Main machinery and equipment needed include sifter, micro pulverizer, mixer, electrically operated oven, weighing machine, bag sealing machine, etc.   ', ' Saves foreignexchange and regional financial resources. ' , '4 ' , ' 1'),

( ' Biscuits', 'Biscuits are baked food items with greater nutritive value, due to some additives, than plain bread of equal weight.  Biscuits are normally classified into three broad categories hard biscuits, soft biscuits and batter biscuits.  "Hard Biscuits'' particularly cookies and crackers are selected to be produced in the manufacturing plant. ', 'Demand for biscuits is increasing with the growing urbanization, rising income and the associated change in the pattern of food consumption.  Biscuits particularly cookies are bought by urban dwellers during holidays, birthdays and other occasions.  Much of the biscuits---- being consumed in the Region is either imported or brought from Addis Ababa.  There is need to make the Region self sufficient in the production of these food items.   ', 'During the last few years, a number of biscuit factories  have been established in the country.  According to CSA, average annual production of biscuits between 2000 and 2004 was 9,263 tons.  Most of the production takes place in Addis Ababa.  Having around 26 percent of the country’s population, the Amhara Region consumes a substantial portion of the biscuits production.  The growing demand for biscuits can absorb the production of a medium size biscuits, cookies and crackers making factory. ', 'The major raw materials of hard biscuits and cookies are wheat flour sugar and other ingredient, which are available in domestic market.  ', 'The process of hard biscuits, cookies making involves the pre-mixing of ingredients other than flour into a cream, dough making (flour with the pre-mixed cream) laminating stamping or punching (that is shaping and cutting) baking, cooling, stacking and packing. Required machinery and equipment are:Cream mixer, Dough mixing machine, Laminating machine, Stamping (shaping/cutting) machine, Oven, Cooling equipment, Stacker, Packing (work) table, Except the worktables all are assumed to be imported.

', ' ' , '4 ' , ' 1'),

( ' Brown sugar', 'Weaning food is a type of food prepared from different ingredients to constitute a balanced diet.  The food is given to babies, children and breast- feeding mothers.  For the purpose of mixing the different ingredients in the required proportion and for large-scale production, weaning food is mainly produced in factories.  Fafa food products are examples of weaning food. ', ' Due to the widespread poverty prevailing in the Amhara Region, pregnant mothers do not get proper and sufficient diet during pregnancy.  This does not physically affect only the mothers but also the yet-unborn babies.  At birth most babies are below the normal weight.  After birth the mothers and the babies do not get the necessary diet in the required amount and mix.  The mothers remain weak and sickly; the children underweight and susceptible to diseases.  This lack of proper diet affects both the physical and mental conditions of the children.  When one travels through Amhara land, it is common to see underfed, underweight and skinny children tending livestock.  Though it will not eliminate the general shortage of food in the Amhara Region, production of weaning on a commercial scale will improve the food consumption of many if not all mothers, babies and children in Amhara land.', '  In 2004, the Amhara Region had 3.1 million babies and children (0-4 years) and 9.8 million women between the age of 14 and 49.  The babies and children and women, if provided, will consume weaning food.  Currently Fafa Food Products and private a factory produce weaning food.  But for the last 20-25 years, most of the production was supplied to people where there were acute food shortages.  In other words, no weaning food was supplied to mothers and children on a regular basis through out the country; and the benefit of feeding weaning food was not popularized by the media.  But there is a strong felt need for the supply of weaning food for the demand is there waiting to be met.  If might be unrealistic to expect that all children in the Amhara Region will consume weaning food simply because their parents may not afford to buy the food.  But if at least 20 percent or 615,000 of the 3.1 million babies and children (between 0-4 years of age) consume weaning food, and if a child consumes at the minimum 250gm of weaning food per day, the annul demand will be 561,187 quintals or 56,118 tons of weaning food per year.  This is more than the production capacity of 4 medium scale factories.', ' Weaning food is made form various farm products.  All the raw material can be secured from the Region.', ' The production processes generally include the following operations.  Sorting, cleaning, soaking, steam cooking, drying, roasting, crushing and grinding, cooking and packing.  Soaking and steam cooking are done only for Soya beans.  The major equipment required for the plant include winnowing machine, electric dryers, electric ovens, cooling steel vat, a crushing machine and millstone.', 'Improves the physical and mental well being of children, contributes to the development of productive human resources of the Region, increase production due to labor input of physically and mentally healthy labor forces makes the Region self-sufficient in this important food item. ' , '4 ' , ' 1'),

( ' Castor oil', ' Castor oil is processed or extracted from castor seeds. The oil has application in hydraulic fluids, paints, varnishes, surfactant and in the production of synthetic fibre and diabasic acids. In the context of the Ethiopian domestic market, castor oil can be used in the production of soap. But production of the oil for the export market might be more attractive financially.', ' ', 'A study made some years ago estimated that the country produces between 10,000 and 15,000 tons of castor seeds per year. However, production of castor seeds in not considered as a normal farming activity by many farmers. Castor seeds naturally grow around homesteads and in marginal lands with no much attention given by farmers. If proper care could be given by farmers for the production of these seeds, the harvest could have been much larger than the figures indicated above. Considering the market potential for castor oil, there were preliminary attempts to establish castor oil producing plants as early as the 1960s. But so far no plant has been established. The price of castor oil in the international markets varies from USD 750/ton to USD 900/tons and the average factory gate price could be USD 675/ton which is equivalent to about Birr 6000/ton. This indicates that castor oil production can be a good foreign exchange earner. India and Brazil dominate the international market for castor oil. One study has indicated that the market in Europe for the oil ranges from 35,000 to 50,000 tons. Thus the objective of a castor oil producing plant should be to export its product. ', ' Localities in the Amhara region which are suitable for producing castor seeds.', ' As the first step castor seeds are cleaned in shaking screens of various sizes and then are fed to multiple stage steam heated cookers in order to be conditioned. Then the seeds are taken to the expeller (press) as needed. The expeller breaks up the seed and subjects them to pressure, thus extracting oil which is expelled from the machine and can be stored in drums.

The expelled oil should be left to settle for about two days, so the sediments will settle to the bottom and the oil can be decanted. The oil is finally pumped to the filter for further clarification. The oil discharged from the filter is taken to storage or packing facilities. Main machinery needed include cooker, expeller, filter press, seed cleaner, and other accessories.

', ' Learns foreign exchange, brings cash income to castor seeds producers, stimulates castor seeds production, and facilitates the production of other industrial products (such as paints….) for which castor oil is an input.' , '4 ' , ' 1'),

( ' Commercial starch', ' Starch is a basic need for people and it is also an input for many types of industries. Starch is mostly used or consumed in its natural form, but it is also converted to other forms. Glucose, for example, is one of the varieties of products which is prepared from starch. Glues of different kinds can also be made from starch which is used as adhesives in many industries such as paper printing. Commercial starch is mostly prepared from corn and potatoes. In industry, starch is used as sizing, finishing, binding, and diluting agent, adhesive and water absorber in the textile, paper, pharmaceutical, and cosmetic and confectionery industries. Glucose and syrups are the major derivatives of starch with high commercial value.', 'While the raw materials for making starch are adequately available at home, the country has been importing starch and associated products from abroad by spending badly needed foreign exchange resources. As many other economic phenomena this is also another animally which defies explanations. Next to the food and beverages sectors, textile is the largest industrial sector in the country. And this industry consumes a large amount of starch which is imported. So do the paper and printing industries. Even the two big textile mills in the Amhara Region Consume a substantial quantity of starch. With the current dietary habits of the population, household consumption of starch is small when seen against the total population. However, with increasing urbanization and industrialization the demand for starch will grow and this will necessitate the establishment of a commercial starch producing Plant. The Amhara Region, being one of the largest corn and potatoes growing regions in the country, is a good candidate for having a starch production plant. ', 'In 1990, consumption of starch was estimated to be about 2000 tons; and demand for 2005/06 was projected to be 7000 tons which is an increase of 3.5 times. Since there is no commercial starch producing plant, all this demand is being met imports. The current demand for starch definitely justifies the establishment of a plant which will at least meet part of the starch requirement of the country. ', ' Maize or potatoes are the main raw materials for producing starch and these will be obtained from local sources.', ' The simplified production process is as follows. Steeping:- this is to soften the kernels so that subsequent milling operations and separations can be carried out efficiently. Determination:- oil rich germ is separated from starch, gluten, hulls and fiber. Then the corn is ground in attrition mills. When the material leaves the mill, it becomes a mixture of water, starch, gluten, germs and hulls. It is further fed to mills which grind the material to very small particle sizes. After removing the hulls and fiber particles by passing it on a set of querulous, the starch and gluten are allowed to separate using gravitational methods. Separation of starch from gluten:- using this process heavy starch is deposited on the bottom and the gluten is removed at the top of the lower end of the tables especially designed and manufactured for this purpose. Major plant and machinery needed include steeping tanks; mills screen bends, hydro cyclones, centrifugal machines and dryers.', 'Promotes self sufficiency in a critical industrial product, saves foreign exchange and regional financial resources, stimulates the production of corn and potato crops, contributes to the health improvement of the people, and introduces new skills and technology. ' , '4 ' , ' 1'),

( ' Composite flour', ' Composite flour is a mixture of cereals or legumes or the combination of both. Cereals in composite flour processing include sorghum, wheat, barley and maize. The legumes are beans, peas, chick peas and soybeans. In most cases, composite flour is delivered packed in plastic bags of either 5kg or 10kg. The main nutritional value of composite flour (if it is a mixture of cereals and legumes), is that it contains both carbohydrates and proteins which is particularly useful for feeding children.', ' ', 'Considering its nutrition content, the main consumers of composite flour are mother and children. This group of people comprises about 56 percent of the population in the Amhara region. This translates in to 10.8 million people (2006). The potential consumption of composite flour by mother and children in the Amhara Region is the potential demand for this product in the region. If we assume that one potential consumer of the product consumes about 50gm of composite flour per day, total potential annual demand of the product in the region could reach about 197100 tons (10.8 million X .05 kg X 365). However, given the level of income of the overwhelming majority of the people in the Amhara region, it is unrealistic to expect that all the potential consumers will actually consume composite flour. Hence, to be on the safe side, we have assumed that only 30 percent of the potential customers will consume composite flour in the region. With this assumption, the annual demand for the product under consideration will be 59130 tons. As population increases and the level of personal income grow, this annual demand will also increase. This roughly estimated demand for composite flour will be sufficient to absorb the production of more than two medium sized flour mills and the region. ', ' As mentioned above, the main raw materials for composite flours are cercal (wheat, barley, and oats) and legumes (peas, beans, click peas, lentils.....). The Amhara region is one of the regions in the country, where these groups of crops grow relatively in large quantities. The region will supply sufficient quantities of these crops for the plants to be established.', 'The raw materials are first cleaned by a separator and suction filter. Then it is scoured after being weighted in the weighing section. It is stored in the dampener where water is added for dreiching. Milling is then performed and inserted into the square sifter. Next it is delivered to a double deck purifier and then to the needling mill. Finally the products are mixed in a mixing vessel according to proportional mix ratio. It will then be inspected, weighed and packed. Main machinery and equipment need for the plant include screw conveyor, weighing machine, milling separator, dis separator, scores machine, suction fitter, dust collector, stoner, dampener, brush machine, pneumatic conveyor, double roll mill, square sifts, double deck purifier, bran finisher, midding mill, agitator, packer, bucket elevator, chain feeders, mixers and bagging macine. ', 'Contributes to the reduction of nutrition deficiency in the region, stimulates production of legumes by creating a new demand for the crops, and diversifies the pattern of food consumption in the region by reducing the high dependency on cereals and by increasing the consumption of legumes.  ' , '4 ' , ' 1'),

( ' Confectionery Making Plants', 'Confectionery is a general term which includes candy, gums, caramels, chocolate, and other sweets. Most confectionery products are made from sugar, liquid glucose, gums, starch, cereal flowers, flavoring agents and food colors. ', ' ', 'The market for confectionery in Ethiopia is supplied from domestic production and imports. Between 1999 and 2004, average annual domestic production of confectionery (all candy) was 1346 tons. An equal amount of confectionery in the form of gums, chocolate and other types of sweets is assumed to have been imported every year. Confectionery production in the Amhara Region is confined to very small candy making units which cater to their respective narrow local markets. The quality of their products is much below that of any standard candy produced by modern candy factories. Much of the confectionery products consumed in the Region is either produced in other regions of the country or is imported from other countries. If we take consumption of candy from domestic production, the consumption share of the Amhara Region is about 350 tons per year. This consumption volume from domestic production alone can justify the establishment of a modern confectionery producing plant in the Region ', 'Almost all the raw material for confectionery making (except chocolate) will be obtained form domestic sources. ', 'For making hard candies the mixture of the main ingredients (sugar, glucose, citric acid powder, oil of lemon, color…) is cooked in open pans or a steam jacketed kettle. A temperature of 150-1600c is maintained during cooking. The cooked mixture is transferred quickly to an oiled water cooled table and mixed with coloring and flavoring agent. The material is now ready for moulding into desirable shape manually or automatically. The moulded product is air dried and the finished candies are than twist wrapped for sale. Main types of equipment of a confectionery plant which will produce all types of confectionery products include: powder mixing machine, sugar grinder, copper pan for sugar boiling, working tables, pedal press, automatic rotary machine with cutter revolving coating pan, roller and cutter, sizing machine, coal fired furnace and other accessories. ', 'Saves foreign exchange and regional financial resources, introduces new skills and technology, creates demand for sugar which strengthens the need of establishing a sugar factory. ' , '4 ' , ' 1'),

( ' Cornfleaks', ' Cornflakes is a type of food made from corn flour and usually eaten during breakfast. It is similar to sliced and dried or roasted potato chips', ' ', ' Corn or maize is one of the major crops grown in the Amhara Region. Corn does not constitute one of the staple foods in the Amhara Region. It is rarely consumed in a form of bread or “Injera”. The popular from of consumption of corn is to roast the corn seeds while they are on the shales. In some localities corn is used to make home-made beer. In times of food shortages corn flour is made into injera and consumed. Currently corn constitutes a very small portion of the diet of an average family. One major advantage that corn has is that productivity per unit of hand and labor is much higher than many other crops. Corn flakes are new types of foods for many ordinary families in the country. However, in practically all western counties they are the basic breakfast diets. Given its large production per unit of land, corn can be a major source of food if people are used to the different types of diet that could be made from the crop. One type of diet is corn flakes. Up to now, all the corn flakes consumption of the country is met by imports. With domestic production of corn flakes, import of the production will be replaced and with proper marketing strategy local consumption will increase. If corn flakes are popular in the west, there is n o reason why they can not be in our country ', 'Practically all zones of the Region have localities which can produce corn. ', ' Similar to the manufacturing of all food items, the process of manufacturing corn flakes starts with the cleaning of the raw material – corn. Cleaning is done through a series of stages until the corn is completely free from foreign material. Then follows the operation of grinding and making the corn in to different grades of flour. After this, the flour is converted into dough whereby it is made into different but thin or flat shapes before cooking. After cooking the flakes are packed.', ' Stimulates production of corn and increases income of corn farmers, introductions new diet to the region, creates possibilities for exporting corn flakes to other regions.' , '4 ' , ' 1'),

( ' Dehydrated vegetable', ' Dehydration of vegetables is the process of reducing moisture of vegetables so that micro-organism do not grow and spoil it and the natural qualities are not harmed to any appreciable extent.  Dehydration is carried out in closed chambers by mechanical means under controlled conditions of temperature and humidity in such a way that the product is attractive, tasty and nutritious.  Dehydrated vegetables are considerably less in weight and volume and can be preserved for a long time.  Due to low cost of dehydrated vegetables compared with canned products, a plant which produces these items has a better and wider market.', ' At harvest time, the production volume of many types of vegetables is greater than the consumption volume during harvest.  Consequently the surplus quantity which is perishable cannot be stored to be consumed or sold after harvest.  Faced with this problem producers sell the vegetables for much lower or even at a “throw-away” prices. In the Amhara region, these problems are faced by producers of potatoes, onions, tomatoes, and other vegetables and fruits.  Due to lack of culture in dehydration, so much vegetable products are wasted every year in many localities of the region.

', ' Dehydration of vegetables is not a common practice, at least on commercial basis, in the Amhara region and the market for dehydrated products has not yet developed.  Because of this, it is difficult to predict the potential market for dehydrated vegetables.  However, if there are markets for undehydrated vegetables (i.e. fresh vegetables) one can safely assume that there will be sufficient market for dehydrated vegetables which has only lost their natural taste.', 'All localities in the Region which produce vegetables especially those which are closer to the main urban areas. ', 'Vegetables which are suitable for dehydration are onions, potatoes, peas, ginger, garlic, cauliflower, cabbage, beans, carrot, lady fingers, etc.  Vegetables to be dehydrated are graded according to size, stage of freshness, tenderness; and they are washed thoroughly to remove foreign matters.  The vegetables are then peeled to remove upper skin.  The method depends on the types of vegetable being processed.  Potatoes are peeled by abrasive wheels; onions by hand whereas peas are deshelded by pea huller.  Potatoes and other similar vegetables are then sliced in a slicer.  Peas are pricked in a pricking machine.

There are treatments employed to arrest the action of undesirable enzymes present in the fresh vegetables.  All vegetables except onions, ginger and garlic are given this treatment.  This treatment is known as blanching and sulphating.  For blanching vegetables are dipped in boiling water or steam while sulphitation involves the treatment of the vegetable with sodium sulphite or bisulphate.  This treatment increases the storage or shelf life of dried products, improves the color and protects the vitamin content.  The final stage is dehydration and packing.  Depending on the type of vegetable and quantity to be hydrated, various types of driers are used such as tray drier, rotary kiln drier and tunnel drier, etc.  Time and temperature of dehydration depend on the vegetable and it takes 1 to 12 hours to reduce moisture content to below 5 percent.  After drying the vegetables are tested for moisture and sulphur content; and it is packed in moisture proof paper.  Time between unloading from the drier and packing should not be more than half and hour for better results.

Plant and machinery needed include wooden tables with aluminum top, washing tank, slicer, cross flow drier electrically heated with provision for circulating air and controlled with thermostat, balancing tanks with aluminum, baby boiler, cooling tanks, empty can washing machine with sterilizer, heat sealing machine, other miscellaneous equipment such as weighing balances, aluminum utensils and laboratory equipment.

', ' Stabilizes the market for vegetable products, increases the income of producers, increases the value of the vegetables to be dehydrated, stimulates vegetable production in the region, introduces new skills and technology to the region, crates possibility to export the dehydrated vegetables.' , '4 ' , ' 1'),

( ' Dry milling', ' Maize is one of the major crops in the Amhara Region.  Production of this crop in the Region in 2002/2002 was 6.53 million quintals which was about 19 percent of the total grain production of the Region.  Most of the maize production is consumed in the villages where it is produced, but some surplus is sold to the urban population.', ' About 25 percent of the production of maize is assumed to be sold to urban markets where it needs grinding by modern mills.  The existing grain mills are technically suitable for processing other grains mainly wheat, barley, teff, etc.  Considering the volume of maize production of the Region, there is a need to establish some small milling plants for maize in the Region.', ' Maize flour is used for making different types of food.  It is also mixed with teff or wheat flour to make injera or bread.  In some lowland areas of the Region such as Mettema, maize is a staple food.  This project idea is to produce maize flour for regional and local consumption using the dry milling process.  The present pattern of food consumption in the Region has a sufficient demand for maize flour to justify the establishment of a small scale flour mill for processing maize.', ' The main source of maize in the Region is the eastern part of the Region along the Woldiya-Debre Sina road.', 'There are two types of technologies for producing maize flour; these are wet and dry milling processes.  Wet milling is a highly sophisticated and capital intensive process.  Pounding, the traditional small scale method of producing maize flour is also very wasteful.  This project idea considers an alternative small scale method- dry milling by machine which greatly reduces waste.  Dry milling is done using power mills such as hammer mills and plate mills.  In this process, the relatively hard and tough peels and embryos are thoroughly broken up and incorporated in the meal together with the starch.  The starch provides calories for energy and the peels and embryos supply oil and protein. ', ' Stimulates maize production in the region, further diversifies the supply of food for the urban population, and introduces new skills and technology to the Region.' , '4 ' , ' 1'),

( ' Essential oil', 'Essential oils are odoriferous organic volatile bodies of an oil character.  The oils are mainly derived from certain plant sources, and by nature they are present in small concentrations in certain parts of the plants such as leaves, barks, roots, flowers, or fruits.  Essential oils have extensive application for a wide range of uses.  They are used in soaps and cosmetics, pharmaceuticals, confectionery and aerated water, etc.  Essentials oils can be used for domestic consumption and for exports.  Common essential oils are eucalyptus oil, lemon, grass oil, geranium oil, pine oil, castor oil, corn oil, garlic oil, ginger oil, etc. ', 'Though declining due to deforestation, the Amhara Region is a source of wide variety of plants.  Different kinds of essential oils can be obtained from these plants.  Up to now, no attempt has been made to extract these oils for commercial purposes; and the Region has not benefited form its plant resources in the area of essential oil production.  Without further aggravating the depletion of the forest resources, it is possible to produce essential oils from trees and vegetables which can be planted and harvested and again replanted.  In fact, if commercial productions of essential oils are rewarding, reforestation activities might take place in some areas of the Region. ', ' All essentials oils used for various purposes are imported; and import figures are not readily available since different oils are categorized under different import figures.  But the presence of soap factories, pharmaceutical factories, confectioneries, cosmetics etc, indicate the existence of a captive market for some type of essential oils.  In addition, there is a high potential for exporting essential oils to countries where plant resources are extremely limited or practically non- existent due to climate.', ' The existing plant resources and farm products such as garlic, singer, geranium, castor, corn, etc. are sources of essential oils; and these can be found and/ or grown in the Region.  Besides, some commercial tree/plant farms could be established.', ' Three different production processes are used to extract or separate oils from plant materials.  These are distillation, expression and extraction by volatile solvents.  Different types of machinery and equipment are used depending on the type of oil to be extracted or produced and the type of production process to be used.', ' Economy**:** More use of the Region’s natural resources, earning and saving of foreign exchange resources.' , '4 ' , ' 1'),

( ' Fertilizer', 'Crushed bones of cattle are rich in calcium, phosphorous, ammonia, nitrogen and citric acid. Crushed bones can be used as fertilizers and animal feed which are in short supply in our country ', ' ',' The Amhara region has 10.1 million heads of cattle.  Taking average cattle mortality of 10 percent, there are almost 1.0 million heads dying every year.  An average adult carcass yields about 27.3 to 36.4 kg of bones along with other by-products of economic importance such as hooves and horns.  This means that about 32 million kgs or 320,000 quintals or 32000 tons of bones are available every year and this quantity will increase as the cattle population increases. Of course, this quantity is scattered throughout the Region, but with effective mechanism, it is possible to collect at least 80-90 percent of this quantity to one or two bone crushing plants (If will be similar to the collection of hides and skins.) The Amhara Region needs fertilizer which does not contaminate its soil, it needs feed for its livestock resources.  But every year it wastes a valuable resource which can be converted to fertilizer and animal feed', ' Who can say that there is no market for a fertilizer in the Amhara Region? Of course, products from the crushed bones will have market in the Region as well as in other parts of the country.  After all, annual imports of chemical fertilizer to the country are more than 300,000 tons and the share of the Amhara Region is 60,000 tons.  If there is a market for a chemical and artificial fertilizer, there will definitely be a market for a natural fertilizer.', 'The bones are received either in wet condition directly from slaughter houses, meat packers or in dry conditions from villages through rural market channels.  After classifying the various types of bones removing marrow and separating the skull and the hooves, the bones are crushed in jaw crushers.  The crushed bones fall into vibrating screen and are separated into several mesh sizes.  The different mesh sizes are used for different purpose such as animal feed, fertilizer, glues, etc.  Main machinery and equipment include bone crushers, pulverizer, bone digester, boiler, settling tank, rotary sieve, one impact disintegrator, weighing scale, axes and other tools. ', ' foreign exchange saving, increasing grain production, enhancing the development of the livestock resources of the Region, acquiring new skills and technology, utilizing a resources that could have been wasted.' , '4 ' , ' 1'),

( ' Fish meal', ' Fish meal is used as feed for poultry and cattle.  It is made from inedible fish and edible fish waste.  Feeding fish meal to poultry and cattle enhances the nutritive value of meat and eggs.  Fish meal is also used as fertilizer.  Fish oil which is a by-product of fish meal preparation is used in the manufacture of margarine, lower grade cooking fat and shortening, soap and paints.  It also serves as a substitute to other fats and oils.', 'The Amhara Region has the largest water body in the country.  Lake Tana covers an area of about 3700 square kilometer and has the largest fish stock in the country.  In addition, Lake Haik and the major rivers of the Region have a substantial size of fish stock.  Harvesting fish in the Amhara Region is done using traditional and primitive methods.  This is very wasteful and least rewarding to fishermen.  Currently all by- products of fish harvesting are not utilized.  These by-products can be collected and made into fish meal.  Types of fish that are not edible by human beings can also be used to prepare fish-meal.  Admittedly, one cannot expect the production of huge quantities of fish meal from the resources that the Region has.  However, there is a potential to produce this product from the fishery resources in Lake Tana and to some extent in Lake Haik. ', 'The Amhara region has about 31.9 million heads of livestock and poultry.  The proper management and utilization of this resource will generate income to farmers, employment and foreign exchange earnings.  One major constraint to the development of the livestock resources of the Region is the shortage of animal feed which is mainly caused by shortage of grazing land and lack of alternative animal feed production system.  One possible solution to this problem is to produce animal feed from different raw material such as fish waste, inedible fish, animal bones, crop residues, etc.  Production of fish meal could be a source of animal feed at least in areas around Lake Tana where cattle fattening, dairy farms and poultry should be encouraged.  The animal feed requirement in Bahir Dar and Gondar alone could absorb the production of the proposed fish meal plant. ', ' The fishery resources in Lake Tana will be the main source of raw material', ' Fish meal and fish oil production involves basically the process of cutting and crushing of raw inedible fish and edible fish waste, cooking, drying, grinding, cooling and packing. Main plant and machinery include crusher, cooker, presses, disintegrator, dryer, meal grinder, separator, conveyers, boiler, bagging and weighing machines.

', ' Utilizes resource that is thrown away as waste and that is considered unusable, helps the livestock sector with the provision of feed, and introduces new skills and technology.' , '4 ' , ' 1'),

( ' Fruit processing', '  Processing and canning is used to preserve perishable foods, such as fruits, vegetables, fish, meat and some dairy products, such as butter. Processing and canning method creates products that are convenient for consumers. They are ready to eat or require minimal preparation and cooking. Processed and canned fruits, such as Orange, Pine apple, Papaya, etc. are reserved for a long time and can be consumed domestically, and can also be exported to earn foreign exchange', ' With the variety of altitudes and agro-climates, the long growing seasons and accessible irrigation sources in Ethiopia, fruits, vegetables and other crops can be grown in many parts of the country. Nevertheless, fruit and vegetable processing in the country is very limited. The existing agro-processing factories are very few. One of the known agro industries is the Upper Awash Agro-Industry Enterprise which is currently processing and conning Orange Marmalade. Although there are some other firms that are exporting various fruit and vegetable products to some countries, such as Germany, Italy and the Netherlands, the participation of the private investors has been low in the pat. Given the existing potential for cultivating fruits, the processing and canning of the fruits is still inadequate and irregular. However, because of the new Investment Code, which has created a conducive environment for agro-investment, the cheap labour force in the country and the availability of transport services, including air transport, nowadays investment in the agro-processing and canning of fruits is encouraging in Ethiopia. Hence, it is encouraging for the private investors to participate in the fruit processing and canning activity in the Region', 'Factories processing and canning fruits are very few in the country and there are non in the Amhara Region. Hence, there will be a wide range of market for the product. Possible users of the product many include groceries, supermarkets, and big hotels in the Region, tourists, and individuals. There may be also the possibility of exporting the product. ', ' The main raw materials for the processing and canning plant are fruits such as orange, Pine apple, Mango, Papaya etc. Most of these fruits can be available in many parts of the Region.', ' In most case food processing may involve a complex set of techniques and ingredients to prepare ready to eat convenient foods. However, fruits require minimal processing techniques. They are simply picked and stored before being sent to market. Hence, fruit processing will involve picking, storing and washing before it is sent to market or to the canning process. Like other perishable foods, canning preserves the fruit by heating it in airtight vacuum-sealed containers. The can is filled in a cooker, called retort and cooled to prevent overcooking of the fruit inside. This process removes oxygen. It also removes enzymes involved in fruit spoiling, and kills micro-organisms that may be present in the fruit.', 'One of the benefits of the new investment is the utilization of the resource with new skill and technology. It will create employment opportunity for the people in the Region. It will generate earnings for the investors in the form of profit, and will generate revenue for the regional State in the form of income tax. It will encourage horticulture producers in the Region. There will be also a possibility of exporting the product to earn foreign currency. ' , '4 ' , ' 1'),

( ' Fruit and vegetable', 'Fruits and vegetables are generally perishable goods. Without proper preservation, they are often spoiled due to microbial degradation or enzymatic reaction.  Preservation techniques aim at complete or partial destruction or elimination of microbial agents (mold, yeast, bacteria’s) or by inhibiting their growth and activity.  Through preservation, it is possible to store, transport and distribute fruits and vegetables without changing their basic natural content ', 'In recent years, a culture of growing and producing fruits and vegetables for commercial purpose has been developing in the Amhara Region, especially in communities close to urban centers.  Unfortunately, in some season of the year, a lot of fruits and vegetables is harvested which the market can not absorb.  As a result, farmers are forced to sell their produce at very low prices, and this discourages farmers from producing these crops.  In other seasons, the very crops which were in large supply one or two months before are not available in the market.  One main cause of this fluctuation in the supply of fruits and vegetable is the lack of preservation system for these produces.  Through the problem of perishability of fruits and vegetable can not be eliminated completely, using different methods of preservation will help both the producers (farmers) and the consumers.  Hence, the need of promoting such type of a plant is obvious. ', 'Except some traditional and crude methods of preservation, the whole Amhara Region does not have any single plant which is engaged in the preservation of fruits and vegetables through drying, canning and other techniques of preservation.  The volume of fruits and vegetables that are sold at “throw- away prices” and are left to rot in some localities in the Region could justify the establishment of a plant which will be engaged in the preservation of fruits and vegetables. ', 'Production of fruits and vegetables is more prominent in areas around Bahir Dar, along Bahir Dar-Woreta road, around Gondar, near Dessie and Combolcha. ', 'There are several methods of preserving fruits and vegetables from spoilage.  These include heat treatment, dehydration, salting, pickling, preserving with sugar and chemical freezing and sterilization by electric or ultraviolet.  This project idea deals with the drying and canning forms of preservation.  The process of preserving fruits and vegetables through drying involves cleaning and washing, peeling, drying and packing.  There are different equipments used for the drying of fruits and vegetables depending upon the type of the product.  The most common ones are cabinet dryer, tray dryer, horizontal dryer. Canning is a preserving method in which food products are kept in a hermetically sealed container and given a heat treatment to kill all the micro organisms, so as to increase the shelf-life of the product. Canning of food consists of the following steps. Preparation of fruits and vegetables for canning includes washing, peeling, coring and trimming, slicing and blanching. Canning includes can filling, exhausting, sealing, processing and cooling. Plant and machinery include peeling, slicing, pricking machines, tanks, boiler, weigh scale and other accessories.

', 'Solves farmers perennial problem, increase income of farmers, introduces new technology and skill, enhance the development of fruits and vegetables in the Region. ' , '4 ' , ' 1'),

( ' Gelatin', 'Gelatin is a mixture of protein obtained by boiling skin, ligaments, tendons and bones. Being a hydrolysis product obtained by hot water extraction, it does not exist in a natural state. The principal end users of gelatin are the food, pharmaceutical and photographic industries. Gelatin is animal jelly, glutinous material obtained from animal tissue by prolonged boiling. It is a protein substance purified or edible gelatin is a food used chiefly in deserts, ice cream and jellied incats. There are principally four categories of gelatin. These are photographic, pharmaceutical, edible and technical according to descending order or grades. Basically, any plant can produce any grade of gelatin suitable for all ranges of applications. Gelatin is also used in various photographic such as dying, as bacteriology as a culture medium and in preparation of sizes, fining cements, etc. It is also the main ingredient in glue making. It has also applications as adhesive in the textile and paper industries. ', ' ', ' The local demand for gelatin is entirely met through imports. Between 1989 and 1993, the average annual import of the product was 71000 kgs. The demand for gelatin depends on the expansion of pharmaceutical, photographic, textile, paper and shoes industries. Due to changes in the economic policies of the country, gelatin consuming industries especially pharmaceutical and photographic have expanded during the last ten years. A general market study for the product indicated that the projected demand for it will reach about 10,000 tons by 2010. This projected demand is more than the production capacity of a medium size gelatin producing plant. The Amhara Region has its share of photographic and textile industries which consumes some quantity of gelatin. In addition, the region is a major source of the raw materials for making gelatin. The region as a major source of the raw materials and a modest (as of now) consumer of the product could be an appropriate area for establishing a gelatin factory.', 'As stated earlier, the main inputs for gelatin are hides, bones and tannery wastes such as splits, trimmings, etc. These inputs can easily be collected in the tanneries and abiattors located in the Amhara Region.    ', 'Gelatin manufacturing process can be divided into three major stages material:- preparation, extraction and filtration, and chilling, drying and blending. The material preparation mainly consists of bone grinding, degreasing, demineralization and liming. The bones are ground to 5-15 mm and then passed to a degreasing operation where any meat and fat are removed by hot water. The demineralization process is where ossein (decalcified bone) is produced by tracing ground degreased bones with hydrochloric acid of 30%-35% concentrations. Demineralization yields a by-product called dicalcium phosphate by controlled precipitation. The slurry is then further processed and dried to be sold for cattle feed. After acidulation and removal of the by product dicalcium phosphate what remains is the declassified bone assign which is now acidic. It is then washed and immersed in quicklime medium to alter its PH to alkaline state and also to depolymerize the collagen component. The liming process takes between 45 and 100 days. The assign is then washed and neutralized by acid treatment for further processing.

The next major process is extraction and filtration which is conducted in stainless steel tanks with temperature ranging between 50oc and 100'C and duration of about 42 hours. The extraction process results in a gel solution. This is then passed to primary filtration to remove course particles. Deionization is required for gelatin used for pharmaceutical, most food grades and photographic use. The gel solution is then passed to secondary filtration where fine suspended particles together traces of residual grease are removed. The solution is then evaporated under vacuum in two stages to increase the solid concentration from 5% or 6% to 14% or 18%. A third filtration process may be required to remove any suspended particles left in the partially concentrated gelatin liquor.

The final major process is chilling, drying and blending. The PH and redox state of gelatin is checked and adjusted by adding chemicals before chilling quickly reduces the temperature of  the solution from 55oc to 23oc and the gelatin acquires a from extruded moudles. The chilled gelatin is then dried where by the moisture content is reduced to about 11 percent. The drying process results in a gelatin which has a form of mat which is broken to 20mm. long pieces. After under going testing the gelatin is ground to a desired size and packed.

Main plant and machinery needed include bone grinder, degreasing and treatment unit, liming/deliming unit, acidulation unit, extractor, filters, ion exchanger evaporators, chiller, dryer, crusher, blender, grinder, packing unit, laboratory, equipment, storage tanks, conveyors and other auxiliary facilities.', 'Similar to other projects.  ' , '4 ' , ' 1'),

( ' Glucose', 'Glucose is a viscous syrup liquid which is a mixture of dextrose, maltose and other higher oligosaccharide, derived from starch by acid or enzyme hydrolysis and about 20 percent water. A considerable amount of glucose is used for processing in breweries, pharmaceutical, tobacco, tanning, paper and adhesive industries. It has also many applications in canning; food preserving, baking and dairy. Basically, there are at least four types of glucose. These are acid converted glucose syrup, high maltose glucose syrup, high converted glucose syrup and high maltose low dextrose syrup. Each type has distinct characteristics based on the content and proportions of its ingredients. ', ' **Rationale**: As stated above, glucose has many applications, in different industries especially in the pharmaceutical industry. In public health, glucose is considered as a life-saving product since it is given to patients who can not take their diets through the normal process. In this regard, glucose can be considered as one of the most essential pharmaceutical products which should always be available in all health care institutions. But this essential product is not produced in a Region with a population of 19.2 million and which has a number of hospitals and many clinics and health posts. In fact domestic production of glucose does not meet domestic requirement even at the national level. The country is dependent on imports for this critical life-saving product. As population increases, the demand for glucose will increase making the country more dependent. To be self sufficient in the supply of glucose, production of this product at home should be promoted and encouraged ', ' Some studies indicate that for medical purposes alone, the demand for glucose in 2006 is about 22000 tons per year and the share of the Amhara Region is 5720 tons. Meeting this demand can be a viable venture for an investor in the Region. This demand could be augmented by demand from neighboring regions like Bene-gumuz and parts of a neighboring country such as Eastern Sudan.', ' The main inputs for making glucose are maize starch, activated carbon, soda-ash, HCL acid and water. Almost all these inputs will be imported.', 'Slurry of starch of about 60% water is prepared and treated with HCL acid in a converter where the reaction takes place at 1500c and maintained for 15 minutes. The treated slurry is then transferred to wooden vats where it is neutralized with soda-ash solution. Then it is filtered and further refined by activated carbon. Then it passes through a vacuum evaporator where it gets the required concentration. After being cooled the product is packed ready for shipping. Main plant and machinery include slurry  preparation tank, converter, glow tank, wooden vat, filter press, refining vessel, vacuum saporator,  pumps, soiler and accessories, water treatment plant and laboratory equipment. ', 'Self sufficiency, saving of foreign exchange and regional financial resources, promoting public health, introduction of new skills and technology ' , '4 ' , ' 1'),

( ' Ground nut oil', ' Ground nut kernel contains 50-55% of oil. The oil obtained from the kernel is yellow to greenish yellow in colour with chief constituents of glycerides of oleic and linoleic acids with lesser amounts of the glycerides of palmitic, stearic, arachidic, behenic, and lignoceric acid. The oil is used as a substitute for olive oil and other edible oils, soaps, salad and cooking oil, mayonnaise and margarine. The meal is an important component of feeds for poultry and cattle.', ' ', 'Total apparent consumption (local and imported) during the past seven years ranged from 30,276 tons (2003) to 129,839 tons (2004).  The mean apparent consumption in those years was 67,818 tons and this amount is considered to represent current effective demand for the year 2006. Moreover, in order to estimate the present ( 2008) demand it is assumed that demand for the product grows at a rate of 4% which is equivalent to the growth of population. Accordingly, taking the year 2006 apparent consumption as a base and applying a growth rate of 4% the current unsatisfied demand which excludes local production is estimated at  65,722 tons. ', ' The principal raw material required for the production of groundnut oil is groundnut seed, which are produced locally in different regions such as Oromia, Benishangul, SNNPRS, etc. The seed gives 44.5-50% oil, 50-55% meal.  All the other raw materials are also found locally. The raw material, refining chemicals and packing materials requirement of the envisaged plant is indicated in Table 4.1.  The total annual cost of raw and auxiliary materials is estimated to be Birr 10,059,620', ' Edible oil technology can be grouped into two: mechanical pressing and solvent extraction.  Sometimes the latter compliments the former.  For oilseeds with high oil content such as ground nut, first mechanical pressing will be applied and over 85% of the oil will be extracted.  The remaining oil in the expeller cake will then be extracted with solvent.  For some other oilseed with low oil content, solvent extraction is generally considered as the best alternative.  However, the initial investment cost of solvent extraction is much higher than mechanical pressing.  In addition, solvent extraction is more appropriate for large scale processing than small scale edible oil plants', ' ' , '4 ' , ' 1'),

( ' Honey', ' Honey is a product obtained from beehives.  It is used to sweeten and flavor foods at home and in food industries.  It is also used in the pharmaceutical and cosmetic industries.  In our country honey is made into a popular local drink-tej.  Processed honey is strained (extracted) honey after raw honey undergoes a serious of filtration and purification processes.', ' Honey is one of the agricultural products which the Amhara Region exports to other regions of the country and to foreign markets.  It the system of apiculture is improved honey production in the Region will substantially increase.  In 2005/2006, of the 4.012 beehives found in Ethiopia, 0.8 million (about 20 percent) were in the Amhara Region.  Production of honey during the year was about 41.58 million kg.  Of this, more than 90 percent is exported from the Region.  Currently it is raw honey that is exported from the Region.  Processing honey within the Region and exporting it will not only add to its value and bring more income but will also create additional employment in the Region.  This will further expand the apiculture sectors of the Region’s agricultural economy', ' The existing foreign and domestic market of raw honey will be replaced by the strained or processed honey.  With the supply of a product whose quality is enhanced through further processing, the market for honey will expand both at home and abroad.', 'Raw honey will be collected from the surrounding rural areas where the processing plants are to be located. ', ' Honey processing mainly involves passing of the raw honey through a series of filters in order to remove solid particles.  After removing the crystals, it must be packed in a sealed container.  A moderate heating system (solar one) could be useful to make the raw honey melt.  Main plant and machinery include honey extractors, filter equipment, packing machine and seals', ' More added values to a regional product, more income to farmers and product, more income to farmers and processors, more foreign exchange, more financial flow to the region, stimulates apiculture activities' , '4 ' , ' 1'),

( ' Intravenous Solutions', ' Infusion therapy supports the restoration and maintenance of physiological conditions of patients referred to as “homeostasis” Which is described as the “physiological equilibrium” of the human organism. There are four main ranges of application of highly specialized intravenous infusion solutions. These are (a) treatment of disturbed water and electrolyte metabolism, especially in severe cases, (b) therapy of acid-base imbalances, (c) volume substitution and volume replacement in surgery of an accident victim suffering blood loss and (d) parental nutrition for severely ill and postoperative patients. Infusion therapy as a basic tool of modern medical care enables physicians to restore and stabilize homeostasis stress quickly and completely.', ' ', 'For a long time all intravenous solution requirements of the country were being imported to the country were being imported to the country. During the last 10 years one or two plants were established to meet some of the intravenous solutions requirement of the country’s health system. However, due to some technical and financial problems, these new plants have almost ceased operations. Hence a country of 75 million people with an expanding health care system’s till imports all its requirements of intravenous solutions. If we assume that at least one percent of the population require intravenous solution and consumption by each individual patient of the population require intravenous solution and consumption by each individual patient is about liters per year, the annual demand for intravenous solution in the country will be about 1.5 million liters per year. This conservative estimate is more than the production capacity of an intravenous solutions making plant. ', 'Main inputs required for making intravenous solution are chemical (dextrose), PE for plastic bottles, PVC bags with stoppers, glass bottles with stoppers and packaging boxes. The plastic bottles and the packaging boxes can be purchased from domestic sources. Dextrose is made from starch; and the starch could be obtained from the food industries. ', 'The main manufacturing/production stages include treatment of water, distillation, preparation of solutions, filling and sealing of bottles, sterilization (by autoclave), visual inspection, labeling and packaging. Water needed for the production of infusion solutions has to be of extremely high quality, which can be achieved only by special purification treatment. The steps needed for the treatment of the water are pre filtration, active carbon filtration, sterile filtration, demineralization via ion exchanger (anion/ cation columns), de mineralized water storage tank, pre filtration of de mineralized water and sterile filtration of de mineralized water. The distillation unit is fed with fully de mineralized water; the distillate is generated by multi-step evaporators and subsequent condensation. After condensation, the water is stored at temperature of approx. 90oC. From this storage it is pumped to the various production points by centrifugal pumps. The preparation of the water is followed by the preparation of the intravenous solutions. Typical infusion solutions formula are: 0.9% normal saline in water, 5.0% dextrose in water, 5.0% dextrose in normal saline. The chemicals are controlled by the quality control section prior to the manufacturing process. The preparation of the solutions is followed by filling and sealing of bottles. Then follows sterilization by autoclave. The bottles stacked on the special wagons are rolled in to the autoclave chamber and sterilized in accordance with an electronically controlled cycle having three stages heating, actual sterilization and cooling periods. Subsequent processes are visual inspection, labeling and packaging. Main machinery and equipment needed include demineralization unit, distillation unit, solution preparation unit, autoclave, labeling machine, packaging machine, steam generator, compressed air plant cooling and chilled water plant, and laboratory equipment. ', 'Similar to other projects ' , '4 ' , ' 1'),

( ' Iodized salt', ' Iodized salt is edible salt where iodine is added. The addition of iodine to edible salt is essential to avoid goiter and other related health problem.', ' ', 'The necessity of salt to humans is too obvious to tell. It is one of the essential food flavoring ingredient which is added to almost all types of foods. However, iodine has to be added to salt to make the salt safer for human consumption. Hence the use of iodine as an additive element to salt is as necessary as salt itself. In other words, salt must be iodized to make it more useful as a basic consumption item. During the last 10-15 years, iodization of salt was not as common as it was during the previous decades. It has been reported in state and private newspapers that the salt we consume is not iodized. This has increased the number of people with goiters in many parts of the country. The Amhara Region suffers the most by the lack of iodized salt because almost all the salt that is consumed by the people of the Region is not iodized. The consequence of consuming unionized salt is felt after duration of some years and this reduces the pressure on the relevant authorities to take action for providing iodized salt for the people. The question of market for iodized salt does not arise since the unionized salt is being consumed by the 20 million people of the Region. ', ' The main source for the unionized salt will be the salt mines in the Afar National Region. For the Amhara Region the Sudan could be another source.  
 ', 'The process of adding iodine to salt is simple. It only requires the mizing of a certain amount of iodine to a specific quantity of salt and mizing the two. Main plant and machinery include silos for storing the unionized salt, mixing facilities and packing. ', ' Improves the health standard of the population.' , '4 ' , ' 1'),

( ' Jam and Jelly', '  These are processed and preserved fruits which are canned or bottled for distribution. Jams are prepared by boiling fruit pulp with sufficient quantity of sugar. The final product of jams should contain no less than 68.5 percent of soluble solids. Jellies are prepared by boiling the fruit with or without water, straining, mixing the strained and clear juice extract with sugar and boiling the mixture to a stage at which it will set to a clear gel. Marmalade is a fruit jelly in which slices of the fruit or the peel are in suspension. Marmalade is usually associated with the product made from citrus fruits like oranges and lemons in which shredded peel is included as the material in suspension.', 'Almost all parts of the Amhara Region are suitable for growing different kinds of fruits and vegetables. Fruits like orange, lemon, banana, etc can grow in many places, where there is a potential of irrigation. Unfortunately, since these crops do not constitute the main staple food of the people, they are not grown widely. Until recently fruits and vegetables have never been cash crops in practically all parts of the Region, except in the two or three larger towns. For these reasons, farmers did not have strong interest in producing citrus and other fruits. However, as urbanization expands and more people live in towns, the consumption of fruits and vegetables has increased especially during the last 10 years. The demand for such fruits in the Amhara Region is being met by imports from the Awash Valley and western Wollega which are more than 700 kms and 400 km from Bahir Dar respectively. Having Lake Tana and Abay at its center and other rivers distributed throughout the Region, the Amhara Region imports fruits from far off places in the country. The Region can easily produce fruits not only for its consumption but for export and for converting the fruits to jams and jellies. ', ' The supply of jams and jellies is composed of imports and domestic production. The domestic supply comes from one single plant located in the Awash Valley. A casual observation of shops in major urban areas indicates that imported jams and jellies dominate the market. Between 2000 and 2004, average annual domestic production of marmalade was 1190 tons, but annual production was declining drastically. In 2004, annual production was 2873 tons while in 2003 and 2004, yearly production was 144 tons and 108 tons, the main reason for this fall in production could be the flooding of the market by imports. Jams and jellies are canned products which have considerable weight. As a result, transporting them long distances increases their prices because of high transportation costs. Because the raw materials are perishables, plants which produce jams and jellies are located near main fruits growing areas. With a population of 19.2 million, the market for jellies and jams in the Amhara Region can support a small scale fruit processing plant.', 'Citrus fruits being and to be grown in selected localities of the Region. Other inputs such as sugar will also obtained domestically. Inputs like acids, colors and flavor will be imported. ', 'The manufacturing of jam involves the following steps: - Preparation of the fruit for jam making, addition of sugar, acid, color and flavor; boiling end point packing. Jellies are viscous products containing not less than 45% of fruit juice and 55% of sugar by weight. The mixture is concentrated by heat to such a desired consistency when the contents cool down. The three essential ingredients of jellies are pectin, acid and sugar which are mixed in certain proportions to give specified physical properties. Main plant and machinery include boiler, stainless steel (tilting type) steam jacketed kettle, pulpier, S.R. Scalar; reformer, flanger with can testing and with different chucks and dies; bottle washing machine; fruit washing tanks with water spraying attachments, retractometer, laboratory equipment, platform weighing machine, wooden barles for storage of pulps, other accessories and utensil. ', ' Stimulates regional production of fruits, saves foreign exchange and original financial resources, introduces new skills and technology promotes self sufficiency' , '4 ' , ' 1'),

( ' Maize starch', ' Like other commercial starches, maize starch has many uses. It is used as food in puddings, soup and gravy thickeners, as cold or hot water laundry starch, as a preferential water absorber in baking powder, in the manufacture of confectionery, in sizing and finishing textiles and papers, as a binding agent in papers, in making adhesive pastes, in conversion to dextrin’s, which are the bases of many adhesives, in syrup and sugars, as a binding and diluting agent in the preparation of pharmaceutical products such as pills and tablets, in cosmetics, etc. In addition the production of maize starch yields some by-products that have a high commercial value.', ' ', ' While maize is available in the country for producing enough quantity of starch, the product is imported to meet the input needs of the various industries which use maize starch. The various uses of maize starch which range from puddings to pharmaceutical ingredients indicate a large demand for the product in the country. Specific figures as to the annual demand for maize starch is not available since different  but similar products are lumped together in the import statistics. However, given the variety of uses of maize starch, one can safely assume that the demand for the product justifies the establishment of a maize starch producing factory in the country. Maize is one the major grains which is produced in the Amhara Region. If the maize starch producing plant is established in the region, it will have enough raw materials for the plant.  ', ' All “Kola” and Low “Woina dega” areas of the Amhara Region are suitable for producing maize.', ' Maize is cleaned and transported in to steeping vats. The steeping water has a temperature of maximum 520C which is maintained by circulation via a heat–exchanger. To facilitate the gluten separation about 0.2 to 0.3% sulphurous acid is added. This additive also bleaches the starch. The steeped maize is discharged by screw conveyors to the de-germinating mill. It breaks up the maize kernels and sets the germs free without damaging them. The maize slurry drops into the germ separator where the fat-containing germs are separated from the slurry and flow into a container. They are pumped into a washing machine and a dewatering press. The germs are then dried and ready for storage. Having high value edible oil content of about 45%, the germs can be used for oil extraction. The maize slurry flows into the container and is pumped to the refiner mill. For coarse fiber washing, the slurry is delivered to an extraction section. The starch milk is collected in raw milk vessels equipped with stirrers. The crude starch milk is pumped to the extraction section for fine fiber washing. From the extractors the starch milk flows to the container. This is followed by a series of filtering and refining processes which results in high quality maize starch. By-products of the process include high quality animal feed. Required machinery and equipment include about 24 units of machines and instruments. The main ones are cleaning device, steeping device, germ separation unit, germ washing unit, dewatering press, germ dryer, maize slurry mill, washing unit, extraction unit, washing unit, extraction unit, starch milk filtration device, etc', ' Similar to other projects.' , '4 ' , ' 1'),

( ' Margarine', ' Margarine in a food product made from one or more vegetable or animal fats intimately mixed with one or more variation of cow’s milk together with table salt and several optional ingredients in small quantities. It is rich in fats and oils, and widely used as a substitute for butter. It is a source of calories and used in cooking and as a spread for bread in hotels and restaurants, and households.', ' Margarine, first developed in the late 1860s in Europe by the French chemist Hippolyte Me’ge-Mouries, and given patent in the United States of America in 1873, is today widely used as a useful food in many countries of the world. It is rich in fats and oils, which are one of the six nutrient food classes. Thus, nutritionally, the value of margarine as a food fat is primarily a source of food fuel (calories) and other nutritional factors. For this and other reasons, nowadays in Ethiopia margarine is widely used in cooking substituting butter in many big hotels and restaurants and in households, particularly, in urban areas. It is also used as a spread for bread. However, there are only a few firms, such as the Ethiopian Dairy Products factory which produces some margarine looking product from cow’s mild, and the Mojo Oil Products Factory, which produces some margarine only from oil fats. Most the margarine being consumed in the country is imported. Hence, there is a good opportunity to establish a margarine manufacturing plant in the Region.', 'Margarine is widely used in big hotels and restaurants as spread, and sometimes for cooking. Supermarkets and food groceries require margarine for resale. Households, especially in big cities, use margarine for spread and for cooking. Therefore, there will be a wide range of market for the product in the Region and other pats of the country for the product. ', 'The main raw materials for the manufacture of margarine are vegetable oils, such as palm, corn, sunflower, cottonseed oils, rapeseed, soybean oil, etc. other raw materials are cow’s milk and table salt, and other ingredients. Most of these raw materials are available in the Region. ', 'The process of production starts with the making of the required materials available. The ingredients in margarine are those found in its edible fat portion and in its milk portion. There are such ingredients as vitamins A and D, vegetable lecithin, emulsifiers and similar materials dissolved in the liquid fats from the vegetable portion in making margarine, while in the milk portion there are dissolved salt and other ingredients and additives readily mixable with milk. The two portions are thoroughly mixed to produce an emulsion which is chilled to solidify the mixture, kneaded to a plastic consistency and packaged. The margarine produced this way, which is almost white in colour, is mixed with a yellow vegetable dye to make it look like butter. ', 'Getting easily the product in the Region by the various users. Creation of employment for the people in the Region. Creation of earnings for the investors (in the margarine production) in the form of profit. Generation of revenue for the Regional Government in the form of income tax and VAT. ' , '4 ' , ' 1'),

( ' Meat processing', 'Meat from cattle can be processed into different food items like canned meat, beef-in-jelly, frozen meat, dried meat, etc. these meat items can be consumed locally or they can be exported**.** ', ' ', ' The level of consumption of processed meat depends on the level of economic development in a given country. Processed meat is usually consumed in urban areas where people do not have enough time or facilities to prepare fresh food. The product is mostly consumed by single women, men, students, members of the armed forces and other people living in camps. The advantage of consuming processed meat is that it saves time and it does not require the consumer to have different type of cooking utensils. Frozen meat is usually prepared for export market. The major consumers of processed meat in our country are members of the armed forces; and the supply of this food product has been coming from the meat processing factories located in Gondar, Combolcha and Dire Dawa. However, these factories have become very old and they need to be replaced by new and modern meat processing plants. These new plants could produce canned meat and frozen meat both for the domestic and foreign markets. The Amhara Region has more than one third of the livestock population of the country. With this resource base, a meat processing plant can be, established in the region to supply processed and frozen meat to the local and foreign markets.', ' Cattle growing areas of the region', ' The first stage of the meat processing operation is the slaughtering of the cattle, skinning the carcass, separating the different parts of the body. At this stage the operation will have two major branches – one branch for further processing of the meat and another branch for freezing the meat. In further processing, the meat is cooked, mixed with vegetable (it necessary), oil, salt and other ingredients and finally conned.  ', 'Earns foreign exchange, stimulates livestock production, increases the income of cattle growers ' , '4 ' , ' 1'),

( ' Milk', 'Raw milk will be processed to produce pasteurized milk, and other milk products such as yogurt, cheese, ghee butter, fat- free milk.  The benefit of milk and its products as nutrition is too known to repeat ', 'The Amhara Region has about 26 percent of the population and 29.1 percent of the cattle resources of the country.  Looking at these magnitudes, one could have expected to find many modern and commercially oriented dairy farms and milk processing plants at least around the major urban centers of the Region.  Unfortunately this is not the case.  There is no any urban center in the whole Region where there is a commercial supply of pasteurized milk and other processed milk products.  Small quantities of raw milk are supplied to consumers in some urban centers by people who keep two three cows in their yard.  The main problem for the near-absence of any commercial milk production and processing entities in the Region is that the market is not properly explored and exploited.  We should be aware that the Amhara society is a very traditional society.  As such the introduction of “new” products to the market, no matter how the products are useful, need concerted efforts to convince people to use these new products. What is a common consumption item when it is produced at home becomes a strange product when it is offered for sale in the market.  It is common to consume milk and milk products when they are produced at home, but uncommon when they are produced commercially and offered for sale.  Probably this is why there are no milk production and processing commercial enterprises in the Region. In any hotel in the Region, a guest can not find a bottle of pasteurized milk, cheese, yogurt or butter.  Is this not strange?  Provided that the product is useful, the market should be created using the principle “supply should create its own demand”.  At any rate with proper market strategy, there will be enough market for at least small milk production and processing enterprises in the major urban centers of the Region. ', 'As explained above the major urban centers of the Amhara Region like Bahir Dar, Dessie, Combolcha, Gondar, Debre Markos, Woldiya can have enough markets to absorb the production of small milk production and processing enterprises. ', ' The main raw material is raw milk.  Raw milk can be obtained from (a) own dairy farms, (b) farmers around the enterprises which raise livestock or (c) both sources.  Which source is dependable and least expensive will depend on the specific characteristics of each urban center and this will be determined when feasibility studies are undertaken.  In most cases, sources of raw milk is own dairy farm and farmers of the surrounding areas.', 'The process of producing pasteurized milk is as follows.  Collection and weighing of raw milk, removal of microscopic impurities, cooling and homogenizing, re-sterilizing, cooling (by chilled water) and storing and finally filling in packs or packages- machinery and equipment for pasteurization includes module of milk pasteurization, refrigeration and homogenizer, purification and treatment equipment, boiler, filling and weighing machines.  Additional machines will be needed for producing other products. ', ' Creates direct and indirect employment, increases the income of farmers who supply raw milk to the factory, stimulates agricultural economic activities and above all –improves the health, physical and mental well- being of consumers.' , '4 ' , ' 1'),

( ' Milk powder', ' Milk powder is a dairy product produced from cow milk. Cow milk basically contains water, fats, protein, sugar and ash. About 87% of cow milk is water by weight. Milk powder is prepared by skimming the milk whereby a considerable but proportional cream substance is extracted before it is powdered. The processed milk powder, after some vitamins are added is packed in full galvanized metal cans or plastic bags whose standard sizes are 240, 500, 1000 and 3000 grams.', ' ', 'The major users of powdered milk are households, institutions like hospitals, schools, hotels restaurants, cafeterias, canteens, etc. The types of milk powder used by consumers differ on the type of direct consumer such as age, sex, job and also by the type of institutions. In most cases, powder milk is produced in advanced countries and is mostly exported to developing countries. The main advantage of powder milk is it loses the water component of the raw milk and contains a concentrate of protein, vitamin and other nutrition substances which are needed by the consumer. Powder milk is easy to transport and that is why countries export milk powder instead of raw milk. In Ethiopia, there is no domestic production of powder milk. All the demand for the product is met by imports and grants in the form of food-aid. For example, between 1984 and 1990, the average annual import of powder milk was about 18000 tons. Based on growth rates of imports, the demand for milk powder is projected to be about 34,000 tons in 2008. The share of the Amhara region will be about 10,000 tons or 10 million kgs. This demand quantity for the region could justify the establishment of a small power milk processing plant. ', ' The main raw material is raw cow milk. Some additives and packing materials will also be needed. The inputs will be obtained from local sources.', 'Raw milk from surrounding areas is first collected either by milk cans or road tankers. it is then stored and filtered. The filtered milk is then cooled to 6oc. The product is then pasteurized and recooked and sugar is added after cooling. This regeneration and evaporation takes place where the skimmed milk is concentrated to 47% total solid. It is then spray dried and cooled. Finally it is packed in standard containers and ready for delivery. The main machinery and equipment needed include skimming machine, pasteurizing, evaporator, spray dryer, shaking fluid bed CIP center, packing machine, boiler, compressor, cooling plant, etc.. ', ' Similar to other projects. ' , '4 ' , ' 1'),

( ' Modern Abattoirs', 'Abattoirs are modern facilities where live stocks (cattle, sheep, goats…) are examined (for their health), slaughtered, dressed and packed to be distributed to customers**.** ', ' ', ' Unlike in our country, in developed countries all livestock to be used for human consumption are slaughtered in abattoirs and then supplied to butcheries where consumers buy meat, mutton, ham, etc. in our country it is only-few large urban centers which have abattoirs, and the abattoirs mostly slaughters cattle and supply them to butcheries. Even in these few urban centers, goats, sheep, chicken are slaughtered in individual homes. The few large urban centers of the Amhara Region do not have modern abattoirs like Addis Ababa and Dire Dawa. These Urban centers especially Bahir Dar, Gondar and Dessie are growing in terms of population and economic activities. With population and economic growth comes modern types of services such as abattoirs. The presence of abattoirs in a given urban center increases the supply of disease-free meat to the consumers. It also contributes to reduction of illegal selling of uncertified meat in a given area. Hence the establishment of small size abattoirs at least in the three major urban centers of the Region is a necessity; and it is very likely that the enterprise will be financially viable.', 'The cattle to be prepared in the modern abattoirs will come from the localities surrounding each major urban center of the Region. ', 'Preparation of cattle in modern abattoirs involves the following operations. Examination of the animals to make sure that the meat is fit for human consumption, killing the animal in a specified place within the abattoir, preparing the body for skinning, separating the various parts of the caracass, cleaning parts of the caracass where necessary, disposing various wastes and dressing the meat for distribution. ', 'Contributes to the promotion of good public health through the supply of certified meat. ' , '4 ' , ' 1'),

( ' Pasta', ' Pasta and macaroni are convenient food items and are main dishes in many households and of restaurants in almost towns of the region.  The products are processed from wheat flour.', 'The production of pasta and macaroni will supplement the food consumption pattern of the population in addition to the traditional dishes. The products are relatively not expensive and are popular in urban areas.   They can easily be prepared and are not time consuming which make them preferable by many town dwellers.  The demand for pasta and macaroni is increasing in relation to the growing urban population.  As the demand for these food items increases, there must be a plant which will produce these items in the Region. ', ' The increase of the population and urbanization in the region will create demand for large amount of food items.  As pasta and macaroni products are preferred by many town dwellers there is an existing and potential demand for these products.  Presently pasta and macaroni products are imported from other regions particularly from Addis Ababa. ', 'A pasta and macaroni plant would easily get the required raw material input from flour mills located in the region or the flour can be imported from other parts of the country.  ', ' The processing of pasta and macaroni products involves cleaning of the wheat flour, mechanically kneading and homogenization, processing or extruding (shaping) through round (for short pasta like macaroni) or rectangular dies (for long pasta like spaghetti) drying and packing.  ', ' The main productive machinery and equipment are: Kneader and homogenizer. Extruder or press, Cutters (for long and short pasta), Driers, Moulds , Conveyor rods and canes (for long pasta). All machinery and equipment are imported item.' , '4 ' , ' 1'),

( ' Pea canning ', 'Preservation of food stuffs has been conceived as an art of living ever since the dawn of human history. At present, various methods of preserving food can be cited, such as canning, refrigeration, drying, salt-pickling, sugar preservation and smoking. The scope of the study is the preservation of dried pea canning from the time it is delivered to the plant until it arrives at the wholesale customer.

The protein concentration of peas range is from 15.5-39.7%, which can be consumed in either roasted, boiled or in any other forms. Dried pea canning is preferred than fresh pea canning, because of unstable high quality of packing of fresh pea.

', ' The average size of exported peas during the first five years of the study period (1997-2001) was 70 tons. This figure has significantly grown to an average of 531 tons during the last four years of the study period (2002-2005). Similarly, the average magnitude of imported canned pea has grown from an average of 17 tons during the first five years of the study period to an average of 2,053 tons in the last four years.', ' Peas are delivered from the field in trucks. The peas are fed in to an electrically driven conveyor system that washes, removes vines and leaves, removes ends and cuts the peas and sorts them by diameter. About ten percent of the water used in this process is lost to spray and splashes. One quarter of the mass of the peas is removed in this process and sent to a dairy as feed.

Water packed in the canned peas is not chlorinated. Prior to filling, the peas are weighed. When there is a direct filling undergoing a salting process in order to preserve the freshness of the raw materials. Before seaming, each must be weighed to prevent shortage of weight. Then the blanching is performed (Blanching means rapidly heating peas to denatures the enzymes contribute to loss of color). It is performed using boiling of water or steam, either in rotating drums or in drench baskets. Then after testing of cans for leakage, cooling of cans inside the cooling tank, the material is ready for dispatch. The technological process has no any adverse environmental impact.', ' ', ' ', ' ' , '4 ' , ' 1'),

( ' Peanut butter', ' Peanut butter is a yellowish brown butter like product made from grounds nuts or peanuts. It is essentially made from cleaned, graded, blanched, roasted and crushed groundnuts containing about 45% oil and 25% proteins. Peanut butter is a highly nutritive food containing proteins, fat, carbohydrates as major constituents. It also contains calcium, phosphorous, iron, vitamin A, B1 and B2, etc. The calorific value of peanut butter is about 600. Peanut butter is used in the preparation of sandwiches, candy, bakery products, insecticidal formulation (to attract insects/pests), etc.', 'The Amhara Region especially the western and northwestern part is suitable for the production of groundnuts or peanuts. However, up to now, no large scale or commercial farming of peanuts has been undertaken. Even now, peanut crop is being produced by small-scale farmers. Like any other product, peanut brings more prices to its producers when it is further processed and converted to products like peanut butter. The peanut produced in the region is transported to Addis Ababa to be sold either in raw form or to be processed. Though the price of a peanut of quintal in the growing areas is relatively high compared to the prices of other crops, it is much lower than its price in Addis Ababa. If a plant is established in the Region for processing peanut, it will bring more financial resources to the Region. In other words through further processing there will be more value added for the product before it leaves the Region i.e. the product will bring more income. ', 'Despite its high nutrition value and the possibility of local production, the consumption of peanut butter is so far limited to urban residents only some factors restrict the consumption of peanut butter in rural areas. First, peanut butter is usually consumed with bread prepared in bakeries. People are not used to use the butter with injera, or any other type of staple diet used in the countryside. Second, in spite of the availability of peanuts in many rural areas, the crop is not usually converted to butter for local use. Third, rural people are not very much aware about the nutrition value of the crop. Finally, the crop is a cash crop which is readily sold in local markets instead of being consumed by the producers.

Even in urban areas, the consumption of peasant butter is limited to high income groups due to the high prices of the product. Currently a jar of local peanut butter which is about 400gms is sold for Birr 9.00 which discourages many potential consumers. In addition, the distribution of the product is limited to few so-called supper markets which cater to the need of foreigners and few nationals of high income. Had it not been for its high price, peanut butter is a popular food item. Children like it very much; so much so three children could easily eat one whole jar of peanut butter with bread during two or three meals.

Much of the peanut butter supplied to the market is imported. It is only in the last five years that peanut butter has started to be produced by cottage industries; and the share of the locally produced peanut butter in the market is very small. But if the product is produced in a modern factory which will improve its quality and possibly reduce its unit price, the demand potential is indeed high. Even with the current consumption level, the demand for peanut butter is projected to be 847 tons in 2006 and this demand is expected to grow by 5 percent every year. Current production of the butter is probably not more than 100 tons. This indicates that there is sufficient market for the product in the country; and the market will expand as more people start consuming the product. Since the Amhara Region has the natural potential to produce peanuts, it is natural that the region should process the peanuts to butter. There is also a good potential to export the product. ', ' Western and northwestern part of the Amhara Region.', ' Production of peanut butter involves the following operations:

The peanut seeds are shelled in a decorticating machine

The shelled peanuts are heated to an internal temperature of about 1450C to obtain the proper roasted flavor.

The influence of roasting time on sensory attributes and chemical measurements of flavor or components are examined.

Roasted peanuts undergo blanching to remove the skin of the seed

A coarse or medium grind is made, the ingredients are added and blended,

The oil level is controlled at 3% by keeping the mix at low temperature

Final grind is prepared at an appropriate temperature to produce the desired texture of smooth creamy paste,

Air is removed by vacuum and the mixture is cooled, and

The peanut butter is packed by using a vacuum fill type packing unit.

The premises under which peanut butter is manufactured/processed, packed and stored and distributed and all the equipment and tools used during processing should be maintained under strict hygienic conditions. Workers should have the highest standard of personal cleanliness.

Machinery and equipment needed include decorticating machine, roaster with thermostat, blanching equipment, coarse grinding machine, paste grinding and mixing machine, packing unit (vacuum fill type) and miscellaneous testing equipment, tanks, tools, etc.', 'Saves foreign exchange, stimulates local production of peanuts, increases the income of producers, introduces new technology and skills. ' , '4 ' , ' 1'),

( ' Pickling', ' Pickling is the preservation of food items in common salt or vinegar. Spices and oil are added to make the food tasteful. Pickles are good appetizers and add to the palatability of a meal. Pickles aid digestion by stimulating the flow of gastric juices Rapeseed oil, sesame oil, mustard oil, lime juice, vinegar etc are used for pickling. Some spices such as bay leaves, cardamom, chilliest, cinnamon, clove, coriander, dill herb, ginger, mace, mustard, black paper, garlic, etc. are added to the process of pickling. Some examples of pickles are cucumber pickle, turnip pickle, lime pickle, red chilies pickle, mango pickle, apple pickle, etc', 'Pickling is one method of food preservation which is essential for maintaining the nutrition value of many types of crops, fruits and vegetables for a considerable length of time. Many perishable farm products are preserved for future consumption using. Pickling technology. Ethiopia being an agricultural country has many types of farm. Products which can be pickled to prevent physical and chemical deterioration and prolong the “shelf” life of these products. These will save many perishable products from being sold at much depressed prices at harvest time. The lack of technology to preserve perishable agricultural products in the country has discouraged farmers from producing these perishable products thus denying consumers the benefits of consuming these products in post harvest seasons and producers of saving them for better prices also in post- harvest seasons. All these problems point to the need of establishing pickling plants in the country for the benefit of both the producer and consumers. ', ' There is no a single pickling plant in the whole country let alone in the Amhara Region. Hence whatever latent market there is for pickled products, is not yet exploited. Without going into any market research but by simply considering the size of the population of the country, one can easily conclude that there is a sufficient demand for pickled products in the country. The Amhara Region can take the advantage of this situation by establishing the first pickling factory in the country', 'The raw materials for pickling are farm products mainly fruits and vegetables, salt vinegar, sugar, spices and water. All these will be obtained from domestic sources. ', ' Pickling is done in two stages:- fermentation or salting, and finishing and packing. Fermentation or curing is done either with dry salting or in brine. In dry salting method, the vegetable is treated with dry salt. The salt extracts the juice from the vegetable and forms the brine which is fermented by lactic acid forming bacteria. Fermentation in brine is soaking of the vegetable in a salt solution by predetermined concentration for a certain length of time. This treatment is given only to vegetables like cucumbers which do not contain enough juice to form brine with dry salt. Pickled products should be packed into bottles or jars loosely so as not to damage the shape and appearance of the pieces. Fresh vinegar is then added to fill up the spaces between the pieces. The jars or bottles are then allowed to stand for a while with the lid loosely on, covered again with more vinegar, if necessary, sealed air tight. Required machinery and tools include. Reformer, flanger, seamer and can testing gauge with different chucks and attachments; pressure cooker (retort); cap sealer portable; jar washing machine, cutting and peeling knives, fruits and vegetable washing tanks; preparation tables with aluminum top and benders; utensils, trays, etc. of different sizes and shapes; glass carboy and plastic vats, weighing balance, etc.', 'Stimulates production of fruits and vegetables suitable for pickling, saves foreign exchange, promotes self-sufficiency, introduces new skills and technology, and improves income of producers. ' , '4 ' , ' 1'),

( ' Potato', ' Potatoes can be converted into chips, wafers, flour starch, alcohol and canned potatoes.  Potato chips are made plain or flavored and they may be sliced, plain or regular as well as wavy or wafer cut.  Potato wafers are chips which are deep fried in vegetable oils.  Both potato chips and wafers are becoming more and more popular in the big urban areas of the country.', ' Potatoes are one of those perishable agricultural products which are by nature difficult to store and keep them for months even weeks.  After harvest, potatoes either have to be consumed by the producer or sold for immediate consumption by the buyer.  Due to their perishablity potatoes have to be sold immediately after harvesting which results in excess supply over demand depressing the price of potatoes.  This discourages farmers from growing potato which has relatively higher yield per hectare.  One option to solve this problem is to convert fresh potato is into dry or fried (chips and wafers) potato so that it can be sold during any time of the year with better prices.  This is why this project should be promoted.', ' Potato chips and wafers are new types of food whose consumption is increasing in the big urban centers.  With appropriate marketing promotion, the demand of these food products will increase in the future.  Strangely enough while potato is produced in all the highland parts of the country, most of the potato chips and wafers being consumed are imported.  One can see imported packets of chips and wafers in the “super” markets of Addis Ababa.  If we can produce potatoes, there is no reason why we can not process the fresh potato and change it to chips and wafers.  The existing market which will expand in the future will absorb the production of one or two potato chips and wafers producing plants.', ' All the “Dega” and upper “Woina Dega” parts of the Amhara region are sources of raw material-potato.  If the plant is to be established, the source of the raw material will be West Gojam and South Gondar, if in Combolcha, South Wollo and part of North Showa will be the sources of the raw material.', '(a) Chips: washing and peeling, cutting into chips or chipping, disinfection or blanching, dehydration and packing. (b) wafers- the process is similar up to blanching and it includes passing through hydro extractor to remove excess water from the sliced potato, deep frying in vegetable oils; and packing in polyethene bags.

Main machinery include boiler, potato peelers, steam jacketed kettles dryers, slices, storage tank and other assorted accessories. ', 'Increases the income of potato farmers, stimulates potato farming, saves foreign exchange, crates the flow of financial resources to the Region. ' , '4 ' , ' 1'),

( ' Poultry feed', 'Poultry feed is a type of feed especially formulated and prepared for chickens. It is made form oil cakes, molasses, frushka, maize or other cereals, limestone, salt, etc. The feed is to be used by modern and traditional poultry growers. ', ' Despite large flocks of poultry birds found throughout the country, poultry is the least modernized and commercialized agricultural activities. Due to its low level of commercialization, the economic benefit of this sub-sector has been very low both to the farmer and the national economy. Among other factors, the main cause for the low performance of the sub-sector is the lack of proper feed for the birds in rural and urban areas. It is common knowledge that chicken are the most neglected domestic animals in rural Ethiopia which results in low production of eggs and poultry meat. If properly feed and taken care of, chickens are the most productive among domestic animals. Which type of domestic animal gives birth/hatches 15-20 children/chickens in one production cycle? It is none other than the female poultry bird. With this multiplying capacity, the bird could have benefited its owner if provided with enough feed and proper husbandry. For the poultry sub-sector to contribute more income to owners and to the economy, feed must be produced and distributed to urban and rural areas.', ' According to the results of the “Ethiopian Agricultural Sample Enumeration” of 2000/02, the poultry population of the country was about 43 million of which 11.1 million were egg-laying hens. The share of the Amhara Region was 13 million and 3.3 million respectively. The Poultry Development Enterprise supplies 115 gm. of feed for each of its birds for each day. Annual feed requirement for each bird is, therefore, 42kgs. If properly fed, the food requirement of all the poultry birds of the country 1.81 million tons per year. (This assumes that all types of birds will consume the same quantity of food). Estimated annual feed consumption of poultry in the Amhara Region is about 0.54 million tons. Of the total poultry population about 1.99 million (4.6%) are in urban areas. The feed requirement of the urban poultry population is 84000 tons = (1.99 mill. x 42k.g).  If we assume that at least 70 percent of poultry if we assume that at least 70 percent of poultry birds in urban areas are provided with proper feed, annual requirement will be 58800 tons. Producing this feed requirement will make many small poultry feed making plants financially viable.', 'except vitamins, all the raw materials can be obtained from domestic sources. ', 'The major operations for poultry feed production are preparations of raw material, Primary crushing, assorting and measuring, mixing, fine crushing, pellet making and packing. Raw and auxiliary materials are first changed into silos and tanks where they are made ready for further processing. They are then processed by primary crusher. Crushed materials are separated by means of sifts, and then stored to assorting tanks according to the kind of raw materials.  The raw materials are then mixed by means of a mixer. In this process, fatty ingredients are added to the materials in order to raise the nutrient value of the feed. The feed obtained from the mix is mixed with molasses. After this, the material is further crushed by means of the second chamber. (some times second crushing could be unnecessary.) The final product is next accommodated in the product tanks, and then weighed and packed. Main machinery and equipment need for the plant include tanks and silos for raw and auxiliary materials, metal screen and shaker, mixer, hammer mill (crusher), bladder, weighing scale bagging equipment, dust collector, product tank, tanks for oil cakes and molasses, boiler and other accessories. ', ' Contributes to the development of the poultry industry improves the income of poultry farmers, contributes to the food situations of the Region, introduces new skills and technology.' , '4 ' , ' 1'),

( ' Pulses', ' Beans, peas and lentils belong to the genus of legumes. These crops are also known as pulses. In many countries great importance is attached to pulses for human consumption especially with a view to their richness in protein. The aim of industrial processing of pulses is to prepare the agricultural produce for human consumption that is promoting perfectly hygienic products of attractive appearance to market requirements, keeping a constantly high quality standard. The processed pulses are either sold to consumers or delivered to the food industry for further processing to produce tinned foods or any other refined ready-made meals. Processing of pulses also helps to store the material to be sold in post harvest season. It is also used to maintain food reserve for period of food shortages.' , ' ', ' Processing of pulses is not only a commercial operation for making financial gains, but it is also an operation that will lessen problems during times of food shortages. Hence, the need for processing pulses should not be seen only as a commercial venture. It should also be considered as a means for preventing human suffering during periods of in adequate food production. ', 'Enough pulses will be secured within the region for supplying the needed “raw materials’ for the processing plant. ', 'The processing of pulses involves about five stages depending on the type of seed to be processed. These are cleaning and grading, hulling (with out/with splitting), glazing and/or polishing, grinding and screening and hydrothermal treatment, Cleaning and grading include operations like removal of foreign matters, elimination of damaged discolored, broken, spoilt or infested seeds, removal of dirt sticking to the seed surface, classification by sizing to obtain a uniform end product. Hulling operation involves removing the indigestible coat from the seeds. During this operation, peas and lentils are often split or divided in to two halves. Glazing and polishing pulses are often exposed to an after treatment to improve their appearance and storage stability. Hulled and split peas and lentils are dampened and guided to pass through a rotating glazing drum after adding a glucose solution. Thereafter all sticky split halves are sorted out in the drum grader and subsequently separated again by using the splitter. Grinding and screening involve grinding and sifting the semi-processed peas and lentils using hammer or fine-grinding mills and plansifters for producing flour. Hydrothermal treatment represents a treatment with moisture and heat over a specific period, which allows the manufacture of special and easy-to-prepare food. Whole peas and lentils are soaked in water for 5 to 15 hours depending on the species, thus increasing their water content to about 45 percent. Then they are fed into autoclaves to be cooked to the stage of “well done”. The precooked pulses are then passed through a recycled- air drier for drying at low temperature. Precooked whole peas and lentils are used for preparing meals. Required machinery includes different sets of machines for (a) cleaning and grading (b) hulling and splitting and (c) sundry equipment. Machines for (c) include separator, magnetic separator, and indent cylinder unit with secondary separator, gravity separator dry destoner, and drum grades with countersunk perforation. Machines for (b) include vertical whitener-pearler, drum graders, splitter, round sifter, dry destoner. Machines for (c) include intake chute, elevators, cyclones and fans, spouts and aspiration ducts, etc. ', 'Similar to other projects. ' , '4 ' , ' 1'),

( ' Small scale bakery', 'Commercially prepared bread is an everyday mass consumed food item.  It is a convenient fast food consumed with popular meals like pasta or alone.  Bread is prepared in bakeries and distributed to consumers in urban areas. ', 'Significant number of residents temporarily lives in many towns of the region.  They consume food items that are prepared outside their homes like bread and pasta products.  This is reflected in many restaurants in small towns.  Other urban dwellers, like students want to have bread for breakfast and lunch time.  Modern small bakeries in small towns of the region will cater to the need of the urban population.  ', 'There is an apparent need for convenient fast food like bread in most towns of the region.  The number of people that eat outside their home in small restaurants are main customers of bread.  In addition town dwellers also consume bread, particularly during break fast-time.  The demand grows with the increase of the population in the urban areas.  ', ' The main raw material for bread is wheat flour processed in near by flour mills. ', ' Basically bread making involves the preparation and mixing of ingredient dough making, cutting, moulding and baking.  Apart from baking, the other process can be performed manually. ', 'The following baking machine and equipment are essential:  Mixer (Electric),  Sieves, Oven (Electric) , Metal Trays, Roller,   Scale, Divider               Work table, Mould , Bread boxes ' , '4 ' , ' 1'),

( ' Soya bean processing',

'Soya bean proteins are available on the market in the form of deflated Soya bean flours (DSF) protein concentrate, protein isolate but seldom as whole flour which includes the seed oil with all its vitamin E, phospholipids and other micronutrients. By refining Soya bean oil essential micronutrients are eliminated; extracted Soya bean oil is separated from phospholipids (lecithin) through the degumming process and, in the deodorization process, part of the vitamin E is also lost. The Production of whole Soya bean flour has the advantage that the micronutrients are preserved. The diet of all pre-school and school children should normally contain vitamin E and lecithin, since these compounds are essential for the development of the brain and nerve cells. ',

'In countries like ours where there is deficiency in many types of food nutrients, crops like Soya bean reduce the magnitude of this deficiency to some extent if they are available in sufficient quantity and if consumers are well aware about the nutrition content of this crop. A soya bean is produced in many parts of out country. But it is not considered as a staple food and its consumption is limited. Besides, people in rural areas do not know that the crop could be processed to produce different types of food, which is rich in protein and other nutrition. For producing nutrition rich food varieties especially useful to the physical and mental development of children, the production of Soya beans, its processing and distribution should be encouraged both at the national and regional level. ',

' Soya bean is mixed with other food ingredients to make infant foods, enriched flour for pasta, bakery products, meat substitutes, etc. In countries where Soya beans is available, wheat flour contains a minimum of 3 percent of defatted Soya beans flour (DSF). If Soya beans flour is available in our country, one could assume that the flour mills will add Soya beans to the wheat flour to enhance the nutrition content of their product. This means if 500,000 tons of wheat flour is produced in the country, the demand for Soya beans flour will be 15,000 tons. With this assumption, the demand for Soya bean flour is projected to be 28,000 tones in 2006 and will grow to 36,000 by 2011. This demand projection, though it is preliminary, indicates the existence of a demand that is large enough to absorb the production of a Soya beans processing plant.',

' While the major raw material is Soya beans, inputs such as hexane solvent, caustic soda, and bleaching agents are needed. Soya beans will be produced in the country; the others will be imported.',

' The main stages of Soya beans processing are storage, drying and dehulling, separation of hulls from the cotyledons, preconditioning, extrusion, drying and cooling and milling. Each processing stage has different sub-stages. Machinery and equipment include Soya bean storage, dehuller, binder, extruder, dryer-cooler, pin mill, boiler, water treatment and laboratory.',

' Increases protein rich food supply in the country, improves the physical and mental development and growth of children stimulates soya beans production, saves foreign exchange, and introduces new skills and technology. ' ,

'4 ' , ' 1'),

( ' Soya Sauce Brewing' ,

'Soya sauce is a product made from soya beans.  It contains exceptional natural delicacy which is brought forth by the intervention of all sorts of amino acids originating from their brewing and melting with other ingredients.  ',

' ',

'The average import of soya sauce from 1997 to 2006 is 17,248.30kg. The modest increases in 2001-2002 from the previous 4 years and the steep rises in volume from 2003 and 2006 particularly in 2004 and 2006 is an indication that a food consumption pattern adopting soya sauce is rapidly developing in urban Ethiopia. A review of the import data from 2003-2006 gives the impression that the sharp increases in 2004 and 2006 were probably intended to augment supply shortages in the immediately preceding years 2003 and 2005. It can be deduced from this postulation that the average of the 2004-2006 imports reflects demand for soya sauce as of 2006 ',

'The three main ingredients used in the production of soya sauce are soya bean, wheat, and salt. The major raw materials soya bean and wheat are locally available in the neighboring regions such as SNNPRS and Oromia Regional State while salt can be sourced from Afar region, Afdera. ',

'**Soyabean (or defatted soyabean)**: the most important raw material for soya sauce protein, is heated by steam so that soya sauce koji of Aspergillus Oryzae will easily work on protein.  The quality and yield (Availability of nitrogen in raw material to product) of soya sauce are swayed by this treatment. High temperature, high pressure, short time treatment will greatly improve the quality and yield of the product. After being steamed, the soya bean is cooled in a cooler down to the designated temperature. ' , ' ',

'4 ' , ' 1'),

( ' Spices', 'Spices are of the various strongly flavored or aromatic substances of obtained form plants. Spices are commonly used as condiments or employed for other purposes on account of their fragrance and preservative qualities.  Principal sources of spices are black pepper, chilies, cinnamon and cassia, cloves, cardamom, spice seeds as coriander, cumin, fenugreek dry ginger, turmetic, etc.  These spices are used in various blends for the preparation of food items and other products. ', ' Many of the spices listed above are produced, through on a peasant farming scale, in many parts of the Amhara Region especially in the localities surrounding Lake Tana.  Some of the spices are exported raw to the Middle East, Europe and the Far East.  It is common knowledge that processed products bring more foreign exchange than products which are raw.  Given this, it would benefit, the Region, the country and the producers if spices are processed at home and exported with more added values.  This will stimulate the spices producing sector and increase the income of farmers.', ' The market for spices is both at home and abroad. Both markets have the potential to expand.

', 'Mainly in areas around Lake Tana, Birr Shelko and many localities in all parts of Amhara. ', 'Spices can be ground with two different methods: dry grinding and wet grinding.  The process in dry grinding is as follows: Cleaning, sun-drying, pulverizing, screening and packaging.  In wet grinding the process are cleaning, wet grinding, screening, spray drying and packaging.  For the different spices there are different formulations.  Machinery for the dry grinding process includes micro pulverizer, electric motor, vibratory screen, weighing balance.  For wet grinding churner, electric motors, storage tank, slurry pump, heating unit, cyclone separator, weighing balance and some accessories. ', ' More foreign exchange earning, more resources to the Region, stimulates further production of spices on commercial basis.' , '4 ' , ' 1'),

( ' Starch derivative', 'Starch is extracted from maize, millet, wheat, rice, potatoes, or from roots such as manioc, tapioca, cassava yucca, etc. Further processing of starch produces starch derivatives such as glucose syrup, special glucose syrups and dextrose syrup. Dextrose monohydrate, dextrose anhydride, total sugar, high fructose syrup and sorbitol are extracted from dextrose syrup. Glucose syrup is used in the food industry not only because of its sweetness and nutritive value; but in particular for its functional properties which include moisture stabilization, softening ability, build-up of texture, prevention of crystallization of other sugars, formation of film and body. Glucose syrup is mainly used for sweets and confectionery, ice cream, pastries, preserves, and liqueurs. The syrup is a sweet, colorless, highly concentrated solution of a mixture of easily digestible sugars. Special glucose syrups like maltose syrup and high - DE (Dextrose Equivalent) glucose syrups are one group of refined starch derivatives. These starch derivatives are used in frozen dairy products, beer, confectionery such as drops, gelatin and jelly sweets, chewing gum, marzipan, beverages, frozen dairy products, soft drinks, jams, pastries, ice cream, etc.  Dextrose syrup is a sweet, colorless, concentrated solution heaving a DE of 97-89%, a typical sugar spectrum of 96% glucose and 4% maltose and oligosaccharides and a concentration of 71%dry substance. It is made from starch milk by two-stage enzyme-enzyme liquefaction and saccharification. The syrup is used for pastries, soft drinks, etc. it is also further processed to produce fructose syrup, dextrose monohydrate and sorbitol. ', ' ', ' The three major types of starch derivatives glucose syrup, special glucose syrup and dextrose syrup are used as inputs in the food and beverages industries. Productions of beer, dairy products, soft drinks, pastries, various types of sweets, dairy products, etc. require large amounts of starch derivatives every year. For example production of beer which is a major consumer or user of starch derivatives was 1,247,000 hecto liters in 2004. Production of soft drinks which is another major user of the derivatives was 1,052,000 hecto liters during the same year. These two groups of beverage products alone consume large quantities of starch derivatives every year. The consumption of starch derivatives by the various industries taken together could justify the establishment of a starch derivatives producing factory. This is more so in view of the fact that all the raw materials to produce refined starch are available in the country. The Amhara Region is a major growing area for most of the crops from which starch is produced.', ' Maize, millet, wheat, rice, potatoes, etc from which starch is made are produced in the Amhara region.', ' For producing starch derivatives from refined starch, three types of production processes are employed for glucose syrup, for special glucose syrup and for dextrose syrup. Processing stages involved in the production of glucose syrup are acidification (treating starch slurry with acid), conversion (converting the acidified starch at high temperature into a mixture of glucose, maltose and higher saccharidies), refining and evaporation. Extraction of special glucose syrups is done through liquefaction, saccharification and evaporation. Dextrose syrup is laso produced (extracted from refined starch) through the process of liquefaction, saccharification, refining and evaporation. Starch liquefaction proceeds in two stages in the presence of thermostable alpha-amylase. In this case, part of the enzymes is added to the starch milk and the starch is preliquefied in a steam heated converter. Liquefaction then proceeds in a rentention zone at a temperature of 95oC for a period of 90 to 120 minutes. Saccharification is done in the presence of amyloglucosidas. It is a slow process which takes about 48 to 72 hours. This is followed by multi-stage purification process. Productions of the three major starch derivatives require different sets of machinery and equipment. For example machinery and equipment for producing glucose syrup include starch mill tank, continuous acidification, batch acidification, acidified starch milk tank, heat exchanger, continuous converter, flash cooling, hot water aggregate, neutralization tank, filter, tanks, evaporator and product tank.', 'Similar to other projects. ' , '4 ' , ' 1'),

( ' Sugar', ' Sugar has become one of the essential food consumption items in the country especially in urban areas.  Though per capita sugar consumption in Ethiopia is one of the lowest in the world, the volume of consumption has been growing steadily since the establishment of the first sugar cane plantations-cum-sugar mills in the Awash Valley in the early 1950’s.  As a sweetening food item, sugar is used in preparing all types of drinks (coffee, tea, soft drinks, beer, juices-) and foods (pastries, bread of special types, etc', ' Between 2000 and 2004 average annual production of sugar in our country was 243,428 tons; and the average annual consumption of the Amhara Region during the same period was estimated to be 63,291 tons.  This volume of consumption is equal to the annual production quantity of Wonji Sugar Mill.  The Amhara Region has many areas where the climate, soil and other natural characteristics are suitable for sugar cane plantations and sugar production.  With t4he continuous increase in transportation cost, the time will not be too far when the cost of transporting one quintal of sugar from the existing factories to the Amhara Region will constitute more than one-half of the price of the sugar.  If the Amhara Region has suitable land for growing sugar cane, if the consumption of sugar in the Region justifies the establishment of a large medium size sugar mill, it seems logical that the establishment of the plantation and mill should be promoted by the Regional government.', 'Estimated consumption of sugar in the Amhara Region range from 65,000 to 75,000 tons (3.4 kg-3.9 kg per person) per year. This consumption level will grow in the future at the minimum due to population increase. The current level of sugar consumption in the Region will make the establishment of a sugar cane plantation- cum- sugar mill a viable venture. The total land requirement for the cane plantation may be about 5000 to 6000 hectares of land. ', '  A sugar mill is one of those agro-processing industries where the production of the raw material and the final product should be established together.  Hence the main source of the raw material for the sugar mill will come from the plantation (farm) that will be established along the mill.  There might be a possibility where sugar cane could be obtained from out-growers who live around the sugar mill.', 'The sugar cane plantation part of the project will involve land preparation, planting irrigating and harvesting the sugar cane and transporting the cane to the sugar mill for crushing. The sugar milling part of the project involves- Crushing of the cane, juice clarification and boiling, crystallization and separation from molasses, drying and bagging. ', ' Makes the region self-sufficient in the production of a basic consumption item- sugar; keeps the financial resources of the Region within the Region, creates employment opportunities in the agricultural and manufacturing sectors, introduces a new technology to the Region, supplies molasses for alcohol and cattle feed factories.' , '4 ' , ' 1'),

( ' Tomato ketchup', 'Tomato ketchup, paste, juice and puree are food products made from tomato fruits. These products are becoming popular in the major urban centers of the country and their demand is steadily increasing every year. ', ' ', 'The supply of tomato products is mainly composed of imports. However, a small quantity of tomato paste is produced locally. Local production of tomato paste between 2000 and 2004 was 1734 ton per year on the average. Due to the liberalization of the country’s foreign trade, the import of tomato products has been increasing during the last 10 years. Domestic production of tomato ketchup, paste and juice is not more than 10-15 percent of total consumption. This means that more than 17000 tons of tomato products are consumed in the country every year leaving a deficit of about 15000 tons to be substituted by increasing domestic production. ', 'The manufacture of potato ketchup, paste and juice require adequate supply of tomatoes and water. There are many areas in the Amhara Region which are suitable for growing tomatoes. Areas around Lake Tana especially the eastern, southern and northern shores of the Lake are considered as best areas for growing tomatoes. Besides, these areas have enough water supply if the processing plant is located in a town located near the lake.  ', ' The processing of tomato ketchup, paste and juice involves the following major operations- collection of ripened tomatoes, putting them on a washing line, washing the tomatoes, separating good tomatoes from the crushed, rotten ones, crushing the tomatoes, concentration, filtration homogenization, flavoring, bottling and cooling. Required machinery include: tomato charging machine, tomato washing and sorting machine, concentrator, filter, homogenizer, seasoning mixer, bottling machine, cooler, labeler, packing machine, water treatment facility, boiler, etc.', 'Possibilities of foreign exchange earning through export, saves foreign exchange by substituting imports, stimulates the production of tomatoes and other vegetables, and introduces new skills and technology. ' , '4 ' , ' 1'),

( ' Vegetable oil', 'Pressing the seeds and then extracting the oil with steam or water obtain vegetable oil. The high protein residue that remains after oil extraction /oil cake or oil seed cake/ is a valuable feed stuff for livestock. Then the refined oil is used for cooking food. Vegetable oil is preferred to animal fat and used in most cooking. ', 'The diversified agro-climate conditions of the country favor the cultivation of highly diversified varieties of oil seeds, Oil seeds grown in large quantities in different parts of the country include sesame, Niger seed, groundnut, rapeseed, sunflower, and castor beans. Vegetable oil is used in most food cooking. Even those kinds of food eaten without cooking, such as salad, need vegetable oil particularly made for this purpose. Vegetable oils are rich in monounsaturated or polyunsaturated fatty acids, and are more desirable than saturated animal fats such as butter. For this and other reasons, vegetable oils are preferred to animal fats, and demanded in all food cooking, by households, hotels and restaurants. Although there are many oil producing (oil milling) plants in the country, there are only a few factories, such as the Mojo Oil Milling Factory and Bahir Dar Oil milling Factory, which are known for quality vegetable oil.

Many of the oil seeds mentioned above are grown in most pats of the Amhara Region. In spite of the increasing demand for oil by various users or consumers, there is only a limited supply of oil in the Region. Hence, given the availability of raw material, and given the potential demand for oil, there is an inviting condition for investors to establish a Vegetable Oil Milling Plant in the Region ', '

Vegetable oil is preferred to fat oils by many people, hotels and restaurants and individuals. People with blood pressure, diabetes, and other problems need vegetable oil produced free from cholesterol. Therefore, there will be sufficient market for the product in the Region and in other parts of the country.

', ' Primary raw materials for the production of vegetable oils are ground nuts, sesame seed, cotton seed, oil plant, peanuts, sunflower, rape seed, safflower, corn, coconut etc. many of these oil seed plants are gown in various pats of the Amhara Region.

', 'Pressing the oil seeds and then extracting the oil with steam or water obtain vegetable oil. The high protein residue remains after oil extraction. During the first pressing of the oil seed, that party of the lower grades of the oil come from subsequent pressing of the oil seed and usually is refined to remove the bitter flavor in the oil that is extracted after the first pressing', 'It will create employment opportunity for the people in the Region. There will be earnings for the investors in the form of profit. It will generate revenue for the Regional State in the form of income tax and VAT. The residue that remains after oil extraction is used for animal feed. ' , '4 ' , ' 1');

( ' Aluminum Household Utensil', ' Domestic utensils can be made from different metals such as copper, brass, silver, bronze, iron, steel, aluminum, etc.  Aluminum utensils are popular because they are light, they don’t rust and are relatively less expensive than utensils made from steel and sliver.', 'Though not in large quantities compared to the size of the population, the Amhara Region has become a market for aluminum household utensils.  These utensils are either imported from abroad or are made in Addis Ababa.  Due to the increase of the urban population and the market penetration of rural areas the use of aluminum household utensils will increase in the future.  This will justify the establishment of a plant that will produce basic household utensils made from aluminum. ', ' The market for aluminum household utensils is dominated by products imported from Egypt, Turkey and other countries.  These products are fist imported to Addis Ababa and then distributed to other towns of the country.  The Amhara Region is flooded with products made in Egypt.  As of now, the Region’s market for aluminum based household utensils may not be big; but is will grow.  Since production of utensils is not subject to economies of scale, it is possible to establish small units for producing these utensils for the Region’s market.', ' Import', 'Basically there are three stages in the production process of aluminum utensils.  These are pressing, beading and coating.  Aluminum scrap or ingot first melted in iron crucible and molten metal cast into the slab type open mould by mechanical process into rectangular billets.  The billets, after annealing and cleaning are pressed through re-rolling machine three to five times to make the sheet of reaustic thickness.  The stamped circle is now ready for deep drawing to get the shape of the desired utensils.  Shaping refers to pressing with dies on press, beading on the lathe and surface treatment.  Main plant and machinery include coal fired furnace, reversible moulds could rolling mill, pre-heating, circle cutting and stamping machine, de-drawing double action power press, spinning lather and pre- heating furnace, counter spinner and hand press and cleaning tanks. ', 'Saving in foreign exchange, saving in regional financial resources, introduction of new skills and technology to the Region ', ' 7', '1 '),

( 'Blacksmith’s Hearth ', 'Blacksmith’s hearths are made of sheet metal for burning coal in order to facilitate heating of the metal to be forged or formed to different shapes by blacksmiths. The hearth also contains a hand blower to supply air to the burning coal. The simplest round shaped hearth is considered For Manufacturing in this project idea. ', ' ', 'Among the 19.2 million people in the Amhara Region about five percent or 0.96 million are members of the blacksmith communities. This amounts to about 192,000 families. If we assume that there are at least two people in each family who practice the work of a blacksmith, the number of blacksmiths in the Region could be as high as 384,000. One blacksmith needs one hearth; and the potential demand for blacksmiths hearth could be 384,000. If we assume that at least 20 percent of the blacksmiths will buy the hearths initially, the demand for the hearth will be 76, 800. As other blacksmith see the advantage of using the hearth, the demand for this useful product will increase. ', 'Metal sheets are the main inputs and these will be secured from domestic scrap of metals. ', 'B.P. Sheets are cut to different sizes and shapes with the help of hand lever shear. The sheet for the hearth is bent circumferentially to convert the sheet into tabular form. Three lugs are riveted to the sides to of tabular ring and over the lugs; the bottom plate is fixed with bolts and nuts. The cast iron pipe fittings, the pipe stand and castings are assembled. The hand blower is also fitted. The hearth is then painted. Machinery required includes bench/drill, bench grinder, pipe bending machine, lever shear. ', ' Increases productivity of blacksmith’s thereby increasing their income, saves charcoal and in turn reduces deforestation, saves time and effort of blacksmiths, hence increasing their time available for other function.', ' 7', '1 '),

( ' Chaff Cutter', 'Chaff cutter is an agricultural implement by which cattle fodder including straw is chopped so as to make the fodder easy to be swallowed by the animal. Chopping the fodder using the cutter enables the livestock to consume more feed which results in more milk or meat or drawing power.

', ' ', ' Though the Amhara Region has more than 20 million heads of cattle, sheep and goats, the farmers do not use chaff cutters for feeding their animals. The reason is that the use of the implement is not known in the Region and the product is not available. With 3.6 million farming families in the Region and with 20 million livestock, there will be a large market for chaff cutters if the use of the product is demonstrated widely to farmers. If we assume that only 10 percent of farming families will buy the product at the initial stage, demand will be 360,000 units. This is much larger than the economic size of a viable plant.', 'Chaff cutter is mainly made from high carbon steel; and this will be imported. ', ' The frame is cast in green sand moulds by cast iron, and the blades and handles are made of steel. The mould is made in sand and clay and molten CI is poured into it to make the main body of the tool. The axle and handle are separately made mostly from steel and assembled, main machinery required includes small cupola, motorized sand nuffer, CI mounding boxes, bricks constructed oven, foundry tools, CI and aluminum metal patterns.', ' improves livestock productivity, increases farmers benefits obtained from livestock.', ' 7', '1 '),

( ' Chisels', '  A chisel is a hand tool with a sharp flat edge at the end and used for shaping wood, stone or metal.  Chisels are made of many kinds according to their use.  One kind is used for metal and metal alloys while another kind is used by carpenters.', '  Two types of chisels are used in the Amhara Region-the traditional home made chisel and the imported one.  The traditional chisel is made by blacksmiths using traditional techniques.  These types of chisels are used only by carpenters.  The other types of chisels are the imported ones and they come in different sizes and for different type of purposes.  The imported chisels dominate the market especially the urban market.  As long as it can be produced economically, the Region should strive to be self-sufficient in any product including chisels.', 'Chisels produced by blacksmiths are mainly used in rural villages in the preparation of traditional wooden farm implements.  The use of chisel is widespread in the urban areas and its application is mainly in the wood and metal working industries.  An observation of building material shops indicates the variety of chisels being imported and distributed in the country.  As construction and other economic sectors expand, the demand for chisels will also expand.  Even with the current consumption level, a plant which will produce chisels will operate without facing any demand constraints. ', 'Imported ', 'Chisels are manufactured from hot rolled or forged annealed bars and bar plates, strips and sheets.  The strips or bars are cut into pieces of proper size.  The pieces are heated on oil furnance for forging by a forging hammer.  The excess material on the side is removed again by hammering or by using a grinding stone. Main machinery required includes power hacksaw, power hammer, and oil fired furnace, polishing machine, moulds or dies. ', 'Savings in foreign exchange and regional financial resources, introduces new skills and technology, enhances self-sufficiency, possibility of export. ', ' 7', '1 '),

( ' Galvanized Iron Bath Tubs', 'G.I bath tubas are household items used for washing clothes, utensil and for bathing. They are also used for storing things. Because of their durability, G.I. bath tubs are more preferred to similar tubs made from plastic. In most cases, the bath tubs are attached to a water supply line and are fixed in one place. ', ' ', ' In the rural Amhara Region, washing and bathing are mostly done in rivers, streams, creeks and in places where there is water supply. It is only sick people and babies who take or are given bathing at home. In the urban Amhara Region, almost all the people take their baths and wash their clothes at home. It is mainly in the urban areas where there is a need of using bath tubs. So which supply galvanized iron bath tubs? Similar products made from old drums and manually produced in cottage industries are supplied to the market. But the quantities are too small and supply is sporadic to satisfy the market. In addition, the “raw material” (old drums) is in short supply. To produce this important household item in sufficient quantity in the Region, a modern plant needs to be established. If we assume at least 30 percent use galvanized iron bath tubs, product will be 120,000 at the initial stage. If this demand is years, a plant has to produce 30,000 unit per year to satisfy the initial demand. In course of time other families will start buying the bath tubs as families become more aware about the benefits of the products.', 'Galvanized iron sheet is the main raw material; and this will be imported.    ', ' The metal sheets are cut to different sizes and shapes as required. Next shearing and rounding is done. The bottom is flanged and round. After this bottom Ring is made. Finally the parts are assembled and welding is done where necessary.', 'Improves personal hygiene  of consumers, saves regional financial resources, ', ' 7', '1 '),

( ' Galvanized Iron Buckets', 'Buckets are made from galvanized iron (G.I.) sheets and they are used for carrying solid and liquid materials. In the construction industry, buckets are population for popular for moving mortar, water, sand, etc. from one spot to another. Buckets are durable and they are also used for pulling water from wells. ', 'Plastic buckets are replacing metal buckets for carrying water for domestic purposes. But metal buckets are used for various types of activities especially in the construction and agricultural sectors. All metal buckets used in the Amhara region re bought from Addis Ababa. But since producing buckets is a simple process with modest investment, it is possible to make the Region self-sufficient by producing buckets in the Region. This is why this project idea is included in this study.  ', 'Construction is expanding in the region, household and farm use for buckets is increasing. If we assume that of the 3.7 million household of the Region at least a mere 5 percent have buckets, this will translate into a demand of 185,000 buckets. If another 25,000 is added for the construction and agricultural sectors, total demand could, reach 210,000. Hence, any plant which will produce within this demand range will be a viable plant. ', ' to be imported', 'Toe produce buckets, the galvanized iron sheets are cut to different sizes as required and rolled into conical shape. A separate piece is cut from the sheet for the bottom and welded with the lower ends of the conical shaped part of the buckets. The handle is made of wire, which is bent and riveted to the sides of the bucket. Main machinery and  equipment include bucket body bending machine, treadle shearing machine, bar bending machine, bar cutting machine, bucket making machine and handle press. ', 'Contributes to the efficiency of the construction sector, eases the burden of some farm work and increases efficiency, saves regional financial resources, creates self- sufficiency. ', ' 7', '1 '),

( ' Hammers', 'Hammer is forged steel hand tool used for hammering.  It has a long wooden handle which provides leverage when the hammer is used.  The main purpose of a hammer is to give impacts at a particular place for pushing, straightening, breaking, etc.  Hammers come in different sizes and they are driven by either mechanical or human power.  Those operated by power or steam are called power/steam hammers. ', ' Hammers especially the hand hammers are easy to make; but they are not being produced in the country in sufficient quantity.  Some quantities of hammers are being produced by the Akake Spare Parts but these are small ones used only for pushing nails.  Due to limitation in domestic production both in quantity and variety, hammers are imported from abroad.  Hammers are widely used in the Amhara Region.  They are used both by urban and rural residents.  Though total quantity of hammers being used in Region is not known in terms of numbers, it is believed to be in thousands.  All these are imported or bought forms Addis Ababa considering the importance of this hand tool, there is a need to establish a plant that could produce hammers hand some related hand tools.', '  If a product is not produced in a given region but it is used widely in that region what this indicates is that there is demand for that product.  This means that there is a need to establish a plant to produce that particular product.  The issue of how much demand, how many to produce will be determined at the stages of feasibility studies.  What is need in the identification of project ideas is establishing the general fact about the need of supplying a particular product from local production.  For a plant that will produce hammers In the Amhara Region, there will be enough market to absorb its products within the Region.', 'Like all metal inputs, the steel material that will be used to make hammers will also be imported. ', ' The process of producing hammers include cutting of blanks from low carbon steel bars, forging, grinding trimming and flattening, hardening, handle making and fixing.  Main plant and machinery include power pres (120 ton capacity), drop forge hammer, hot air circulation tempering furnace, power hacksaw, piller drill, center lathe, oil fired furnace and buffing machine.', 'saving in foreign exchange and regional financial resources, self-sufficiency, introduction of new skilled and technology ', ' 7', '1 '),

( ' Hand Sewing Needles', ' Needles are widely used in rural Ethiopia for sewing new home spun and woven garments and for mending clothes. In the rural Amhara Region it is common for every household to have two or more needles. There are three varieties of needles for general use:- darners and short needles. This project idea considers the general purpose needles with short round eyes (holes), 30-50 mm long and darners (mending needles with long eyes, 40-70mm. long). Needles shorter than 20-40 mm. are normally for professional purpose and are not considered in this project idea. ', 'safety pins and needles ar essential household items in rural Ethiopia. In the Amhara Region there are about 3.84 million families. Each family has at least two needles at the household level. In addition, each woman, at least in the urban areas, has her own needle for “emergency” purposes. (There are about 725000 women above the age of 15 in the Region). Taken together, number of needles being used in the Amhara Region could reach as large as 8.4 million. Like many other industrial products, all these needles are also imported. Is this not time that we produce needles at least for domestic consumption? ', 'Based on imported figures of a number of years and by considering the annual growth rate of the population, the projected demand for needles for the country in 2006 is about 16.55 million of which 4.31 million is the share of the Amhara Region. The current and future demand of needles justifies the establishment of a plant that will fabricate needles for household use. ', 'Major raw material required for fabricating needles is drawn steel wire usually of high carbon with 1.2% carbon, 0.2% Silicon, 0.5% manganese, less than 0.01% sulphur and 0.01% phosphorous. Electroplating chemicals are also required. The raw materials are to be imported. ', 'Sewing needle manufacturing involves a series of operations using highly specialized machinery. The major stages are wire cutting, eye forming, grinding, heat treatment and electroplating. Detail activities or operations include buying drawn wire coils, straightening and cutting to length of two needles, pointing both ends, stamping joint flat needle center, punching two eye holes, breaking into two needles, grinding the edge of the eyes, induction hardening of the needles, tempering to appropriate hard ness, cleaning by scouring, repainting the needle end, electroplating (nickel coating) washing and drying, inspecting and packing. Major plant machinery and equipment required include needle making machine line equipment, heat treatment equipment, electroplating line equipment and tools. ', 'More or less like other project ideas ', ' 7', '1 '),

( ' Hand Stapling Machine', ' This is a small machine which is used to staple sheets of paper. This is an alternative system for pinning up papers with alpines, etc. The machine is normally available in different shapes and sized depending upon the number of sheets to be stapled at a time. There are heavy duties, light duty, medium duty staplers. The staplers are mostly used in offices, schools, and in all places where there is paper work. In addition to papers, stapling machine is used for polythene and plastic bags.', ' ', ' All the stapling machines big and small used in the country are imported. Every year, thousands of these machines are imported to satisfy the growing demand for the machines by the increasing volume of paper works undertaken by offices, schools, shops, and other business organizations. Separate data on imports of staple machines are not available as these data are included in the import figures of other office stationery products. However, considering the expansion of the social economic and administrative infrastructures of the country during the last 10 years, one can safely assume that there is sufficient demand for this stationery product that will absorb the production volume of one or two small plants which will produce hand staple machines. ', 'The main inputs for making hand staple machines are mild steel low carbon steel sheets or strips, spring wire, electroplating chemicals, etc. These inputs will be imported in bulk. ', ' Manufacturing of hand staple machines requires blanking, bending or drawing, making tongue, springs and other parts, assemble and electroplating. In blanking, parts are cut from mild steel, low carbon steel plates on a hand operated power press Power or hand operated presses make use of dies for blanking operations. Next stage is bending which is carried out on hand or power operated press. Bent parts are taken to the assembly shop. Tongues are also manufactured by power presses. Springs and tubes are made separately. Maker's name, code and other information are printed on the parts while processing. All parts are taken to the assembly shop and are assembled together. The assembled stapler is now cleaned, after treatment with acid and other chemicals, etc; and the product is electroplated. Usually nickee and chrome plating is done. Finally the staplers are packed in polythene bags first and then in paper boxes. ', 'Saves foreign exchange, contributes to self-sufficiency, has export potential to other parts of the country. ', ' 7', '1 '),

( ' Hospital Beds, Stretchers & wheel Chairs', 'Hospital beds, stretchers, wheel chairs sand other furniture are made form metal bars usually mild steel or iron and mostly they are electroplated. This furniture is essential for the complete operations of health are institutions. ', ' ', 'The number of health care institutions in the Amhara region is increasing from year to year. Now every woreda (there are more than 102 of them) in the region has at least one clinic and a number of health posts and the region has more than seven hospitals. However, all the furniture used in the health care institutions are either imported from Addis Ababa or abroad. But producing hospital beds, stretchers and wheel chairs is a simple operation and only requires a few sets of machines. Give this it is possible to produce these products in the region. The market for these products in the region could be sufficient to absorb the production of a small plant. The plant could produce other household and office furniture in case the demand for hospital beds does not fully occupy the production time of the plant. ', 'The metal product from which the furniture will be produced will be mostly imported. ', ' Like all other metal fabrication operations, production of hospital beds, stretchers and wheel chairs involves cutting, welding, fixing or joining and painting or electroplating. Main machines required include shearing machine, welding machine, painting or election plating machine, etc.', 'Promotes self sufficiency, facilitates the provision of health care services in the region, and saves regional financial resources ', ' 7', '1 '),

( ' Insecticide Sprayers', 'To reduce to crops by insects, it is essential that they be sprayed with insecticide and pesticide if necessary. Insecticides are commonly available in two forms: in the form of a dry powder or as a liquid. For the dry power an insecticide duster is used. For certain applications however an insecticide sprayer is used in gardens and orchards. An insecticide sprayer basically consists of a cylindrical container fitted with a nozzle. A manually operated plunger is used to create a high pressure within the vessel which forces the insecticide out as a fine spray. To prevent the insecticide from reacting with the inside of the vessel, the container is made of galvanized brass or a plastic material.   ', ' ', ' Insecticide sprayers are used for ant malaria campaign, for killing insects and other pests which damage corps. These instruments are used both for public health and for farming purposes. The safety of the people and crops are basic components for safeguarding the economic and social welfare of the population.', ' Metal sheets are the main inputs. These will be imported.', 'The metal sheets to be used to manufacture the cylinder are first cut to size with the help of a treadle guillotine shearing machine and are then made in to a cylindrical shape with the help of a roller. The gear assembly is made with the help of a milling machine. Machinery required roller sheet bending machine, top and bottom can shearing machine, side seaming machine, double pillar press and fly press. ', ' Improves the health situations of the people, increases farm production due to reduced damage of crops by insects and pests.', ' 7', '1 '),

( ' Iron and Steel Cots', ' Cots are small and light beds (fixed or folding) made from mild steel conduit pipes.  These beds are lighter and less cumbersome than beds made from wood.  Cots, like wood beds, can not be eaten away by moths or white ants and so have longer life.  To save floor space some types of cots can be double decked.  The folding type cots have the additional advantage of being folded and staked away during the day time thus freeing room space which can be used for other purposes.', 'Beds are among the most essential household furniture for any family.  But in the rural Amhara Region, there are millions of people who do not have beds in the proper sense of the word.  Some families considered “well-to-do” use beds crudely constructed form eucalyptus poles.  Most rural families sleep on floors or on what is known as “medeb”. One reason why rural people do not use cots is that these products are not effectively introduced and promoted in the Region.  There are more than 17.02 million people in the rural areas of the Amhara Region. . If given the choice, there could be at the minimum 500,000 people who can be willing to buy cots.  This can justify a plant which produces iron and steel cots in the Region. ', ' There are small manufacturing units which produce beds from wood in three or four major urban centers in the Region.  There are also units which produce beds made from metal frames and meshed wire.  But these units cater to urban customers and their production capacity is limited. However, if cots are introduced and effectively promoted in rural areas and offered for reasonable prices, there will be enough number of people (among the 17.02 million population) who will buy cots which can justify the establishment of a cot manufacturing plant.', 'to be imported. ', 'Cots are prepared from mild steel conduit pipe.  These pipes are cut into the size of cots.  The pipes are then bent to shape on a pipe bending fixture.  There after the joints are welded and the supporting members are riveted.  Once the frame is completed, holes are drilled in the frames and part of the cot on which the body lies is fixed.  This part can be made from wire or nylon cord.  Main plant and machinery include pipe bending fixture, arc welding set, fly press, bench type drilling machine, flexible shaft grinder, portable drilling machine, lever type shear, painting accessories. ', 'Improves the well-being of the people who will use the beds, self-sufficiency in this essential consumer product, saves financial resources of the Region, improves existing skills and technology. ', ' 7', '1 '),

( ' LPG Container&Pressurized Fire Extinguisher', 'LPG container or cylinder is a hollow metallic body with equal, circular ends and regular curving sides. At its base, the cylinder is designed not to touch the ground. It rests on a circular support to bear the weight of the cylinder and its content. LPG cylinder is used to contain or hold butane or liquid petroleum gas which enables the gas to be distributed to consumers. A device called regulator is attached at the top of the cylinder to control the intensity of the gas during the use of the cylinder. The capacity of  a typical cylinder used in homes ranges from 4 kg. to 19 kg.  ', ' ', ' The major users of LPG cylinders are urban households, hotels, restaurants, coffee shops, pastries, etc. Oil companies are the main suppliers of these cylinders. All the cylinders are imported. The demand for LPG cylinders mainly comes from new users or consumers of butane gas. Another source of demand for cylinders is from old customers who want to have additional cylinders for keeping reserve of butane gas. New users of cylinders come from further urbanization of the country and also from scarcity of traditional energy sources which force people to use butane gas. In 2005, number of cylinders in circulation was estimated to be about 29,000. Assuming that butane gas supply will not be a constraint, the demand for LPG cylinders will increase at least by the annual rate of the urban population growth (5%). Another 5 percent of additional demand will come from people who will shift from traditional energy to butane gas energy. With this assumption the projected demand for LPG cylinders in 2011 will be 47000. Production of LPG cylinders is basically a metal fabrication operation which is less amenable to economies of scale. Fabricating close to 50,000 LPG cylinders could be a viable operation for a small plant.', 'Cold rolled mild sheet, 2.6 mm thick, valves and other fittings and powder for fire extinguisher, welding wire, paint, labels and other consumables. Some of the main raw materials could be obtained from domestic sources. ', ' Cutting of the different parts by shearing machines and mechanical press, first drawing of half cylinder on a hydraulic press, annealing in the furnace (if required) second drawing, punching a hole in top half cylinder, for valve ring, making machine valve ring, welding two-half cylinders together, welding the valve ring to the cylinder, forming skirt and top guard rings, welding a skirt and top guard to cylinder, annealing in the furnace, leak testing and hydraulic testing drying the cylinders, short blasting of the exterior, painting of the exterior. Filling the cylinder with powder for fire extinguishing assembly of valves and other fittings, pressurizing the fire extinguisher, final leak testing. Main plant and machinery required include shearing machine, mechanical and hydraulic presses, furnace, lather, lathe with special welding attachments, rolling machine (small size), hand weld, rotating site, hydraulic test equipment, shot blast cabinet, paint equipment, filling equipment, assembly bench, gas filling equipment, compressed air test ring and/or test tank, welding machines.', ' Similar to other industries.', ' 7', '1 '),

( ' Metal Cabinets', ' Metal cabinets are used for storing important material such as documents, stationery, small tools, and food products.  Most metal cabinets have cup-board type shapes, and they are usually made from steel sheets with locking arrangement.', 'With the decentralization of the state apparatus down to the Regions, zones and woredas, many offices have been opened in the Amhara Region.  With this development, the demands for office furniture and fixtures have been increasing.  Metal cabinets also known as filling cabinets are among those products whose demand has been increasing with decentralization.  One can visualize the number of filling cabinets installed in every office in the whole Amhara Region at the different levels of the regional government.  All these metal cabinets are either imported or bought from Addis Ababa.  Metal cabinets simply need metal sheet welding, joining, bending, fitting with locks and painting.  These are simple operations.  They can be done in the Amhara Region, and filling cabinets can be fabricated in the Region. ', ' A small plant with a capacity of about 250 metal cabinets per year is a viable plant.  The minimum demand for metal cabinets in the Region is more than 250 units per year-probably 3 times this number.  If this is the case, the market for metal cabinets in the Region can justify the establishment of a plant that will fabricate/assemble metal cabinets.', ' Like all other metal based products, inputs for this plant will also be imported.', 'Metal cabinets are made from steel sheets.  Steel sheets are cut in treadle shearing machine according to desired sizes.  They are then bent.  The bending operation is done in the press brake.  After this, they are drilled and welded.  When fabrication is completed, painting takes place and the product is “backed in storing oven“.  Metal cabinets should have attractive finish.  The fabrication of sides, backs, doors, etc. should be such that there is minimum gap between joints. Up to ten types of machinery and equipment are needed for fabricating metal cabinets, some of which are hand operated press brake treadle shearing machine, hand shearing machine, gas welding equipment, portable spot welding, double ended bench grinder, spray painting equipment, portable electric drilling machine, stoving oven ', 'Self-sufficiency, saving of regional financial resources, new skilled and technology. ', ' 7', '1 '),

( ' Metallic Buttons & Buckles', ' Metallic buttons, buckles, cuff-links, tie-pins and other metallic products used for dressing are used mostly for men dressing.  Metallic dress buttons and buckles are pressed by blanking and piercing of mild steel sheet and formed to shape and finally nickel plated.  Tiepins and cuff-links are made from anodized aluminum with different designs and shapes.  Of the four metallic products, the buttons and buckles have more demand in the market.  Tie-pins and cufflinks are products used by high income groups and they are subject to fashion changes.', ' While metallic buttons face competitions from plastic and horn buttons, metallic buckles so far do not have any substitution.  Metallic buttons are mostly used in overcoats and the buckles are used for belts.  There are small buckle making units in Addis Ababa, but there are none in the Amhara Region.  Hence metallic buckles, buttons and the other two products are either imported from Addis Ababa or from abroad.  Producing the buttons and the buckles requires simple machines and conventional technology.  These products can be fabricated in the Amhara Region for the Regional market and if possible for the market in neighboring regions.', 'The four products under consideration are used for men’s dressing.  The male population of the Amhara Region is roughly 9.6 million of whom more than 8.5 million are children and adults who use belts; to which buckles are attached.  If ten percent of all belts are replaced every year for a variety of reason, the demand for replacing old buckles is about 850,000 per year.  This shows the magnitude of demand for buckles in the Region and this can absorb the production of a plant which will produce buckles. ', ' The metal which will be brass, will be imported.', 'Dress buttons and buckles are pressed by blanking and piercing of mild steel sheet and formed to shape and nickel plated.  Tie pins are made in pressed metal anodized aluminum pieces which are engraved, turned, plated and polished.  Cuff-links are made in flowery designs and gilded faces on anodized aluminum pressed and brass pressed pieces.  Machinery required for the plant include hand press, vertical type precision engraving machine, single lip tool grinding machine, universal faceting machine, straight line engine turning machine, hand tools, measuring tools, jigs and fixtures, and electroplating, gilding and anodizing unit. ', ' Save foreign exchange to the country and financial resources to the Region, introduces new skills and technology, promotes self-sufficiency.', ' 7', '1 '),

( 'Metal Safe Boxes ', ' Metal safe boxes are heavy boxes made of thick steel sheets constructed in double form where concrete is put between the steel sheets.  The heavy boxes are primarily used for keeping cash, jewelry, gold, important documents and other valuable items.  The boxes are made in such a way that they are heavy and can not be lifted and carried by individuals.  Besides, their doors are locked with numerical configuration which makes them unopenable unless one knows the configuration.  These two features of a safe box make it a very dependable and secured store for valuable items.  In recent years, due to the increasing theft of religious symbols, icons and other ecclesiastical- objects, many orthodox churches are buying and using metal safe boxes for the safe-keeping of these religious objectives.', 'Metal safe boxes are imported and they are also fabricated at home.  The technology of making safe boxes is simple and many technicians have acquired the skill of fabricating metal safe-boxes.  In Addis Ababa, there are a number of workshops which fabricate metal safe boxes for the local market.  The safe- box requirement of the Amhara Region is met by imports form Addis Ababa.  More and more churches in the Region want to have safe- boxes for the safe- keeping of objects.  In addition cooperatives, shops, offices, merchants, etc need to have safe-boxes. ', 'Products like metal safe-boxes are produced in batches.  First, parts or components are fabricated piece by piece and the pieces are welded and /or riveted.  The final product is a composition of many parts and pieces.  In this type of production process, workshop machines can be used for producing/fabricating different types of products depending on the demand of each product.  For example, one workshop can fabricate components of grain mills, parts of metal safe boxes and bodies of edible oil mills.  With this type of product mix, the workshop can operate full time which is one basic condition for making a plant viable.  As the market for each product expands, there will be specialization and different workshops could produce the different products. ', ' The metal sheet and the numerical lock will be imported.  The parts of the concrete can be produced in the Region.', ' The major process is cutting and grinding of the metal sheet parts of the box, welding together the parts, putting the concrete between the metal sheet, again welding, fixing the numerical lock, and machining the outside parts of the box for smoothness and painting.  The required machinery and equipment are those which are standard machines, instruments and tools in a metal fabrication workshop.', 'acquiring new skill, know-how, saving of the Region’s resources, safe- keeping of valuable property, ecclesial objects, which are part of our cultural and historical heritage, plus the other common benefits. ', ' 7', '1 '),

( ' Mouse Trap', 'Mouse trap is a metallic device designed and produced to trap and kill mice; and it is a very useful gadget both in urban and rural areas. The device is made of metallic sheet, metallic wire and metallic coil or spring. In many areas, rodents destroy crops on farms and in barns and this reduce crop production especially the production of cereals. Some studies estimate that the loss of crops due to rodents to be about 20 percent of harvest. ', ' ', ' All the demand for mouse trap is net by imports. Annual imports of this device are estimated to be in the range of 200,000-250,000. There is domestic know-how to produce this useful device. But this product has been imported since it was known to the Ethiopian market. Production of mouse trap is not subject to the conditions of economies of scale; since it does not require large investment for big machinery and equipment. The existing market for mouse trap can make a mouse-trap making plant a viable venture.', ' The metal sheet, wire and spring will be imported.', 'The process of making mouse trap is relatively simple. The metal sheet is cut and bended according to a specific design. The wire and the spring are attached to the metal sheet frame. The spring could be made in the plant or it can buy from a supplier. Main machines include shearing machine, coil winding machine, welding machine, and accessories. ', 'Saves foreign exchange and regional financial resources, saves crops form being destroyed and/or consumed by rodents, and introduces new skills and technology. ', ' 7', '1 '),

( ' Pilfer Proof Bottle Caps', 'Pilfer proof caps are aluminum and cork products widely used for corking glass bottles in the beverages, pharmaceutical, food and chemical industries. The caps are fitted with a pressed cork as plastic pieces to prevent leakages. Pilfer proof caps are made with different sizes, but the most commonly used sizes are the 31.5mm. and the 28 mm caps. ', ' ', 'The major end users of pilfer proof bottle caps are alcoholic beverages and pharmaceutical manufacturing enterprises. During the last 15  years additional plants which produce alcoholic beverages and pharmaceutical products have been established in the country. For example, in the Amhara Region alone two large beer factories were established in the country. More than three pharmaceutical factories were also established. Some of the old beer factories have been also expanded to increase production. Due to the establishment of the new factories and the expansion of the old ones, demand for pilfer proof bottle caps has increased. Around 1994, the demand for the caps was estimated to be about 13 million pieces; and projected demand in 2007 is about 18 million. The Amhara Region has two large beer factories which meet the major portion of the demand for beer in the country. In addition, there are two soft drinks and about three "mineral" water bottling plants in the Region. These factories together consume more than 5.5 million pieces of pilfer proof bottle caps in a year. As these factories expand and as new factories are established the demand for the caps will grow. Subject to further detailed market study it appears that there is sufficient demand for pilfer proof bottle caps which can make a plant financially viable. ', ' Main raw materials or inputs are aluminum sheet of 0.22 mm thickness, cork seal and lacquer. These raw materials will be imported.', ' The production process involves lacquering, slitting, cap production, seal assembly and packing. The aluminum sheet is coated with lacquer and dried on an oven. The coated sheets are then trimmed to exact dimensions on a singing machine and slitted to strips. strips are fed to a double action power press using compound die. The drawn caps are fed to a scotting machine where the uncurled grip marks and the pilfer proof ring are formed. The caps are then taken to the lining machine and the corks are fixed. Finally assembled caps are inspected for pressing or any other defects and then packed. The main machinery and equipment needed are lacquering machine, drying oven trimming and stripping machine, power press, set of dies, rolling machine, lining machine, compressor, conveyor system and carts.', 'Similar to other projects.', ' 7', '1 '),

( ' Razor Blade', 'Razor blades are essential items used by household and barber shops.  They are used mainly for shaving and cutting of threads.  Production refers to ordinary type of razor blade.  ', 'Practically all urban and many rural men shaves frequently and use ordinary blades for shaving.  The rural population also considers razor blades as very important tools for use in cutting threads and other materials.  Presently there is no razor blade making plant in the region.  ', ' Demand for razor blades grows particularly with growth of urban population.  Current demand in the country is meet entirely from imports.  Large quantity of imported razor blade could not satisfy the demand.  It is important to have a razor blade making factory to tackle the demand in the whole country lit alone in the Amhara Region. ', 'The main raw materials for making razor blade are imported. Stainless steel,   Printing ink,   Chemicals, Waxed paper,  Printed label,  Packing material,   Small cartons,  Large carton boxes. ', ' Razor blade making process involves basically the following, punching of basic material for holes and corners, degreasing, hardening, tempering, lacquering, stamping (of brand prints) grinding and honing, polishing, coating, drying and packing. Production Equipment: Punch press automatic, Hardening and tempering furnace (electric), Off and on reeling machines, Printing machine (automatic), Lacquering machine,  Braking machine,   Grinding and honing machine,  Strapping machine,  Spray booth, Wrapping machine, Other (Tungsten carbide tools, accessories, work tables). All the major machining and equipment are assumed imported. ', ' The location of razor blade making has to be in major town like Bahrdar to serve the demand of the region.', ' 7', '1 '),

( 'Rural Household Hand Tools ', ' Products considered in this project idea are simple hand tools used by rural households for a variety of tasks including agricultural activities. These tools include picks, axes, sickles, shovels, machetes, etc. The tools are used on farms and around houses.', ' Due to our low level of development in manufacturing, transport, construction, trade and commerce, finance and other service sectors, more than 85 percent of the people of Ethiopia live in rural areas deriving their livelihood from traditional agriculture which depends much on human labor and animal power. This situation requires the extensive use of hand tools to perform different tasks at home and on farms by millions of rural family members. For example, axes and sickles are essential hand tools for any rural family. Every family has to have at least two sickles and one ax to meet the family requirement for accomplishing various tasks on farms and around the houses. There is also a need for the other hand tools.Even though there is one factory that produces sickles, shovels and spades, the bulk of the country’s demand for hand tools is met by imports. For example the sickle market is flooded by imports. Other hand tools are also supplied from imports. Since hand tools for rural households are part of agricultural implements and tools, they have an impact on agricultural production and rural reconstruction. As such these tools should be produced at home as much as it is economical.', ' In 2006, there are about 12.8 million families living in the rural areas of Ethiopia. Of these, 3.3 million families are in the Amhara region. As mentioned above, rural hand tools are needed by each rural family. For example, in the Amhara Region the demand for sickles is about 6.6 million, 3.3 million for axes, and similar numbers for other types of hand tools. Most rural households have the hand tools needed for their farm activities either from imports or domestic production. As domestic production is very small, most of the hand tools especially sickles in the hands of farmers are from imports. The future demand for these tools is, therefore, composed of replacement and new requirement by young rural families. A market study for rural hand tools indicated that in 2006, the demand will be about 434,000 and the share of the Amhara Region is about 130,000. The projected demand will grow in the future and this may justify the establishment of a plant which will produce different types of hand tools to be used mainly in rural areas.', 'The main raw materials are steel plates, rivets and for some products like sickles, wooden handles are also required. The metals will be imported. ', ' The plant will be a multipurpose mechanical workshop equipped with different kinds of mechanical equipment. The production process involves cutting, punching, forging, forming, bending, grinding/sharpening, heat treatment and painting. Major machinery and equipment needed are power shear, eccentric presses, fuel fired furnace, friction screw press, double ended pedestal grinder, quenching tank, manual tube bending machine, tumbler, painting equipment, black smith’s tolls and other auxiliaries.', ' Substitutes imports from abroad and from other parts of the country there by saving foreign exchange for the country and financial resources to the Region. Facilitates the development of the rural economy, introduces new skills and technology, promotes self sufficiency', ' 7', '1 '),

( 'Safety Pins ', 'Safety pins are used to pin clothes together, and in rural Ethiopia to take out thorns which accidentally penetrate body parts such as feet) and chiggers.  Safety pins are popular in rural areas.  All most all individuals except small children have at least one safety pin each. ', 'Safety pins are simple wires cut into desired lengths sharpened in one end, bent in the middle and cupped in another end which is used as a hook for the sharp end.  Though simple they are to make, safety pins are imported.  Is it not time to produce, at least, safety pins in the country?  With a population of 19 million people, most of them living in rural areas, the Amhara Region should promote the establishment of a safety pins producing factory. ', 'Is there a need to discuss the market potential of a product where nothing is produced locally and all is imported from abroad.  The market is there; the issue is how much/money to produce? ', 'The ”raw material” for making safety pins is mild steel wire and thin sheet metal.  The inputs will be imported. ', 'Mild steel wire is cut into required length.  A special machine converts the wire in to a safety pin.  The head of the safety pin is manufactured in another machine and pressed with the body on another machine.  Main machines include automatic pin manufacturing machine, automatic head assembling machine, bench grinder and drill. ', ' Saves foreign exchange and regional financial resources, introduces new technology and skills, possibility of export to other parts of the country.', ' 7', '1 '),

( ' Saws', 'Saws are made from high carbon steel having teeth on the edge of one side.  They are essentially of two types- circular and linear.  Saws are one of those hand tools which are used in all types of activities where cutting of wood and wood products is involved. ', 'The wood cutting works going in the whole Amhara Region require the use of saws.  However since saws are not available in sufficient quantity, wood cutting is done using axes.  Unless for splitting logs, axes are not very convenient and efficient for cutting wood.  Besides, there are many types of wood cutting works (joineries, timber production carpentry, etc) which exclusively require the use of saws.  All types of saws used in the Region and for that matter in the country are imported.  But except the manufacturing of high carbon steels sheets from which saws are made, the production of saws is a simple workshop operation which can be done anywhere in our country.  The Amhara Region should promote this project so that the country could start fabricating saws which work manually. ', ' To prove the existence of a sufficient market for saws in the Amhara Region, one does not need to quote import or consumption figures.  These figures are quoted when the gap between domestic production and consumption are close which entails the possibility of risk because of market saturation.  In a situation where domestic production is non-existent and consumption is satisfied by imports, one can safely conclude that there is sufficient market for the production.  this is the situation for hand saws.  There is a demand for them which can absorb the production of a small production unit.', ' Saws are made from high carbon steel sheets.  These sheets will be imported.', ' The high carbon sheet is cut into square pieces, then corners are pruned on the sheet cutter.  Then these pieces are drilled and bored on the lathe further these are put on mandrel and turned to accurate size.  Then the teeth are cut on the milling machine.  The pieces are then heat treated.  Bore is internally ground while both the faces are surface ground.  Main machines required are lathe, sheet cutter, milling machine, special purpose tool, stamping machine, bench grinder and workshop tools.', ' self-sufficiency, saving foreign exchange and regional financial resources, introduction of new skills and technology, possibility too export to other parts of the country.', ' 7', '1 '),

( ' Screw Drivers', 'a screw driver is a long metallic rod; one end flattened and shaped to form a sharp edge, while the other end is fixed with wooden or hard plastic handle for proper handling and gripping while in use.  The purpose of a screws driver is to tighten or loosen screws.  Screw drivers are extensively used in maintenance and engineering works.  Some screw drivers have their ends magnetized so as to bring out screws by the attraction of the magnet from deep holes or cavities, while others have “plus” ends for screwing or unscrewing special type of “plus” screws.  The length of screw drivers may range from 3 inches to 24 inches and having diameters accordingly. ', 'If not welded, riveted or made from one piece, parts and components of any product are screwed together.  In other words, they are joined together and held tight by screws for which screw drivers are used to tighten.  And if parts are to be dismantled say for repair and maintenance works, screw drivers are used to loosen screws.  In urban areas, there are at least one or two screw drivers in practically every home, shop and stores.  However, most of the screw divers like other hand tools are imported.  The Akakie Spare Parts Factory used to produce some type of screw drivers, but they are not visible in shops, stores and other marketing outlets.  This indicates that domestic supply is either too small or the products are not well accepted by consumers.  On the other hand imported screw drivers are found in large quantities in building materials and mechanical products stores.  There is no question about the need of producing screw drivers in the country; and the Amhara Region will take the critical role of introducing this project to potential investors and promoting the project for its realization. ', ' When one considers (a) the importance of screw drivers in maintenance and engineering works (b) the number of screw drivers being imported every year and (c) the potential of demand growth in the future, he can only conclude that there is more than sufficient market for the product.', 'the steel rod from which screw drivers are made of will be either imported or obtained from the Akakie Spare Parts Factory. ', 'Special hand steel rods are required to manufacture screw drivers.  The process follows the following sequence.  Cutting the steel rod to the required size; cutting is done either on power hexa or power shearing machine.  It can be done also in power press.  Grinding- this operation is done on center less grinding machine to obtain uniform and good surfaces.  The tip is also ground to taper to form screw end.  Heat treatment- after the screw bar is made it is heat treated to obtain a hardness.  Fixing handle either wooden or plastic handles are prepared and fixed to the metal part.  Main machinery and equipment include friction screw press, oil fired furnace, quenching tank, center less grinding machine, drilling machine, Rockwell hardness tester. ', 'contributes to the development of the hand tools industry of the Region, saves foreign exchange and regional financial resources, and introduces new skills and technology, possibility of export to other regions. ', ' 7', '1 '),

( ' Shovels and Spades', ' Spades and shovels are basic hand tools for all types of construction, building, agricultural, soil conservation, water and forests resource development works.', ' Visualize Amhara land from north to south and from east to west; and one finds millions of things to do to build the basic infrastructures of the Region, to improve the social and economic condition of the Amhara people and to conserve, protect, and develop the natural resources of Amhara land.  To do all these things spades and shovels are required.  If 10.1 million Amhara between the age of 15- and 60 are mobilized and they are given spades and shovels at least to conserve and protect their soil resources by building all types of soil conservation structures, Amhara land would be free from the problem of soil erosion in a matter of 2 to 4 years.  To do this one basic requirement is to provide every able bodied Amhara with a shovel and spade.  Like many other industrial products, spades and shovels are brought to the Amhara Region from other parts of the country.  But these are basic products which the Region should be self- sufficient and a plant which will produce these basic hand tools must be established.', 'In rural Amhara land shovel and spade are basic hand tools for every household.  These tools are used around the house as well as on farm plots.  They are also used in community works like tree planting, building terraces, constructing small irrigation works, rural roads, etc.  There are 3.4 million families in rural areas and this can give us an indication of the potential market for shovels and spades in the Amhara Region.  If we assume that at least 25 percent of the rural families will have two spades and one shovel, total market demand for these tools will be about 850,000 shovels and 1,700,000 spades.  Even with this conservative assumption, the demand for the tools is very large.  A plant which produces 100,000 shovels and 200,000 spades per year can be a viable plant for establishing in the Region.  ', 'The main “raw material “for the plant is gnot iron.  Other factories in the country import this input.  So will the plant to be established in the Amhara Region ', 'The manufacturing process of shovels and spades involves four parallel groups of operations.  These are (a) preparation of the sections of shovels and spades (b) preparation of wooden handles, (c) preparation of Y- shaped **handles** and (d) assemblyof spades or shovels with the wooden handles.  The first operation which is the most important one has a number of sub-operations like cutting strips, punching blanks, heating, forging blanks, forming of handle tubes or holes, punching of fixing holes- Major machinery and equipment include eccentric power shear press, heating equipment for blanks, friction screw press, grinding machine, punching tools for shovels and spades, shovel embossing tool, punching tool for handle fixing hole, handle tube rolling tool, spade embossing tool, punching tools for steel handle parts. ', 'Contributes to the development of the Region’s physical infrastructures including natural resource conservation, introduces new skills and technology, saves financial resource of the Region. ', ' 7', '1 '),

( ' Sickles', 'Sickles are used to cut grain stalk (cereals, Pluses, oil seeds, ---) at harvest time, grass and some time branches.  They are used both on farm and around the house. ', 'In the Amhara Region alone there are 3.7 million families whose major occupation is farming.  If we assume that at least two sickles are need by each farming family, the need for sickles in rural areas alone will be 7.4 million.  Supply of sickles to the Region comes from three sources- local productionby blacksmiths, factory production from Addis Ababa and imports.  Production by blacksmiths constitutes a small portion of the total supply to the Region.  Production from the Addis Ababa factory has been declining over the years.  On the other hand imports of sickles are increasing.  But since it is technically possible to produce sickles, the domestic factory production of sickles should be revived and substitutes the import.  Most cereals production takes place in the Amhara Region and sickles are needed in cereal growing areas. ', 'Factory production of sickles in the country was 494,000 in 1987,. 229,000 in 1989 and 146,000 in 1990.  In a period of three years, production declined by about 80 percent. Since then production has not recovered.  While domestic production was declining, imports have been increasing.  This project idea is to produce sickles in the area of the country where it is needed most. ', ' Sickles are made from that carbon steel.  This input will be imported.', ' the flat carbon steel is cut into pieces of desired sizes.  The piece is heated for the purpose of forging by forging hammer.  The excess material on the side is removed by hammering again which is called trimming.  After this, finishing process is performed and at last a wooden handle is fixed.  Machines required are hydraulic power hacksaw machine, open hearth black smithy, coal fired muttle furnace, oil quenching tank, spring hammer, double ended grinder, haraness testing  machine, and other accessories. ', ' saving in foreign exchange and regional financial resources, increases productivity of farmers during harvest, self-sufficiency, development off hand tools and farm implements industry.', ' 7', '1 '),

( ' Snap Fasteners', 'Snap fasteners are used inmany different garments of men, women and children, and are popular because they are convenient to use.  They are basically push-buttons which can be fastened by simply processing the two parts together; and to disengage the two parts, only a slight pull can only be applied.  Snap fasteners consist of two basic parts the “male” part which has a small knob protruding from it and the “female” part which has a corresponding hole and has two miniature clips on either side of the whole which help to hold on to the knob of the “male’ part once it is pressed into it. ', ' This is a product used by every body especially women and girls.  It is not only used for holding different pieces of shirt, dress, skirt… together, it is also used because it looks more appealing than ordinary buttons. Women have different uses for this product.  So far it is not being produced in the country.  The whole consumption of this product is based on imports.  The Amhara Region can promote the production of the item for regional consumption and for selling it in other parts of the country.', ' Since there is no any entity which produces this product in the country and quite a substantial quantity is imported there is a captive market for the production volume of a plant which will produce snap fasteners.', 'Snap fasteners are made from sheet brass and coated with nickel. ', 'Both parts of a snap fastener are cut from thin metal sheets, pressed to make the desired shapes in the two parts and pierced to make holes.  Main machinery includes automatic spring insert machine, dies for “male” and “female” parts, tumbler for polishing, nickel plating equipment and aluminum and brass basket for pickling. ', 'Saves foreign exchange and regional financial resources, introduces New skill and technology, possibility of export to other parts of the country. ', ' 7', '1 '),

( ' Solder Wire', ' Soldering is a process by which two metals are joined together by a third metal which is known as soldering wire.  The wire is an alloy of lead and tin.  Soldering is different from welding.  In welding the two same materials melt first and then join, while in soldering, the metals to be joined do not melt but the soldering wire melt and join the two metals on cooling.  Along with the soldering wire some flux is also used to help in adhesion.  Soldering wire is used in electrical, electronics, telephone, plumbing, radiators, scaling of tin cans, making of gas meters, etc.', ' ', ' Like practically all other industrial products, soldering iron is imported from abroad.  The Amhara Region receives its share of the import from Addis Ababa.  Annual consumption of this product by the whole country is 90000 tons and share of the Amhara Region is 25000 tons.  Production of soldering iron can be done either in small scale, medium scale or large scale operations.  If this is the case, establishment of a plant to produce soldering iron in the Region can be a viable venture. The plant can start by producing first to the Amhara market and gradually it can expand its operation to cover the market of neighboring regions.', 'As mentioned above soldering iron is alloy made from tin and lead and the two raw materials will be imported. ', 'The principal process is making the alloy by melting the two metals and the molten alloy is passed through a die (casting) to make it into a wire.  After cooling, the wire is rolled on a rotating wheel and then groups of wire are packed together.  Machinery and equipment include coke fire furnace, rolling machines, wire cutting, winding machines and other accessories. ', ' Saving foreign exchange resources to the country, self- sufficiency in a critically important industrial products, enhancing the development of the electronics, electrical, canning and telecommunication sectors.  Introduction of new technology and know-how to the Region.', ' 7', '1 '),

( ' Spanners', 'Spanners are metal tools with a specially shaped ends for holding and turning nuts and bolts.  They are used for gripping a bolt or a nut head, and providing the leverage while opening it.  There are two types of spanners (a) ring spanners (also called socket type) and (b) plain spanners (called single or double end).  This project idea considers double-end spanners which are widely used and has larger demand. ', 'Spanners are very essential hand tools in all mechanical works such as assembling, repair and maintenance of all types of machinery and equipment.  Though some quantity of spanners is produced by the Akakie Spare parts Factory, most of the spanner needs of the country is met by imports.  Spanners are made by cutting steel bars into required lengths and making both ends according the desired shape and dimensions.  If the steel bars that could be used to make spanners are made available, it is technically possible to produce different sizes of spanners in the Amhara Region for regional as well as national consumption. ', ' During the last four years, import of spanners was 20,000 per year on the average; and domestic production is estimated to be about 2000 pieces.  This shows that there is much gap between domestic production and imports which gives opportunities for increasing domestic production to reduce imports as much as it is technically and financially feasible.  The import substitution gap is wide enough to justify the establishment of a factory that will produce the most common spanners.', ' Spanners are made from steel bars and these bars will be imported.', 'In manufacturing spanners, the following operations are performed:- cutting steel bars in to specific lengths, stamping and forging the bars in to presses, milling the spanner ends and printing, heat treatment, butting and polishing the spanners, electroplating, testing and packing.  Main plant and machinery include power press, drop forging hammer, broaching machine, belt grinder, shot blasting machine, tempering machine and hardening furnace. ', ' Contributes to the development of machine tools industry, saves foreign exchange and regional financial resources, possibility to export to other regions, introduction of new skills and technology.', ' 7', '1 '),

( ' Stapler & Puncher', 'Stapler and punchers are essential stationery items for use in offices, printing presses activity areas.  They vary in type/size according to purpose they are put to use.  The plant is to produce desk duty type products commonly used in offices.  ', ' New offices of the government and of the private sector are emerging in all areas of the region.  They demand office tools to their daily use like stationery items.  One of these are staplers and punchers.  They are imported and cost foreign currency to the nation.  There is no factory that produces a stapler and puncher in the region.  It is necessary to establish a plant that serves the demand.  ', ' The demand for stationery items like staplers and punchers is growing with growing socio economic activities.  Government offices in kebele, woreda, zone and region are established and their numbers is many.  The offices for private sector also increased with growth in investment and trade.  All this offices use paper to process their daily activities.  This has increased the demand for stationery items like stapler and puncher; demand for the product is currently met from imports. ', ' The main raw material for producing stapler and puncher are the following:  Cold railed steel sheets,    Steel rods,  Electroplating material, Other (rivets, springs, paints, plastic parts), Packing material.', '**Process**Products making process basically involves the following:  Cutting or shearing (of cold rolled/mild steel sheet) to desire dimensions.  Pressing or press blanking and forming,  Degreasing (of metal sheets for staplers), Machining /lathing, that is sizing and shaping of materials for punchers. Electroplating (staplers),   Assembling,  Checking,  Painting,   Packing ', ' Machinery and Equipment  Shearing machine,   Presses (power and fly), Drilling machine,    Riveting machine,   Lathe, Compressor with spray painting equipment,  Grinder,  Degreasing tanks, Electroplating tanks.', ' 7', '1 '),

( ' Steel Storage Bins', 'Bins are used for storing anything from grains to commercial products both in houses, stores, shops, etc. Storing in steel bins replaces or is an alternative to storing in mud pots, gunny bags, underground pits or other forms of traditional storage facilities for grains. ', ' ', 'In the Amhara Region the traditional storage system for grains is the use of large or small pots made from mud, barns made form wood or underground pits. The mud pots do not usually contain large volume of grains and they do not last long. Barns made from wood and plastered with mud are kept outside the houses and as such are liable to be infested by rodents with a substantial loss of grain every year. Underground pits are used in the highland areas of the region usually used for storing barley. These pits are usually flooded with water during the rainy season, and the loss of grain is quite large. It has been said many times that more than 25 percent of the country’s grains production is lost/wasted every year due to the traditional storage system practiced by farmers. This huge annual loss of grains can be substantially reduced if steel storage bins are used. In addition, due to shortages of wood because of wide spread deforestation in the Region, it has become almost impossible to construct grain stores from wood. Mud posts can not be used for storing grains which are more than 5 quintals as their structure are weak to withstand load.

Of the 3.6 million farming families living in the Amhara Region, at least some “well-to-do” families might be interested in using steel storage bins instead of the traditional storage facilities. If we assume that for the initial phase at least 3 percent of the farming families will use steel storage bins, total initial demand for the bins will be 108,000 units and this conservative demand estimate is more than the production capacities of a number of plants which produce steel storage bins. ', 'Steel sheets or galvanized iron sheets is the main input for producing steel storage bins. Either of the inputs will be imported. ', 'The sheet is first cut to the required size. It is then rolled to cylindrical shape and the ends are seamed. Circular sheets are cut and fixed to the cylindrical section of the bin and later the lid is fixed. The final process involves revetting of handles and latches. Main machinery required includes shearing machine, side seaming machine, bending machine, driving machine and punching machine. ', ' Saves grains from being destroyed by rodents, increase food supply to the populations', ' 7', '1 '),

( ' Steel Vaults, Safes and Cash Boxes', 'Steel vaults, safes and cash boxes are security chests used by banks, shops, factories, and other bodies which handle money for keeping cash and other important or valuable items. Banks use only steel vault doors with masonry construction for the chamber. ', ' ', 'One can only imagine or visualize the number of money handling units (shops, restaurants, hotels, coffee shops, tea houses, factories, offices, garages, homes, bars, etc.,) in the Amhara Region to realize the demand of vaults, safes and cash boxes. Even churches needs these safe – keeping products for keeping religious icons. Currently some safe boxes are made by some workshops in some urban areas of the Region. However, these are not of the required these are not of the required quality in terms of construction and locking system. There is a need for producing better quality of steel vaults, safes and cash boxes. These products are imported from Addis Ababa or from abroad and are brought to the Region; and the products are heavy to transport which makes them expensive. A capacity must be created in the Region to make it self-sufficient in the production of these items. ', 'Main inputs are mild steel plates and these will be imported. ', ' Mild steel plates are cut into shape by a portable straight line oxygen gas cutting machine. The members of the frames of double walled doors are also cut by the same machine or gas cutting set. Different parts of the double walled doors are welded together. The door hinges and locks are fitted. In the same way the safes and cash boxes are fabricated. Finally the boxes are painted. Required machinery includes flexible shaft grinder, universal hand shear, double ended bench grinder, gas cutting and welding set, electric welding set, portable hand drill, hand press brake, spray painting unit, stoving chamfer and other fools.', 'Promotes self – sufficiency, provides more security to valuable properties, saves financial resources ', ' 7', '1 '),

( ' Tin Containers', 'Packaging is the most essential part in the distribution of goods from the producers to the consumers.  Tin containers have been one of the most important media in packaging.  Various products like oils, processed fruits, various milk products, biscuits, talcum powder, etc, are packed in tin containers.  These are some basic advantages of using tin containers.  These are:- saving space by putting the cans on top of the other, can be reused, have better guarantee against seepage, can withstand high temperature unlike plastic containers. ', ' There is only one factory i.e. Ethiopian Crown Cork which produce tin can containers.  Some tin cans (container) using factories have small tin can making units attached to the main factory.  Apart from this, there are no factories that produce tin can for the various industries which use tin cans for packing their products.  Such factories include the paints factories, the fruits and vegetable processing and canning plants, fish and meat canning factories, and other assorted industries.  As industry develops in the country, more tin can using factories will be built.  This will require additional tin cans for packing purposes.  This implies that more tin can producing plants should be established in the country.  In the Amhara Region, there are two meat and fishing canning factories.  Other tin can using factories are to be established in the Region in the near feature.  For the existing industries as well as for those to be established, there will be increasing demand for tin cans.  And there will be a need to establish a tin can container producing plant in the Region.', ' The tin can requirements of the food processing industries are met by imports, while domestic factories supply tin cans to the paints and varnish factories.  Between 1987 and 1988, average annual production of tin cans was 1.8 million pieces.  No additional capacity has been created since then while the demand for tin can is increasing.  During the last ten years, more capacity has been created in the production of paints and varnishes; this in turn creates additional demand for tin cans.  All in all the demand for tin cans of the food and paints factories in the Amhara Region may justify the establishment of a tin can making plant in the Region.  The plant can also export its products to other parts of the country. ', ' To be imported.', 'Tin containers are made from tin coated sheets.  The manufacturing of tin containers needs only limited operation.  The sequence of operation is (a) cutting of sheets, folding and rolling, (b) seaming and flanging and (c) screen printing.  Main machinery include testing tank, wire cutting machine, auto lock 2m folding and side seaming work, inclinable power press 10 tons capacity, hand operated wire forming machine, soldering equipments, paneling press for embossing, side folding and flanging, air compressor, paneling press for body banks cutting and corner cutting and fully automatic tin seaming machine. ', 'Supports the food processing and canning and other similar industries, promotes self-sufficiency, saves foreign exchange and regional financial resources, and introduces new skills and technology. ', ' 7', '1 '),

( ' Transmission belt', ' Transmission belts are used for power transmission purposes by connecting driving and driven pulleys of machinery. Transmission pulleys are widely used in industrial, agricultural, construction and other operations to transmit power. Of the various types of belts in use V- belt is considered for this project as it is the type (according to the market study) more in demand.', ' ', 'Import of transmission belt during the past seven years has shown a general increasing trend although it is characterized by fluctuations. The yearly average level of import during the period 2000-2002 was around 160 thousand kilograms and increased to a yearly average of about 301 thousand kilograms during the period 2003-2005. The quantity imported in the year 2006 has sharply increased to 455.7 thousand kilograms. Compared to the average yearly import of the period 2003-2005, there is a total increase of about 51% or annual growth of about 13%. ', ' India and China are a few of the sources for the required raw material. Ethiopia is also developing a rubber plantation and processing project at Guraferda woreda in SNNPRS which is planned to replace the imported natural rubber in the medium term.', 'The process starts with a thin layer of cushion rubber sheet wound by a cord of fabrics with slight tension. The cover cloth which is a woven jacketing fabric rubberized by fractioning in a calendar is cut into strips and laid in the V grooves of the ring mould .The groove is then filled with the extruded strip of filler rubber compound. Trapezoidal section is formed at this stage. The ends are then joined together.The assembly is wrapped with nylon tape and the moulds are transferred to steam vulcanizing chamber which would result in the finished product. Belts of larger sizes are made on adjustable belt presses where more than a single layer of cord fabric is used. A fabric cord coated with adhesive is cut to the desired width, and the strips are wound in layers over filler and the cover cloth is sealed. The belt is vulcanized in stages in hydraulic presses. ', ' ', ' 7', '1 '),

( 'Various Hand Tools ', ' Hand tools are widely used by craftsman in industries of all types. These tools are hammer, spanners, screw drivers, hacksaw, file, pliers, wire cutters pincers, etc. Hammers, spanners and screw drivers are relatively more common hand tools. As their name imply, these tools are manually operated. This project ideas is about producing screw drivers, hammers and spanners. Spanners are gripping and adjusting type of hand tools. Spanners or wrenches of various designs are used for bolt-fastening (tightening and loosening) operations. Screw drivers are used to drive the slitted head of screws. They are used for tightening and loosening screws. Hammers are used for hammering, stamping or pressing operations.', 'Practically all hand tools used in the country are imported. Some types of winches were started to be produced in the Spare Parts Factory at Akake. However, they do not seem to penetrate the market. There must come a time when our country produces most of if not, all the hand tools we use. If the Amhara Region takes the first initiative to establish a factory that will produce these three important hand tools, it will have an advantage over other regions, in the development of the whole hand tools industry. ', ' Thousands of each hand tool is imported into the country every year. As the economy expands demand for these tools will increase. Even the present levels of imports justify the domestic production of these tools. ', ' The “raw material” for these tools will be different types of steel; and this will be imported.', 'The productions of the three hand tools have different production processes.  a)       **Screw driver-** drawn wire of mild steel of smooth surface finish is cut into required lengths.  One end of the blank (the cut steel) is notched, serrated or grooved to provide stability and for the plastic handles.  The other end is made slant by flattening and gradually tapering to the end, till the edge thickness of the flant becomes that of the standard slit to which the screw driver is used in standard practices.  The flattening and tongue shaping are carried with a suitable press.  Plant and machinery include power hacksaw, grinder, electroplating and finishing equipment. b)      **Hammers-**  production process include cutting of steel bars – which are called stocks, heating the stocks in a forging furnace, forging, hole punching for handle, peening, machining, heat treatment, grinding, testing, antirust coating, wooden handle assembly.  Main machinery and equipment include drop forging  hammer, power press, furnace, surface grinder, polishing machine, tanks and accessories.

c)      **Spanners-** Process includes cutting of steel blanks, heating up to forging temperatures, forging of steel, trimming and mechanical finishing, grinding, hardening and tempering, finishing and electroplating.  Main machinery and equipment include blanking process, hot gorging press, trimming press, grinder, embossing machine, tanks, and accessories ', ' Saving of foreign exchange for the country, new skills and technology to the Region.', ' 7', '1 '),

( ' Water Filter Containers', ' Water filter containers are component parts of domestic water filters used for treating water to make it free from undesirable impurities and harmful bacteria that may cause water borne diseases. The containers for the water filter can be made from locally available clay material (burnt clay containers) aluminum or stainless steel. As compared to other types of containers, stainless steel filter containers have much more popularity because they are more durable and attractive. Water filter containers are used together with water filter candles for treating drinking water.', 'In more developed countries where there is more awareness about health and other qualities of life, the use of water filters is an absolute necessity. Every household has at least one water filter apparatus for filtering drinking water. The apparatus is as essential as an oven which is used for cooking food. In least developed countries such as ours, where there are problems in the quality of water which comes from tapped and untapped sources and where the use of water filters is very scarce, millions of people suffer from water borne diseases. The irony about this problem is those water filters are simple apparatus which can easily be made by local craftsmen and which can be acquired by paying reasonable prices. The main obstacle is that the lack of awareness by the majority of rural people about the benefits of using water filters. However, with public campaign about the health benefits, people will be readily willing to use water filters. Hence, by recognizing the need of using water filters, the Region should promote and facilitate the establishment of a plant which will produce water filters. ', 'so far the main consumers of water filters are hospitals, laboratories and some high standard hotels and restaurants. Compared to the total population of the country, household purchase and use of water filters are extremely small. Consequently the quantities of water filter imported every year are relatively small. For example, between 1986 and 1996, average animal import of water filter was 1075 units; and the import has been increasing at an average rate of 14 percent per year. The projected demand for 2007 will be about 25000 units. This demand is more than the production capacity of medium scale plant which can be established in the Amhara Region whose share of projected demand will be close to 7000 units. The projection was made with the assumption that only 2 percent of urban households will use water filters. This is a very conservative assumption. Given the health benefits that water filters give to consumers, one could have assumed more than 2 percent which could have increased the projected demand. ', ' The major raw materials are stainless steel sheet and polishing compound; and these will be imported.', ' The process of manufacturing water filter containers requires practical knowledge. Stainless steel circles are pressed in double action power press to the required size and shape. If the hard steel circles are used, they are first annealed, then pressed and finally spun on spinning lathe for proper shaping of the item. The containers are finally polished and dispatched to the market. Machinery required include deep drawing toggle type double action power press (200 tons) spinning lathe machine, swaging machine, back geared pillar drilling machine and bench polisher.', 'Saves foreign exchange, contributes to the improvement of health standards of consumers, promotes self-sufficiency in industrial products, brings in financial resources to the Region through export of the product, and introduces new skills and technology. ', ' 7', '1 '),

( ' Weights', 'Small weights are essential items for selling many types of products in merchandize stores such as shops, kiosks, etc. Items like sugar, coffee, flour, fruits and vegetables and many others are sold by using weights to measure their weights or mass. You find weights in every shop and kiosk selling different types of merchandize and also in jewelry houses. The standard weights in shops and kiosks are of 5 kgs, one kg, 500gms, 100gms, and 50gms. ', ' If one visualizes the number of shops and kiosks in the country, it is easy to imagine the number of weights under use in the country. All these weights are imported. Weights are made from ferrous or non-ferrous metals either by casting, forging or machining. These are simple operations but still we do not produce the weights we use. Like so many other products, it is time we start producing these simple objects and stop importing them. Investors in the Amhara region can take this opportunity and produce weights not only to the Region but also to the other parts of the country. ', 'If strict control is undertaken by the Standards Agency, probably more than 50 percent of weights being used in the country would be disqualified for incorrect (usually for being under weight) measurement. A casual observation of weights in any shop reveals that most of the weights are chiseled to reduce their weights. So a weight which weighs 1kg originally when it was produced now weighs probably 800 or 700 gms. When this widespread problem is considered, it is safe to assume that at least 50 percent of the existing weights need replacement which generates a large demand for weights for replacement. In addition, other weights will be needed for new shops and kiosks to be opened throughout the country. This indicates that the demand for weights will be large enough to absorb the production volume of a medium size plant. ', ' The ferrous or non-ferrous metals from which weights are made will be imported.', 'The non-ferrous weights are of the cast bronze. The bronze may be either of phosphorous bronze, copper and its alloys. The construction of the weights is solid type, having normally pentagon, and hexagonal shapes, flattened at the top and bottom faces. Weights can be manufactured with either of the following processes by casting, forging or machining. In the casting process, the weights are cast by the usual casting procedure to give the weights some symmetrical and definite shapes. Normally cast weights do not require machining, but they are cleaned on the surfaces and painted black. The forging process is simpler and cheaper than the casting process but the initial cost of machining is high. This requires power and steam hammers and their accessories. Small weights, particularly non-ferrous and below 200gms can be obtained from bright hexagonal or pentagon shaped bars, duly cut into pieces. Machinery needed include small cupola, small alloying furnace, molding boxes and tools, patterns, power press. ', 'Saves foreign exchange and regional financial resources, brings in financial resources to the Region, introduces new skills and technology to the Region, promotes self-sufficiency in industrial products. ', ' 7', '1 '),

( ' Wheel Barrow', ' Wheel barrow is one of the essential tools in the construction industry. It is used to move dirt, soil, sand any material from one place to the other. In construction works where heavy duty machines are hot employed, earth moving and similar works are done using spades, shovels and wheel barrows. The three hand tools improve the productivity of labor in construction works.', ' Like most other construction hand tools, the Amhara Region imports wheel barrows from other parts of the country of from abroad. But if the Region has to accelerate its social and economic development, it has to be self- sufficient in the production of basic construction hand tools like wheel barrow. Assembled wheel barrows take a lot of vehicle space to transport and as a result they are difficult and relatively expensive to transport. This alone necessitates the need to establish a wheel barrow fabrication and assembly plant. The Amhara Region can not go on importing some essential products especially such simple capital goods items as wheel barrow.', 'The current civil works activities such as construction of roads, buildings, small irrigation schemes, soil conservation, water and forestry development will continue with hopefully, increased tempo. This requires the use of thousands of wheel barrows in the whole Region. The present and future need for wheel barrows will make the establishment of a wheel barrow fabrication and assembly plant viable. ', 'Import ', 'A wheel barrow is essentially made of three components- the metal sheet where the load is placed, the two hollow metal handles and the four curved “legs” and the wheels. The metal sheet will be fabricated in such a way that it takes the required shape, the hollow metal handles and the “legs” will be heat treated to gain the required shape. The metal sheet and the handles and legs will be joined either by soldering or by riveting. The wheel will be attached with the rest of the body in the appropriate place. ', 'self sufficiency in an important construction hand tool. ', ' 7', '1 '),

( ' Wick Stoves', ' Wick stove is a small stove made of low quality steel sheets and which uses kerosene for burning or producing heat energy.  The stove is used for cooking and heating. ', ' Over 95 percent of households in the Amhara Region use fuel wood and charcoal for cooking their food and for heating their homes.  This has contributed greatly to the destruction of forests and vegetation in the region. The use of frees for fuel (in the form of charcoal and fuel wood) is using renewable sources of energy; and this is preferred to the use non- renewable sources of energy.  But in the case of the Amhara Region, trees cut for fuel are not replaced by planting other trees. Thus what is naturally renewable has become non-renewable due to neglect.  In this situation, to save the remaining forest resources of the Region, and not to further aggravate the soil erosion problem of the Region, the use of kerosene through wick stove is one option for generating fuel for cooking and heating.  The relative advantage of using kerosene instead of fuel wood and charcoal will depend on the relative pries of the two sources of energy.  Up to now, kerosene is cheaper than fuel wood for the unit of energy each provides.  Hence there is rationale for producing wick store in the Region.', ' Practically all wick stoves are imported.  The main sources of the products are china and India.  During the Last five years average annual imports of wick stoves was about 10,000 units; and import was growing at an average rate of 18 percent per year.  Of this average annual import, about units are assumed to have been distributed in the Amhara Region.', ' The metal sheets are to be imported and fabrication is to be made here.', ' the process involves the fabrication of individual parts and assembling them into a composite unit which consists basically of three parts- the bottom, container of the kerosene and the middle part which is the base for seating the cooking vessel.', ' To the Regions Economy. Reduce deforestation and soil erosion create employment', ' 7', '1 ');

(' Training Center for Tour Guides, Hosts and Hostesses ', 'The proposed training center will be a commercial venture which will give intensive and quality training for tour guides, hosts and hostesses in hotels and restaurants and other places where tourists use. The objective of the training will be to enhance the quality of services provided by this group of people so that tourists are happy during their stay in the Region as well as in the country. ',

' the growing number of tourists in the country require different services from the host countries. The most important of these services are tour guide services, services to be given at hotels, restaurants, coffee shops by hosts and hostesses. Up to now the training of these personnel was not given proper recognition and attention. Tour guides simply become tour guides without taking any training what-so-ever. Hosts and hostesses do not take training that focuses on the need of foreign tourists. In fact in the Amhara Region waiters in hotel and restaurants do not nave proper training for the job they do? They learn their trade by trail and error and also by making not a small number of guests angry and frustrated. Guests who are nationals of the country might tolerate this situation, but foreign tourists take a very low opinion about the country and its people for the poor services of a few tour guides, hosts and hostesses. They also tell about the poor services to other potential tourists in their countries. In this way, the country’s image is tarnished and potential tourists are discouraged from coming in the country. One main solution for this is to give intensive and quality training to tourist guides, hosts and hostesses in the region. ' ,

'The center that will give this necessary training can be a private training center or it can be operated by the concerned public agency of the region. The training center can cover its operating expenses by charging training center lump sum or monthly fees. The training may not take one whole year. It can be done during certain months. As there are no trained tour guides, hosts and hostess in the region, there will be large number of these people who will take the training. If the training is made a requirement, there will be more potential trainees in the region. The training should be given in Bahir Dar, Gondar and Lalibela. ',

' Good and experiences trainers, training facilities such as classrooms, training materials and equipment etc. ',

' Training program including training materials will be prepared. Trainees will be selected from potential candidates. Some type of entrance examination should be given to classify and group the trainees. Training program will be conducted. ',

' ', '8', '1'),

( ' Information Centers for Tourists ', 'An information Center for tourists is a center where all relevant information the foreign tourists need is collected, prepared and distributed to actual and potential tourists. The information that tourists need include brief description about tourist sites, locations of these sites and means of transport to reach sites, available hotels, restaurants, shops of local handicrafts, prices for hotel rooms, food and drinks, local handicrafts and other souvenirs, fees for visiting tourist sites, tour guides and drivers. Tourists are also interested in the history, geography and culture of areas they visit. Such information should also be provided at the center. ',

'Ethiopia is a mosaic of peoples and cultures. More than 80 languages are spoken and two of the world’s major religions (Christianity and Islam) plus a number of less-known faiths are followed, resulting in great cultural diversity. Religious and other cultural festivals, with roots in the distant past, are very colorful and continue to form an important part of communal life. The above mentioned points are also well reflected in Amhara region. All these information should be prepared in books, pamphlets, brochures, DVDs, pictures, photos… and distributed to domestic and international tourists. So, In order to provide enough information to tourists, there is a need to establish an information center which will cater to the needs of tourists (actual and potential) ',

' Every tourist needs information on issues mentioned above. Some of the information to be provided helps the tourists’ form being exploited by scrupulous businessmen (owners of vehicles, hotels and restaurants, souvinious shops tour guides, etc). Having this information, tourists will pay “fair prices for fair services”. The information will be provided by charging some prices to make the center a going venture. If 20,000 tourists visit the Region, and if one tourist pays Birr 20 for this information, total revenue of the center will be Birr 400,000 per year. This revenue will make the center a viable business enterprise. ',

'The information which is important to tourists should provide in books pamphlets, brochures, DVDs, pictures, photos can be produced in the country. ',

'It enables to give enough information to tourists creates job opportunity, introduce such modern information services to the region. ',

' ', '8', '1'),

(' Hotel and Restaurant at the Blue Nile Falls ', ' ' ,

' Domestic and foreign tourists visit the Blue Nile Falls almost every day throughout the year. Of course, there are more tourists during the rainy season when the volume of water at the fall reaches its highest point. At any rate, thousands of tourists visit the fall every year. But there are no facilities at the site where tourists gather to watch/see the fall. Usually most tourists arrive at the fall around 10-12 a.m in the morning when it is hot at the site. While watching the cascading of the water in the fall, they need drinks, shelter from the hot sun and sometime snack. But unfortunately there are no facilities to provide these services. If there were hotels and restaurants, many tourists could have made overnight stay near the fall. They would have preferred to watch the fall at sunset or sunrise. They could have wanted to hear the sound of the Falls during the night. They could have experienced what it feels during the night in rural Ethiopia where there are no noises of urban life. In short, they could have preferred to stay near the fall watching its huge water flow for sometime say a night, a day or more. But there is nothing there to make them stay. No hotel, no restaurant, not even a shade, not even a food-stand. Not even an umbrella in other places, in other countries, all sorts of tricks are made to make tourists stay longer and spend more. But not in Amhara land at the Blue Nile Falls one of the most spectacular sceneries in the world. At the Falls, tourists stay only for about 15-30 minutes and then they leave. They leave soon because there is nothing to make them stay longer even though they are attracted by the natural beauty of the fall. The sooner they leave the less they spend. ',

' The numbers of domestic and foreign tourists who visit the Blue Nile Falls vary depending on the season of the year. During the rainy season, when the volume of water flow at the fall is at its peak, there are more tourists visiting the falls. In the dry season the water volume declines and so does the number of tourists. But the number of tourists who had visited the fall during the last three to four years indicates that there is sufficient demand for the services of a small hotel and restaurant. Like many other tourist sites, the market for this hotel and restaurant could be seasonal, but it can be profitable by working during the “tourist season”. The hotel and the restaurant do not have to be very sophisticated and expensively built. All they need is to be extremely clean and comfortable with reasonable prices and efficient services. The food must be simple but carefully and cleanly prepared and cooked. These are what “ferenjis” want in 3rd world countries. ',

' ',

' More benefits from tourism, more tourists, longer stays by tourists in the region, more economic activities in the locality ',

' ', '8', '1'),

( ' Special Bus Services to Tourists', ' Special bus services to tourists is a form of transporting tourists form one tourist site to another say from Gondar to Lalibela or from Bahir Dar to Gondar. The transport service will have special buses with ventilators, television sets, toilet facilities and a small supply of snacks and drinks. It will have one or two hostesses or hosts who will serve, guide and inform tourists about places they pass through. ',

' In addition to identified tourists sites, many tourists like to see the countryside. They want a to see ordinary places and ordinary people of the countries they visit. As a result in addition to special tourists sites, these tourists want to ‘get a feel” of other places within a country. To do so, they need to travel by ordinary buses, trains or special buses. In most countries which have highly developed tourism industry, tourists are provided with special buses with special facilities. These buses operate with travel schedules convenient to tourists and they usually shuttle between major tourist sites or tourist destinations. As mentioned above, the buses are equipped with facilities required for comfortable surface travel. With some rare exception in Addis Ababa, special bus services are not provided to tourists in the country. The only means of transport for almost all tourists in the country is are transport. Many tourists land in Addis Ababa: travel by air to Bahir Dar; stay there for one or two days, fly to Gondar and stay for a day and take a flight to Axum or Lalibilla, spend overnight and fly back to Addis and then to another country or home. If there were special bus services for tourists, they could travel from Addis to the other tourist sites taking more days in our country and spending more. The tourists will see more about us and we will get more of their money. ',

' The major tourist destinations in the country up to now are the northwestern and northern part of the country. At the current stage of tourism development in the coronary, between 100,000 and 150,000 tourists visit the country every year. Among these tourists probably 25 to 40 percent will prefer to travel by special buses to their destinations i.e tourist sites. This will be sufficient to make a special bus services enterprise a financially viable business entity. ',

' Well trained bus conductors and hostesses, buses equipped with all the necessary facilities as mentioned above, tents and mobile toilet facilities (if possible). ',

' Will give tourist alternative means of transport which increases their satisfactory about their stay in the country, will make tourists stay more in Ethiopia and spend more in Ethiopia . ',

' ', '8', '1'),

( ' Production of Handcrafts for Tourists ',

' Handicrafts are manual skills making usable products graced with international visual appeal. They are decorative or functional objects generally made by hand. However, hand and power tools may be used in making some craft items. There are many kinds of handicrafts used for decoration and for other purposes, including, as sovereign goods and for tourist attractions. These include paper craft products, leather craft products, pottery products, woodworking, stained glass, jewellery making and others. People buy them for decoration in their houses and as a hobby. Especially, tourists have interest in the various kinds of handicraft products. ',

' Handicrafts survive to serve a wide market, including that of tourists who want special handicraft products. The Amhara Region has various tourist attractions because of its historical and natural phenomena, such as Lalibela, Fasilidies/Gondar/, the Semen Park, the zege churches, the Blue Nile Water Fall/ Chis Abay/, Lake tana and others. The tourists, /visitors/ who come from different countries will be interested in the handicraft products made in different forms and buy them for decoration and as a hobby. There are also visitors from other regions of the country who visit the historical places and other areas who may be interested and buy the handicraft products as a hobby, as sovereign gift articles and for various purposes. Thus, the production of the handicraft products will generate foreign exchange to the Region and create employment opportunities for the growing labour force, including the disabled. There fore, there is an encouraging environment (condition) to produce various types of handicrafts that will attract tourists who come from different countries. ',

' Hundreds and thousands of tourists visit the natural and historical attraction places of the Region every year, especially during summer, and will be interested in the various handicraft products. There are also people who buy the products for sell and as sovereign gift articles. Hence, there will be sufficient market for the products. ',

' The main raw materials for the production of the handicrafts are leather products, paper products, wood, cotton, clay/sand/ and others. Many of these raw materials can be found in the Region. ',

' The different handicrafts have different processing techniques and use different technology (machines and tools).

Jewellery: making ranges from simple work with beads to advanced metal work. For work in metal, the jewellery maker needs a basic knowledge of sawing, filing, soldering and buffing. More advanced techniques including forging metal, costing, that is using moulds to shape molten metal and granulation (attaching pieces of metal without soldering). The work in metal should be equipped with workbench hammers, pliers, files, mallets, burnishes and soldering tools.

Leather craft: Useful and attractive objects are made from leather using cutting, shaping and joining techniques. More advanced project in the leather craft work require additional tools such as utility knife, punches for caring the leather, thronging chisel, lacing needle, and leather shears.

Pottery: Ceramic objects, and moulded completely by hand or thrown (shaped on a potter’s wheel; a device with a rotating horizontal disk. When the clay hardens, it is fired in a high temperature over a kiln to strengthen it. To make the object waterproof glazes can then be applied and the pieces are fired again.

Woodworking: In the case of wood working (wood craft) techniques as sawing, joining and finishing can be employed to make a wide variety of useful and ornamental objects from jewellery boxes to picture frames. Equipment used includes, frames, a workbench and carpentry tools, a meter box, a measuring tape, sand paper and varnishes. ',

' Other crafts can also be made using different techniques and machines (tools). ',

, '8', '1'),

( ' It will generate foreign exchanges. It creates earnings for those involved in handcraft products in the form of profits, and generates revenue for the Regional Government in the form of income tax and VAT. It will crate employment opportunity for the growing labor force in the Region. ',

' ',

('Center for Cultural and Musical Shows for Tourists', ' The Northern tourist circuit known as “Historic Route” Comprises the most important tourist sites in Ethiopia. Amhara region is one of the richest regions of Ethiopia in natural, wildlife and historical attractions. Further more, the region is situated at the heart of the historic route of Ethiopia, the region has many “world heritage sites” such as the Rock-hewn churches of Lalibela, and castles of Ethiopia’s emperors at Gondar, the Semain Mountains National Park, the Blue Nile Falls and the ancient churches at Lake Tana which are noted for their traditional murals, the mummified remains of Ethiopian kings and numerous other historical churches and antiquity sites. In addition to these attraction areas, the region has many ethnics, cultures and traditional musical instruments and songs. All these religious, historical and cultural heritages are attracting domestic and international tourists to the region. In order to show these cultural to tourists’ cultural and musical shows are necessary especially in areas of tourist centers, such as Bahir Dar, Gonder and Lalibela. ',

' When we see the data of tourists flow to the region, the number of tourists’ increases from year to year. The international tourists are will interested to know about the religion and cultural ceremonies, and traditional music and songs. So, these all make the establishment of such show centers within the region and it has a market potential. ',

' ',

' The cultural and musical show centers should be furnished with cultural and historical artifacts and traditional handicrafts. All the furniture and fixtures should be made firm local material and be local craftsmen. ',

' If creates a good opportunity for the tourists to know religious music and songs, creates job opportunity, increases the income, brings more income to the Region. ',

' ', '8', '1'),

( ' Physical Fitness Centers and Gymnasiums ',

' Physical fitness centers and gymnasiums are places where people take various types of physical exercises and gymnastics. These exercises are good for the body and the mind. It is medically proved that some of the exercises keep people physically fit and healthy. It is also proved that some specific forms of exercises control the level of blood pressure and diabetic conditions. In physical fitness centers, there can be also steam and sauna baths, table tennis and ground tennis games. Other additional services can also be given to customers. ' ,

' Physical fitness centers and gymnasiums do not require large investment, but their benefits are next to services rendered by health care facilities. In fact in many countries, physical fitness centers and gymnasiums are built and provided by the state. In other countries these centers are provided both by the state and the private sector. At any rate, physical fitness centers and gymnasiums are available in large numbers in developed countries. In fact many residential houses in developed countries have their own physical fitness facilities. This is in addition to the many gymnasiums and physical fitness centers scattered throughout residential neighborhoods. However, in developing countries physical fitness centers are very rare and they are used by a small number of people. For example, Addis Ababa, the capital of the third populous country in Africa and which has more than 3 million inhabitants has only four or five gymnasiums and physical fitness centers. Building and equipping a physical fitness center does not cost more than the price of a 4-wheel Drive vehicle. But this very useful facility is not available even in the major urban centers of the country. The Amhara Region, like all other regions of the country, does not have any physical fitness centers. To promote the physical well- being of the people at least of those who live in urban urban areas, there is a need to establish physical fitness centers in all major towns of the Region. ',

' About 2.3 million people live in urban areas in the Amhara Region. If we assume that at least 20 percent of the urban population will use the services of physical fitness centers and gymnasiums, total number of users will be 460,000. This number of potential users will be spread across the different urban centers of the Region. Intuitively, one can say with some degree of certainty that there is enough market for physical fitness services in the zonal capitals of the Region. ',

' There is no as such a “raw material” needed for the operation of the physical fitness center or gymnasium. It will only need utilities such as water and electricity for its operations. ',

' A physical fitness center or a gymnasium is a facility that provides services. People come to the center and undertake different physical exercises depending on their need or interest. Thus, there is no as such a process as there is in a manufacturing facility. However, there are various machines, equipment, tools and instruments used in a physical fitness centers. The list of such items varies depending on the range of services to be provided by the center. ',

' improves the physical well-being of people in the Region, controls the negative impact of some type of diseases such diabetes and high blood pressure, creates recreational facilities which improves quality of life. ', '8', '1'),

( ' Establishment of a Zoo at Bahir Dar ',

' Zoo which is also know as zoological garden or zoological park, is an establishment devoted to the exhibition, preservation and study of animals. Even though many people visit zoos for entertainment, zoos are also used to teach the public about animal behavior and natural habits. ',

' A zoo plays a role in the conservation of endangered (in danger of extinction) animals by developing innovative breeding methods to maintain the species that are in danger of extinct or decline. It offers a variety of opportunities that teach the behavior and natural history of zoo animals and their wild counter-parts. It will give the opportunity to the educated young people () young scientists) of the Region to participate in the programs of breeding animals in the zoo. These young scientists will protect animal habits in the wild and carry out research that advances knowledge of animal biology in the Region. The zoo will also introduce people to their local wildlife by offering valuable learning experience. Children can learn abut the work involved in keeping animal and about the differences between domestic and wild animals. ',

' The Amharic region has various opportunities of tourist attraction, and many visitors come to the Region from different countries every year. There are also people from Addis Ababa and from other regions who visit the historical places and natural attractions such as Fasiledes (Gondar), Lalibela, the Blue Nile Water Fall (Chis Abay), Lake Tana, etc. The visitors form other countries and from other Part of Ethiopia will be interested to visit the rare creatures that come from different areas. ',

'The zoo to be instituted will need different kinds of animals (species) for breeding. These animals will be brought from other zoos and parts. After collecting the animals, breeding and domesticating the animals will take place. ',

' The main sources of animals for the Zoo will be other zoos and parks in the country, and the zoos of neighboring countries, like Kenya can also be possible sources for the new Zoo to be established in the Region. ',

' It creates employment opportunity for the growing labour force in the Region. There will be earning for the investors in the form of profit. It will generate revenue for the Regional State in the form of income tax and VAT. ',

'8', '1'),

(' Amusement and Recreation Park at the Major Urban Centers ' ,

' Amusement and recreation parks are places where there are different physical facilities installed for the purpose of giving amusement and recreation services for children and adults. Such facilities include various types of playing machines such as dummy riding horses, cars, trains, big rotating circular structures with secured seats for children, simulating machine guns, missiles, rockets with different targets to “hit”. They also include sporting and physical fitness facilities such as swimming pools; table and ground tennis courts and others. ', ' ',

' Since government decentralization, some urban areas in the country are expanding fast and their population is increasing rapidly. Bahir Dar is one example in the Amhara region which is expanding at higher growth rate. Urban areas with large population need various types of services. People want to enjoy outdoor amenities with their children. Adults want to take different physical exercises and their children want to play with different playing materials. That is why there are many and large amusement and recreation parks in all cities in developed countries. Addis Ababa has started building such facilities on a larger scale during the last ten years. In the Amhara Region, cities like Bahir Dar, Gondar and Dessie have large population to create enough demand for services to be provided by small scale amusement and recreation parks. ',

' Major inputs needed will be various types amusement and recreation facilities, a large plot of land where these facilities have to be built and installed. ',

' The main activities will be preparing the ground; installing infrastructures such as water, power, drainage and roads; building and setting up the various amusement and recreation facilities. ',

' improves the social life of the city, introduces children to “prototypes” of modern technology, improves the physical well-being of adults. ', '8', '1'),

(' Wild Life Parks - Sanctuaries ',

' Wild life parks or game reserves are places reserved and protected for undisturbed living space for wild animals, in the African context for animals like elephants, lions, giaraffe, zebras, etc. Wild life parks in East and southern Africa attract million of tourists every year making the countries earn large amount of foreign exchange resources and creating employment for many people. The parks are protected by law from encroachment by people and domestic animals In kenya, Tanzania, South Africa and other southern and eastern African countries there are huge tracts of land where wild animals roam in thousands. The purpose of this project idea is, therefore, to establish game reserves or wild life parks in appropriate localities in the Amhara Region. ',

' ',

' up to the first quarter of the last century, many parts of the now Amhara Region especially the lowlands(along river valleys) and the areas along the Sudan boarder were sanctuaries of many types of wild animals mostly large mammals. With population increase and further deforestation, most of those wild animal sanctuaries in the low land areas were converted to livestock grazing areas or farms. As a result the wild animals except the monkeys and apes were decimated through uncontrolled hunting, lack of shelter and lack of food especially in the low land areas of the region. In the boarder areas, there were large numbers of wild animals until the 1960s and 70s. But their number was decreasing for reasons mentioned above. Today, there are few animals like lion, elephants and some. others along the Ethio-Sudan boarders. If certain areas along the boarder are reserved for wild animals, the remaining wild animals will migrate to these protected areas. In a short period of time their number will increase to make the protected areas a wild life reserve or park. This is how the wild life parks in other parts of the country were established and developed. Once new parks are established in suitable areas in the Amhara Region, the development of other infrastructures such as access roads, lodges and restaurants will follow. Currently tourists come to the Region mainly to visit our religious, historical and natural heritage. The establishments of wild life parks in the Region will make tourists stay more in the region and will also attract additional tourists who are interested in wild life. ',

' A survey has to be undertaken to determine which localities in the Region have the highest potential of becoming wild life parks. Main criteria for the first phase evaluation will be the presence of wild life (animals) in the area, absence of human settlement and agricultural activities around the potential areas. Once these areas are identified, additional criteria will be developed to select one or two sites where wild life parks will be developed. The development of the sites will entail the protection of the sites from human interference, provision of adequate water and food supplies within the parks establishing observation center in the sites, if necessary bringing in some wild animals from other areas of similar climatic conditions. ',

' ',

' Will attract more domestic and foreign tourists hence brining in money to the region and creating employment. ', '8', '1'),

( ' Convention/Conference Centers ',

' Convention/Conference centers are physical facilities which include buildings, office furniture and fixtures and other equipment. These physical facilities are used to conduct conferences, meetings, symposiums, workshops, conventions, etc. The conferences or the other forms of meetings could be international, national or regional. the availability of well designed and well equipped convention/conference centers in a given city with good hotel accommodations and transport services easily attracts many conferences, meetings and other large gatherings of people. These conferences and meetings will bring money to the cities where they are held. Conference participants, media people, security personnel and others will spend money in the cities for different purposes Money is paid for hotel accommodations, restaurants, transport service providers, shops, etc. The income that conferences, conventions workshops, and other gatherings generate to a city expands economic and social activities in that particular city. This creates employment, increases income of the people. It is because of such and similar benefits that many cities in developed and developing countries build large convention/conference centers and encourage investors to establish standard hotels and restaurants. ',

' ',

' Up to now Addis Ababa is the only city in the country which has international standard convention/conference centers and these centers are owned by the UN Economic commission for Africa (ECA) and by the African Union (All). These two centers can serve for international, national and regional conferences and conventions. Some federal government agencies and a few hotels in the capital have some facilities for holding some types of meetings. In recent years some regional capitals have built facilities which can serve as conference/convention centers. However, only one or two meet the basic requirements of a conference/convention centers. Addis Ababa, being the headquarters of ECA, OAll and other continental and sub-regional organization hosts many conferences, workshops, and meetings etc. every year. As the only city with conference centers, Addis Ababa monopolizes all regional, international and national meetings being held in Ethiopia every year. If other regional capitals build convention/conference facilities of required standards, there will be opportunities for hosting some of the conferences, workshops and other meetings in regional capitals. Located at the shore of banks of the Lake Tana and the Blue Nile River, Bahir Dar has the highest potential for becoming a venue for international, national and regional conferences and other types of meetings. Bahir Dar is less than one hour flight from Addis. With its natural beauty, the city can be an attractive place to host conferences, seminars, conventions etc. provided it has well designed and equipped conference centers as well as high standard hotels and restaurants. ',

' The main objective of this project idea is to build conference/convention center in Bahir Dar to attract international, national and regional meetings. As such the main source of raw material. ',

' Like a manufacturing entity, there is no description of process and technology for a project idea which aims at establishing a conference center. In the context of a conference center "process and technology" refer to the construction and equipping of a building which will be suitable for holding conferences and other meetings and the provision of the necessary services in the conduct of the conferences. The technology aspect includes all the necessary equipment, tools, machinery, instruments, furniture and fixtures needed to organize and excuite conferences, seminars, workshops, etc',

' Stimulates tourism in the region, generates income to the regions businesses such as hotels, restaurants, transporters, ', '8', '1'),

( ' Clean and Neat Hotels and Restaurants for Tourists ', ' ideally all hotels and restaurants regardless of the type of customers should be clean and neat. Unfortunately this is not the case in all places and all times. However, hotels and restaurants which cater to foreign tourists have to be extremely clean and neat. They hate to have much higher standards than other hotels and restaurants which meet the demand of the local market. At the same time, hotels for tourists have to be relatively small perhaps in the range of 15 to 20 beds since tourists come in groups of not more than 20 people in a group Foreign tourists who travel to Africa come with certain pre-conceived prejudices about the standards of hotels and restaurants. These prejudices can only be disproved if these hotels and restaurants are always clean and neat to the highest standard. Otherwise, tourists will be discouraged from visiting tourist sites in the Region. Hence one pre-condition for the further development of the tourist industry in the Amhara Region is the presence of hotels and restaurants with the highest standard of cleanliness and neatness. This project idea, therefore envisages the establishment of such hotels and restaurants in such tourist sites as Bahir Dar, Blue Nile Falls, Gondar, Lalibela, Semen Mountain park, etc. ',

' ',

' Every year a substantial number of foreign tourists visit tourist sites in the Amhara Region. Most of the tourists are what is called back pack tourists which means they travel with low budget staying in least expensive hotels and eating in low prices restaurants. For these types of tourists, the most attractive facilities are small hotels and restaurants which are simple, functional but extremely neat and clean. Some for their clean clothing. Some of them wear like the farmers in their own countries. They water faded jeans and khaki shirts. But demand clean accommodations. ',

' If small hotels and restaurants which are clean and net are established in the major tourist sites of the region, they will have enough customers of foreign tourists which will make them financially viable. In addition, these small hotels and restaurants will also be used by Ethiopians who will travel to the tourist sites for different purposes such as government and business trips. This will bring additional revenues to the facilities. ',

' This project idea envisages at least one high standard small hotel and a restaurant in each of the major tourist sites of the region. In each site one hotel with twenty bed-rooms and a restaurant with a seating capacity of 40 people are assumed to be built. The estimated investment cost for these facilities will be the following ',

' Induces more tourists to visit the region, creates good impression about hotel facilities in the region, brigs in more foreign exchange to the country and revenue to the region. ', '8', '1'),

(' Modern Hotels & Restaurants ' , ' Modern hotels and restaurants are facilities where food, drinks, bed rooms and other services are provided in an efficient, cordial and pleasant manner and style. Operating hotel and restaurant businesses require cleanliness and neatness of services to be provided and efficiency, cordiality and good manner on the part of hotel and restaurant workers. ',

' ',

' Except in one or two major urban centers of the region, are no modern hotels and restaurants with acceptable standards in the whole Region. Most zonal capitals and almost all woreda capitals do not have hotels and restaurants which meet minimum standards. What they can “hotels and restaurants” in these “urban centers” are filthy facilities with dirty bed rooms, unwashed bed-sheets, unhygienic food preparation facilities, workers with dirty clothes and halls and rooms filled with swarms of flies. In short, almost all the so-called hotels and restaurants found in most urban centers in the Region are well below accepted standards. ',

' Clearly there is a need to establish modern hotels and restaurants at least in zonal and woreda capital of the region. Government employees, merchants, travelers in the Region residents and tourists will be the main customers of these catering businesses. ',

' The main processes of establishing modern hotels and restaurants in urban centers of the Amhara Region include studying the market, securing land, constructing buildings, equipping and furnishing the buildings and starting the operations of the businesses. ',

' Similar to other project ideas. ', '8', '1'),

(' Training Center for Food Preparation and other hotel and Restaurant Services ' , ' Preparation of foods (cookery) drinks, provision of different types of services in hotels and restaurants are essential for the success of such enterprises. The foods must be clean; tasty, fresh and must be presented in pleasant manner and style in which every thing is clean and net. To do this, hotels, restaurants, coffee shops, cafeterias and other catering businesses must have well trained workers in all sections of operation starting from the house cleaner to the manager. ',

' ',

' Here ‘market potential refers to the need of giving training to almost all workers of hotels and restaurants in the whole Region. This need arises from the fact that practically all people working in hotels and restaurants do not have any rudimentary training in the works they are engaged. It is not unusual where a cleaner becomes a cook after a certain period of cleaning in the kitchen of a certain hotel or restaurant in the region. Probably this is not unique for the Region. It happens also in other regions. But the level of hotel and restaurants services in the Region is, admittedly, much below the standard of some other Regions. This is especially true in the western parts of the Region. There could be many reasons and causes for the poor food and service provided by hotels and restaurants of the Region. There is no need to mention all these reasons and causes, The end result is that there is a strong need to give training in food preparation, hotel and restaurant services for practically and workers of hotels and restaurants operating in the Amhara Region. The need for this training is not limited to the major urban centers, it includes all towns (small and large) of the Region. To put it bluntly, the Amhara Region is behind many other Regions in the provision of high standard services in hotels and restaurants. To catch-up with the rest of the country in these areas, a massive training should be given to hotels and restaurant workers throughout the Region. ',

' The process of providing these trainings starts with the acquisition of a training facility. Once this is acquired, recruiting of trainers and securing training furniture and fixtures will follow. Recruiting trains and conducting the training will be the final stages of the process. To get enough number of trainees per training cycle, and effective marketing strategy should be in place, since during the first phase owners of hotels and restaurants will not see the advantage of sending their workers to the trained. ',

' Stimulates the growth of catering business in the Region, increases customers satisfaction. ', '8', '1'),

(' Training Center for Hotel & Restaurant Management ' , ' The center will train people in practical hotel and restaurant management and administration. Trainees will be those who will work at every level of the hierarchy in the management of hotels, restaurants, coffee shops, cafeterias, pastries and other catering enterprises. ',

' Because of its location in the interior part of the country, the Amhara Region has been late to be exposed to western type of catering business. Cities like Dire Dawa, Harar, Nazreth. Addis Ababa have been the first urban centers in the country to be influenced by western style of handling catering business. As a result these urban centers have developed a culture better suited to the relatively efficient management of hotels, restaurants and other catering enterprises. On the other hand, urban areas in the Amhara Region have been late in their acquaintance to the management and administration of hotels, restaurants and other similar enterprises. As a result, there are many problems facing the operations of hotels, restaurants, cafeterias, etc. the main cause for these problems. is the fact that personnel at every level of hotel and restaurant management have not taken basic training in the management of these and similar enterprises. The end result of all this is that compared to other major regions, the services provided by hotels, restaurants, etc are relatively poor. This can be confirmed when one observes how hotel and restaurant management staff and personnel handle customer complaints, requests, and issues related with hotel hospitality and reception. Personnel are indifferent, negligent, in some cases rude, arrogant and in general inefficient. The whole operations of hotels and restaurants are bellow accepted standards. The level of cleanness and hygiene of utensils by which food and drinks are served, of bed rooms, toilets, eating and drinking halls, even the clothing and general appearance of workers is poor to say the least. ',

' To improve the quality of hotel and restaurant services and at least to raise these services up to the national standard, basic training in hotel and restaurant management and administration should be given throughout the Region on a regular basis. ',

' The process starts with the construction or renting of a building to undertake the training on regular basis. Once this is accomplished, employing trainers, purchasing training furniture and fixtures will follow. Recruiting trainees and conducting the training on a regular basis will be the final process. Training cycles could be 3 month, 6 month, one year and two years depending on the specific subjects to be given in the training. ',

' Improves the performance of the catering business in the Region, increases customers satisfaction, stimulates the expansion of the hotel, restaurant and other related businesses in the Region. ', '8', '1');

('Chrome Tanned Hides and Skins Preparation Plant',

'There two types of tanned leather- vegetable tanned and basic chrome tanned produced by using vegetable extracts and basic chrome sulphate respectively. According to leather experts, chrome tanned leather is soft, supple, strong and permeable to air. This type of leather is extensively used for making finished leather goods like sports goods and shoe uppers. ',

'The Amhara region had the second highest number of cattle, sheep and goats in the country. In 2005/06, this number was estimated to be about 22.5 million. Out of this livestock resource, about 1.8 million hides and skins are harvested every year. Practically all this resource is sold to merchants in Addis Ababa where it is processed in the leather and shoes industry or where it is exported in raw or semi- processed form. Any raw material will bring more income to the area where it is grown or produced if it is further processed in that area. That is why the Region’s resource must be further processed in the Region so that more financial resources could flow to the region. The will increase the income of producers and processors. ',

'As there has been domestic and foreign markets for the hides and skins produced in the region, so there will be market (at home and abroad) for tanned leather to be produced in the region. ',

'Of the 1.8 million pieces of hides and skins produced from the region, at least some portion of it will be supplied to this project if it materializes. ',

'Socking the raw hides and skins in large quantity of water, liming with lime and sodium sulphide in paddle; deodorized and fleshed in machines to produce pelt. The pelts are now washed thoroughly and delimed in a 2 percent ammonium sulphate solution, pickling in 8 percent sodium chloricde and 1.5 percent sulphuric acid using drums is the next operation. For producing chromed tanned wet blue leather is treated with 10 per cent basic chrome solution in the picking bath. Main machinery and equipment include twin paddle, tanning drum, “unhairing” machine, fleshing machine, and accessories. ',

'Forms the basis for developing leather industry in the region, brings additional income to the region, stimulates the development of the livestock sector, earns foreign exchange if the tanned leather is exported introduces new skills and technology to the region. ', '9', '1'),

(' Leather Footwear Making Plant',

'Bare human feet are protected from hazardous stone and dust by wearing man-made shoe. Leather footwear is one of kind of shoe that protects the feet. ',

'Leather footwear is increasing popularity with rising income and increasing in awareness of its superiority over plastic, rubber and canvas shoes. Leather shoe are produced mainly in Addis Ababa and other towns and imported to the region. Basically leather footwear are produced by small-scale private enterprises although substantial numbers of small-scale private producers of footwear are currently operating in other parks of Ethiopia, only few in number are located in the region. It is very essential to establish small-scale leather shoe manufacturing enterprises in the region, which can employee many persons. ',

'There is a huge potential and existing demand for footwear in general and leather shoe in particular for the large number of the population in the region due to the rise in income and increase of population in urban towns. There is unsatisfied huge demand for leather shoe. The manufacturing enterprises that produce durable footwear can capture this huge demand. ',

'The main raw material is leather, which is available from local tanneries. Other inputs like insole, eyelet and threads are also available in the domestic market. ',

' Leather shoe production involves (clicking) uppers of leather, sewing together the inner and outer layers of the uppers, lasting (shaping) the upper and heels, and attaching to soles. All operation can be performed manually or mechanically, depending on the materials in use.

Machinery and Equipment : Hydraulic clicking press , Skiving machine , Lasting machine , Sole cutting and sole splitting machine , Finishing machine , Heat sealing machine , Pneumatic sole attaching machine , Stamping machine , Compressor ',

' ', '9', '1'),

' Leather Garments Making Plant',

' Leather garment is processed and finished leather formed into jackets, coats and trousers for ladies and men. Products of leather garment especially those of ladies are sensitive to changes in fashion, style and even to economic conditions. Among the clothing industry, lather garments are considered as luxury products. ',

' All leather garment products consumed in the Region are produced in Addis Ababa. But the raw material is taken from the Amhara region as well as from other regions. Given the sizable quantity of hides and skins produced in the region, it is possible to establish viable leather processing and lather garment industries. This project aims to make the region self-sufficient in leather garment and also to export leather garment to other parts of the country especially to Addis Ababa. ',

' The main “ raw” material for leather garment is finished leather. Enough hides and skins can be obtained from the livestock resources of the Region to produce finished leather. Production of finished leather can be made by a separate plant or it can be combined with garment making. In either case the main raw material- hides and skins are available for the establishment of a small leather garment plant in the region. ',

' Depending on the size or capacity of the plant, the market potential could be the region, national or foreign market. As stated above leather garment is a luxury product which implies consumers are of the high income group within the target population. Within the Region, there are potential customers such as high level civil servants who receive relatively high income. Currently these people buy leather garments in Addis Ababa. The leather garment can also be exported. ',

' The making of leather garment is a very simple process. It requires, measuring and marbling the various parts or sections of the garment, cutting (manually or mechanically) the parts, sticking or sewing together the parts, inspecting and packing or delivering it to customers. ',

' Leather garment only requires the use of automatic or power driven sewing machines. The machines can be specialized machines for stitching different parts of the garment. ', '9', '1'),

' Leather Sole Making Plant',

' Leather soles which are made from hides constitute major inputs in the manufacture of leather shoes. Leather soles are usually used for the manufacture of high quality leather shoes, and these shoes are mainly produced for the export markets. Leather soles are exported as semi finished products to be used as inputs in the manufacturing of leather shoes. ',

' Ethiopia is reputed to have the largest livestock population in Africa. According to the Central Statistical Agency, in 2001/2002, the country had about 42 million heads of cattle of which 11 million were in the Amhara Region. With this resource one could have expected to find a very vibrant leather processing industry in the Amhara Region. But, unfortunately this is not the case. It is only very recently that one or two hides and skins processing plants were established in the Region. To utilize the livestock resources of the Region and to get maximum benefits from this sector, plants which manufacture leather garment, leather goods and other leather products such as leather soles should be established. So far all the hides and skins produced or harvested in the region are sold to merchants in Addis Ababa, and these merchants sell the hides and skins to local processors or export them to foreign markets. In this situation, the benefits that regions farmers and traders receive from the livestock resources of the region are very small compared to what exporters and processors receive. To maximize the benefits of the region’s resources to the people of the region, all value adding activities have to be done within the region. ',

' The demand for leather soles is met by local production and imports. A study on the market for leather soles indicates that in 2006, the projected demand for this product is 281000 pairs; and this demand is expected to grow by about 7 percent every year. The Amhara Region has more than 26 percent of the country’s cattle population. Given this, it gives economic sense if a leather soles producing plant is established in the region. ',

' Cattle growing localities of the region. ',

' The major operations include leather cutting, leather sole splitting, roughing, trimming, edge making, stamping and cementing. Main machinery include roughing machine, sole edge cementing machine, sole drier, double side laminating, automatic splitting and automatic sole producing machines, hydraulic press, band pressing and decorating machine. ',

' Substitutes imports which saves foreign exchange, utilizes regional resources and improves the income of cattle growers and traders of hides and skins, has export potential to earn foreign exchange, introduces new skills and technology. ', '9', '1'),

' Canvas Shoes Making Plant',

' Canvas shoes are shoes whose uppers are made from canvas (thick and water proof fabric) and plastic soles. These shoes are popular among students. They are also sports wear. ',

' Canvas and rubber shoes production in the country between 2000 and 2004 was on the average 196,000 pairs per year. The consumption share of these products in the Amhara Region could be around 51,000. In addition to local production the canvas shoes market of the country is flooded by imports from Asia. Probably the import volume is more than twice domestic production. Hence the consumption of canvas shoes in the Amhara region could be in the region of 150,000 pairs per year. This translates to 0.01 pair per capita consumption. Like other industrial products which are basic to the majority of the population, the consumption of canvas shoes will increase every year. This shows that the region needs one canvas shoes making plant at least to meet part of the demand for canvas shoes in the region. ',

' As noted above, canvas shoes are popular among elementary and high school students. In the Amhara region, in 2004, there were about 2.2 million elementary and high school students. If we assume that at least 40 percent of these students use canvas shoes, annual demand of canvas shoes could be 880,000 pairs. This potential market size is more than sufficient to make a canvas shoes making plant financially and technically viable. ' ,

' Canvas shoes are mainly made from canvas and rubber sole. The canvas can be obtained from some of the textile factories of the country. The raw material of the rubber sole will be imported and the sole could be made in the plant. ',

' The main processing stages include cutting the canvas uppers of the shoes into various sizes and sewing them, preparing the rubber soles using injection moulds and joining the uppers and the soles by heating process. Main machines required include moulding machine, sewing machines, upper and sole joining machine, and other hand tools. ',

' Saves foreign exchange and regional financial resources, promotes self-sufficiency in the region, and introduces new skills and technology. ', '9', '1'),

'Leather Shoe Uppers',

'These are the upper parts or covers of shoes made from finished leather. With increasing specialization of all types of manufacturing activities, leather shoe upper are prepared separately and supplied to leather shoes manufacturing factories. Leather shoes factories in industrially advanced countries receive their shoe uppers from leather factories in developing countries. ',

'With the largest livestock population and the 2nd highest human population in Africa, Ethiopia has the highest potential to be the continent’s largest producer and consumer of leather goods. This potential can be translated into reality if the country improves its livestock quality and expands its leather and leather products industry. During the last twenty years, this industry has shown improvement in increasing its product mixes and in expanding its exports. Leather uppers are among the export items of the industry. With 16 percent of the total land mass of the country, the Amhara Region has close to 30 percent of the livestock resources of the country. But the Region does not have leather industries which matches its resources. In the world division of labor, processing hides and skins close to the finishing stage including shoe uppers is left to the developing countries. In this scheme of things, the Amhara Region, being one of the centers of livestock resources, should position itself to produce leather products like shoe uppers. The products have markets both at home and abroad. If the region has about 30 percent of the countries livestock resources, should it not produce, at least, 30 percent of the leather products of the country? ',

'The plant could be an integrated plant where it starts processing raw hides and skins and produces finished leather including shoe uppers. Hence the raw materials, hides and skins, will come within the region. ',

' The first step is the cutting of leather according to the designs supplied by the customer (shoe manufacturer) with the help of patterns on clicking press. Similarly lining component of suitable material is also cut. The upper components are skived and folded according to the design and lining as joined with it using suitable joining solutions. Then follow the stitching on various types of machines, eyeleting and cleaning. The finished uppers are then brushed and packed for sale. Main machinery required includes pattern shearing machine, grading pantograph, clicking press, stamping machine, flat, post and cylinder bed sewing machine, upper folding and brushing machine, miscellaneous machines and tools, etc. ',

'Utilizes regional resources, learns foreign exchange, stimulates livestock production, brings in financial resources to the Region ', '9', '1'),

('Lining Leather from Goat & Sheep Skins',

'Lining leather is a low- quality type of leather used as lining material for shoes and other leather goods. Lining leather is generally made from defective skins of goats and sheep. ',

' ',

'Practically all goods made from leather have linings and these linings are also made from leather. Hence the demand for lining leather increases with the demand for leather goods especially leather shoes. The potential of the Amhara region with regard to the development of the leather industry is briefly stated in another project idea within the industry. In short, the region has the raw material base to develop leather based industries for the regional, national and international markets. ',

'Goat and sheep skins are the raw materials for producing lining leather and these could be obtained within the region ',

' Goat and sheep skins to be finished into lining leather are soaked in water containing one percent of Syndet or Idet 10. these are then washed and bleached in a solution containing required amount of oxalic acid, calagon and basyntan for half an hour washed with running water and hosed up to remove excess water. This is followed by retaining for two hours in drums containing water and about 15 gallon myroband hosing up the material for overnight. Excess of tanning matter is removed by washing and the material is fat liquored at about 450c. The fat solution is made from 31 percent Turkey red oil, one percent castor oil, two to four percent china clay and 150 percent water based on the weight of the material. The material is then rammed dried, raw dusted, staked, toggled, dried, buffed and softened in drum. Next is the seasoning of the skins.

Machinery required includes single width shaving machine, inclined bed blazing machine, wooden drums with agitator, setting machine, buffing machine, staking machine, spray equipment and other miscellaneous equipment and tools. ',

'Similar to other resource based project ideas ', '9', '1'),

('Finished Leather Making Plant',

'Hides and skins undergo a number of processing stages before a final product called finished leather is reached. The first phase of processing hides and skins which involved the removal of hair, fats, meat and other unwanted materials is labor intensive; and at the same time it is the unpleasant stage of changing raw hides and skins to finished leather. Finished leather is used for making leather product such as garments, shoe uppers, belts, sandals, cases and covers of all types, gloves, transmission belts, etc. ',

' ',

' With about 16 percent of the area of the country and 27 percent of the population, the Amhara region has close to 30 percent of the total livestock population of the country. In 2004/2005, of the 71.4 million livestock population (cattle, sheep and goat) of the country, 20.2 million were found in the Amhara region. With this resource one would have expected the Amhara region to be a home of a vibrant leather producing industry. But this is not the case. It is only during the last 10 years that one or two hides and skins processing factories were established in the region. All the hides and skins produced in the region are exported to Addis Ababa. The development of regions, countries and even localities starts with the efficient and modern utilization of their natural, man made and human resources. The Amhara region should do all what is necessary to develop and utilize its natural resources. Encouraging potential investors to invest in breeding, raising and processing the livestock resources is one important measure that should be taken by the regional government. Producing finished leather is thus one component of the development and utilization of the livestock resources of the Region. Finished leather has both domestic and foreign markets. In the domestic front, many leather garment small scale industries have been established in Addis Ababa in the last 10 years. With minor swings in the demand for finished leather, there has always been a captive foreign market for finished leather. Hence, the Amhara region can produce finished leather and export the product to markets within and outside the country. ',

'A the Present level of the development of the leather industry in the region, it will be difficult for any finished leather producing factory to find somi-finished leather as raw materials. It is, therefore, advisable if the factory becomes and integrated leather factory which starts from raw hides and skins and ends at the finished leather stage. If this is the case raw hides and skins will be obtained from the Region. ',

'The main stages of processing are in general, soaking, lining, relining, pickling, tanning, fatiguing and stuffing and dyeing. Major plant and machinery include drum with 5HP motor shaft pulley for each drum separately, electrical unit heater for stuffing durum 5HP, shaving machine single width, electrical hand operated settling out machine, lace cutting machine, wooden setting table, wooden straining frames hollow in center, water pump and prep line, etc. ',

'utilizes regional resource, increases incomes of livestock producers, stimulates the development of the livestock sector, earns foreign exchange ', '9', '1'),

('Leather Goods Making Plants',

'Product Description: Leather goods are goods made from finished leather. The goods include suitcases brief cases, ladies’ bags, wallets, gloves, belts, footballs, etc. ',

' ',

'With the largest livestock population in Africa, one could have expected Ethiopia to have thriving leather goods industries which supply domestic and foreign markets. But there is only one leather goods making factory in the country; and this was built to supply to foreign markets through an arrangement with a European marketing firm. Some of the products of the factory are sold in Addis Ababa in one or two shops. Apart from this, there are no supplies of leather goods in the country. the demand for leather goods is limited due to high prices of the products and the low purchasing power of the majority of the population. However, there is a section of the population which has the financial ability to buy leather goods like ladies’ bags, wallets, belts small briefcases. Of the 20 million people in the urban areas of the Amhara Region, at least 0.05 percent can afford to buy some type of leather goods. This will translate in to 100,000 potential customers. if we assume that one potential customer will buy one piece of leather goods per year, 100,000 units of leather (the majority of which will be ladies bags) goods will be sold every years. Even if half of this becomes actual demand, it will make a leather goods making factory finically viable. ',

'The main inputs will be printed or plain chrome leather, cloth lining, stud, thread, rivets, buckles, pins, nails, flour, dyes, etc. The main inputs will be secured from domestic sources; others will be imported. ',

'The main processes include lay out and cutting of components as per designs, sorting of components, assembling components, stitching or cementing with card board/plywood, fitting of stud or buckles, reverting, lining and fixing, finishing, brand staming and packing. Machines needed are flat bed industrial sewing machine, stitching machine, upper skiving machine, sole splitting machine, ball press, strap cutting machine, trade mark embossing machine and other accessories. ',

' Saves foreign exchange, will generate income to the Region, stimulates the development of the livestock and leather industry, ', '9', '1'),

(' Chrome Tanned Hides and Skins Preparation Plant',

' There two types of tanned leather- vegetable tanned and basic chrome tanned produced by using vegetable extracts and basic chrome sulphate respectively. According to leather experts, chrome tanned leather is soft, supple, strong and permeable to air. This type of leather is extensively used for making finished leather goods like sports goods and shoe uppers. ',

' The Amhara region had the second highest number of cattle, sheep and goats in the country. In 2005/06, this number was estimated to be about 22.5 million. Out of this livestock resource, about 1.8 million hides and skins are harvested every year. Practically all this resource is sold to merchants in Addis Ababa where it is processed in the leather and shoes industry or where it is exported in raw or semi- processed form. Any raw material will bring more income to the area where it is grown or produced if it is further processed in that area. That is why the Region’s resource must be further processed in the Region so that more financial resources could flow to the region. The will increase the income of producers and processors. ',

' As there has been domestic and foreign markets for the hides and skins produced in the region, so there will be market (at home and abroad) for tanned leather to be produced in the region. ',

' Of the 1.8 million pieces of hides and skins produced from the region, at least some portion of it will be supplied to this project if it materializes. '

' Socking the raw hides and skins in large quantity of water, liming with lime and sodium sulphide in paddle; deodorized and fleshed in machines to produce pelt. The pelts are now washed thoroughly and delimed in a 2 percent ammonium sulphate solution, pickling in 8 percent sodium chloricde and 1.5 percent sulphuric acid using drums is the next operation. For producing chromed tanned wet blue leather is treated with 10 per cent basic chrome solution in the picking bath. Main machinery and equipment include twin paddle, tanning drum, “unhairing” machine, fleshing machine, and accessories. ',

' Forms the basis for developing leather industry in the region, brings additional income to the region, stimulates the development of the livestock sector, earns foreign exchange if the tanned leather is exported introduces new skills and technology to the region. ', '9', '1'),

(' Leather Footwear Making Plant',

' Bare human feet are protected from hazardous stone and dust by wearing man-made shoe. Leather footwear is one of kind of shoe that protects the feet. ' ,

' Leather footwear is increasing popularity with rising income and increasing in awareness of its superiority over plastic, rubber and canvas shoes. Leather shoe are produced mainly in Addis Ababa and other towns and imported to the region. Basically leather footwear are produced by small-scale private enterprises although substantial numbers of small-scale private producers of footwear are currently operating in other parks of Ethiopia, only few in number are located in the region. It is very essential to establish small-scale leather shoe manufacturing enterprises in the region, which can employee many persons. ',

' There is a huge potential and existing demand for footwear in general and leather shoe in particular for the large number of the population in the region due to the rise in income and increase of population in urban towns. There is unsatisfied huge demand for leather shoe. The manufacturing enterprises that produce durable footwear can capture this huge demand. ',

' The main raw material is leather, which is available from local tanneries. Other inputs like insole, eyelet and threads are also available in the domestic market. ',

' Leather shoe production involves (clicking) uppers of leather, sewing together the inner and outer layers of the uppers, lasting (shaping) the upper and heels, and attaching to soles. All operation can be performed manually or mechanically, depending on the materials in use.

Machinery and Equipment :

Hydraulic clicking press, Skiving machine , Lasting machine , Sole cutting and sole splitting machine , Finishing machine , Heat sealing machine , Pneumatic sole attaching machine , Stamping machine, Compressor ',

' ',

' ', '9', '1'),

(' Leather Garments Making Plant',

'Leather garment is processed and finished leather formed into jackets, coats and trousers for ladies and men. Products of leather garment especially those of ladies are sensitive to changes in fashion, style and even to economic conditions. Among the clothing industry, lather garments are considered as luxury products. ',

'All leather garment products consumed in the Region are produced in Addis Ababa. But the raw material is taken from the Amhara region as well as from other regions. Given the sizable quantity of hides and skins produced in the region, it is possible to establish viable leather processing and lather garment industries. This project aims to make the region self-sufficient in leather garment and also to export leather garment to other parts of the country especially to Addis Ababa. ',

'The main “ raw” material for leather garment is finished leather. Enough hides and skins can be obtained from the livestock resources of the Region to produce finished leather. Production of finished leather can be made by a separate plant or it can be combined with garment making. In either case the main raw material- hides and skins are available for the establishment of a small leather garment plant in the region. ',

'Depending on the size or capacity of the plant, the market potential could be the region, national or foreign market. As stated above leather garment is a luxury product which implies consumers are of the high income group within the target population. Within the Region, there are potential customers such as high level civil servants who receive relatively high income. Currently these people buy leather garments in Addis Ababa. The leather garment can also be exported. ',

'The making of leather garment is a very simple process. It requires, measuring and marbling the various parts or sections of the garment, cutting (manually or mechanically) the parts, sticking or sewing together the parts, inspecting and packing or delivering it to customers. ',

' Leather garment only requires the use of automatic or power driven sewing machines. The machines can be specialized machines for stitching different parts of the garment. ',

' ', '9', '1'),

(' Leather Sole Making Plant',

'Leather soles which are made from hides constitute major inputs in the manufacture of leather shoes. Leather soles are usually used for the manufacture of high quality leather shoes, and these shoes are mainly produced for the export markets. Leather soles are exported as semi finished products to be used as inputs in the manufacturing of leather shoes. ',

'Ethiopia is reputed to have the largest livestock population in Africa. According to the Central Statistical Agency, in 2001/2002, the country had about 42 million heads of cattle of which 11 million were in the Amhara Region. With this resource one could have expected to find a very vibrant leather processing industry in the Amhara Region. But, unfortunately this is not the case. It is only very recently that one or two hides and skins processing plants were established in the Region. To utilize the livestock resources of the Region and to get maximum benefits from this sector, plants which manufacture leather garment, leather goods and other leather products such as leather soles should be established. So far all the hides and skins produced or harvested in the region are sold to merchants in Addis Ababa, and these merchants sell the hides and skins to local processors or export them to foreign markets. In this situation, the benefits that regions farmers and traders receive from the livestock resources of the region are very small compared to what exporters and processors receive. To maximize the benefits of the region’s resources to the people of the region, all value adding activities have to be done within the region. ',

'The demand for leather soles is met by local production and imports. A study on the market for leather soles indicates that in 2006, the projected demand for this product is 281000 pairs; and this demand is expected to grow by about 7 percent every year. The Amhara Region has more than 26 percent of the country’s cattle population. Given this, it gives economic sense if a leather soles producing plant is established in the region. ',

'Cattle growing localities of the region. ',

' The major operations include leather cutting, leather sole splitting, roughing, trimming, edge making, stamping and cementing. Main machinery include roughing machine, sole edge cementing machine, sole drier, double side laminating, automatic splitting and automatic sole producing machines, hydraulic press, band pressing and decorating machine. ',

'Substitutes imports which saves foreign exchange, utilizes regional resources and improves the income of cattle growers and traders of hides and skins, has export potential to earn foreign exchange, introduces new skills and technology. ', '9', '1'),

('Reinforcement Iron Bars Making Plant',

' A combination of cement, sand, aggregate and bars of deformed or round iron is the heart of the building and construction industry. These materials combined together in certain proportion constitute the strength of all building and other construction works. Buildings, bridges, dams and all kinds of light and heavy construction works require reinforcement bars. The bars with concrete are reliable in carrying both static and dynamic loads. ',

'The production of cement, reinforcement iron bars, sheet glass and bricks are the foundation for the development of modern construction industry. Most construction materials are bulky which make them expensive to transport long distances. Thus in practically all cases, many types of construction materials like cement, iron bars, bricks are as far as possible produced in areas which are relatively close to their consumption centers. The Amhara Region is one of the least constructed and built areas in the country. In addition, basic construction materials such as cement, reinforcement bars, even bricks are not produced in the Region. They are all imported from other parts of the country- on the average 600 km from the Region. This makes these materials more expensive which hampers the expansion of building construction and civil engineering works- which the Region needs very desperately. Reinforcement bars are made mainly from iron bars which are imported. The plant which produces reinforcement bars can be located in any city where there is enough power. At least to save transport cost and to have reliable supply of this essential construction material, there is a strong need to establish one reinforcement bars making plant in the Amhara Region. ',

' For a long time there was only one plant which was producing reinforcement bars. Recently one plant was converted to produce reinforcement bars. Between 1999 and 2004, average annual production of reinforcement bars was 6,845 tons; and during the same period about the same quantity might have been imported every year. The two plants are located near Addis Ababa; and the imported bars are also distributed from Addis Ababa. Similar to many parts of the country, construction is increasing in the Amhara Region. The current construction volume alone can consume the production of a medium size reinforcement bars making plant. ',

'The raw materials are bellets and scrap iron. Bellets are imported and scrap iron is collected within the country mostly in and around Addis Ababa. Only bellets will be used in the new plant since scrap iron will not be found in the Region in sufficient quantity. ',

'The main process is to heat the bellets and making the heated bellets pass through a series of rolling mills whereby the bellets are elongated at each stage of rolling until they reach the desired thickness. Finally the elongated bars are cut in to the desired length usually 4 meters each. Main machineries include heating furnace, rough, intermediate and finishing mills. ',

' self- sufficiency in a very critical building material, development of new skills in the Region, further expansion of construction activities due to less cost of reinforcement bars. ','10', '1'),

('Steel Profile Making Plant',

'Steel profiles are products rolled out of billets. They are generally produced in the form of rods, angles, channels, squares, hexagons etc from steel billets by using rolling mills. The main applications are for structural fabrication, house construction projects, and machinery construction in engineering industry. ',

'Building construction in many cities of the region is rapidly growing. People want to build condominium, high-rise buildings for apartment purpose. Private firms construct offices, houses, stores and factory buildings all using steel profiles. Presently there is no factory that produces steel profile in the region. It is imported mainly from Addis Ababa and other regions. The demand however, increases with the growth of building construction. It is very essential to have a steel production plant in the region to satisfy the demand and create employment. ',

'The end user of steel profiles (structure) is the building construction sector. Recent data shows that average yearly consumption of steel in the country is more than 5000 tons per year and the construction sector is growing rapidly to more than 10% annually. The same growth of building sector and the demand for steel fabricator is assumed to exist in the region and it is high time to have a plant that produce steel structure in the region. ',

' The main materials are: -Steel billets, Rail and plate spares, Miscellaneous consumables/lubricants. ',

' a) Process

Steel billets are heated in furnace around 12000C, White-hot billets are rolled out to desired measure in rolling mills, Physical and chemical test are carried for standard qualification.

b) Machinery and Equipment

Rolling mill, Pre-heating oil fired furnace with oil burner, 600 KVA transformer, 300 HP motor, Heavy duty lath, Billet shearing machine, Sharper 24inch, Pillar drilling machine, 25 mm, Double ended pedestal grinder, Pump set motor, water pipe and overhead tools for water, Coil winding machine, Various tools, Motor 5 HP and 10 HP, Weighing scale, platform type 5 tons capacity. ',

'The main plant that produces steel profiles has to be based in the industrial towns of Bahrdar and Combolcha. ', '10', '1'),

(' Steel Fabrication and Ironwork Factory',

' A steel fabrication and ironwork factory is for the manufacture of light steel structure of buildings, cold –beat plate profiles, pressed plate doors, single beam crane tracks with columns, aluminum profile products, vessels, tanks, etc. These products are essential inputs in the building, construction and freight transport industries. ',

' Except for some crude and small workshops in the larger urban centers (Dessie and Bahir Dar) the whole Amhara land does not have even a small but modern steel fabrication and iron- work factory. All the products that such a factory produce and /or fabricate are imported from Addis Ababa. Most of these products are bulky and take a lot of space to transport and as a result are expensive which is reflected in their expensive prices. What was once dormant, the Amhara Region (at least in urban areas) is showing some signs of modernization, some signs of development and some signs of awakening. These signs of modernization should be supported by the provision of the necessary inputs such as metal fabricated products and the way to provide these inputs is by promoting the establishment of a steel fabrication and ironwork factory. ',

' The economic and social development activities of the Region which are manifested by various construction works can absorb the different products of a steel fabrication and iron work factory. ',

' Import',

' main manufacturing or fabrication processes include calling (sawing, shearing) of the metals, machining (bending, pressing, punching, milling, drilling, shaping, grinding, welding, sand-blasting and hardening), testing, surface treatment, assembly and quality control. ',

' Self- sufficiency, saving of resource, transfer of technology, development of new skills plus the other common benefits of industrial development. ', '10', '1'),

(' Pad Locks Making Plant',

' Pad lock is a particular type of lock which is used to lock doors, boxes, gates, etc. Pad locks are manufactured in different sizes and shapes. They can be made either from ferrous metal or non-ferrous metal. (Ferrous iron are those which contain small percentage of carbon and do not have any copper or other similar element, while non-ferrous alloys are those which do not contain carbon, but have elements of copper, zinc, tin, etc. as alloying elements.) ',

' One can imagine the numbers of doors, boxes, gates, etc that need pad locks in the Amhara Region. The number could be in the millions. All pad locks used in the region as well as in the country are imported. Any casual observation of shops, any where in the country will reveal that pad locks displayed for sale are of foreign origin. The technology of manufacturing pad locks is a simple and common technology; and this technology can easily be mastered by Ethiopian technicians and skilled laborers. The investment needed for making pad locks is modest which is affordable by many national investors. Given this, it is logical to propose the establishment of a pad lock manufacturing factory in the Amhara Region. ',

' Millions of padlocks are being used throughout the country; and millions will be needed in the future. In such a situation, the fact that there will be a market for pad locks is too obvious to discuss. ',

' to be imported ',

' Depending upon the size of the lock and the material from which it will be made, the production process takes the following main steps. The body of the pad lock may be either casted or fabricated. If the body is to be made from steel, it will be fabricated by steel plates, cut into shape in power press. Usually there will be two plates of the same shape and size-one consisting of the top side and the other the bottom side. The two parts are joined together and riveted. Holes are made by piercing tools. The levers are also manufactured on the power presses. If the body is to be made from non- ferrous metals, it is normally cast in one piece. The shakle is made from mild steel or hard steel rods, bent and flattened at ends. Size of the lock, serial number, makers name, model, etc embossed after manufacturing. Main machines include hand press, power press, bench drill, lancer bolts, compressor die and tools. ',

' Saving in foreign exchange and regional financial resources, self- sufficiency, possibility of export to other parts of the country, new skills and technology in the Region', '10', '1'),

('Door Locks Making Plant',

'Door locks are used to lock up doors. Common door locks are called mort ice locks. A door lock is operated by a key and latch. Door locks can be vertical, rebated or dead type. Vertical locks are used in flush doors. ',

'Door locks are among the most essential household products. Millions and millions of rooms in houses, offices, shops, schools, hospitals, factories, etc need door locks for safe keeping of properties and the safty of people. All the door locks that the whole country needs every year are imported. Making of door locks mainly requires fabrication of different metals and assembling them; and this can be done in our country. So far no attempt has been made to produce door locks in any part of the country. The Amhara Region should take the initiative to manufacture the first modern door locks in the country. ',

'There is no need to cite figures of imported door locks or the number of rooms that require door locks. It is enough to say that there will be sufficient market for door locks to absorb the production volume of any door locks producing plant. ',

'Door locks are made from different metals, and like any other metallic product produced in the country, metal inputs for the production of door locks will be imported. ',

'A door lock consists of the following parts:- body cover, case plate, striking plate, latch bolt, levers, latch spring, liver pivot and other pins and keys. The body cover, face plate and striking plate are made of mild steel sheet. These parts are cut from the sheet on a power press. The latch and locking bolt are generally made of zinc alloy and are dying casted and fitted to the required shape and size. The latch spring is made of spring wire. The levers are made of brass or mild steel. The levers are sand casted or cut from the brass or steel sheet and galvanized after wards. The keys are generally made of zinc alloy nickel plated. The guide pins are turned and cut off on small machines. All the components are then assembled to make door locks. Main machines needed are power press, hand press, bench drilling machine, bench grinder, electro plating unit. ',

' foreign exchange saving financial resource saving, self-sufficiency, introduction of new skills and technology. ', '10', '1'),

(' Metallic Doors and Windows and Frames Making Plants',

' Metallic doors and windows and metal frames have become more and more popular in urban and even in rural areas. They are increasingly replacing wooden doors and windows because they are relatively leas expensive and easily accessible sine they can be fabricated even in small urban centers when there is electric power. ',

' The use of metal doors and windows must be encouraged since this will save trees from being cut down for timber production- which further aggravates the process of deforestation in the Region. It is better to conserve and develop our natural resources and generate foreign exchange that will substitute the use of our natural resources. The use of metal doors and windows is one by which we save our natural resource-forests at the expense of spending foreign exchange for importing the metal input. But the foreign exchange used to buy the metal could be generated by exporting products to be obtained from various natural resources. In addition, metal doors and windows are stronger and last longer than wooden doors and windows. ',

' Any body who is familiar with the rural and urban housing situations in the Amhara Region can easily realize the magnitude of need of metal doors and windows in the whole Region. If we leave aside rural homes, most homes in urban areas need better and stronger doors and windows. Besides, new houses and other buildings are being built in almost all urban areas of the Region. Though there are units which fabricate metal doors and windows in many of the urban centers of the Region, the doors and windows they produce are below acceptable standards. Their measurements are faulty, their design, welding, grinding, painting etc are crude and of poor quality. Consequently the final products are of inferior quality. Dissatisfied with local production of doors and windows, many home builders and almost all contractors purchase metal doors and windows manly from Addis Ababa and to a limited extent from Bahir Dar. This indicates that there is a good market for doors and windows with good quality (which include precise measurements, attractive and fine design, quality and strong welding, fine and smooth grinding and attractive and appropriate painting- all with sturdy framework) ',

' Import',

' The doors and windows are to be fabricated from metal products known as T-shape, L-shape Z- shape, etc. Designs are made, physical measurements are taken. Parts are cut according to sizes, welded and ground finally, the product is coated with anti-rust and painted after locks and keys are fitted. Main machinery and tools include drilling machine, workshop tools, double ended grinder, flexible shaft grinder, welding set. ',

' contributes to the conservation of forest resources, develops technical skills, and saves regional financial resources. ', '10', '1'),

(' Steel Pipes Making Plant',

'Steel pipes are essential items in building construction and manufacturing industries for the transport of water and steam. All urban houses are equipped with steel pipes. ',

'Water from municipality sources is transported mainly by using steel pipes. They are safer and durable for a long period of time can be buried in the ground. Modern construction of building uses steel pipes inside the building. Steel pipe has also other service like in furniture making. However, there is no steel pipe making plant in the region and it is imported mainly from Addis Ababa. It is highly essential to have a steel pipes making plant in the region as building construction is rapidly growing. ',

'The main demand for steel pipe comes from the growing modern building construction for the transport of water. The distribution of water in town also highly depends on the serve of steel pipes. The growth in population and growth in distribution of clean water require huge supply of steel pipes. The existing and potential demand is sufficient for the viable operation of a new steel pipe making plant. ',

'The main raw materials are steel sheets, enameling paint, oxygen and acetylene gases. The steel sheets and enameling point will be imported. ',

' (a) Process the main process of steel pipe is sheet cutting, drawing, welding, straightening, threading, parting and inspections.

b) Machinery and Equipment: Steel sheet cutting machine, Welding machine, Drawing machine, Oxygen and acetylene gas container, Enameling paint machine ',

' ', '10', '1'),

('Capped Nails Making Plant',

'Capped nails are used mainly in fixing corrugated iron sheet roofs, walls or fenced construction. The predominant roofing material in urban Ethiopia is galvanized corrugated iron sheet and capped nails are used in fixing the corrugated iron sheets. ',

'Many modern dwellings require corrugated iron sheet roofs. The traditional use of grass straw roof are not suitable as they are fire hazardous and not long lasting and many farmers tend to change the roof of their houses even by construction of new ones with corrugated iron sheet roof. Capped nails are required to fix these corrugated iron sheet roofs. ',

'There is huge existing and potential demand for capped nails as there is a big backlog in building construction. The housing need is increasing and construction of dwelling houses by corrugated iron sheet roofs is undertaken in many places of the region. Due to rising income of rural population there is high priority by the people to construct new houses by corrugated iron sheet roofs. This has created demand indirectly to capped nails both in urban and rural area. There is no factory in the region to satisfy the huge demand of capped nails. ',

'The main raw materials are wire and hoop (iron) and these will be imported. ',

' (a) Production Process Capped nail making process involves basically the following: Feeding of wire and washer into the nail making machine, which the machine straightens the wire, insert the washers into the wire and cuts the wire into prescribed lengths and points, inspecting and packing.

b) Machinery and Equipment : Washer making machine, Capped (umbrella) nail making machines, Washer polishing machine, Surface grinder, Wire coil stand, Tools, accessories and worktable except worktables the machinery and equipment are assumed imported. ',

' ' , '10', '1'),

('Bolts and Nuts Making Plans',

'Bolts and nuts are one group of industrial fasteners extensively used in all branches of production activities. They are used in the production of all types of physical products especially made from metal and wood. Bolts and nuts are mostly made from mild steel, but in small quantities they can also be made from other ferrous and non-ferrous metals. Bolts and nuts have different sizes, shapes and can be made for different fastening purposes. They can be manufactured either by cold or hot process. ',

'These products are extensively used in all types of production and construction activities. Annual consumption of nuts and bolts is in tens of thousands of tons in our country. All the nuts and bolts that the economy of our country needs are imported. But it is possible both technically and financially to produce these important products in our country. Manufacturing bolts and nuts in a country is part of an effort to build an engineering or machine tools industry in the country. This project idea is an attempt to trigger the desire of both policy makers to promote and encourage potential investors to seriously consider the establishment of a bolt and nuts making factory. ',

'During the last four years average annual imports of nuts and bolts were 40,000 tons. This quantity alone can justify the establishment of a bolts and nuts producing plant. With increasing demand for these products, there is increasing need for such a plant. ',

'Nuts and bolts are made from bars of different metals like mild, steel brass, copper, aluminum, etc. These inputs will be imported. ',

'There are basically two types of processes for the manufacture of nuts and bolts-cold process and hot process. This project idea considers the hot process type technology. In this process, after cutting to a fixed length, bars of metals are shaped by heating into such shapes as hexagonal, square, square neck, round head, etc. types of nuts and bolts. Main plant and machinery include automatic double stroke, cold heading machine, automatic bolt head trimming machine, slotting machine, thread rolling machine, pointing and facing machine, heat treatment furnace, nuts forming, punching and chamfering machine, nut tapping machine, and tumbling barrels for cleaning and polishing. ',

'Saves foreign exchange and regional financial resources, provides essential inputs to the construction, transport, manufacturing sectors of the Regions economy, and introduces new skills and technology to the Region. ', '10', '1'),

('Galvanized Iron Sheet Products Making Plant',

' A wide range of essential product items can be fabricated in an establishment equipped with basic processing facilities. The envisaged plant could produce dustbins, storage bins, buckets, bath tubes, gutters etc from galvanized iron sheet. ',

'The need for products produced from galvanized iron sheets is very high both in urban and rural areas of the region. Dust bins are used for litter collection, storage bins for grain and other products storage, buckets for carrying water and other liquids, bath tubs for washing and bathing and gutters for drains in construction. These items are relatively bulky and can be transported to distant markets at high transport cost. It is very important to manufacture these products in the region. ',

' There is high demand for GI products both in rural and urban areas of the region. The population uses them for different purposes. Presently the demand is not satisfied and some of the goods are imported mostly to the region from far places like Addis Ababa. The establishment of GI products manufacturing unit will resolve the supply problem. ',

'The main raw and auxiliary material need for GI products making are: Mild steel sheets of different gauges (of dust/storage bins), Mild steel rods (for bucket handles)., Mild steel angles (for storage bin bottom rings), Galvanized iron sheets (for bath tubs, buckets storage bins), Pipe fittings and taps (for both tubes), Welding material, Rivets, Paints. ',

' (a)Process Production of the range of GI products involves basically the process of shearing, rolling, rounding (circle cutting, bottom forming, welding/riveting, assembly/fitting of also handles, bids hinges, rings, finishing painting etc) and inspection.

b) Production Equipment

Shearing machine, Rivet machine, Circle cutting machine, Bench drill , Bar bending equipment - Painting equipment , Bar cutting equipment, Other (measuring instrument hand tools, work, Presses tables ... etc), Welding set ', ' ', '10', '1'),

('Cocks and Valves (Water Line Fittings) Making Plant',

'Cocks and valves are fittings used in water pipes. They are needed in all areas (homes, hospitals, offices, public water taps, etc) where water is delivered through pipes. These fittings are also used (with adjustment) for pipes used to transport other liquid substances. Examples of cocks and valves are water taps used for opening and closing the flow of water; check valves are used to check the flow of water or other liquid during maintenance operations. Cocks and valves are normally made of brass or stainless steel due to the fact these metals/alloys are not affected by water and are corrosion proof. The products are produced either by casting or machining process. ',

'the supply of piped water is expanding in both urban and rural areas of the Amhara Region. About twenty years ago, bringing water from rives, springs or a well to villages through pipes was very very rare. Today one can witness the presence of water points in village centers in many parts of the Region. Most of the urban areas of the Region are supplied with piped water; and the provision of piped water is expanding. However, all materials used to construct or install piped water (pipes, valves, water meters, etc) are either imported or brought from Addis Ababa. In another project idea, we have proposed the establishment of a plant which will produce metal pipes for water supply. The Region should also try to be self-sufficient in the production of cocks and valves to facilitate the further expansion of piped water supply in the Region. ',

'All cocks and valves used in the water system of the country are imported. Considering the extent of water supply system and its potential for expansion, one can safely assume that there is more than sufficient demand for cocks and valves which will make a new plant viable. ',

'the brass from which the products are to be made will be imported. ',

'The manufacturing process involves casting of parts, cutting and machining, preparing and fixing rubber parts, assembly of parts, polishing and packing. A number of parts in valves are cast. The casting is done in a mechanized foundry having small furnaces, cupolas, moulds, dies, etc. The cast parts are some times hollow –having bores inside and require clearing. Machinery required are small furnace, moulds and dies, lathes, and portable drilling machine. ',

' Facilitates the provision of piped water in the Region, saves foreign exchange for the country and financial resources for the Region, introduces new skills and technology to the Region, and promotes self-sufficiency, possibility of exporting to other parts of the country. ', '10', '1'),

('Wood Screw Making Plants',

'wood screw product is an upgraded or further processed wire rod. It is like nails used for fastening and wood works. ',

'Furniture and other woodwork products are rapidly increasing in both in rural and urban areas. In all small and large urban centers in the Region, there are furniture making units. These units demand fastening items like nails and wood screw. Wood screw provides ease in fastening but particularly in unfastening with much less chance of itself being damaged. There is no local manufacturer of wood screw in the region. All the needed quantity is supplied from import. It is necessary to establish a wood screw to eater the existing and potential demand. ',

'A recent study indicates that annual demand of wood screw grows by 10%. There is no local manufacturer in the country and the supply is imported at high cost of foreign currency. The demands in the region and outside justify the establishment of a wood screw making plant. The market will be sufficient for the product of the plant. ',

'The main raw material of wood screw is mild steel wire, which is imported. The other item is packing material which can be obtained locally. ',

' (a) Process Wood screw making involves the process of basically rivet making (heading or making of head), polishing (smoothing in rivet surface and making it shine), slotting (the head), threading and pointing, finishing (cleaning from oil grease and dust) and packing. Al process or sub process except packing are automatic.

b) Machinery and Equipment: Double stroke heading (riveting) machine, Slotting machine, Threading (and pointing) machine, Centrifugal oil separators, Bile and cutter grinder, Tumbling barrel. All machinery and equipment are assumed imported. ',

' ', '10', '1'),

(' Wire and Wire Products Making Plants ',

' there are two major products in this project. One is barbed wire and the other is galvanized wire. Barbed wire is mainly used for fencing purposes which saves a lot of wood poles and Galvanized wire is made into different products. ',

' Wire and wire products are used for various purposes in both rural and urban areas. Some wire products can be made into gabion which is used for soil conservation and protection measures. The use of wire and wire products is very limited in the Amhara Region, probably because the benefits of using wire and wire products are not widely known and/or accepted in the Region. But even the small consumption of these products in the Region can justify the establishment of a small wire and wire products making plant. At least the present domestic consumption of wire and wire products justifies the establishment of such a plant. ',

' the major stages of production are pickling or mechanical decaling, wire drawing, auresling galvanizing and barbed wire manufacturing. ',

' The type of machinery and equipment for wire and wire products include pickling equipment, drawing equipment, galvanizing equipment and barbed- wire making equipment. ',

' main raw material will be imported', ' ', '10', '1'),

('Cupboard and Drawer Locks Making Plant',

' These locks are also called furniture locks as they are used in various types of furniture. Cupboard locks are used for locking cupboard doors and drawer locks are used for locking drawers of tables and other similar furniture. These locks are generally made from brass to have long life and good appearance. However, as brass becomes more expensive, the locks are also made from sheet metal. Lately locks are made by casting zinc. ',

'One can easily imagine the number of cupboards and drawers there are in use in the country. It is in the hundreds of thousands. There are drawers and cupboards in homes, offices, hotels, hospitals, shops, factories, stores, etc. If we take homes alone, we can roughly estimates the number of cupboards and drawers available in the urban areas of the country. In 2006, there are about 2.4 million families living in the urban areas of the country. Of these families, it is safe to assume that at least 40 percent of them have one cupboard and two drawers. This translates into 960,000 cupboards and 1,920,000 drawers. Usually one cupboard has two locks and one drawer has one lock. Hence the number of cupboard locks is 1,920,000 and that drawer is 1,920,000 locks. All these locks are imported. It is common sense to think about exploiting this huge market by establishing a plant which will produce cupboard and drawer locks. ',

'Following the above argument, let us assume that at least 25 percent of the existing locks are replaced every year and new demand for locks grows by 3 percent per year. Total annual demand for these locks will then be 1,075,200= (25%of 3,840,000+3% of 3,840,000). Meeting this annual demand will be more than the production capacity of at least 5 small scale locks producing factories. ',

'The different parts of locks are all made from metals. All these will be imported probably in ready-made of semi-finished form. ',

'The different components of locks i.e. body plate cover, plate belt; levers, keys etc. are sand casted with the help of patterns. They keys are sometimes made of steel on a power press in die. The casted parts of locks are filled to give the finish in die. After filling the springs are fitted to levers and grooves are cut to fill in the key blank. The different components are then assembled and the opening and closing of lock is checked for its smooth operation. Required machinery include pit furnaces with electric blower, moulding, casting, filling and fitting tools, bench vices, hammers, chisels, belt sander and polishing machine, measuring tools. ',

' Saves foreign exchange and regional financial resources, brings financial resources to the Region, introduces new skills and technology, and promotes self-sufficiency in industrial products. ', '10', '1'),

(' Barbed Wire Making Plant',

'Barbed (sharpened) wire is a very effective means of providing security to a particular area. It essentially consists of two or more steel wires which are fitted with small pieces of pointed barbs-hence the name barbed wire. The steel wires are tightly twisted so that the barbs remain in a fixed position. ',

'Barbed wire are used as fences for various buildings and enclosures. They are installed around factories, stores, vegetable and other commercial farms located near urban areas, dairy farms and other establishments which have properties susceptible to theft. Barbed wires are used to keep away animals (wild or domestic) from destroying crops, fruits, vegetables, tress, hay, etc. and to protect such properties from theft and vandalism. The alternative to the use of barbed wire is to build walls around properties or to build fences from wood poles. Walls are expensive and wood poles cause deforestation. In addition, wood poles have shorter service life. So far the use of barbed wire in the Amhara Region is very rare. It is only around some school compounds that barbed wires are used for fencing purposes. Virtually all homes, barns, etc are fenced using wood poles and other dry branches of wood. This has aggravated the problem of deforestation in the Region. The use of barbed wire for fencing can be promoted for replacing the use of wood poles for the same purpose. This is why this project idea is included for promotion by the Region. ',

'There is one small plant near Addis Ababa which produces barbed wire for the whole country; and this plant produces from 300-500 tons of barbed wire per year. The barbed wire requirement of the Amhara Region is met by imports from Addis Ababa. Barbed wire is one of those products which are inconvenient and expensive to transport. Because of increasing economic activities in the Amhara Region the demand for barbed wire will increase in the future. As land is becoming more and more the property of private individuals, more land will be enclosed by fences to (a) separate one piece of land from the other (b) protect properties on the land such as grass, trees, crops, (c) fruits & vegetables, livestock, etc. ',

'Steel wire will be imported until such a wire is produced in the country. ',

'The barbs are first cut to the correct size and the barbs may either be made during the cutting process or sharpened later. The steel were is taken from the roll directly and while the two strands are being twisted together, the pieces of sharpened wire or barbs are fitted into the wire. They are then rolled and packed. Main machines required include special purpose twisting machine, bench grinder, mechanical wire cutter, saws, hand tools, etc. ',

'Saves regional financial resources, contributes to the conservation of forest resources, and introduces new skills and technology. ', '10', '1'),

('Wire Gauge Making Plant',

'This is a wire net which is widely by builders and in a number of industries. Wire nets are also used in soil conservation structures and also as retaining wall for holding mud slides along roads built on hilly areas. ',

'Among the uses that wire gauge or gabbion provides the most relevant for the Amhara Region is its uses in the prevention of soil erosion. As we all know, the Region being mountainous in most parts is subject to severe soil erosion every year. Due to lack of soil conservation measure, most of the soil resources of the Region are eroded and soil productivity has declined considerably in many parts of the Region. Though expensive compared to other soil conservation measures, the use of gabbion is one effective way to protect and conserve the soil resources of the Region. Gabbion is particularly effective to stop the formation of gullies or to control the widening of already formed gullies. Besides, in the construction of roads, gabbion is used for constructing retaining walls to protect mud slide or the stride of stones towards the road which can cause the road to be blocked. Given this, the establishment of a wire gauge making plant in the Region is necessary. ',

'The Amhara Region covers an area of 170,000 km2 of which more than 80 percent needs soil protection structures one of which is the use of gabion. If situations had permitted 136,000 km2 of the Amhara Region should have been provided with soil conservation and protection measures. If we assume only ten percent of this area is to use gabbion for soil conservation structures, total area will be 13,600 km2. The quantity of gabion to be used for this area will be enormous. When demand for other uses of wire gauge is added, the combined demand for wire gauge can easily absorb the production of a medium size wire gauge plant. ',

'Main raw material is wire which can be obtained from domestic factories. ',

'Although there are a number of different types of wire gauges such as honeycomb, diamond, woven wire and crimped wire, it is mostly the honeycomb which is widely used. The netting is hexagonal and the mesh size may vary from ¼ inch to 2 inches. Main processing stages include the following. Wire of the correct gauge is fed from a wooden bobbin and is twisted together by a machine with another wire fed from a spiral coil rod. The finished netting is coiled on to a roller for dispatch. Main machinery required includes wire netting machine, special coil winding machine, bobbin winding machine, beaming carriage and lathe. ',

'Contributes to the soil resources protection efforts of the Region, introduces new skills and technologies, saves regional financial resources; maintains productivity of soil, etc. ',

' ', '10', '1'),

('Metal Polishes Making Plant',

'Metal surfaces generally get faded on exposure to air-atmosphere. By application of metal polish which contain finer grade of abrasives, the metal surface regains its shine. Metal polishes have become items of every day use. Polishes not only improve the outward appearance of the article on which they are applied, but also increase their life. ',

' ',

'Metal polishes have become popular for car paints. Most cars, when painted for the second or more time, use metal polish for their painting. In addition there are other products with metal covers which extensively use metal polish. All metal polishes used in the country are imported. As imports of vehicles will increase in the future, the demand for metal polishes will also increase. They will also replace chemical paints. ',

'The raw materials for making metal polish include Tripoli powder, silica powder, mineral oil, oleic acid and liquor ammonia. All these will be imported. ',

' A mixture of mineral oil and abrasive material are mixed and emulsified preferably with ammonium oleate soap containing some amount of ammonia. In the case of paste polish the percentage of abrasive material is increased to a considerable extent and then passed through homogenizer. The material is then packed and marketed in metal containers. Plant and machinery needed include jacketed vessel complete with heating arrangement and stirrer, homogenizer, miscellaneous equipment such as mild steel pans, aluminum vessels, enameled mugs, weighing scales, testing equipment, etc. ',

'Saves foreign exchange and regional financial resources, promotes self-sufficiency in industrial production, and introduces new skills and technology. ', '10', '1'),

(' Draft (Drawing) Machine Making Plant',

' A drafting machine consists of a protected head around which revolves a square with two detachable scales permanently fixed at right angles to each other. The unit is fixed to the drawing board by a double parallelogram of bars which maintained its parallelism in every position on the board. A drafting machine performs all the functions of set square, T-square, and parallel rule protractor. ',

' Drawing instruments used by students, draftsmen, engineers and other professionals come in different forms and sizes. All the drawing instruments used throughout the country are imported. Most of the instruments are made from plastics and some are made from metals. It seems strange that at least some attempts have not been made to make some types of drafting instruments in the country. A drafting machine is used in all technical schools, colleges, universities and in engineering offices of the country. With the expansion of technical schools and colleges in the country, the demand for drafting machine is increasing every year. It is time that the country starts producing at least some engineering design and mathematical instruments for domestic consumption. Production of drafting machine is one that should be promoted to make the country self-sufficient in this important engineering tool. ',

' In 1996 E.C. there were more than 40,000 students in engineering related fields in the Technical and Vocational Education program of the country. This figure will grow as more students from secondary schools join the program-which means the demand for drafting machines and other technical and engineering instruments will also increase. In addition to the need of drafting machine by vocational students, there is also the demand for the product by engineering students of the country and by technical professionals who are engaged in design and drafting works. All in all, annual demand for drafting machine may range between 60,000 to 80,000 per year. This will justify the establishment of a plant which will make drafting machines. ',

' Most the inputs for making drafting machine will be imported. ',

' Some parts of the drafting machine like the drawing board, transparent acrylic scales, castings for balancing weight, machine faces and rocking arm can be imported or obtained from the market for the first phase of operations. Other parts like protractor head, adjustable drawing table stand, parallelogram arms bars etc will be fabricated in the unit. These components require operations like casting of aluminium, milling, turning, general machining and polishing etc. on high precision equipment. Finally all the components procured from out-side and fabricated in the unit/plant are to be assembled. Main machinery required are center lathe, pipe bending machine, bench drilling machine, circular graduating fixture, painting equipment, bench vice, and hand tools. ',

' Promotes self-sufficiency, enhances quality of technical education, saves foreign exchange and regional financial resources, and introduces new skills and technology. ', '10', '1'),

(' Gabion Making Plant',

' Gabion is a large rectangular box of netted wire used in civil engineering works. Gabion has long been used as a transition method of construction and engineering for protecting river banks from erosion, for hardening the shoulder of roads and the face of slopes to prevent landslide. Gabion is also used for the foundation of water reservoirs. In the context of the Amhara Region, where there are serious problems of landslides gullies and in general soil erosion, gabion will be used for the protection and conservation of soil resources. Gabion is produced in a tabular or bed mattress (rectangular cube) type wire netting form. Stones have to be stuffed inside the gabion to make it useful. ',

' ',

' The demand for gabion comes from the need of protecting the soil resources of the Region. The loss of these resources through water erosion is huge. Every year the Amhara Region loses billions of tons of fertile soil due to erosion. The consequence of this resource loss has been the decline of food production which results in food shortages in most parts of the Region. There are many localities in the Region where it has become difficult to grow trees, and shrubs, even grass due to the extreme shallowness of the soil or complete lack of it. The use of gabion is one alternative means for protecting soils from erosion. Gabion mad from wire might cost more than some erosion control measures. As a result, it is used selectively and in areas where other erosion control measures are not effective. Relevant government agencies and many NGOs are involved in protecting and conserving our natural resources. These organizations use gabion for protecting the soil from erosion. Unfortunately, there is a shortage of gabion since local production is very low. Most of the gabion used in the country is imported. As there is a very strong and urgent need for conserving the soil resource of the Amhara Region; and as the size of land to be covered by soil conservation measures is more than 75 percent of the 170,000 sq.km of the Region, there will be large demand for gabion in the Amhara Region. '

' Galvanized iron wire is the sole raw material and this will be either imported or bought from domestic sources. ',

' Galvanized iron wire is set on an automatic wire netting machine and knitted into diamond shaped wire netting. To shape the wire netting into the designated tabular form or rectangular cube form the back bone framework is made. This framework is inserted in to central portion and the outer edge of the wire netting to produce the desired tabular or rectangular cube form. There are two types of automatic machines:- the fully automatic type chain-link wire netting machine and the semiautomatic type wire netting machine, Technology experts recommend the use of the fully automatic type. This type will also enable knitting of big or small mesh fence netting and rockslide (landslide) prevention netting of various lengths. Major machinery and equipment required include: fully automatic chain link wire netting machine, semi-automatic type wire netting machine, rectangular cube frame manufacturing machine, circular ring frame manufacturing machine, frame twisting machine, circular ring frame and rectangular frame fixing machine and machine for straightening wire netting. There will also be other auxiliary machines such as cranes, electrical equipment, motors, trucks etc. ',

' saves foreign exchange, protects soil resources, used for other civil works, and introduces new skills and technology. ', '10', '1'),

('Hinges Making Plant',

'A hinge is a joint usually made of pieces of metal on which a lid, a door, a window, a gate or a box is attached to the main body of the object. Hinges are produced in a wide range of shapes, dimensions, and weights. Hinges are used in wood and metal work industries to be used as components for different products ranging from simple cupboards to big compound gates. ', ' ',

'The supply of hinges is composed of local production and imports. Local supply of hinges is from cottage industries and handicrafts; and the quality is low and the hinges are used by rural people. Hinges used in urban areas are of the imported types. They usually have better appearance and quality. They also come in different shapes and sizes. Demand for hinges is projected to reach 367000 kgs in 2007 and 391000 kgs in 2011. These demand projections could make a hinge making plant a financially viable enterprise. The Amhara Region can take advantage of this opportunity if it first establishes this plant. ',

'The main raw materials are steel sheet, steel rod and electroplating material such zinc or chrome. These inputs will be imported. ',

'Manufacturing of hinges consists of different metal cutting and forming process. i.e shearing, blanking, bending, drilling of holes, rod cutting, riveting and assembling, Electroplating is an optional process to finish the product. Main machinery and equipment required are hot chamber die casting machine, air compressor, power presses, fly press, polishing lathe, belt and disc sander, bench drilling machine, metal lathe, shearing machine, electroplating plant, etc. ',

'Similar to other projects. ', '10', '1'),

('Metallic Sanitary Fittings Making Plant',

'These are pipe fittings which are mainly used in kitchens bath rooms, toilets and other similar facilities. The fittings include basin valves, kitchen sink valves, shower/bath valves, and basin and kitchen sink drainage systems. The products are all chrome plated to protect them from rusting and to give them shinning and attractive appearance. The products intended to be produced in the project idea are chrome plated fittings to be used in showers, bath rooms and kitchens. The plant could also produce gate valves. The main types of products will include cocks, shower fittings, bath tub fittings, hand wash basin traps, bidet fittings and bidet traps. ',

' ',

'Though the construction industry is expanding and growing at a rapid rate during the last ten years, many types of construction materials are imported. And metallic sanitary fittings are one of the groups of construction materials which are imported. Between 1980 and 1990 when imports were restricted by government policy, an annual average import of metallic fittings was about 269,000 kgs. The projected demand for these fittings in 2008 will be 2,895,000 kgs. Currently, there is a small plant with a production capacity of about 75,000 pieces of pipe fittings per year. The projected demand is much larger than the capacity of the domestic plant. Hence for the purpose of substituting imports, one or two plants have to be established to meet the current and future demand of metallic fittings. With the growth of the construction industry, it is inevitable that the demand for metallic fittings will also grow. The Amhara region can take advantage of this market opportunity by establishing a plant which will produce metallic fittings. ',

'The major raw materials are brass scrap, copper ignots, brass bars and tubes, electroplating chemicals such as nicked chloride, nickel sulphate, chrome salt and sulphuric acid. Most of these of raw materials will be imported. Brass scrap could be collected locally. ',

'The production process can be classified into four stages-casting, machining, electroplating and assembling. Brass is used to produce the main component. Gravity die casting technique is employed to produce value body, bonnet and other parts that can be easily produced by casting. The die (mould) used in this case is made from cast-iron and is permanent. The casting process begins with melting the brass ignot and scrap in a furnace (induction furnace in this case). After melting the metal is tapped into a ladle and the ladle is carried to the pouring station where the molten brass is poured into a metal die (mould). After cooling, the die and the castings are separated by splitting apart the two parts of the mould. The castings separated from the die have spruces, runners, and gates which have to be removed and reclaimed for remelting for reuse. This operation is called fettling. It is done in various ways-hammering, tubing and grinding. After fettling, the castings are sent to the machine shop for machinery parts such as the tags body, handle, bounet, sleeve, shower-head and knob. The machining operation includes facing, chambering, boring, drilling, taping and threading on all openings and grinding and polishing on all lapped surfaces.

In addition to die cast components, there are other sanitary fitting parts which require machining. These are mechanical components from free cutting brass such as spindle, seal holder, connecting foods, tubes and nuts. Producing these parts requires cutting the brass bar, facing, chambering threading, grinding and polishing. The next major manufacturing stage is chrome plating. But before plating, the die cast components have to undergo physical and chemical cleaning. Physical cleaning is carried out by rough and smooth grinding accompanied by primary and fine polishing. Chemical cleaning removes lubrication oil, greases oxides, dirt, metallic particles and abrasives that might have contaminated the cast components during fabrication. Chemical cleaning involves primary degreasing, pickling in water solution of acids, chemical degreasing by water solutions of salts and alkalic and activation by dipping the components in 10 percent water solution of sulphuric acid. After the cleaning processes, decorative plating is applied directly by dipping the components into the proper electrolytic solution containing chromic anhydride and proper current density. Finally the components are assembled, tested for leakages and packed. Types of machinery and equipment required include molding and Core making, melting furnace, shot blasting, polishing and buffing equipment, machine shop, electroplating plant, assembling line and testing equipment. ',

' Benefits: Similar to other projects', '10', '1'),

(' Corrugated Iron Sheets Making Plant',

' These ore iron sheets which are galvanized and usually corrugated and used for covering roofs. The sheets are produced with rectangle shapes but with different sizes and thickness. ',

' ',

' About 25-30 years ago, it was only houses in the main urban centers that used corrugated and galvanized iron sheets for roofing material. Almost all houses in the rural areas used special types of grasses or straws to cover their roofs. As a result there was only one corrugated iron sheet factory in the whole country up to the end of the 1990’s. During the last 10 years, people in rural areas have started using corrugated and galvanized iron sheets for roofing purposes. They use these iron sheets as a sign of prestige and also for security against fire. Now it is common to see houses in rural areas covered with corrugated iron sheets. This trend is increasing every year. Some rural families even use money they borrowed from the State for income generating activities to buy corrugated iron sheets for their houses. Because of this new trend, demand for corrugated iron sheet has increased greatly. To meet this new demand, one or two new factories are established and the finished product is also being imported.

In the Amhara Region demand for corrugated iron sheets have been also increasing. One corrugated iron sheets producing factory was established in combolcha. But its production volume is not sufficient to meet the demand of the Region. In fact, the Region imports huge quantities of these products from other parts of the country and from abroad and this situation will continue until the Region creates its own capacity of producing enough quantity of the product.

In rural Amhara alone, there are abut 3.6 million housing units. Currently not more than one percent of these housing units have corrugated iron sheets as roof covers. This leaves abut 3.56 million housing units with thatched roofs. If we assume that one housing unit is about 50 m2, total size of rural houses in the Amhara Region with thatched roof will be about 178,000,000 m2. For a one m2 floor space one corrugated iron sheet is required as a roofing material. Hence the total potential demand for corrugated iron sheets in the Amhara Region can be 178 million pieces. If ten percent of this demand is realized, about 18 million pieces of corrugated iron sheets will be needed. ',

' Local factories import the iron sheets. So will the new plant to be established in the Amhara Region. ',

' Once the iron sheets are obtained, the process of converting them into corrugating and galvanized iron sheets only requires corrugating and galvanizing. Corrugating is done using special machines and subjecting the flat iron sheets to certain loads. Galvanizing is done by submerging the iron sheets in a “pool” of “liquid” zinc with electric current passing through the “liquid” zinc. ',

' Saves regional financial resources, promotes self-sufficiency, conserves natural resources- such as grass which protects the soil from water and soil erosion, protects homes from fires, ', '10', '1'),

('Aluminum Frames Making Plant',

'Aluminum frames and profiles are building material products made from aluminum. The products are used for doors, windows for making water tanks, for show cases etc. aluminum products are popular because they are popular because they are light, strong and they do not rust. ',

' ',

' The demand for aluminum frames are profiles is related with the expansion of the building industry. As stated in other relevant project ideas, there has been a huge expansion in the building industry during the last 10-14 years in almost all parts of the country. Along with it, the uses of aluminum frames and profiles have been also expanding. Today, it is common to see many residential houses, and multistory buildings being fitted with aluminum frames and profiles. As a result of increased demand for these products, many enterprises which produce the frames and profiles are established in Addis Ababa. Having more than a quarter of the country’s population and similar size of the economy, there is enough demand for aluminum profiles and frames which can justify the establishment of a aluminum profiles and frames making plant in region. ',

' Aluminum sheets and bars which will be imported. ',

'the min process is similar to any metal fabrication operations. It involves cutting, bending, jointing, folding, etc. of aluminum sheets and bars. The main machines required include shearing machine, bending machine, welding machine, grinding machine and some auxiliary tools. ',

' ', '10', '1'),

(' Curtain Rails, Stoppers and Runners Making Plant',

' These are products made form steel bars and sheets which are used for hanging curtains in houses, offices, apartments, etc. ',

' ',

' All the curtain rails, stoppers, and runners used in Ethiopia are imported. With the booming building industry going on in the country, the demand for these home interior decorating materials has increased substantially. Producing these materials only requires fabrication (bending, cutting, grinding…) of the metal bars and sheets which are imported. As many fabrication operating the production of these materials is not subject to the rules of economies of scale. They can be produced in small workshops with limited sets of machines or they can be manufactured in large factories where there are huge production machinery and equipment. Considering the building construction activities being undertaken in the Amhara Region, a small plant which will produce curtain rails, stoppers and runners to satisfy the Regional market is needed. ',

' The main inputs are steel bars/rods and sheets. These will be imported ',

' The process a mainly involves the cutting, bending and grinding of the steel rods or sheets. As hearing machine, grinding and bending machines are required. ',

' Promotes self-sufficiency, saves foreign exchange ', '10', '1'),

('Sieve for Building Materials Making Plant',

'This is a mobile equipment for sieving building materials and it consists of an inlet Hooper and a mobile belt conveyer with wheels and vibrating screen. The iron net is mounted on the screen body; the net can be replaced by another suitable screen having holes ranging from 2 mm up to 40 mm. The sieving capacity depends on the mesh and on the granulation of the building material to be sieved. The belt conveyer can be inclined as required by means of a hydraulic system. Transportation on the field can be accomplished by a road truck or by any other Vehicle. The complete equipment is mobile and suitable for all types of terrain and materials. ',

' ',

'Materials that most require sieving are sand, clay soil, aggregates, recycled building materials, lime, etc. With the rapid expansion of the construction industry, the demand for building materials which need sieving is also expanding. This, in turn, has increased the demand for sieving services. It is known that sieving of building materials improves the quality of the building. By the nature of the service it performs, sieving equipment is needed in every major construction sites. Considering the member of construction sites in the country (which are probably in the thousands), one can casily imagine the number of sieving equipment needed in the country. In a situation where the estimated demand (quantified or qualitatively described) is more than the capacity of a plant with the minimum economies of scale, the defining production volume is that volume where the plant becomes financially viable. In this case the minimum capacity is 100 pieces per year and there is definitely a demand to absorb this production volume. '

'The main inputs are sheet metal thickness 4 mm and 6 mm, steel tubes, 2.54 cm and 1.9 cm, steel profiles 40x40 mm and 60x60 mm and various construction materials. The metal sheets will be imported and the others will be obtained from domestic sources. ',

' Since a mobile sieving equipment consists of three main parts, i.e. a sheet metal hopper, a conveyer and a vibration sieve, production involves the following processes.

a) Hopper construction:- sheet metal cutting with shears, steel profiles cutting with a crosscut saw, profile and sheet welding.

b) Conveyer construction- tubes and steel profiles cutting on a crosscut saw, structure welling, belt turning in turning lathes conveyer assembling. (The belt drive, the driving drum and the reducer are supplied along with the technology.)

c) Vibration sieve construction- sheet metal cutting with shears, steel profile cutting, turning of the axis, of the bearing housing, of the lid and of the belt,

d) Construction of detachable box with electrical switches, e) Assembling the three main parts, f) Electrical cables assembling, painting and coating, and testing.

Required machinery and equipment include turning lathes, milling machine, cut saw, console cranes, forck-lift truck, manual electric drills, manual electric grinders, autogenous cutting machine, electro welding machine, compressor and painting gun and tools. ',

'Improves the quality of construction works. ', '10', '1'),

('Water Flow Meter Making Plant',

'Flow meter such as water meter is measuring equipment used to measure the volume of fluid that passes through a pipe. The flow meters considered in this project idea are those that are mainly used for measuring the flow of water. Water meters are mainly used in water distribution system such as municipal water pipes. The use of water meter (or flow meter) in each household, and factory, commercial and other buildings not only permit an accurate recording of the actual volume of water used by the consuming unit, but also helps in efficient utilization and conservation of water. ',

' ',

'The demand for water flow meter is related with the expansion of piped water supply, which in turn depends on the rate of urbanization in a given country. About 15 percent of the populations (11.25 million) of Ethiopia live in "urban" areas. With 5 people in a family, about 2.25 million families are "urban" residents. In ideal situation, each urban family could be provided with piped water which means there will be a water flow meter for each family. Total units of water flow meters for urban families in the country would be close to 2.25 million. If we add another 25 percent for other water consuming bodies in the urban areas such as schools, hospitals, hotels, etc, the overall total of water flow meters will be 2.76 million units. This is the potential national demand for water flow meters. However, not all urban families in the country are provided with piped water. Probably only 70-80 percent use piped water. Even those with piped water do not all have water flow meters for each family. For example in 1994, only 140,000 families (out of 440,000) had water flow meters in Addis Ababa. This was only 30 percent of the total family units in the city. The figure is much lower in other urban centers. But during the last 10 years, infrastructures in utilities (power, water supply, telephone, etc) have been expanding in almost all parts of the country. The expansion of piped water systems will require the installation of water flow meters for the efficient use of the water and effective revenue collection. This means that the demand for water flow meters will increase to match the existing and future piped water distribution systems. Unsatisfied demand for the gadget is more than one million units. To meet this unsatisfied demand, 100,000 units have to be either produced at home or be imported. If local production is competitive both in quality and price, there is a big captive market for water flow meters in the country. ',

'The main raw materials/components required include bronze brass and phosphoric copper, PBB bar, PBB wire stainless steel, ebonite and fibers ABS, AS, POM and PE plastics, paint and adhesive, varnish and register liquid. ',

'The process of manufacturing water flow meters involves producing parts and components (Produced in foundry, machine shop and plastic moulding shop), assembling of parts, inspection and testing of the assembled units, painting, final inspection and packing. The parts produced in the foundry are the main case and the upper case. After the castings of these parts are made, they are machined in the machine shop. Other metal parts are also produced in the machine shop which can also produce different parts to be used for different purposes. The inner parts of the water meter which are made from plastics are produced in the plastic moulding shop. After the production of the various parts, the upper case and its inner parts are assembled together in the assembly shop to obtain the final product. Water meters produced in this manner are then inspected and tested. The meters meeting the test requirements are painted and packed. There are about 31 types of machinery and equipment needed for the plant. These machines are grouped into foundry, machining, plastic moulding assembly and testing and inspection shops. ',

' Similar to other projects', '10', '1')

(' Injection Moulded Plastic Educational Materials',

' These educational materials include set-squares small rulers, compasses. All are made from plastics. The educational materials known among students as “mathematical instruments” are mostly used in geometry and trigonometry classes. They are used to measure angles, length and to construct different geometric figures. Through not made from plastic, a protractor goes with these educational instruments. ',

' ',

'In 2004/2005 total student population in the country was about 12.3 million of whom about 12.2 million were students below university level. With this size of student population, one could expect the presence of a factory which produces these educational materials or instruments. But there is no such a factory. In the Amhara Region alone there were 3.0 million elementary and secondary school students in 2004/2005. if we assume that at lest 50 percent of these students use the sets of plastic mathematical instruments, a one time demand for these instruments will be about 1.5 million sets. This demand will increase as more students use the instruments and as the student population increases. There is sufficient demand for plastic mathematical instruments both at the national and regional level. ',

'the main input will be P.C.V plastics and this will be imported. ',

'The most important production process in to prepare moulds and to use injection moulding machine in which the “raw” plastic is injected into the mould for forming the required shape and dimensions. Again the main machinery is an injection moulding machines which will be supported by other machines for doing related production activities. ',

'Promotes self-sufficiency, saves foreign exchange, improves the quality of education ' , ' 12', ' 1'),

(' Plastic and Polyester Zippers Making Plant',

'Zippers are vital parts of trousers, some kinds of skirts, dresses, bags, etc. Zippers gain popularity a few decades ago as substitute for buttons. First there were zippers made of metal, but metal zippers are by and large replaced by plastic or nylon zippers. ',

'In general urban people wear clothes fitted with zippers. Among the 1.5 million people who live in urban areas in the Amhara Region, we can safely assume that at least 90 percent of them wear one or another type of clothing with zippers. This amounts to 1.35 million pieces or strings of zippers. All these are imported. Making zippers requires simple technology and limited investment. The Amhara Region can absorb the production of a number of zipper making units. ',

'At the minimum the demand for zippers is 1.35 million per year. With more urbanization and more rural people using zippers, the market will expand. This market size enables the establishment of a number of viable zipper making plants in the Region. ',

'Four inputs go into the making of zippers. This are the metal or plastic zippers, the cloth or fabric where the zippers are sewed, to the sewing thread used to sew the zipper and the small plastic or metal parts at the tips of the zipper.

The cloth and thread can be obtained from domestic factories. The metal or the plastic parts have to be imported. ',

'Metal or plastic wires are made into continuous row of fastener links in a coiling machine. The zip fastener links joined to a double coil are sewed to the right and left hand tape of the fastener halves in a sewing machine. ',

'Total building area required is 150m2 which will cost a about Birr 100,000. Plant and Machinery will cost about Birr 260,000. Total Investment= Birr 360,000. ',

' sufficiency, employment creation, keeping the resources of the Region within the Region. ', ' 12', ' 1'),

(' Spectacle Frames by Fabrication Plant',

'Spectacles are special types of glasses used mostly by people who do not have normal eyesight. Spectacles frames are the frames which hold the glasses in the desired shape. These frames can be made form plastic, metals such/as steel, aluminum, gold. However, most spectacle frames are made from plastic materials because they are cheap and easily replaceable. Since the development of plastic technology, spectacle frames made from plastics are increasing their market share. In fact, in low income countries, they constitute the largest share of the market. If they are well designed, plastic frames add beauty especially to ladies. ',

'Ethiopia has about 74 million people. By conservative estimate about 5 percent of the population wear glasses or spectacles- this is about 3.7 million people. The 3.7 million pairs of spectacles- the frames and the glasses all are imported. Of this huge import, 0.9 million is the share of the Amhara Region. Producing plastic frames at home can be done with modest investment and this can done in the Amhara Region. ',

'As mentioned above, at least 3.7 million people use or wear glasses in the country. If demand for glasses increases at the rate of population growth (2.9%), there will be additional 107,000 pairs of spectacle frames needed every year in the country. With this market size, one can safely assume that there will be sufficient demand for spectacle frames which will make a spectacle making plant viable. ',

'Plastics are products of the petroleum chemical industry and since we don’t have this industry, the “raw material” will be imported. ',

'Main processes are sheet cutting, forming and welding, wire inserting and assembling. Important machinery and equipment include sheet cutting machine, forming and welding machine, wire inserting machine, drilling machine and buffing machine. ',

' Saving of foreign exchange for the country, conserving financial resources for the Region, new skills and technology. ', ' 12', ' 1'),

(' Plastic Combs and “Midos” Making Plant',

' Combs made from polystyrene are produced in a variety of sizes and shapes ranging from the small 5 gm pocket comb to 20 grams ladies combs. Combs are consumer items which can be considered as basic necessities. Combs can be made from horns and husks, metals, wood, and plastics. Because of lower price, plastic combs are the most widely used in practically all countries. ',

' All the combs used in the Amhara Region are imported. Some crude types of combs – “midos” were started to be produced in Addis Ababa. But it seems that they have disappeared from the market probably due strong competition from imports. Even with strong competition, it is possible to produce combs domestically which can compete against imported similar products. Most countries import the raw material and process this raw material to make combs; and the combs can compete in quality and price in the home market. If others can do it, there is no reason why we cannot do it. This is why this project idea is included in this study. ',

' At national level, the market for combs is 75 million people. If we exclude babies and children between 0-4 years of age, there are 62.8 million people who are potential buyers (not users-because babies and children use combs also) of combs. Let us assume that about 30 percent of the rural population do not use combs for one reason or another, there remains a minimum of 47.1 million people who can buy at least two combs each ear. Then total demand for combs in the country will be 94.2 million. This figure is an indication of the potential market that a comb producing plant will have in the country. The share of the Amhara Region is 24.5 million combs. ',

' Plastic combs are made from special types of plastic material. Like any other plastic inputs, this plastic will also be imported. ',

' The main production process include plasticizing (the resin is fed from a hopper of the moulding machine and heated and softened to make it plastic in a heated cylinder), injection (a correct amount of plasticized melt is injected from the plasticizing cylinder into the relatively cold mould while closed), after filling (the injected material is kept under pressure for some time to ensure adequate filling of the mould and to prevent the backflow of polymer), cooling (some further time is allowed to elapse for cooling of the moulded comb in the mould until it is sufficiently rigid to be ejected without any risk of deformation of the comb). Machinery and equipment required are injection moulding machine, moulds and dies, scrap grinder, water circulation pumps and other accessories or auxiliary tools. ',

' saving in foreign exchange, conservation of financial resources of the Region, self-sufficiency, new technology and new skills, possibility to export to other parts of the country, ', ' 12', ' 1'),

('Plastic Tanks (Sintex Type) Making Plant',

'In recent years, there has been a considerable increase in the variety of plastics used for various end products. HDPE is one such plastic which has found extensive use in the manufacture of plastic tanks by the rotational molding process. These tanks are manufactured in various sizes ranging from 100 litters to 2500 liters and are used for various end uses such as storage of water, corrosive liquids, gases and other liquids. Metal water tanks are more and more being replaced with plastic water tanks. ',

'Of the 19 million people living in Amhara land, almost 1.9 million live in urban areas; and more than 70 percent of them receive their water supply from municipal water systems. Most of the municipal water users have water tanks made of metals which are hazardous to health after a few years of service. Practically all new houses being built in the major urban center of the Amhara Region have water tanks made form special type plastics (HDPE). These tanks are transported from Addis Ababa to the major urban centers of the Region. Empty plastic tanks are light but they take much space of transport vehicles and this alone makes them expensive to transport. Whether they are made in Addis Ababa or Bahir Dar, the material that goes into the production of plastic tanks is imported. If this is the case then why not someone produce plastic tanks somewhere in the Amhara Region for the consumption of the Region? This project will answer this question. ',

'Plastic tanks come in different sizes for different purposes. They can be made small to be used by young girls for bringing water from rivers, springs or ponds. They can also be made big to be used for storing thousands of liters of water or other liquids. This versatile nature of the product can create a large demand base. The tanks can be bought by urban home builders to be installed in their backyard, by villagers to store water in their cottages, by rural merchants to store and/or transport liquid merchandize such as kerosene, edible oil, tella, etc. As the product is multi-purpose, there will be enough market for tanks in the Region. ',

'Import ',

'Plastic tanks (sintex type) of any Size can be molded (made) by rotational moulding techniques using HDPE compounds or moulding powders. After moulding, the tanks are sent for finishing by buffing wheels which gives luster and polish to the tank. Main machinery and equipment include automatic rotational moulding machine with all accessories, clearing and mixing unit, scrap grinder, A.C. generator, buffing machine, compressor, furnace and other accessories. ',

' self-sufficiency, resource conservation, introduction of new skills and new technology. ', ' 12', ' 1'),

('H.D.P.E Woven Sacks Making Plant',

'H.D.P.E woven sacks are suitable for packing/holding grains, coffee, sugar, fertilizer, potatoes, carrots, onions, sand etc. ',

'Note long ago the main material used for packing/holding grain in the Amhara Region was a sack made from goat skins. To-day sacks made from natural and synthetic fibers produced at home and imported are used for packing/holding grains, fertilizers, sugar, coffee, etc. However all the sack need of the Amhara Region is met either from the sack factories in Addis Ababa or from imports. Sacks are critical items for transporting grains from farms to homes, from homes to market places and from market places to stores and warehouses and some time even to foreign markets. The Amhara Region, being a predominantly agricultural region needs sacks in greater quantity next to the Oromiya Region. Given the importance of this product to the farming economy of the Region, it is logical to propose the establishment of a woven sacks producing plant in the Region. ',

' In the 2001/2002 harvest season, production of all types of crops was estimated to be 39.2 million quintals. To transport this volume from farms to homes could have required a minimum of 15.7 million pieces of sacks. If we assume that, at least 20 percent of the annual production is taken to markets to be sold, this will require about 3.13 million pieces of sacks. In addition sacks are also needed for holding sugar, coffee, salt, fertilizer, flour, and other industrial products. All this clearly indicates the possibility of establishing a viable H.D.P.E. woven sacks making plant in the Amhara Region. ',

'H.D.P.E High density P.E. form which the woven sacks are to be made will be imported. ',

'H.D.P.E is fed to the hopper. The cylinder temperature is kept 150-240/1600C. The blown film from the die is taken up by a take –up roll which is 2-2.5 meters high from the die. This original film is slit by means of industrial blades in to width of about 9mm to 12mm. These slit tapes are stretched by 1 to 7/9 times at around 1000C in hot air tunnel or water. The stretched tapes are wound in winding unit with torque motors. Now warp beaming, weft spooling, weaving on looms in desired mesh and design is done to produce the fabric. If it desired lamination or coating, flex graphic printing and cutting is carried out to give the final product. Main plant and machinery required include one complete plant for the manufacture of H.D.P.E slit tape, looms for weaving of the fabric, pirn winders with eight with eight spindles each, direct beaming machine, bay making and stitching machine, printing machine and accessories like bobbins, pirns, beams, etc. ',

' saves financial resources of the Region, supports the farming sector by facilitating convenient storage and transport, introduces new skills and technology, enhances self sufficiency', ' 12', ' 1'),

('Injection Molded Products Making Plant',

'Products which can be produced using injection moulding technology include plates and dishes, buckets, cups, dishes, trays, waste paper baskets, bins of various sizes, letters/words, umbrella frames, hinged hair pins, soap, cases, etc. All these are made from thermoplastic materials. ',

'All types of products made from plastics are being used in the Amhara Region. These products are used in homes, offices, schools hospitals, restaurants etc. And all these products are either imported or being brought from Addis Ababa. The demand for these products will increase with population, and income growth. To reduce the level of dependency of the Region in getting many products from outside the Region, two or three plants which produce different types of products using injection moulding should be established in the Region. ',

'A casual observation of the market places, shops homes, restaurants, offices etc in the Amhara Region reveal the types and magnitude of plastic products being sold/ used in these places. There are many thousands of plastic products being in the Amhara Region. In fact plastic products are replacing products made from wood, metal and clay. This trend will continue. The volume of sale of plastic products in the Region if produced in the Region will make a plastic factory viable. ',

'Imported. ',

'Five types of thermoplastics like polypropylene, polyamides, acrylic, polystyrene, etc, can be converted on a small scale level into a number of products. Moulding machines with screw seizer are also now available for making production easier. In the production process, first the material (raw material) is changed to hopper and then to heating cylinder where the material melts. After melting, the material is injected to moulds. Then curing takes place and the ram returns to its original position, moulds are opened and the product is cooled. There are about 15 types of machines used to produce plastic products by injection moulding technology. The main ones are: injection moulding machine, semi automatic hydraulic injection moulding machine, vertical moulding machine, reprocessing extruder, one portable drilling machine, moulds, air compressor etc. ',

' saves financial resources of the Region, introduces new skills and technology, saves trees by replacing household utensils made from wood. ', ' 12', ' 1'),

(' PVC Pipes, Conduits and Other Fittings Making Plants',

'PVC or plastic pipes are used for carrying drinking water, irrigation water, sewerage and other liquid and semi liquid substances form one place to another. These pipes have almost replaced other pipes made of metal, asbestos or cement. Conduits are used to cover electrical cables and they are extremely useful for safety. ',

'Until recently all PVC pipes and conducts were imported. In the last three or four years, plants which produce PVC pipes and conduits are established in or near Addis Ababa; but their production volume is not enough to meet the domestic demand. Both PVC pipes and conduits are mainly used in the construction and civil works sectors; and these sectors are expanding almost in every part of the country. With further expansion of the construction industry, the demand for PVC pipes and conduits will also expand. Like many other industrial products, the Amhara Region imports these products from other parts of the country or from abroad. To be self-sufficient in these products, investors must be encouraged to establish a PVC pipes and conduit making plant. Though the products are not heavy, they take a lot of space when they are transported, and as a result, they are expensive to transport. If would, therefore, be economical if they are produced in or near where they are to be used. ',

'more than 25 percent of imported and locally produced PVC pipes and conduits are consumed or used in the Amhara Region. The scale of construction activities being undertaken in the Region certainly justifies the establishment of a medium size plant which will produce PVC pipes and conduits. ',

'the raw material is a by-product of the petroleum refinery industry and as such it will be imported in pellet or powder form. ',

'PVC pipes are generally manufactured through the extrusion process which is forcing a softened plastic materials through an artifice by applying a continuous pressure. ',

' removes some bottlenecks that the construction industry faces, makes the Region self-sufficient, save foreign exchange. ', ' 12', ' 1'),

('Latex Foam Products Making Plant',

'These are low density rubber products used extensively for their cushioning properties of comfort. They find wide use as upholstery material in passenger cars, ships, trains, homes, offices, etc. Popular or common products made from latex foam are seats of sofa sets, pillows, mattresses, etc. ',

'All the material used for making sofas, mattresses, and other products for which soft cushioning material is part of is bought and brought from Addis Ababa. Latex foam, though very light in weight, takes a lot of transport space to transport it from one place to another and this makes its products more expensive if they are not produced near where the foams are produced. From the point of view of consumers in the Amhara Region, there is no reason why practically all industrial products have to be produced in and around Addis Ababa and transported to the Region as finished products. The Amhara Region has to be made self sufficient if products can be manufactured with financially viable operation. ',

'Latex foams are used to make mattresses, pillows, sofa seats, seats of private cars, buses, takes, etc. The demand for these products in the Amhara Region comes from three main sources- increase of the population especially in the urban areas, increasing awareness by people about the use and benefit of latex foam, increase of the purchasing power of the people. Currently, if we take mattresses, probably not more than one percent of the Region’s population uses mattresses made from foam latex. This amounts to about 185,000 mattresses. On the average one mattress takes 2.3 m2 of latex foam. Hence current consumption of latex foam for mattress only is 425,500m2. If other use of (sofa seats, seats of different vehicles, etc) of latex foam is included, demand for the product will be much higher. With more urbanization, population increase, growing awareness about the use of latex foam, etc. future demand will definitely increase. If a detailed market study is undertaken, the result of the study will not reveal a demand figure less than 600,000 m2 of latex foam. Any demand figure around this will make a plant which will make latex foam a viable plant. ',

' to be imported. ',

'Latex is mixed with a stabilizer, ammonium oleate and ammonium acetate and foamed in mixer by beating and blowing air from bottom. The foam swells and when desired bulk has been attained, other chemicals are added and mixing continues very slowly to produce uniform foam. It is then transferred to a mould of desired shape and size and the temperature of the mould is immediately raised for curing. The cured product is washed with water by passing through rolls to remove water soluble chemicals. It is dried and ready for sale. Major machinery and equipment needed are deammonization tank, stainless steel mixers, pot mill, vulcanizing steel moulds, steam boiler, drying chamber, squeezing machine and accessories. ',

' self-sufficiency, saves regional financial resources, improves living conditions of people who use the product, and introduces new skills and technology to the Region. ', ' 12', ' 1'),

('Rubberized Fabrics Making Plant',

'Rubberized fabrics are cotton or synthetic fabrics where rubber is coated in one or both sides of the fabrics. These fabrics have a wide range of applications in homes and industries. Rubberized fabrics are water proof and they are used for making tents, raincoats, canvas shoes, school bags handbags, belt, tiers, special bed sheets in hospitals, etc. Coating or rubber in only one side of the fabric is known as single textured cloth and the coating of fabrics on both sides of the rubber in the form of sandwiched between two fabrics is known as double texture cloth. ',

'All water proof fabrics consumed in the country are imported. This includes fabrics used for tents (used for civilian and military purposes) uppers for canvas shoes, all types of handbags, traveling bags, school bags, fabrics for raincoats. Textile fabrics which are major inputs for rubberized fabrics are produced in the Amhara Region as well as in the country. What we need to produce rubberized fabrics is the plant and machinery for coating rubber on cotton fabrics. If we have this plant, we could save foreign exchange by producing rubberized fabrics; and the Amhara Region should take the initiative to produce this new product. ',

'All the hand bags, traveling bags, schools bags, upper of canvas shoes, tents, etc, that one can observe everywhere are products made from rubberized fabrics which are imported. Even the rubberized fabric requirement of local made traveling bags, hand bags, lunch bags, school bags and tents can create enough demand for establishing a plant for producing rubberized fabrics. Of the 2.3 million elementary and secondary school students of the Region, if only 20 percent use school bags made from rubberized fabrics total demand will be 460,000 bags which can translate to 345,000m2 of fabrics. ',

'Cotton fabrics here at home and rubber to be imported. ',

'formulation and preparation of solvent dispersion or dough (this requires a series of activities), coating of the fabrics by spreading or calendaring technique which again involves a series of sub processes. Main machinery and equipment include two rollers mixing mill, Z- blade mixer, spreading machines, steam heated chamber, boiler, cooling unit, hot air vulcanize, other accessories. ',

' saving of foreign exchange, resource flow to the Region, creating demand for the Region product- cotton fabrics and stimulating raw cotton production, introduction of new technology and skills, self sufficiency in rubberized fabrics at regional and national label. ', ' 12', ' 1'),

('Rubber Shoe Soles Making Plant',

'Microcellular sheet of rubber has become very popular for the production of shoe soles due to its lightness, hard wearing (hardness) , attractive appearance and good flexibility. It has been found out that shoe soles made from rubber are 4 to 5 times more durable than shoe soles made from leather. Because of these properties, rubber has almost replaced leather as a shoe sole in fashion footwear. ',

'Soles are used for footwear made from natural leather or synthetic “leather” In the Amhara Region; it is mostly people in the urban areas who wear shoes whose soles are made from rubber. Of the 1.9 million people who hive in urban areas of the Region, one can safely assume that at least 0.9 million wear leather shoes. In addition to making new shoes, rubber soles are also used for replacing worn-out soles. All the soles used in the Region are either imported from abroad or are manufactured in Addis Ababa. In other part of this document, we have proposed the establishment of leather shoe manufacturing plant. To provide input for this plant a rubber shoe soles manufacturing plant should also be established in the Region. ',

'They are two sources for the market potential of rubber shoe soles in the Region. One demand source will be if a leather shoes factory is established as proposed in this study. If this is realized, this proposed rubber sole making plant could supply its products to the leather shoe factory. The other source of demand will be by shoe repair hand craftsmen for replacing old or worn out soles by new rubber soles. This will absorb quite a substantial quantity of rubber shoe soles. A third source of demand (though not very large) will be individual shoe-makers who produce shoes by order or for a specific market. All these combined will generate enough demand for a plant which will produce rubber shoe soles. ',

'The special rubber material from which the rubbers shoe sole is to be manufactured will be imported. ',

'The main processing (manufacturing) stages include-mixing of the rubber and rubber chemicals, moulding using hydraulic press, releasing the press, vulcanization, testing and packaging. Important plant and machinery include role mixing mill, hydraulic presses, moulds and dies, vulcanizing chamber, boiler, weighing balance and other accessories. ',

' Self-sufficiency, new skills and technology, saving financial resources plus the other common benefits of industrial development. ', ' 12', ' 1'),

(' Disposable Surgical Gloves Making Plant',

' Surgical gloves are thin gauge latex products used as coverings for hand and with a sheath for the fingers. The gloves are mainly used by surgeons, physicians and other people in the health care profession. They are used as a preventive measure against infection or transfer of diseases from patients. Since the onset of HIV/AIDS, the use of surgical gloves has become extremely necessary by all medical and health personnel in all health care places. ',

' disposable surgical gloves are made from natural or artificial rubber latex. The production or manufacturing of these gloves does not require a sophisticated technology and highly skilled manpower. It is an ordinary product which can be produced using ordinary technology and people with ordinary industrial skills. However, surgical gloves are not produced in Ethiopia; and the country pays a substantial amount of foreign exchange every year for importing surgical gloves. This product can be produce in the country and if it is not produced in other parts of the country, the Amhara Region should take the initiative to start producing this essential product. ',

' In 2004/2005, there were about 29,000 health personnel working in state owned health care institutions throughout the country; and the numbers of health institutions public and private were 2415. One can imagine the number of surgical gloves being used by the health personnel in all these institutions every day. If we assume that one state health personnel uses, on the average, five pairs of surgical gloves per day, total daily consumption of these gloves is 145,000 pairs. If we assume that health personnel in the private sector are 20 percent of the number of public health personnel, there are about 5800 are 5800 of them and their daily consumption of gloves is about 29000. Total daily consumption of disposable surgical gloves was, therefore, 174,000 pairs. This translates into annual consumption to about 63,510,000 pairs. (This estimate does not include disposable surgical gloves used by people outside health care institutions). All these gloves are imported every year. Anybody who has seen disposable surgical gloves will wonder why these products are not made in our country? Probably the answer is investors are not aware of the opportunity. This project idea is to trigger the interest of potential investors for the Project. ',

' Both the artificial and the natural latex (rubber) from which disposable surgical gloves are to be manufactured will be imported. If the rubber plantation project which was started in the former province of Illubabor is still alive, there will be a possibility of harvesting natural latex from the plantation. ',

' In the manufacture of disposable surgical gloves from latex, there are three major processes- straight dipping, coagulant dipping and heat sensitive dipping. Of the three, straight dipping is the most widely used for producing gloves. The following activities are undertaken in this process.- Preparation of the compound which makes up the gloves, washing and drying (formers). Formers are made of porcelain, glass, stainless steel or aluminum. This process is followed by dipping of formers into compounded latex coagulating, drying and vulcanizing the film formed on the formers and then stripping off. ',

' ' , ' 12', ' 1'),

('Erasers (Rubber) Making Plant',

'Rubber erasers are used (as the name implies) to erase pencil or other ink marks. Made commonly from natural rubber, erasers are used by students, draughtsman, typists, bookkeeper and others to correct the mistakes of their works. ',

'Only in elementary and secondary schools alone, there were (2004)10.5million students in our country. All these students and other members be of the society use erasers. Annual consumption of this product could in the tens of millions of pieces; and all these are imported by paying very scarce foreign exchange resources. It is strange that this vital educational material has not been promoted in the past for domestic production either by the state or by the private sector. It is time this product be produced in the country at least to meet part of the national demand of the country. The Amhara Region can promote this project idea to be the first Region to produce this important product. ',

'In 2004/2005, there were 12, 272, 430 students in the country. If we assume that one student consumes at least three pieces of eraser in a year, total demand for erasers in the year was about 36.8 million pieces. If we add another 20 percent of this demand to be that of other users of erasers, total demand could be about 44.2 million. This is the magnitude of the national demand. This clearly indicates that there is a captive market for a plant that could produce competitive erasers in the country. ',

'When one looks at it, an eraser seems to be made from one raw material rubber. But it is made from different raw materials where crepe rubber being the main raw material. Some of the other inputs are starch, petrolatum, vulcanized waste rubber, factice, abrasive, lithopone and sulpher. It is possible to find starch petrolatum and vulcanized waste rubber here at home. The rest will be imported. However, if the rubber tree plantation project becomes successful, rubber will also be obtained from domestic production. ',

'Rubber eraser can be manufactured from different raw materials like natural rubber, synthetic rubber and other thermoplastics. In this project idea, it is assumed that the eraser will be made from natural rubber. Pale crepe (natural rubber) is first masticated with other chemicals except sulphur in a mixing double roll mill. When the first mixing is almost complete, sulphur is also added and mixing continues for some time until a sheet of the substance is formed to the desired thickness. It is then pressed and vulcanized in steam or electric heated hydraulic press, cut to desired size, finished on grinder and stamped. Different types of erasers require different types of ingredients. Main plant and machinery needed are rubber mixing roll mill, hydraulic press, cutter and grinder, boiler, stamping machine, and other accessories. ',

'foreign exchange saving, financial resource saving, new technology and new skills, possibility to export to other regions, some degree of self-sufficiency. ', ' 12', ' 1'),

(' Plastic Chairs and Tables Making Plant',

' Plastic chairs are chairs made of plastics and used for seating in different places and occasions. They are used in public places such as restaurants, coffee shops, libraries, schools, etc. Plastic chairs are replacing chairs and seats made from wood, plywood and metals, the chairs have some unique properties which made them “better” choices to consumers. They are light in weight, less expensive than other types of chairs, more comfortable than ordinary wooden chairs, etc. Plastic molded chairs are of two types: plastic molded base with steel frame and a complete plastic molded chair. ',

' Though the material that plastic chairs are made from is imported which costs foreign exchange, the advent and widespread use of plastic chairs and tables contribute to the conservation of our forest resources since they replace chairs and tables made of wood. For this reason alone, the domestic production of plastic chairs and tables should be encouraged. It is only in the last 10 to 15 years, that the use of plastic chairs was introduced to the Ethiopian market. Within this short time the use of the product has spread to practically all urban areas of the country. Even domestic production of plastic chairs has started in and around Addis Ababa. The use of plastic chairs and tables will expand and increase in the future. The products will be used by the rural population also. The Amhara Region should have its own plastic chairs and tables producing plant since this will reduce the price of the products in the Region. ',

' A study for the Addis Ababa Administration has projected the demand for plastic chairs to be around 660,000 in 2005 for the city alone. Addis Ababa has about 3 percent of the urban population of the country. Rough estimates show that demand for plastic chairs by the urban population to be about 2.1 million. The demand share of the Amhara Region is about 0.5 million. These indicative demand figures show the existence of opportunities for investment in plastic chairs and tables production in the Region. ',

' The main raw materials are plastic granules such as polypropylene (PP) and a crylonitile butadiene styrene (ABS) resins. If the chairs have to use steel for legs or frames, steel pipes will be also needed. The plastic materials will be imported while the steel pipes can be purchased locally. ',

' Plastic chairs are made using injection moulding machine. The process of making these chairs and tables involves preparation of the raw plastic material, giving shape to the product using injection moulding and finishing work on the moulded product. If the chairs or the tables are to have steel legs or frames, preparation of steel pipes to make legs and frames will be undertaken. Machinery and equipment needed include injection moulding machine, moulds and dies, scrap grinder, pipe cutting and binding machines, drilling machine, welding machine, material handling equipment, weighing scale. ',

' Contributes to the conservation of forest resources, promotes self sufficiency in industrial products, introduces new skills and technology' , ' 12', ' 1'),

(' Plastic Raincoats Making Plant',

' Plastic rain coats are made from PVC sheets of various thicknesses and in various colors. Due to its low cost and practical use rain coats are used in our country especially in the urban areas. ',

' Plastic rain coats are essential clothing material for people who work in the open air during the rainy season. Ploughing and weeding are done in the rainy season in the Amhara Region. Of the 19.2 million people in the Region, about 17.3 million people live on farms. Most of these people (above the age of 6) need plastic rain coats because the adults work on farms and children take care of the domestic animals. Because the use of rain coats is not widely practiced, people face the problem of raining while working in the open air. It is depressing to see people soaked with rain water and shivering while performing agricultural activities. In many cases due to lack of protection from the rain, farmers stop working on their farms and this delays many critical farm works which negatively affect volume of crop production. If rain coats are produced in the Region and introduced to farmers, they will be needed by practically all farmers. One unique advantage that rain coats have is that, unlike umbrella, their use do not interfere in the ploughing or weeding activities of the farmers. ',

' In rural Amhara Region, children above the age of about seven and the whole adult population are engaged in various agricultural activities during the rainy season. The rainy season is one of the busiest seasons of the year. To protect themselves from the rains, people need rain coats. The traditional rain coat “clothing” such as “gessa” (which is made from a special type of grass) or umbrella is inconvenient to work on farms while wearing it. Recently farmers have started using plastic materials and it is common in Amhara region to see farmers wearing crudely sewn plastic materials to protect themselves from the rain. If rain coats are made available in rural markets in the Region, there will be enough demand for these products to make a rain coat producing plant a viable venture. For example if 20 percent of the rural male population of the Region (1.73 million) buy one rain coat each, total demand for the product can reach 1,730,000 rain coats. This minimum demand estimate is more than the production capacity of a medium size rain coat producing plant. ',

' The plastic sheets will be imported until such a time that plant produces its own plastic sheet. ',

' PVC sheets are cut as per pattern of the rain coat. The different parts are then thermo-welded as per pattern. Zips, buttons and elastic tapes are also fixed by thermo-welding. Other products can be fabricated by heat sealing of plastic sheet pieces already cut as per design and pattern. Main machinery include automatic sealing machine with thermostatically control device, button fixing machine, scissors and tools. ',

' Decreases the hardship f of undertaking farm works when it rains, increases productivity. ', ' 12', ' 1'),

(' Plastic Helmets/Hats Making Plant',

' Plastic helmets are used by construction workers, firemen, civil defense personnel, police force, motor bike riders and users, mountain climbers, lumber-men, miners and other people engaged in heavy duty works. The helmets are made from reinforced plastic which, in turn, is made of mixture of resin and strengthening material like glass fiber, synthetic fiber, asbestos, etc. Reinforced plastic is light in weight, chemical and heat and it does not break easily. Using helmets is an essential protective measure to prevent head injury. ',

' ',

'Due to the expansion of construction works in the country, there are tens of thousands of construction workers in the country. In addition, the number of firemen, members of the police force, motor bike riders, etc is large. If provided, many farmers can use helmets while working on farms. When all these are taken into account, total number of people who can use helmets can be around 100,000. All the helmets requirement of the country is imported and this consumes foreign exchange resources. Though the raw material will be imported, producing plastic helmets will save foreign exchange. Since the production of this item does not require much investment the project can be owned by any investor with a modest amount of financial capital. ',

'To be imported. ',

'There are a number of processes for making plastic helmets, but the most appropriate process is what is known as Single Mould Process. In this process, simple machines are employed and the moulds used are made of wood or plaster of paris. The sequences of operations are as follows:- application of release agent, gel coating, lay-up operation, curing and releasing of moulding. Machinery and tools needed include buckets, brush, trimming knife, rollers, rubber or polyurethane sponge, hand gloves of rubber or polyethene mechanical mixer and drying oven. ',

' Saves foreign exchange, promotes self-sufficiency by subset-Hating imports, introduces new skills and technology, improves the welfare of construction workers, firemen, and other workers of similar activities. ', ' 12', ' 1'),

(' Plastic Buttons Making Plant',

' Buttons are used in garments of all types. A person with a normal clothing outfit needs at least 20 buttons. Buttons can be made from metals, wood, glass, plastic and other similar materials. Probably due to their low cost, plastic buttons are popular among consumers. ',

' Like so many other industrial products, plastic buttons used in the Amhara Region are imported from other parts of the country or from abroad. However, the production of plastic buttons requires a modest amount of capital and common industrial skills; and there is a capacity to produce plastic buttons in the Region. This project idea is to promote the establishment of a plastic button making plant in the Amhara Region. ',

' Imagine the plastic button needs of 19 million people. In rural Amhara Region women do not wear clothes that need buttons. Hence if we assume that men in rural areas and both men and women in the urban areas use buttons, this amounts to 10.6 million people. On the average one person uses about 20 buttons for on set of clothing (jacket, trousers and shirt for a man and blouse, skirt or trousers for a woman). If we assume that each person has at least two sets of clothing, he/she uses 30 buttons. Hence the total requirement for buttons in the Region is 318 million buttons. This figure indicates the existence of captive market for plastic buttons in the Region. ',

' To be imported. ',

' Buttons are made in two ways: by moulding or from plastic sheet. Buttons made by moulding use urea formaldehyde- a thermo set plastic as a raw material. Separate moulds are required for each type and size of button. Power presses are used for the manufacture of moulded plastic buttons. Plastic buttons are also made of acrylic or polyester plastic sheet. (Polyester sheets are used for high quality buttons). This project idea considers production of plastic buttons from acrylic sheet. The main processes of this form of plastic buttons making involve the following. Full size acrylic sheets are cut into required pieces using plastic sheet cutting machine. Round pieces of actual size of buttons are made on drill machine with the help of hallow mill cutter. Finishing/shaping on the buttons is done on a designing machine. A slotting machine is used to design “fisheye”. The buttons are polished with a special process in a wooden drum. Finally, 2 or 4 holes as may be required are made in the buttons. This is done on the holes master machine. The main plant and machinery needed for the plant include plastic sheet cutting machine, drill machine with check, designing/shaping machine, hole master machine, grinding machine, wooden polishing drum, designing cum-slotting machine, electric motor. ',

' Saves foreign exchange, regional financial resources, introduces new skills and technology. ', ' 12', ' 1'),

( ' PVC Foot Wears Making Plant',

' PVC foot wears are shoes and sandals made from PVC granules-the basic input for making many types of plastic products. These foot wears are light in weight and relatively inexpensive. They are used by low income people. ',

' Until recently the Amhara Region was importing all its PVC foot wears (plastic shoes and sandals) from Addis Ababa and from foreign countries. New there is at least one plastic shoe making plant in Bahir Dar and this plant meets some of the plastic shoe demand of the Region. However, there is still a gap between regional production of plastic shoes and demand and this is still met by imports. All the sandal requirement of the Region is met by imports. Most urban people of the Region use sandals. In fact in cities like Bahir Dar, people wear sandals outside their homes while the custom has been to wear sandals at homes. Probably they are relatively cheaper; many students in the urban centers wear sandals when they go to school. The rural people will start using sandals increasing the demand for the product. To increase the degree of self-sufficiency in the production of basic consumer goods, the Region should promote the establishment of PVC foot-wears especially sandals making plant. ',

' Currently the major consumers of PVC foot wears especially sandals are the urban people of the Region. In 2006, the urban population of the Amhara Region is estimated to be about 2.2 million. If a quarter of the population uses sandals, a one-time demand for sandals will be 550,000 pairs. Sandals last for about 3 months. Hence annual demand can reach as many as as 2.2 million. This indicates the potential demand for sandals even with restrictive assumptions. ',

' Imported. ',

' PVC granules are used for making plastic shoes and sandals. The main process of making these products is by injection/compression moulding. Main machine required include injection moulding machines, and different sizes and designs of moulds for different shoes and sandals. ',

' Saves foreign exchange, and regional financial resources, improves self-sufficiency of the Region. ', ' 12', ' 1'),

(' Plastic Syringes and Disposable Needles Making Plant',

' Like conventional syringes, plastic syringes are used for injections muscular as well as intravenous but the difference is that disposable syringes and needles are disposed of immediately after using them once. So every injection requires a new syringe and needle. Disposable syringes are made of plastics with nozzle and sold with needles. Disposable needles have plastic holders and they are presterilized and do not require any sterilization while using them. However, they cannot resist high temperature. ',

' Medical facilities are expanding in the Amhara Region though health coverage of the Region is the lowest among the major regions of the country. With 19 million people living in the Region, millions of syringes and needles are used every year in the Region. With HIV/AIDs being a major health hazard in the Region, the use of disposable syringes and needles has become an absolute must for people to protect themselves against diseases like HIV/AIDs. Given the health situation of the country, one could have expected to find a factory which produces the above products established by the government. Providing disposable syringes and needles should have been considered as an emergency situation. Having more than 25 percent of the country’s population, the Amhara Region should promote the establishment of a plant which can produce disposable syringes and needles. ',

' Disposable syringes and needles are medical products, and as such their production requires the utmost care and the final products must be of the highest quality. If these conditions are met, there will be sufficient demand for disposable syringes and needles in the Amhara Region and its neighbors. ',

' Imported. ',

' Production of plastic syringe and needle has the following major steps. Preparation of compounding mixture, manufacture of plastic parts, manufacture of needles, assembling of the syringes, sterilization of the syringes and needless, and packing. Plastic parts are prepared with suitable dies and moulds on an automatic injections moulding machine. Needles are manufactured by feeding a bright drawn brass rod into the capstan lathe to turn out the hubs which has operations of turning drilling, cut off, and taper turning. The miniature drilling is carried out on high precision drilling machine. Then the hubs are sent for nickel chromium plating. After some additional processes are performed on the needle, both the needle and hubs are fitted to each other on the press machine. In some cases, needles are made by other specialized manufacturers. Once the manufacturing of parts is completed, sterilization, autoclaving, exposure to ethylene oxide, exposure to ionizing radiation and packing are performed.

Many types of machines are involved in the production of disposable syringes and needles. The most important include horizontal injection moulding machine, printing and embossing machine, assembling machine, precision drilling machine, precision cylindrical grinding machine, grinder, needle cutting and finishing unit, moulds, power press, capstan lathe, electroplating, air compressor. ',

' Saves foreign exchange to the country and financial resources to the Region, promotes Regional self-sufficiency in important health care products, introduces new skills and technology to the Region. '

, ' 12', ' 1'),

(' PVC Cables Making Plant',

' PVC cables are of many types. They include (a) PVC insulated service drop wire which consists of three PVC insulated twined wires and is used for service connections; (b) twin twisted PVC insulated cord consisting of electrical appliances, (c) flat type PVC insulated cord consisting of two parallel vinyl insulated wire for electrical appliances (d) round type insulated cord with a twin twisted PVC coated wire sheathed with round PVC sheathing. (e) PVC insulated overhead wire with 20 to 30 core wires of about 0.5 mm diameter twisted together and covered with PVC (f) PVC insulated control cable for electrical appliances, low voltage distribution, indoor telephone wire, wiring of switch boards and low tension cables for automobiles. ',

' ' ,

' Domestic production of PVC cable (electric wires) between 2000 and 2004 was on average 13.060 million meters per year. The production of this product during the five year period ranged between 19.917 million meters in 2004 and 3.073 million meters in 2003. Due to the rapid expansion of the building construction industry, domestic production of PVC cables does not satisfy the ever increasing demand for this product. As a result some special types of PVC cables are being imported. In addition, PVC cables used for electrical appliances are not produce in the country and they are imported. The Amhara Region roughly consumes about twenty percent of the PVC cable need of the country. Its share of consumption from domestic PVC production was about 2.612 million meters per year between 2000 and 2004. Since there is no plant which produces PVC cable in the Region, all the PVC cable requirement of the Region is imported from Addis Ababa. The existing level of demand for PVC cables in the Region can absorb the production of a small PVC cable making plant to be established in the Region. ',

' There are basically two main inputs for making PVC cables copper wire and PVC plastic. Both of these inputs will be imported. Aluminium can also be used instead of copper. ',

' Basically the process of making PVC cable involves the coating of the copper wire with PVC plastic. And the process of coating or covering the wire takes the following stages. A wire tensioning and pay off unit carrying the base wire drums releases the wire under proper tension to the cross head mounted on the extruder. The extruder melts and delivers the required quantity of PVC compound to the cross head carrying suitable size nipples and dies in which the actual coating takes place. A long water trough cools the coated wire. PVC granules are fed to the extruder as cold granules are heated to the required temperature. A pulling out and winding arrangement takes up the covered wire from the cooling trough at uniform rate by means of a capstan wheel.

Plant and machinery needed include wire standing machine, PVC extruder and wire coating machine, wire straightening machine and accessories, cable printing machine and accessories, coated wire twisting machine for twisting together PVC coated wire, cable rewinding machine complete with reel stand, length measuring unit and coil reminder, insulation testing machine and equipment, thickness measuring instruments and other miscellaneous equipment. ',

' Saves financial resources of the Region, promotes self-sufficiency, and introduces new skills and technology, possibility to export to other parts of the country. ', ' 12', ' 1'),

(' Black Insulating Tape Making Plant',

'This is a very handy plastic-like item which finds usage in a wide number of applications. It consists of adhesive tape which is a good insulator and can be applied to an exposed conducting surface to from an insulating layer over it. Black insulating tape is used in electrical fitting works, with cables, electrical motors and other electrical equipment and instruments. ',

'Any place where there are electrical installations, one finds black insulating tapes. Given this, it is easy to imagine the quantity of black insulating tapes being used in the country; it is probably in the hundreds of thousands of rolls. Again like so many other industrial products, black insulating tapes are imported for domestic consumption. However, this product could easily be produced in the country. If promoted effectively investors in the Amhara region could produce insulating tapes for the national and regional market. ',

'Since there is no any plant which manufactures black insulating tape in the country, a new plant to be established for this purpose will have sufficient market which will make it financially viable. By substituting imports, the new plant will produce for an existing market. As the electrification process of the country expands, the demand for insulating tapes will also increase. ',

'Some ingredients which make up the adhesive such as castor oil resin, carbon black can be obtained from domestic sources. Other inputs will be imported. ',

'A plastic sheet is cut to desired width; the adhesive is applied to both sides of the sheet; The plastic with the adhesive is wound on a plastic spool; and the tape is ready for use. For making the adhesive, a compound of crape, asbestos, castor oil resin, carbon black, mineral rubber and other additives are mixed in a fixed proportion. The mixture is then applied on a plastic tape or on a fabric. Machinery required include mixing mill, spreading and slitting machine, bench grinder and hand tools. ',

' Saves foreign exchange and regional financial resources, has the potential of bringing financial resources to the Region, promotes self-sufficiency, introduces new skills and technology to the Region. ', ' 12', ' 1'),

(' Melamine Table Wares Making Plant',

' Melamine table wares such as cups, saucers, dishes and other similar items are household utensils used for eating and drinking. Compared to porcelain and ceramic table wares, melamine table wares are lighter in weight; and they are also durable, they can be made with the combination of different colors and very artistic designs. They are made from materials which are basically plastic. Due to their lightness, they are popular in hotels, restaurants, parties and marriage ceremonies. ',

' Basically two major groups of table wares are used in our country. One group includes the type of table ware used by rural people. These table wares are made by local people from local materials such as clay, specific type of grasses and wood. The other group is used by people who live in the urban centers. Table wares in this group include those made from metals, melamine, ceramics, porcelain and plastics. The use of this group of tableware’s is generally based on level of income of each urban family. Usually plastic tableware are used by low income urban families, melamine table wares by middle income families and ceramic and porcelain table wares are used by high income families. In 2006, number of urban families in Ethiopia is estimated to be 1.8 million. If we assume that the middle income families constitute about 40 percent of the total urban families, the number of these families is about 720,000. These are the potential consumers of melamine tableware. The share of the Amhara Region is about 187,200 families. It is for the market at the national and regional level that the production of melamine tableware should focus on. ',

' As indicated above the potential consumers of melamine tableware’s at t he national level are 720,000 families and at the regional level 187,200 families. Suppose that each family (with five members) buys at least 10 pieces of tablewares of different types, total purchase at the national and regional level will be 7,200,000 and 1,870,000 pieces respectively. This is the potential market for melamine tablewares both at the national and regional level. So far the demand for melamine tablewares are met by imports and to some extent by domestic production. Average annual domestic production is about 460,000 which is much below potential demand as indicated above. Gap between potential demand and domestic production shows the existence of captive market for melamine tableware's in the country. With further urbanization and possible income increase, the demand for these products will increase. ',

' main raw materials include melamine moulding powder, foils and packing materials, the first three will be imported. ',

' Three stages are involved in the production process of melamine. These are charging the mould, closing the mould and curing. To charge the mould, perform, pillets and powder or a combination of these is fed to the mould cavity in predetermined quantity. The printed melamine soaued paper is also kept in the required position. The mould is then closed by lowering the “male” part in the “female” part quickly and accurately. In the curing process, heat as well as pressure is applied for a certain time to the mould to mould the resin into desired shape. The product is then kept under pressure for some more time and allowed to cool. Finally the product is trimmed and polished before being packed. Main machinery includes hydraulic press, butting machine, grinding machine, heating plates, weighing machine, air compressor and some accessories. ',

' Saves foreign exchange and regional financial resources, promotes self-sufficiency in basic industrial products, improves the life styles of certain segments of the populations, introduces new skills and technology. ', ' 12', ' 1'),

('Paint Brushes Making Plant',

' Paint brushes are hand tools used by workers to paint walls and ceilings of buildings. These brushes vary in size from ½ inches to 6 inches. ',

'The Amhara Region gets its supply of paint brushes from Addis Ababa which, in turn, receives these products from foreign sources. Most houses and other buildings in the urban centers of the Region are painted; and practically all new buildings under construction and those which will be constructed in the future will be painted. Buildings usually residential and offices are repainted almost three or every years. All these indicate that painting is an important activity in the building construction sector; and this sector is expanding in the Amhara Region. Paint brush making can be undertaken with small scale operations. The present volume of work of painting in the Region can support the operation of one or two small scale paint brush making plant in the Region. In fact, since there is no any other similar plant in the country, the plants to be established in the Amhara Region can export their products to the other Regions of the country. ',

' ',

'Paint brushes can be made from natural or artificial fibers. In recent years, synthetic fibers have become dominant in the market. Even the handles of the brushes which were being made from wood are now being replaced by plastic handles. Hence, the raw materials will most likely be imported. ',

'The following are the steps which have to be followed in the manufacture of brushes. Preparation of fibers, preparation of handles and ferrule, fixing of fibers in the ferrule, pouring of adhesive in ferrule, vulcanization of rubber solution in the oven, fixing handle to ferrules and packing. Main machinery include, drying oven with air circulation arrangement, polishing of buffing machine, sterilizer, bibers making apparatus, and some tools. ',

' Saves foreign exchange and regional financial resources, possibility of export the products to other regions, introduces new skills and technology. ', ' 12', ' 1'),

('PVC Flooring making plant',

'PVC flooring is one of the plastic products made up of large organic molecule containing carbon. It is made from polyethylene and other plastics by calendaring and injection moulding. Machines it is formed using plastic sheets prepared. It is used for this purpose .it is used for covering floors. It has many advantages, such as light weight, strength, and high resistance to water, fungus, chemical, rust and other damages. it is cheaper than wood and marble. Hence, it is used by big buildings, such as offices apartment, resident houses, etc. for flooring (for covering floors). ',

' ',

'There is an increasing demand for the PVC flooring for building, such as government office, apartment, school, residences, etc. PVC flooring, like other plastic products, is an increasing popular material because it is relatively durable. it an pleasant to touch . it provides design freedom, that is, it can be easily designed in any desired shape and color .it is water, chemical and fungus resistant. it is cheaper than wood and marble etc, hence it will be beneficial to invest in the PVC flouring product in the region. ',

'Because of the significant advantage it has the product is demanded by various users, such as government offices, non governmental organization business enterprise, factories, schools, hospitals, individual users such as households. Therefore, there will be a wide range of market for the product. ',

'95% the row material, mainly, polyethylene, for the production of PCV flooring is imported, while about 5%is locally produced. The countries from where the row material is imported one. Europe (Italy, Germany, etc, united Arab emirates, Egypt, etc',

'Injection moulding: using a piston or screw force plastic resin through heated tube into a mould, where the plastic cools and hardens to the shape of the mould. Then the mould is opened and the plastic cost removed.

Extrusion: In the manufacturing process, pellets of nylon are stirred and melted. The melted plastic mixture will be forced in to the desire shape.

Calendaring: Forming continuous plastic sheets are used for flooring. Forcing hot thermoplastic resin between heat rollers called calendars makes the plastic sheets. ',

' It saves foreign exchange it creates employment opportunity for the growing labor force in the region .There will be earning for the investors in the form of profit. it will generate revenue for the Regional state in the form of income tax and VAT. ', ' 12', ' 1'),

(' PVC Wall Covering Making plant',

' Like most plastic products, PVC Wall covering is made form polyethylene and other plastic by calendaring machine, injection moulding machine, and extrusion machine, which are used for this purpose. It is used for covering walls. It has significant advantages, such as light-weight, strength, high resistance to water, chemical, fungus, rust and other damages. It is cheaper that wood and marble. Hence, various government offices, other organizations and individuals, for covering building walls, use it. ',

' There is an increasing demand for the PVC wall covering for buildings, such as government offices, apartments, schools, residences, etc. PVC wall covering, like other plastic products, is an increasingly popular material because it is relatively durable. It is pleasant to touch. It provides design freedom, that is, it can be easily designed in any desired shape and color. It is water, chemical and fungus resistant. It is cheaper than wood and metal products. Unlike metal products, it is not exposed to rust. Hence, there is a good ground to invest in the PVC wall covering making plant in the Region. ',

' Because of the significant advantages mentioned above, the product is demanded by various users. These users include government offices, nongovernmental organizations, business enterprises, factories, schools, hospitals, individual users such as households. Therefore, there will be sufficient market for the product. ',

' Like other plastic products, 95% of the raw material, mainly, polyethylene, for the production of PVC wall covering is imported, while about 5% is locally produced. The countries from where the raw material is imported are: Europe (Italy, Germany, etc), United Arab Emirates, Saudi Arabia, Egypt, etc.

' Injection molding Using a piston or screw force plastic resin, through heated tube into a smould, where the plastic cools and hardens to the shape of the mould. Then the mould is opened and the plastic cast removed. In the manufacturing process, small pellets of nylon are stirred and melted. The melted plastic mixture will be forced into the desired shape. Then, the calendaring process forms continuous plastic sheets that are used for wall covering. Forcing hot thermoplastic resin between heat rollers called calendars makes the plastic sheet. A series of secondary calendaring is used. ',

' PVC wall covering is cheaper than wood, marble and other imported wall-covering materials and are durable so that it has a wide rage of market. It saves foreign exchange. It creates employment opportunity for the growing labour force in the Region. There will be earning for the investors in the form of profit. It will generate revenue for the Regional state in the form of income tax and VAT. ', ' 12', ' 1'),

(' Plastic Containers Making Plant by Blow Molding',

'Containers are substances produced for holding liquids or other materials that can be poured through an opening at the top of the containers. Plastic containers, in particular are made from polyethylene and other plastics by Blow Moulding machines. A plastic container has advantages over other containers made form metal and other materials, and widely used by various users. Plastic containers include plastic barrels of different size and shape, plastic reservoirs, bottles, etc. ',

'Plastic containers, like other plastic products are cheaper than containers made from metals. They are relatively durable. They are pleasant to touch. Plastic containers can be easily made in any desired shape and size. Plastic containers have other advantages over containers made for metals and are preferred to metal containers. These advantages include strength, high weight, high resistance to water, chemicals, ',

'It is true that there is an increasing demand for the plastic containers in different shapes and size in the Region. Because of the advantages plastic containers have there are various users of the product in the Region. Therefore, the product will have sufficient market. ',

'Like other plastic products about 95% of the raw material, mainly, polyethylene, for the production of the plant is imported, while 5% (minerals and additives) are locally produced. The countries form where the raw material is imported are include:- Western Europe, such as Italy, Germany etc., United Arab Emirates, Egypt etc. ',

'Plastic containers and made by Blow-molding machine. The Blow-molding is used to form containers from soft, hollow thermoplastic tubes. First a mould is fitted around the outside of the softened thermoplastic tube, and then the tube is heated. Next, air is blown into the softened tube. Blow-Molding is used to make different types of containers. ',

' It saves foreign exchanges. It creates employment opportunity for the growing labor force of the Region. There will be earnings for the investors in the form of profit, and it will generate revenue for the Regional State in the form of income tax and VAT. It will meet the demand of the various users of containers in the Region. ', ' 12', ' 1'),

(' Toothbrush Making Plant',

'A toothbrush is an item used to clean the teeth of human beings. In developed countries even horses are provided with their own toothbrushes in which the cleaning is done by people. Before the advent of plastics, most toothbrushes were being made from bamboo and pigs hair. Now tooth brushes are mostly made from synthetic resin and synthetic fiber in which the resins are used for the handles and the nylon mono-filament for the bristles. ',

'Toothbrushes are one of the essential items for people. They keep our teeth clean and free from disease causing bacteria which are produced by decaying food remains left in between our teeth. The use of toothbrush is a necessity and taken for granted in developed countries. In our country toothbrushes are used by the majority of people in urban areas, but in rural areas the use of factory made tooth brushes is extremely rare. Some rural people mainly the young use twigs of some plants as toothbrushes. The use of these twigs is not done for keeping the teeth healthy but to make the teeth whiter so they look good. Unfortunately the overwhelming majority of rural people do not use toothbrushes; and the result is decaying teeth and infection by many diseases related with the mouth and the teeth. Many people loose most of their teeth due to lack of proper care for the teeth. One of the functions of public health personnel should have been to teach and convince rural people to use toothbrushes to clean their teeth and to take other measures to keep the teeth clean and healthy. Regrettably more than seventy years after the establishment of the Ministry of Health, basic hygiene education has not reached rural Ethiopia. But better late than never; and we have to make a start. One way to start is to produce toothbrushes here at home. ',

'About 19.2 million people live in the Amhara Region. If all these Ethiopians were living somewhere in Western Europe or North America, they could have owned 19.2 million toothbrushes at a given time. But living here in their own country, they may have about 0.55 million toothbrushes. This is one fourth of the number of people who live in urban centers. The other 18.7 million do not have toothbrushes. All these people are exposed to various types of mouth and tooth diseases which are mainly caused by unclean teeth and mouth. If public awareness is created about the health benefits of using toothbrushes by public health personnel, a huge demand for tooth brushes will be created. And the potential demand is 18.7 million tooth brushes every 4-6 months. ',

'to be imported',

'The toothbrush making process consists of the following eight stages. Drying of the raw material-resin by hopper dryer; metal mould-the handles are moulded by metal mould attached to the injection moulding machine; annealing-the moulded handles are cooled in water or warm water; separating-the sprue runner on the moulded tooth brush handles is separated; tufting-nylon bristles are tufted on to the toothbrush handles; trimming- the bristles are trimmed in different shapes; hot stamping- brand name, company name, etc. are stamped on the toothbrush; and packaging-product is packaged using different material. Required machinery and equipment include hopper dryer, injection moulding machine, metal mould, automatic extractor for the moulding machine, annealing bath, separating cutter, portable co usher, tafting machine, bristle bundle cutter, trimming machine, hot stamping machine, foil slitter, punching press for blister, high frequency welder. ',

' Contributes to the improvement of health of the people, saves foreign exchange and regional financial resources, and introduces new skills and technology. ', ' 12', ' 1'),

(' Formica Sheets Making Plant',

' Formica (veneer) sheets or decorative laminate are characterized by a hard surface which is highly resistant to damage by scratching, heat and moisture. Formica sheets are mainly used in the furniture and joinery industry. Many table tops, cupboards, drawers, and other similar furniture are made from Formica sheets. In the furniture industry, Formica sheets are replacing plywood or veneer made from wood. Formica sheets come in various colors and designs including wood grain and abstract patterns. The most popular decorative Formica sheets have one millimeter thickness of 1.2 m x 2.44m size. ',

' ',

' Formica or veneer sheets are widely used in Ethiopia in the furniture and joinery industry. All the Formica sheet requirements of the country are imported. Around 1997 the demand for Formica sheets was estimated to be about 70 tons per year. This demand is projected to reach 250 tons per year in 2115. As Formica sheets have become essential inputs in the furniture and joinery industry, it is necessary to produce them locally in order to save foreign exchange. The more Formica sheets are used the less plywood or veneer are used thus saving forest resources. The present demand justifies the establishment of a Formica sheets producing plant in the country; and the Amhara Region should exploit this opportunity by establishing the plant first. ',

' The main raw materials are papers such as Kraft, base and tissue papers; phenol, formaldehyde, melamine formaldehyde and industrial alcohol. The paper inputs could be obtained from local sources and the other inputs will be imported. ',

' Resin preparation, impregnation, assembling, curing and finishing are the major production processes. Phenol formaldehyde and melamine formaldehyde are prepared; in the preparation plant to impregnate the Kraft paper and the decorative base paper respectively. The impregnated paper is then stored in specified conditions. The barrier paper (Kraft paper), the decorative and the tissue papers are stacked in a specified manner on 55 press plates and the curing process is carried out under controlled parameters on hydraulic press. Finally the finishing operations take place. Main machinery and equipment needed include resin preparation plant, hydraulic press, impregnating plant, curing and trimming machine, material handling equipment, vacuum press plates and laboratory and testing equipment. ',

' Saves foreign exchange, contributes to the conservation of forest resources, brings in financial resources, introduces new skills and technology. ', ' 12', ' 1'),

(' Plastic Filament Twine and Rope Making Plant',

' Twine and rope have so far been made from natural fibers. However, during the last 20 years there has been a shift from natural fibers to synthetic fibers for making twine and rope. Today, most twine and ropes are made from nylon, polyethylene, polypropylene and the like. Twine and rope made from synthetic fiber do not rot easily, are light and strong. ',

' Twine and rope are used in agriculture, transport, construction and other economic sectors. Before the advent of synthetic fibers, twine and rope were made from natural fibers. In the country side, in addition to natural fiber, home processed leather made into strips was used as twine and rope. However, home made twine and rope are completely replaced by imported twine and rope. Every year thousands of tons of twine and rope are imported into the country. This import quantity will grow as the economy expands. Though there are no specific figures which indicate the demand for twine and rope, one can safely assume that there will be enough demand to make a twine and rope making factory a financially viable venture. ',

' As sated above, the main raw material is plastic resin such us nylon, polyethylene and polypropylene. These plastic materials will be imported. ',

' To manufacture plastic monofilament, the plastic resins are extruded in the form of a filament by an extruder, and are stretched to the length 3 to 13 times; and the filaments having 200 to 6,000 denier are extruded and are wound round the monofilament bobbin. With these filaments as basic materials, fishing net, fishing string, rope, casting net, spoon net, brush, etc are manufactured. To manufacture ropes, 150 pieces of monofilament are cooled and solidified in the quenching bath and this material passes through a series of roller baths to achieve strength of 7 to 10 times. Each filament is wound round the winder bobbin. The bobbin is set on a 4-spindle stranded type creel stand, and a fixed number of monofilaments are twisted by 4-spindle stranded. There are other processes before the final product is made. Main machinery and equipment needed include extruder, a series of spindles, balling machine, and rope coiling machine, ring doubling frame, a group of high speed cylinders, bobbin stranded and closer. ',

' Saves foreign exchange, brings in financial resources to the region, introduces new skills and technology. ', ' 12', ' 1'),

(' Hard Rubber Battery Container Making Plant',

' A hard rubber battery container is a rigid and strong case or box which contains all the contents and components of a lead-acid battery. A lead-acid battery consists of a container cell plates (positive and negative plates), separators for the cells and sulphuric acid solution and other battery components. The battery container has to be resistant to acid, heat and mechanical vibration. ',

' ',

' The demand for rubber battery container and car battery depends upon the number of motor vehicles and their annual increase. Currently, there are an estimated number of 150,000 vehicles in the country; and at a given time the same numbers of lead acid batteries are in use. More than 30 years ago, one car battery factory was established in Addis Ababa. This factory assembles car batteries by importing the various components of the battery including the rubber container. Between 1980 and 1994, average annual import of battery container was around 6800 units; and average growth rate of the import was 14 percent. Demand for battery container in 2006 was estimated to be about 11.000 and projected demand for 2011 will be 76,000. ',

' The main raw materials include natural rubber, synthetic rubber and reclaimed rubber. Production of natural rubber is being tried in the country. Until there is enough domestic production, the raw materials will be imported. ',

' Production process involves mixing of the raw materials charge (natural rubber, synthetic rubber, reclaimed rubber and chemical additives) using a mixing mill. The rubber compound is then filled into the mould and cured in a steam heated hydraulic press for about 20 minutes at 1580c. After curing is completed, the molded containers are taken out of the moulds, and the edges are properly trimmed. The finished product is then packed and stored. Main plant and machinery required include rubber mixing mill, hydraulic presses, boiler, weighing balances, mould fixers, testing equipment. ',

' Similar to other projects. ' , ' 12', ' 1'),

(' Self-Adhesive Labels Making Plant',

'Self – adhesive labels are pre-gummed and pre-printed strips of plain or coated paper that bear brands, trade marks, emblems, etc. of business organizations and other institutions and affixed to finished goods or to preferred surface of other objects for giving appropriate information. These labels are also called tags or stickers. According to use labels in general can be divided into permanent adhesive and re-detachable adhesive. Self-adhesive labels ready for use mainly include three parts - label raw paper as carrier material, silicon paper or synthetic film from plasticized PVC foils as a baking material and dispersion based contact adhesive as a coating media. ',

' ',

'The main consumers of self-adhesive labels are beverage, cosmetics, textiles, and food, paper, and tobacco, chemical and pharmaceutical factories. Institutions which are responsible for renewing vehicle registrations also use these labels. In 2005, demand for self-adhesive labels by different consumers was estimated to be about 451 tons. This estimated demand is projected to grow by about five percent per year. Part of the demand for self adhesive labels is met from domestic production, but the quality of these labels is considered to be poor by the major consumers. The bulk of the labels are imported. By employing modern technology and quality inputs, it is possible to produce self-adhesive labels with the required quality which can satisfy the quality expectations of the major consumers. ',

'The main materials used to manufacture self-adhesive labels are labels raw paper (carrier material), silicon paper (backing material), dispersion based contact adhesive (coating media) and printing ink. ',

'Rolls of the label paper are brought to the coating machine. In the coating machine for dispersion, the web (continuous sheet of paper) is fed from the unwind of the contact adhesive application station. After application of the contact adhesive, the web is guided through a drying tunnel which is equipped with a conveyor. After the drying process the web runs through a cooling tunnel and through a weight per unit area gauge where the applied weight can be measured. Then the web enters a laminating unit via a web edge guide. Coming from a separate un winder, the silicon zed carrier paper runs over the guiding rolls towards the laminating mechanism. In this mechanism, the webs are bonded together and then wound onto a winder. Label printing and stamping is affected in a flex graphic rotary label printing and stamping machine. Finally the label material is packed. Main machinery and equipment required include coating and laminating machine, dispersion adhesive preparation unit, roll slitting machine, label printing and stamping machine, ink mixing unit, paper cutting device, packing line, laboratory equipment. ',

' Similar to other projects', ' 12', ' 1'),

(' Infusion and Transfusion Kits Making Plant',

'Transfusion kits are used for the transfer of blood from the kit to the body of a patient, where as, infusion sets are used for administering infusion solutions i.e. for the transfer of a solution like glucose to the body of a patient. The two sets of products should have extremely high quality standards and their production requires specially trained and highly skilled production personnel. Though the two types of kits have similar constructions, they differ in two areas. Due to the fact that the blood cells are rather big, the filter in the drip chamber of the transfusion system has a bigger pore diameter than the filter of an infusion kit. In addition, the drip chamber of a transfusion system has a larger volume than that of an infusion set. The two kits must meet the following requirements optimum product quality, absolute operational reliability, convenient handling and flexibility. ',

'Ethiopia has a population of about 75 million (2006). If we assume that 0.5 percent of the population need infusion and transfusion services, the annual requirement of kits will be 375,000. All this requirement has been met through imports. Transfusion and infusion kits are among the essential items in the field of health care which the country has to be self-sufficient through domestic production. And the estimated annual requirement for the kits is more than sufficient to absorb the production of a medium size plant. ',

'The raw materials are PVC (Polyvinylchloride), PP (Polypropylene), ABS (acrylnitiril-butad-ienestyrene), Polystyrene, color pigments and ethylene material (sterilization). These raw materials will be imported. ',

'There are three main stages in the production of transfusion and infusion kits. These are injection moulding and extrusion section, preliminary assembly, final assembly, sterilization and quality control and packaging. Parts and components are produced by the process of injection moulding. Other parts such as flexible tubes made of PVC are made in a special extruder line. In the first stage of assemble operations, many parts of the kits are put together. The remaining parts are finally fitted to the main body of each kit. Autoclave sterilization with ethylene oxide is made for eight hours. Because ethylene oxide is inflammable, the sterilization equipment must be explosion-proof and installed in a separate room. The sterilized sets are stored under quarantine for airing to allow description of rest-quantities of ethylene oxide. Before being released for sale, the kits have to undergo quality tests to prove sterility and absence of any pyrogens. Required machinery include plastic granule feeders, injection moulding machines, moulds for different parts of drip chamber, flow regulator and luer connector, extruder line, cube cutting machines, blister packaging machine, autoclave with piping, pumps, valves, air compressor, cooling unit and sets of laboratory equipment. ',

' Similar to other industries. ', ' 12', ' 1'),

(' PVC Windows Making Plant',

' The raw material PVC has proved to be an ideal material for windows. PVC windows have all the positive qualities of wood, aluminum and steel windows. Long life, stability, safe protection against weather and wind, insulation against heat or cold and noise, plus numerous possibilities for variety are the main advantages of this type of window PVC window production also stands for minimum investment, small building area, low raw material prices, short production time and good market prospects. ',

' ',

' Up to now windows used in the building industry in the Amhara region are made mainly from wood, and steel. Aluminum windows are extremely rare in the region. Due to shortage of timber, making windows from wood has become extremely rare. Windows made from steel are too expensive. On the other hand, building constructions are expanding in every urban area in the region. Even in rural areas, people have started fixing modern windows when they build new houses. If the economic situations of the region improve, most existing houses could be replaced with new and better houses. This will require more windows and doors. Even with the existing level of income, people build new homes to replace old ones and to accommodate new families. The rate of population growth in the region is estimated to be 2.9 percent per year. With a population of 19.2 million people, there are 3.84 million families in the Amhara region. Every year, there are 110,000 new families who need new homes. If we assume that 10 percent of the existing houses are replaced every year, there will be about 380,000 new houses replacing old ones. Hence, the total number of new houses assumed to be built every year will be about 490,000 (380,000+110000). Of this number of new houses, at least 5 percent will use PVC windows if their prices are competitive. This means that 25000 new houses will use PVC windows. When new buildings for schools, hospitals, clinics, offices, apartments, etc. are included, the demand for PVC windows will increase. The 25000 new houses which will use PVC windows will need about 125000 units of windows. The other new buildings might need another 75000 units. The demand for PVC windows in the Amhara region will be about 200,000 per year. As PVC windows are light in weight, they can be easily transported to other places. Hence, the possibility of exporting these products also increases the demand. ',

' The main raw materials are PVC granulate, sheet glass, fittings, etc. The main inputs will be imported. ',

' The PVC raw material is taken from silo and fed to a mixing plant where the additives required for a product suitable for window units are dosed in and thoroughly mixed. The treated bulk PVC is fed to a twin screw extruder which transports, melts, homogenizes and extrudes the desired profile all in one operation. A down stream calibrating table stabilizes the profile and cools it rapidly, thus preserving the form. The continuous profiles are cut to length and stacked before assembly. The extruded window section is cut to length on a double mitre saw and fed to an automatic screwing machine. Here the PVC section and the steel reinforcement section are screwed together. Next, rubber gasket profiles which are essential functional parts of the window are inserted. The frames and sashes are assembled. The fittings are also mounted at this stage. The window pane, glazing bead, and rubber sealing gasket are inserted in the down stream glazing press. Finally, a series of quality checks are performed. There are about 27 units of machinery and equipment needed for the production of PVC windows. The main ones include mixing and extrusion plant, extruder, winder, roll-forming unit, double mitre saw, water slot machine, 4-head welding machine, single-head welding machine, etc. ',

' Similar to other projects. ', ' 12', ' 1'),

(' Plastic Products by Rotary Thermoforming of Plastomers',

' Rotary thermoforming is a plastomers processing method used to produce hollow objects of a volume ranging from several cm3 to 20m3 with a wall thickness from 2 to 10 mm and more. A wide range of products for various applications is produced by this process. The most common products are various containers for chemicals (liquids and powders) and transportation vessels, for the chemical, textile, foods and other industries. Various objects used in agriculture can also be produced – transportation vessels, storage bins, tanks, etc. Other products include toys, light fittings, furniture and a variety of household objects. Rotary thermoforming has numerous advantages over other methods of polymers processing such as blow or injection moulding. ',

' The use of plastic products for a variety of purposes has become so common in both rural and urban areas of the country. In any market place (rural or urban) one can observe the numerous types and large number of plastic containers and other related products made available for sale. In both rural and urban homes, there are many types of plastic containers being used for a variety of purposes. In addition to domestic use, plastic containers are used in manufacturing, agricultural and transportation activities. Plastics produced by rotary thermoforming are not only used as containers, but they are also used for furniture, toys, light fittings. Though the demand of these products is increasing in the Amhara Region, there is not a single plant in the Region which produces any of these products. The existing demand and its potential increase will absorb the production of a rotary thermoforming of plastomers plant. ',

' The material most frequently used are polyethylene of all densities, cross linked and linear poly styrene, polyamide, polyvinylchloride and nylon. These are products of the chemical industry and they will be imported. ',

' mixing is needed when the finished product has to be colored. The plastomer powder and pigments are mixed in exact proportions in mixers of a standard type until the mixture becomes completely homogenous so that the finished product is colored evenly. The plastomer, which is in bags or containers, is put into vessels of a certain size, weighed and taken to the rotary transformer. After this process molding takes place which includes pouring, closing, putting, heating, cooling and taking. When the product has been taken out of the mould, it has to be finished by cutting, planning, drilling, milling, etc. The moulds are relatively simple made of steel sheets. The rotary thermo former consists of a power generator which rotates the mould, a gas burner for heating the mould and a control panel for operating the machine. Required machinery and equipment include gas tanks, mixers, rotary thermo formers, cooling ventilators, finishing equipment and tools, scales, moulds. ',

' Similar to other projects. ', ' 12', ' 1'),

(' Polyester Spin Fiber and Filament Making Plant',

'Textiles are made from natural fibers (cotton, wool, silk) synthetic fibers (polyester, nylon…) or a blend of natural and synthetic fibers. In our country, the overwhelming majority of the population (especially those who live in the rural areas wear garments made from synthetic fibers. The most popular clothing material is fabrics made from polyester fiber. Fabrics made from polyester have desirable properties like adaptability, high strength, good processing and shrinking quality, rot resistance, easy to care and handle, resistance to light and chemicals, Since demand for fabrics made from polyester fiber is extremely high in the Amhara Region, the purpose of this project idea is to indicate the potential benefit of manufacturing the fiber in the region. ',

' ',

'Of the 19.2 million people living in the Amhara region, around 17.3 million of them live in rural areas. Practically all these people wear garments made from polyester fabrics. If we assume that one person consumes at least 5m2 of polyester fabrics, total annual consumption of the product is about 86.5 million m2. Of the 1.9 million people who live in urban areas, about 50 percent of them wear garments made from polyester fabrics. Again if we assume that each urban resident consumers about 7m2 of polyester fabrics per year, total consumption of the product by the urban residents of the region is about 6.65 million m2. Thus, consumption of polyester fabrics in the Amhara region is about 93.2 million m2 per year. More than 95 percent of the polyester fabrics being consumed in the region is imported. If a polyester fiber making plant is established in the region, it will be much easier to establish a polyester fabrics manufacturing plant to supply the regional market. ',

'The main raw materials are chemical products called polyamides and poly a crylnitrile in which polyethylene tereph thalatc is used to produce polyester fiber. These products of the chemical industry will be imported. ',

'The main processing stages are continuous or discontinuous polycondensation, melting or polyester chips making, spinning spin fibers, textile filaments or industrial filaments and spin drawing. Once the spin fibers and filaments are produced, they are delivered to other manufacturing plants. Main machinery and equipment needed for making polyester spin fibers are granulate feed vessel, dryer, extruder, spinning heads, textile finish panel, take-off roller set, laying of undrawn tows, feed creel, textile finish, stretching, crimping, heat-setting, cutter, baling press and laying of drawn endless tows. Machinery for polyester filament include granulate feed vessel, dryer, extruder, winder, spinning heads, bobbin trolley, draw-texturizing and draw-twisting. ',

' Similar to other projects. ', ' 12', ' 1'),

(' Synthetic Marble Producing Plant',

' synthetic marble which is resin binding with an appropriate filler extender is an imitated substitute for quarry marble. Synthetic marble products are industrially processed marble like imitation products manufactured from composite chemical like polyester and inorganic materials such as marble powder, limestone, granite, sand, etc. These products have advantages such as longer life, better varieties of colors, greater manufacturing flexibility and shorter production time. These “man-made marble” are used mainly for commercial buildings, interior decorations, sanitary fixtures, institutional premises, etc. Due to their refractory and heat resistant characteristics, synthetic marble products are used for hearth construction as well. ',

' ',

' Synthetic marbles have been introduced to the Ethiopian market during the last ten years. During this time, the use of synthetic marbles has increased quite substantially in all major urban centers of the country. Practically all sanitary fittings and interior decorations in big building are made of synthetic marbles. As building construction of all types is expanding in every part of the country, the demand for synthetic marble is also expanding. The unit price of synthetic marble is much lower than the price of natural or quarry marble. This is a major factor to increase the demand for synthetic marble. According to a recent study, synthetic marble is projected to have a demand of 435000 kgs. per year in 2006. ',

' Major raw materials required for the manufacture of synthetic marble products are gelocat, panolyester, cobalt, butanox, carnauba wax and filter materials which can be selected from a wide variety of inorganic materials like marble powder, limestone, granite, sand, etc. Raw materials such as marble powder, limestone, granite and sand will be obtained from domestic sources; the rest will be imported. ',

' A polyester compound of a specific quality is mixed with a cobalt solution (acceterator), filler and pigment. A solution of peroxide (butanox) is added to the mixture in order to accomplish the final chemical reaction. The filler material (marble powder and sand) is added to the mixture after removing possible impurities. Setting up of moulds is carried out at the same time. Prior to casting, the moulds are treated with a releasing agent (carnauba wax) and then sprayed with a gelocat solution. This solution provides the resistant layer of the finished product. The prepared mixture is poured in the cavity formed by the appropriate “male” and corresponding “female” moulds to cast the finished synthetic marble product. During casting, the moulds are placed on a especially constructed table equipped with small vibrating engines with ensure a thorough filling of the cavity and adequate dispersion of the mixture. After casting, demoulding and grinding of the cast take place. Finally the products are polished and ready for marketing. The plant can also produce synthetic marble for bathroom fixtures like wash basins, WC interior and shower bases. It only requires the preparation of different casting moulds.

Machinery and equipment for the plant include about 24 units and pieces. The most important ones are vibrator, moulds, spraying cabin, gel coat equipment, air compressor, mixer, grinder, polyester exhauster, water extractor with refrigeration, etc. ',

' Utilizes under utilized natural resources (sand, limestone, granite-----) saves foreign exchange and regional financial resources, introduces new skills and technology. ', ' 12', ' 1'),

(' Pvac (Polyvenyl-Cetate) Wall Coating Making Plant',

' This wall coating material consists of white pigment dispersed in water and of a binder based on PVAC with the addition of filters, flame retardants and preservatives and is used as a protective and decorative final coat for outdoor and indoor walls. The coating may be thinned by the addition of water and is applied to walls with as roller or a brush. This coating material may be used to paint and protect walls in homes, offices and industrial, commercial and other public buildings. It may be applied to concrete and to mortar. If necessary, the surfaces should be smoothed before applying the coating. ',

' ',

' PVAC wall coating is related with the building construction industry. If this industry expands, the demand for PVAC wall coating will grow. The last ten years have witnessed a large expansion in building construction in almost all parts of the country. Buildings for schools, universities, offices, factories, shops, stores, residence, finance and commerce. etc. have been built, and are being built. There are strong indications that this trend will continue in the foreseeable future. After all, if the country has to reach a certain level of development, its building infrastructures have to be transformed from the existing dilapidated situation to a much more improved situation. Similar to other regions, the Amhara region is also experiencing modest expansion in the construction of buildings. These buildings require coating material like PVAC wall coating. Currently, the region receives it wall coating products from Addis Ababa. Like many other building materials, wall coating is a bulky product which makes it expensive to transport long distances. For meeting the existing and future demand for wall coating material, there is a need to look into the viability of establishing a PVAC wall coating producing plant in the Amhara Region. ',

' The main inputs for making PVAC wall coating are PVAC binder, flame retardant, pigment, kaolin, calcite and preservative. Kaoline and calcite could be obtained from domestic sources. The others will be imported. ',

' Raw materials are weighed and put, in the proper order, into a vessel containing water in which they are mixed. The mixer is a combination of a planetary mixer (30-40 rotations per minute giving semi dispersion) and a dissolver (1400 rotations per minute). Mortars and other products of a greater viscosity may also be produced by changing the granulometric composition of the filler or the formulation. Composition of final coating mixture for interior and exterior walls is determined according to the requirements of a particular coating procedure (brush, roller and spray). Final coating mixture is diluted by addition of water depending upon the particular bed and desired type of coating. Materials such as quatz, natural and sedimented calcium carbonates, calcium/magnesium carbonates, magnesium silicates (chalk) magnesium/aluminum silicates, and aluminum silicates (kaolin). The range of the product can be inc increased by combining methods of mixing, changing the ingredients and adding pigments, Required machinery include planetary mixer, scales, fork-lift truck and tanks. ',

' Similar to other projects. ', ' 12', ' 1'),

(' NRP Ballistic Helmet Making Plant',

' NRP (Nylon Reinforced Plastic) ballistic helmet is designed to replace heavier steel helmets while still meeting all the requirements in headgear design for combat wearing. Some of the advantages of the NRP ballistic helmets include better bullet-proof effect, light weight, simple design, low heat conductivity and removable interior parts. The helmets to be produced vary depending upon their specific uses. The standard products are ground troops' helmet, parachutist helmet, rock jumping helmet, navy ballistic helmet and linear helmet. . ',

' ',

' Apart from regular uniforms, all the requirements of the armed forces of almost all developing countries are imported from developed countries. To cloth, equip and arm their armed forces, developing countries spend huge amount of foreign exchange resources every year. All the East African countries import almost all the requirements of their armies. One of the most important requirements of any soldier for combat is helmet. This essential protective headgear is not produced in any of the countries of the East Africa sub-region. Our country, with the largest population in the sub-region does not produce this life saving military outfit at home. As a result, it is forced to spend million of dollars to import this product from abroad. The demand for ballistic helmet depends on the size of the armed forces of a country. The size of these forces in the sub-region could justify the establishment of a medium size NRP ballistic helmet producing plant. The economic size of such a plant is much below the potential demand of the product both in Ethiopia and the sub-region. ',

' The main raw materials required are ballistic nylon cloth, phenol formaldehyde resin, polyvinyl butyral resin, olive green pigment, rubber edging and adhesives. Almost all the inputs will be imported. ',

' Method of manufacture of NRP ballistic helmets involves about six main stages. For making the body of the helmet, the process includes:

(1) based on 3-1 make a coating of resin and O.G. pigment on the nylon cloth and mold 8 ply with press,

(2) The rim of this molded helmet should be smoothly and uniformly finished and it must be attached tightly in the shape of a ball,

(3) In order to attach hardware on the body, 15 drilling is performed.

Preparation of the interior involves.

(2) 6 clips are attached to the head band so they can be worn or removed from body.

(1) Back head rest be attached on the rear head with buckle so that it can be flexible for adjustment of position.

(3) head band leather is attached by using 6 spring clips

(4) To attach neck band on both sides on body so that it is fixed on its position, use clips to band so that helmet is removable when it sustains an impact.

The next manufacturing stages include painting of the helmet, checking its weight, undertaking ballistic and impact testing and packing. Machinery and equipment needed are mixer, coating machine, hydraulic press, mold, trimming machine, cutting machine, grinding machine, drilling machine, riveting machine, welding machine, sewing machine, boiler, lathe, compressor, painting unit, oven, balance and piping. ',

' Saves and earns foreign exchange, promotes self-sufficiency in a critical combat outfit. ', ' 12', ' 1'),

( ' Fiber Glass Reinforced Plastic Products Making Plant',

' Fiber glass reinforced plastics are relatively a new group of man-made material used for construction and are essentially a combination of resinous polymers (thermosetting) with strengthening materials such as glass fibers, asbestos, etc. The combination is usually maintained by the impregnation processes. Woven clothes of fiber glass or non-woven mats are impregnated by reinforcing materials to a hard and infusible state under conditions ranging from room temperature and atmospheric pressure. The plastics are unique in nature. The products made from these plastics are light in weight, they contain high tensile strength corrosion restance chemically inert as well as high heat, electrical and sound insulation resistant. Road and railway tanker bodies, bulk cargo containers, refrigerated containers, car bodies, helicopter rotors, bath tubs, sinks, decorative translucence building panels and roofing sheets are some sheets are some specific products made from fiber glass reinforced plastics. ',

' ',

' In the context of the stage of development that the country has reached, fiber glass reinforced plastics could be used for making mainly bath tubs, sinks, building panels, roofing sheets and containers for water, oil and other liquid substances. During the last five years, local production water tanks (containers) have started and the volume of production has been growing with the expansion of the building industry. Today fiber glass reinforced plastic water rankers placed on top of small and large buildings in Addis Ababa and other major urban areas are common sight. Because of growing demand for these types of water tankers, a number of factories have been established in and around Addis Ababa. On the other hand, other products like bath tubs, sinks, panels roofing sheets, etc, made from fiber glass reinforced plastics are imported. These products are also related with the building industry. As this industry is rapidly expanding in almost all parts of the county, the demand for products to be made from fiber glass reinforced plastics will grow. So far only water tanks used to supply water to buildings are made from fiber glass reinforced plastics; and this is of recent use. But water tanks made from the same material but of larger sizes can be used for saving and storing water for small scale irrigation. The use of such tanks will spread in the rural areas of the country as mall scale irrigation schemes are expanding at increasing rates. In the Amhara Region, the use of fiber glass reinforced plastics products is limited since there are no plants which produce these products in the Region. The water tanks produced in Addis Ababa are bulky and take a lot of vehicle space which make them expansive to transport long distances. As a result, these tanks are not used in the Region. However, the Amhara Region has its share of the national demand of products made from fiber glass reinforced plastics. The demand for these products in the building and irrigation sectors of the Region can justify the establishment of a fiber glass reinforced plastic products making plant. ',

' The main inputs required are resins glass fiber, catalyst and accelerator colors. Like other chemical inputs, these inputs will also be imported. ',

' Reinforced plastics are based either on thermosetting resins or on thermoplastic resins. Whereas thermo sets can be processed by a variety of moulding method, thermo plastics are almost invariably injection moulded. Various methods which are used for making reinforced plastics include centrifugal winding, hand lay up process, spray up moulding, cold matched tool moulding, bag moulding, high pressure moulding and filament winding. The essential requirement of a good moulding operation are (a) the resin must penetrate the entire mass of reinforcement and wet every fiber uniformly and (b) the selection of a suitable reinforcement, thickness and direction of lay-up. ',

' Similar to other projects. ', ' 12', ' 1'),

( ' Plastic Sanitary Fittings Making Plant',

' These are “hard” plastic products used to connect plastic pipes in the sewerage system of buildings. Some of these products are called eflows, tees, etc. With plastic pipes, the fittings are used for fixing kitchen sinks, washing tubs, toilet fixtures and other plumbing facilities. ',

' ',

' For many years, metal pipes and fittings were used for indoor plumbing and cemental pipes and fittings for outdoor sewerage systems. During the last 30-40 years, metal pipes and fittings have been gradually replaced by plastic pipes and fittings for sewerage installations. During the last 15 years, the use of plastic pipes and fittings for sewerage has expanded in our country. Even domestic production of the pipes has started in Addis Ababa. Recently use of large plastic pipes and fittings for transporting water has also started in the country.

Currently all plastic pipes and fittings are either imported form abroad or are fitting produced in Addis Ababa. The demand of these products by the Amhara Region is meet by supplies from Addis Ababa or from abroad.

Similar to other parts of the country, construction of buildings for different purposes is expanding in the Region. Modern water supply systems are being constructed and installed in many urban communities. In some rural areas, small scale irrigation schemes are being introduced. All these activities require the use of plastic pipes and fittings. To meet the growing demand for plastic pipes, a project idea for producing these products has been suggested earlier. Since the pipes need fittings this project idea is for the production of plastic sanitary fittings. The Amhara Region will have sufficient demand for these fitting to enable a plant to operate with financial viability. ',

' The main raw material for producing plastic sanitary fittings is plastic resin; and this raw material will be imported. ',

' The principal process is extrusion. The plastic resin which could be obtained in granular form will be melted and the molten resin will pass the extrusion process. In the extrusion stages different types of fittings (elbows, tees…) will be formed. After the fittings are formed they will be cooled, Finally, the fittings will be given some smoothing operations; and the products are ready for dispatch machinery need include heating apparatus, extrusion machines, dies and some grinding and smoothing tools. ',

' Saves foreign exchange and regional financial resources, facilitates the development of the building industry ', ' 12', ' 1'),

(' Rigid Polyvinyl Chloride Corrugated Plastic sheet Making Plant',

' these re plastic corrugated sheet which e transparent or semitransparent and used for roofing material and any form of shade where seen light is needed. The sheets are mainly used for covering veranda has, temporary structures, portions of roofs of large stores, roofs of corridors, or nay roof space where there is a need o sunlight. There are different varieties of corrugated plastic sheets; and these include galvanized iron not reinforced corrugated sheet, glass fiber net reinforced corrugated sheet and embossed corrugated sheet. In some countries corrugated plastic sheets are used instead of galvanized iron sheet or asbestos slate corrugated sheets. ',

' ',

' It is during the last 20 years that plastic corrugated sheets are introduced in to the Ethiopian market. At present the domestic market of this product is supplied from imports, and the volume of imports has been growing at a rapid rate. However, since the product is relatively new to the Ethiopian market, the demand for it is limited to major urban centers. But in covers of time as the economy develops and as urban housing construction expands, the demand for corrugated plastic sheets will grow. The substitute for corrugated iron sheet is corrugated plastic sheet. If the price of the plastic sheet is lower than that of the iron sheet, there will be more demand for the plastic sheet which can justify the establishment of a corrugated plastic sheet are much lighter in weight and this makes them easier to transport from one place to another. If a factory is established in the Amhara region, the product can be distributed to other regions of the country without incurring higher transport cost. ',

' The main raw material is thermoplastic resin, and this will be imported. ',

' Extrusion of the raw material is the main process for producing corrugated plastic sheets. Extrusion is carried out either by PVC pellet where essential additives were already compounded. Generally the process involves formulation, blending and mixing, extrusion, inspection and packing. In the formulation blending and mixing stage polyvinyl chloride resin and additives such as stabilizer, pigment, etc, are formulated and blended fixed rational and mixed evenly. The mixture is then heated and cooled, and it is put in storage tanks to be made ready for the subsequent extrusion process. Then the raw material is changed in to the extruder hopper where it is mixed kneaded in the extruder by heating. The material is then extruded by a die in to flat sheets. The sheets are passed through the sizing die to form corrugation. Finally the corrugated sheets are cooled, cut and stacked. Sampling inspection is done at intervals to check the main properties of the product.

Then pieces of machinery required are mixer, cooling blinder, extruder, control panel, die, corrugating taking up cutting machine, edge trimmer, grinder and mill. ',

' Saves foreign exchange facilities the development of the building sector, brings in financial resources of the region. ', ' 12', ' 1'),

(' Recycled Plastic Products Making Plant',

' This project idea is about reclaiming of thermoplastic materials to their original state of polyprelene, polurethine, polystsernene or polyvinyl chloride granules and powder. This reclaiming of waste plastic materials to their original state enables, with proportionate compounding of additives and filters, the availability of locally of the raw material used in the manufacture of PVC floor tiles, ball point pen cases, switch boxes, crates, cups an extruded pipes, sewerage PVC pipes and plastic twines or ropes. ',

' ',

' The demand for products which are from reprocessed waste plastic materials has been increasing at a faster rate during the last 10-15 years. This is particularly true for products such as plastic creates, plastic cups and plates, extruded pipes, PVC floor tiles, plastic ropes. If discarded plastic products are reclaimed and restored to their original state, the restored material could be used to produce the above products here at home. In 1997, the projected demand for PVC and PV granules was about 300 tons; and this was expected to increase to about 400 tons increase to about 400 tons in 2008.

This projected demand could be sufficient to absorb the production of a small scale plastic waste reclaiming plant. ',

' Plastic wastes to be collected from various sources. ',

' The main processing stages are granulation, washing, drying, extrusion and palletizing and packing. The main machinery required include granulator, screw conveyor, washing equipment, two stage dryer, storage tank, extruding/ palletizing machine. ',

' improves the environment by removing plastic waste from the ground, saves foreign exchange, and facilitates the development of other industries whose input is reclaimed plastic waste, brings in financial resources. ', ' 12', ' 1'),

(' Plastic File Covers and Folders Making Plant',

'These plastic products include file covers for badges, folders, wallets, passports, stool kits, identity cards, visiting cards albums, brief cases, etc. the plastic covers are used to protect items from being damaged there by inversing their service life. ',

' ',

'The items which need plastic covers are consumed widely in the urban centers of the Amhara region. If we assume that at least ten percent of the urban population of the region uses items that need plastic covers, this turns in to a consumption figure of 200,000 units. With increasing population and income, the consumption of such types of plastic covers will also increase. Up to now, plastic covers consumed in the region are imported from abroad. The purpose of this idea is therefore, to substitute imports by domestic production. '

' The main raw materials are high and low density polyethylene and polypropylene. These inputs will be imported. ',

'In an extruder, granules of high density polyethylene are fed and the raw material comes out in a form of sheet. The thickness of the sheet can be adjusted bused on requirement. The sheet is then cut in to desired shape and size. Passport and files covers or cases contain two parts the outside and the inside parts. The outer parts are made from high density polyethylene and the inner parts are produced from low density polyethylene. Both parts are combined through sealing or stitching. If printing is required on the covers, the final processes are printing. Required plant and machining include extruders with 10 H.P motor, sets of dies and tools, cutting and sealing machines. ',

'Saves foreign exchange and regional financial resources', ' 12', ' 1'),

(' Paraffin Wax Making Plant',

' Paraffin wax is a white, translucent, tasteless and odorless solid which consists of a mixture of solid hydrocarbons of high molecular weight. It can be produced in different grades of melting points. The most common grades are yellow crude scale, white scale and refined wax. Paraffin wax is widely used in the manufacture of candles, cosmetics and waxing of papers. ',

' ',

' Paraffin waxes (artificial, slack and mineral waxes) are not currently produced in the country and import is the only source of supply to the domestic market, Between 1984 and 1994 ( a period of foreign exchange control and shortage), the average annual import for paraffin wax was about 700 tons. By using a 10 percent annual growth rate, the demand for the product was forecasted to be about 2700 tons in 2010 of which the share of the Amhara Region will be about 600 tons or 600,000 kgs. ',

' The main inputs are crude slacked wax, sulphuric acid and activated earth. These inputs will be secured from domestic sources. ',

' The major processes are neutralization, deodorization, filtration, extraction, evaporation and cooling. The oil from the stock wax will be separated by a press, and is collected in container. The slack wax is then taken out from the press and is poured into a jacketed reactor made of build steel. Acid (98%) is added to neutralize the alkalies present in the wax in a reactor. The product is then taken into decolourizer were it is treated with activated earth. The product is then filter and the filter is transferred to another solution tank where it is treated with activated earth. The product is then filtered and the filter is transferred to another solution tank where it is treated with methyethye ketone. The solvent extracted wax is fed into the evaporator where impurities with solvent are evaporated and collected in another container. The refined wax-paraffin wax obtained in molten form is poured into a mild stecl tank for solidity.

Main machines required include baby boiler, hydraulic boiling press, wax melter, sulphuric acid tank, activated clay tank, filter press, wax trays, product trays, water heating tank, L.D.O. supply tank and vacuum pump with motor. ',

' Promotes self sufficiency, facilitates the development of other industries, saves foreign exchange, brings in financial resources to the Region', ' 12', ' 1'),

('Plastic Gutters down Pipes and Conduits Making Plant',

'These are plastic products used for collecting rain water from building roofs and transporting the water to desired destination. The products have become popular due to lower costs, non –rusting characteristics and long useful life. ',

' ',

'All types of buildings used for different purposes always use gutters, down pipes and conduits for handling and clearing rain water which fails on roofs and around buildings. For many years, gutters and down pipes made form galvanized iron sheet or metal sheet were being used for the above purposes. Recently plastic gutters and down pipes have become popular and are fast replacing metal gutters and down pipes. This trend will continue in the future. As the building industry is expanding in all part of the country, the demand for plastic gutters and down pipes will also expand. Recently one factory has been established in Addis Ababa which produces some type’s plastic gutters and down pipes. But the production is small compared to the national demand for these products. The Amhara region has its share of the building industry and it needs plastic gutters and down pipes to the building industry and it needs plastic gutters and down pipes to meet the regional demand for these products. Transporting these products is expensive because the products, though light, take much vehicle space during transportation. Hence it will probably be economical to establish a plant in the region which will produce plastic gutters and down pipes. ',

'The main raw material is P.C.V. plastics and this will be imported. ',

' The main production process is melting plastic granules, making it pass the melted plastic pass through molding machine and forming the gutters and down pipes according to predetermined sizes. The principal machine required is a plastic molding machine. ',

'Facilitates the expansion of the building industry', ' 12', ' 1'),

(' Plastic Plates, Dishes and Lunch Boxes M. Plant',

' These are household items made from thermoplastic materials by injection moulding process. These products brought from Addis Ababa or form around are now common in urban households in the Amhara Region. Compared to metal or ceramic made plates and dishes, plastic plates and dishes are inexpensive. They are also light and more convenient to use. In rural areas, plates and dishes are made form wood, grass and clay. ',

' ',

' Almost all plastic based products (including plates, dishes and lunch boxes) used in the Region are either imported or brought from Addis Ababa. Even if we consider the urban population as the main consumer of plastic plates, dishes and boxes, this by itself can create a huge demand for the products. Lunch boxes have segmented markets. They are used mostly by school children, office employees and workers on construction sites. Currently, it is reported that there are more than two million school children in the Region. If 20 percent of these children use lunch boxes, potential demand will be 400,000. if about 30 percent of the urban families buy at least two plates and two dishes, demand will reach be about 240,000 units for each type of product. This indicates that there is a market for plastic plates, dishes and lunch boxes in the Region which can absorb the production of a number of plants. ',

' The main inputs are thermoplastic materials such as polypropylene, polyamides, acrylic, polystyrene, etc. These inputs will be imported. ',

' Raw material is charged to a hopper and then to a heating cylinder where it melts. A heating cylinder where it melts. After melting, it is injected to the moulds. After curing time, ram returns to its original position, moulds are opened and product is cooled. Final touching is given to the product.

Machinery required include injection moulding machine, semi-automatic hydraulic injection moulding machine with temperature controlling devices, vertical moulding machine, scrap grinder, reprocessing extruder, tumbling barrel, cooking tank, potable drilling machine, pre drying oven, moulds, air compressor, fitters bench, weighing scale and other accessories. ',

' Saves foreign exchange and regional financial resources, promotes self sufficiency, crates convenience to consumer. ', ' 12', ' 1'),

(' Building Condominiums for Rent ', ' Condominiums are multi-story apartments built in large urban centers. Depending on income level of potential tenants, condominiums can be built with low cost building materials with minimum facilities and limited by some what sufficient living spaces. Other condominiums could be fancy and luxurious with all facilities and amenities. The type and standard of condominiums to be built depend on the expected income class of potential tenants. This project idea envisages the construction of low cost condominiums with the basic and essential facilities intended to be rented for employees of the various branches of the regional government and for other people of similar economic background. ', ' ', ' the decentralization of government services and the consequent expansion of the state apparatus at regional, zonal and woreda level has dramatically increased the number of employees of the federal and regional governments. This has created a severe shortage of housing at the regional, zonal and woreda capitals. Currently there are thousands of state employees and people of other walks of life who do not have descent housing. Thousands are forced to pay exploitative rents for sub-standard accommodations and many do not have choices but to stay in crammed and dirty so called “hotel-rooms”. There are some attempts to solve the housing problem on of which is the provision of small plots of land so that people can build their own houses. But due to many constraints, only few have built their own houses. One option for reducing the acute shortage of housing in the zonal and woreda capitals and in Bahir Dar is to encourage investors to build low cost condominiums in these urban centers. The condominiums will have many candidates for renting, and they will be financially attractive to the investors. After all, of all investment ventures, constructing buildings for rent is the most risk free and one of the most rewarding. ', ' Building condominiums requires hollow blocks, nails, corrugated iron sheets, cement, paints, reinforcement bars, wood poles. These building materials have to be secured from different sources within the country. ', ' **-** The main process includes studying the real estate market, securing the land, building the condominiums and renting them. ', ' alleviate the housing shortages in the urban areas of the region, provide descent accommodation for many people, and stimulate construction activities in the region. ', ' 13', ' 1'),

(' Private High Schools ', ' These are high schools from 9th to 10th grades and college preparatory classes which provide high standard and rigorous teaching and learning for students who can afford to pay the tuitions. The schools will be similar to those like St. Joseph, Cathedral and Nazareth in Addis Ababa. These schools are known for their rigorous teaching and almost all students from these schools pass national examinations. This project idea is to establish such private high schools at least in the major urban centers of the Region.

As mentioned in other project ideas, the private sector has not been involved in the provision of social services such as education and health. In developed countries the best and most efficient, though expensive, social services are provided by the private sector. The participation of the private sector in the provision of social and other services will expand the volume of these services and also will reduce the burden on public institutions which provide such services. It will also give more choices to users of these services. Those who can afford will get to private organizations and the rest will use the services of state or public institutions. This is what is happening in Addis Ababa in the area of health and education.

In the Amhara Region, the provision of social services by the private sector is almost non-existent. Of course, there are some private clinics, “colleges” kindergartens, etc operating in the region. But these are new and far in between. The project idea of private high schools in the region stems from the fact that such high schools are in great need by many parents in the major urban centers. At least, there will be enough number of students in Bahir Dar, Gondar, Dessie- Combolcha, Debre Birhan and Debre Markos to make a private high school a financially viable and rewarding venture.', ' ', ' ', ' ', ' ', ' Improves the standard of education to be given to students who can attend these schools, produces students with strong academic background and with high potential to go to higher education. ', ' 13', ' 1'),

(' Private Hospitals ', ' These are health service institutions which provide quality and efficient health care services for clients who can afford the fees and other expenses. During the last 10-15 years private clinics and hospitals have been established in Addis Ababa. This project idea envisages the establishment of one or two small private hospitals in the Amhara Region. ', ' ', ' The market potential for the services to be provided by private hospitals depends on two main factors. These are (a) quality of health care services provided in the public health care sector and (b) standard of living of the people living in a given area. If the quality of services given by the public health sector is believed to be good, people do not have any incentive to go to private clinics or hospitals. If the case is other wise, people with better income will go to private clinics and hospitals. This is what has been happening in Addis Ababa during the last 10 years. The situation could be the same in other major urban centers of the country. In the Amhara Region in cities like Bahir Dar, Gondar and Dessie, there are people who can afford to pay for the services of private clinics and hospitals. These people come to Addis Ababa to get health care services from private institutions incurring additional expenses for transport, hotels, food and other. Subject to further market study, there seems to exist a sufficient market for the services of small private hospitals in some urban centers in the Amhara Region. ', ' ', ' ', ' Improves health care services of the region, reduces the burden on public health care facilities, and strengthens the health care capacity of the Region. ', ' 13', ' 1'),

(' Privately-owned Public Bath and Shower Services ', ' Public bath and shower services are places where people go and take baths or showers by paying service changes. In simple terms these are places where people wash their bodies. It is also possible to include services which enable people to do their laundry- i.e to wash their clothes. The best example for bath and shower is the “Filwuha” in Addis Ababa. ', ' ', ' If one visualizes all the urban (small and large) centers in the Amhara Region, in fact in the whole country, he or she can find practically no places where people can take bath or shower. Not more than five percent of the urban houses have bath or shower facilities. Even most hotels in zonal and woreda capitals do not have such facilities. Under this situation people are forced to take baths or showers by boiling water in heir kitchen and taking the bath in their living rooms or in their backyards. And this is done, in most cases, at long intervals. So the situation with regard to bath and shower services in the Region is grim. In some urban centers which are lucky to be near rivers or streams people do their body cleaning in these rivers and streams?

There are about 2.1 million people living in “urban areas” in the Amhara Region. Probably not more than one percent of these people have in-door bath or shower facilities. The rest do not have any such facilities. Hence there is a huge market for enterprises which can provide bath and shower services by building and installing these facilities in locations convenient to the public. If we assume that 40 percent of the urban populations take shower or bath once in a week, this translates into a demand of 840,000 baths or shower per week. ', ' The main inputs for providing shower and bath services are rooms, water and energy. Energy could come by installing solar panels by which sunlight energy is converted into electric power. Water could be obtained from the municipality or it can be generated by digging wells. ', ' ', ' Improves personal hygiene, decreases incidence of diseases. ', ' 13', ' 1'),

(' Recreation Centers in Zonal Capital ', ' These centers will have facilities for various indoor and outdoor games, swimming pools, ciruma halls and facilities to stage theaters and music shows. These facilities can also serve for conducting wedding ceremonies and for assembly halls.', ' ', ' With the decentralization of government structures and deveelution of state powers, zonal capitals have become centers of important administrative functions, commerce, industry, transport, education, health care, et. During the last 10-15 years, the population of the urban centers which are designated to be capitals of respective zones has increased substantially, there are more level servants, teachers, health care workers agricultural professionals, policemen, etc. there are also more merchants, hotel, restaurant, and coffee shops workers.. more people are also working in other micro and small enterprises.

While the population of the zonal capitals has increased there has not been a corresponding increase in recreational facilities. There are no cinema halls, no indoor and outdoor games, no swimming pools, n o musical shows, no theaters…. .People especially those who moved to these urban centers are bored, demoralized and frustrated. Their places of “recreation” are drinking bars, “chart bets” and the bile . This situation is depressing for many residents especially young and educated government employees.

If recreation facilities are established in Zonal capitals, they will have enough customers to make them financially Viable. These facilities will generate financial benefits to the investors and they will provide desperately needed recreational outlets for the people. ', ' ', ' Process here refers to the stages that will be undertaken to build and operate the recreation facilities. These stages are, securing land constructing buildings, installing recreational facilities and operating the facilities ', ' Improves the physical and mental will-being people, saves people from being alcohol and chat addict ', ' 13', ' 1'),

(' Small Scale Foundry Plant ', ' A foundry plant is a plant where metal is melted, and where the molten metal is poured into a mold for producing a certain product. Examples of cast metal products are automobile engines, agricultural machine parts, water pumps, pipe fittings, weaving machine parts, manhole covers, etc.', ' A foundry plant is a plant where metal is melted, and where the molten metal is poured into a mold for producing a certain product. Examples of cast metal products are automobile engines, agricultural machine parts, water pumps, pipe fittings, weaving machine parts, manhole covers, etc.', ' There is not a single foundry plant in the whole Amhara Region. However, there are various types of machinery and equipment whose many parts need replacement every year. Many of the parts can be produced using foundry technology. The need of the thousands of grain mills, motor vehicles, machinery and equipment of the textile, beer, food, leather and other factories for parts that could be produced locally justifies the establishment of the foundry. ', ' Import material is ingot iron and this will be imported.', ' The main foundry operations consists of melting, moulding, sand preparation and conditioning, core making, pouring, cooling, surface cleaning, fettling, heat treatment (if necessary). Coke-fired, air–blast cupola is the commonest and cheapest way to obtain molten iron. Other meeting systems include electric induction system and channel type or crucible type induction molding furnace. For small castings automatic flask less side-below moulding system is employed. ', ' a) transfer of skill and technology to the Region, b) enhances the degree of economic self sufficiency of the Region c) creates linkages between economic sectors d) lays the foundation for heavy industry', ' 14', ' 1'),

(' General Purpose Engineering Workshop ', ' The general engineering workshop envisaged in this project idea is an engineering workshop which will repair and maintain mechanical and electrical equipment not only in urban areas but also in rural areas. The main types of equipment needing such maintenance and repair services are (a) equipment used for cultivation, harvesting and processing (b) transport equipment such as trucks, motor cycles, bicycles, animal-drawn carriages (c) equipment for repairing minor roads and tracks such as picks, mattocks, shovels, wheel-barrows, mobile concrete mixers, (d) water pumping equipment for domestic use and small scale irrigation (e) taps and joints in piped water supplies (f) domestic tools and equipment- stoves, cooking utensils four mills.', ' A general engineering workshop is a workshop which has all the necessary equipment, machinery, tools, instruments and other facilities with technically trained people. The workshop is multi- purpose, and it is managed and run on the basis of modern technical business principles. This type of modern technical business organization does not exist in the Amhara Region. There are two “engineering” workshops in Bhair Dar and Dessie but they do not meet the technical standards of a modern engineering workshop. There are many thousands of equipment, machinery, tools which need repair and maintenance. Most of these machinery and equipment are brought to Addis Ababa for minor and major repair and maintenance services. This cannot and should not go on forever. There must come a time when the Amhara Region should have its own general engineering workshop to meet its repair and maintenance needs.', ' The various machinery and equipment working in the economic and social sectors of the Amhara Region need repair and maintenance services that will justify the viable operations of one or two general engineering workshop. ', ' The project will be a service providing enterprise. It will need various types of spare parts for providing repair and maintenance services. The parts will be imported. Gradually, the workshop will fabricate some parts.', ' Main stages include receiving of the machine to be repaired, cleaning, identifying defects, replacing defective parts or repairing, testing--. Machinery includes power and hand driven tools, general engineering workshop equipment, work benches, desks, stools, cupboards, etc. ', ' self- sufficiency in major repair and maintenance works, saving of financial resources, saving in transport expenses, development of repair and maintenance skills for different machinery and equipment.', ' 14', ' 1'),

(' Assembly & Fabrication of Walking Tiller & Tractor ', ' As the name indicates walking tiller and tractor means a small plowing machine which is driven by a motor attached to the machine but which is also pushed by a human being. The machine is a much smaller version of a tractor. The machine is used for plowing small plots of land.', ' The Amhara Region is a region of millions of peasant farmers whose average land holding size is between 0.50-0.75 hectares. Since times immemorial the Amhara peasants have been using oxen, horses and mules for traction power. When grazing land was available in sufficient size, using the above domestic animals for farming was not difficult, even though their productivity was extremely low. However, in today’s Amhara land, practically all grazing land has been converted to farm land. Because of this and other reasons, there are no enough number of oxen for plowing. More than 40 percent of the peasant farmers do not have oxen for plowing. To make farming less time consuming, less ardors, less physically demanding and to make plowing efficient, an alternative method of plowing (in the context of peasant farming,) should be adopted. One alternative is to mechanize (to use big and self driven tractors and combines) the whole peasant farming system. But given the present land holding system, large-scale mechanization is not feasible. The best option would be to provide the peasant farmers (individually or in groups) with walking tillers and tractors. These machines are simple to operate and much more productive than plowing using oxen. They save the time and effort of the peasant farmer by plowing more land per unit of time. The time saved could be utilized for other income generating activities or for undertaking soil and water conservation works or similar activities useful to the individual farmer or the community. ', ' Currently Amhara land has about 19 million people of whom 17.5 million in rural areas, and practically all the rural people are peasant farmers. If we assume 5 people in a family, there are about 3.5 million families who depend on farming in the Amhara Region. That means the potential market for walking tiller and tractor is the size of the Amhara farming families. Given the average land holding in the Amhara Region, walking tractor will be sufficient to the plowing needs of at least 3 families and this implies that the highest potential demand for walking tillers will be 1.2 million. But this will be unrealistic. If we assume that only 10 percent of the potential demand will be actual, demand for the walking tiller will be 120,000. But to be on the safe side let us assume that only five percent of the potential will be actual, demand will be 60,000. This market size will justify the need of establishing a walking tiller and tractor assembly plant in the Region. The market for the tiller could also cover other Regions.', ' The “raw materials” for this project are the various parts and components that go into the assembly of the walking tiller and tractor. For the first 3-5 years most parts will come from part suppliers or parent companies which produce the tillers. Gradually, some parts could be fabricated in our country. ', ' Until the stage of fabricating some parts or components is reached, the technology of assembling parts to produce a machine is relatively simple. It mainly requires rotating platform where the various assembling process takes place. Of course, some major components of the machine such as engine will be imported as complete units.', ' a) create employment, b) transfers technology, makes farming more efficient c) saves labor, d) probably increase productivity. ', ' 14', ' 1'),

(' Fabrication & Assembly of Hand Pumps ', ': Hand pumps are used for taking out water from the ground using human energy and with the help of a cylinder and piston arrangement. The cylinder part is in the form of a barrel and the piston part is in the form of a cup washer made of leather. Normally capable of delivering water up to 1000 liters per hour, the pump works on reciprocating system. A medium size pump operates 20 to 30 stocks per minute. Hand pumps are used where municipal or piped water is not available or where extra facility for water provision is to be made. Being very economical and least expensive, a hand pump can lift water from a depth of 24 inches. For deeper water levels, a long rod is used with the piston system for taking the water out. Hand pumps can also be used for lifting water for watering vegetables around homes. ', ' The drive to provide clean potable water to the rural population is increasing, and the number of rural communities receiving clean water is growing every year. The most common system of supplying clean water to these communities is by digging wells and installing hand pumps. In the Amhara Region alone there are tens of thousands of hand pumps installed by government agencies and NGOs. All these hand pumps are imported, but it is possible to fabricate hand pumps in the Region. As the program of supplying clean water to the rural population is to expand so is the need for more hand pumps. The need for more hand pumps will justify the establishment of a hand pump fabricating plant in the Region. ', ' Currently there are more than 5000 water points that use hand pumps in the Region Coverage of clean water supply in the Region is not more than 25 percent. This indicates that the Region has a long way to go to provide clean water for the urban and rural population of the Region. The market for hand pumps is composed of replacing old hand pumps and installing new hand pumps in the Region. If we assume that ten percent of the existing hand pumps have to be replaced and 2000 additional hand pumps will be installed throughout the Region, annual demand for hand pumps will be about 2500. This will make a medium hand pumps fabricating plant a viable venture. The product could also be exported to other regions of the country.', ' Most of the parts of a hand pump are made from metals- brass or steel. These will be imported. One component is made of leather and this will be obtained from domestic leather factories.', ' The main components of a hand pump are: pump body, handle, valve, leather cup, rod, and strainer. The pump body is the component which works as a cylinder and it is made of brass, copper pipe or steel casting. The handle is always cast type and made of cast iron. The valve is circular in shape and is made of brass or copper. The leather cup is used to work as a piston inside the cylinder. The rod connects the valve to the end of the handle. The strainer is made of brass and has holes through which water passes. Its purpose is to prevent mud and other solid impurities from passing with the water. After all these components are fabricated/purchased they are assembled to make a hand pump and installed. Main machinery and equipment include lathes, power hacksaw, spray painting machinery, shaping machine, testing equipment, pedestal grinder, foundry machine. ', ' supports the rural water supply efforts of the Regional government and NGOs, saves foreign exchange and regional financial resources, self- sufficiency in this important product new technology and skill.', ' 14', ' 1'),

(' Fabrication & Assembly of Small Mechanical Threshers ', ' Mechanical threshers are harvesting machines which separate seeds from straw mechanically. There are different threshing machines for different types of crops. This project idea deals with threshing machines for wheat, barley and oats. These machines save time and human energy; they are also efficient i.e. grains are not lost during threshing time as they are in traditional threshing.', ' The traditional method of threshing grains in the country is time consuming and above all it is inefficient. Some fraction of the harvest is lost in the ground where threshing takes place. In the Amhara Region, more than 60 percent of grain production is cereals. To save time and reduce wastage of grain during threshing, mechanical threshing machines should be introduced. To reduce the cost for each farming family, one mechanical threshing machine could be brought by a group of farming families to be owned by the group but to be used separately. The use of mechanical threshing machine will liberate farmers from the drudgery of traditional harvesting work. ', 'Among the 3.7 million families (households) in the Amhara Region, about 3.33 million are farming families. Of these, close to 2.3 million produce cereals. If we assume that one threshing machine will be owned by five families, the potential maximum demand for mechanical threshing machines will be 460,000 units. If we assume that only 10 percent of the maximum potential demand will be realized during the introduction phase of the machines, demand will be about 460,000 units. This is more than the viable capacity of a mechanical threshing machine fabricating/ assembly plant ', ' Metals to be fabricated and parts to be assembled will be imported. ', ' A thresher is a rotating drum with a good number of bent galvanized wires fixed on its surface to hit the grains for their separation from the chaff or straw. For rotating purpose a shaft with ball bearing is fitted to the drum. In the production of the thresher, parts which require fabrication will be fabricated, others either they will be manufactured or purchased, or after assembling they will be painted.', ' Contributes to the modernization and efficient operation of the farming sector, introduces new skills and technology, releases labor for other more productive work if available, reduces the need of livestock/cattle for threshing purposes, reduces waste during harvesting', ' 14', ' 1'),

(' Assembly & Fabrication of Mechanical Seed Cleaners ', ' Mechanical seed cleaners are used for seed clearing and grading in small scale operation. Seed cleaning and grading enhance the quality of the seeds and thereby the value of the seeds. In rural areas farmers will get more for their grains if they use these mechanical cleaners for cleaning and grading their marketable surplus.', ' The Amhara Region is more than 90 percent agricultural; But farming is traditional where there is very little modernization in harvest and post-0harvest operations. Cleaning and grading of seeds especially using mechanical devices is almost unheard of Due to lack of cleaning operation, the quality of farm produces are considered as inferior because of the presence of foreign matters like dirt, dust, sand, etc with the grain. This problem can be rectified if mechanical seed cleaners are introduced and popularized in the Region. This project idea is one attempt for promoting the establishment of a plant that produces seed cleaning machines in the Region. ', ' The size of the farming sector in the economy of the Amhara Region and the quantity of farm produce (grain) indicate the magnitude of the need for seed cleaning service and by extension for seed cleaning machines. At present, with the exception of a few machines installed by grain merchants or by grain mills operators in one or two urban areas, there are no seed cleaning machines in the whole Amhara Region. Whatever surplus grain produced and exported from the Region, it is exported before cleaning and grading which depresses its price. If seed cleaning machines are produced and distributed in the Region, there will be added-value to the Regions farm products and farmers will get higher prices. ', ' Semi-finished metallic products which will constitute seed cleaning machine will be imported or bought from domestic suppliers.', '**:** The Process involves working on sheet metals such as shearing of edges, folding for body frame, angle bar structure work, drilling and screwing, turning of shafts, pulleys and machining of plumber, block bearing, assembly including welding, fastening with bolts and nuts and finally spray painting. More than ten types of machines are required. Some of them are central lathe, double ended bench grinder, precision center lathe, universal shaper, pillar drilling machine, sheet folding machine, are welding set, air compressor with spray painting, gas welding set, bench drilling machine and accessories. ', ' Support the farming sector possibly increases the income of farmers, introduces new skills and technology ', ' 14', ' 1'),

(' Assembly of Centrifugal Pumps ', ' Pumps are used to deliver water, particularly when the water has to be lifted from a lower level to a higher level, where energy is needed for shifting the water. The energy is obtained from a motor which converts electrical energy into mechanical energy. They are two types of pumps –the centrifugal type is the most versatile and broadly used in agriculture and industry. This type of pump is compact, easy to maintain and low in energy consumption.', ' During the last few years, many farmers in the Amhara Region have started using small irrigation a scheme to grow fruits and vegetables; and the number is increasing. Some farmers are using these pumps for their small scale irrigation schemes. This can be witnessed along the Bahir Dar- Woreta main road, and along the Finote Selam- Dangla main road. In these localities, it is possible to observe the use of pumps by farmers. As the benefit of irrigation farming is recognized by more and more farmers throughout the Region, there will be more demand for pumps. The assembly of pumps is the first step towards manufacturing of the pumps. The Amhara Region should promote and support the establishment of a pump assembly plant to facilitate the development of irrigated agriculture.', ' Annual of import of all types of pumps is around 80,000 units of which 60000 units is estimated centrifugal pumps. Share of the Amhara Region is about 20000 units. This will increase as more and more farmers turn to small scale irrigation activities to increase their income. The current level of use of pumps and the expected increase of this use will justify the establishment of a viable pump assembly plant in the Amhara Region. Assembled pumps can also be exported to other parts of the country.', ' Parts and components of pumps are the “for this project. This parts and components will be imported from a foreign firm which is reputable in the manufacture of pumps. ', ' The manufacturing of pumps involves the following steps design and drawing, casting, machining and assembly. In the case of an assembly operation, the steps to be followed are arrangement of parts and components according to sequence of assembly, and assembling parts and components. Testing is done at the final stage. Machining of some parts and components could also be made. As far as plant and machinery is concerned, an assembly plant does not require much. The most important machines could be grinder, assembly benches, bench drilling machines, various types of hand tools.', ' Introduction of new skills and technology to the Region, support to the agricultural sector, expansion of irrigation farms,', ' 14', ' 1'),

(' Assembly of Small Diesel Engines ', ' As power generating units, diesel engines have multiple purposes. Motor vehicles, agricultural machineries, irrigation pumps, electric power generators, etc, use diesel engines to receive power for doing certain functions. ', ' All types of diesel generators are imported into the country, and this import will increase as the economy expands requiring more power. Diesel engines come in different sizes, and each engine is composed of many parts and components. Due to economies of scale, many diesel engine parts are manufactured by specialized manufacturing units and they are supplied to manufacturing-cum-assembling units. Considering the importance of diesel engines, there is a strong need at the national and regional level to start; at least, assembling the engines from imported parts and components. Through assembling, we can learn manufacturing and fabrication of parts. This is how the development of basic industries in any country takes place --- assemble-fabricate-manufacture.', ' Diesel engines- small and large are needed in the various sectors of the country’s economy. As the economy expands the need for diesel engines expands. During the last three years, average annual import of diesel engines was 7500 units. The purpose of this project is to substitute imports by assembling diesel engines at home. The existing demand can justify the establishment of a diesel engine assembly and fabrication plant.', ' Parts and components will be imported. ', ' Major components of a diesel engine include engine blocks, cylinders and fixing liners, crankshaft, piston, piston rod, valves, valve grinder, etc. All these are manufactured by foreign suppliers for the first phase. Gradually, some components especially the engine blocks can be manufactured at the plant. Engine blocks are made by casting in a simple foundry. During the first phase of operation, assembly of all components and parts will be done at the plant. Another activity of the plant will be repair and maintenance of diesel engines. ', ': saves foreign exchange, saves regional financial resources, possibility of export, and supports other economic sectors, new technology and skill. ', ' 14', ' 1'),

(' Fabrication and Assembly of Oil Crushers ', ' Oil crushers are used for extracting oil from oil seeds. These crushers are being used in parts of the Amhara Region where oil seeds are grown. For example, there are hundreds of oil crushers in West Gojam Zone which is an oil seeds growing area. Oil crushers, though not efficient in their extraction rate, are suitable for small scale operation and they can be installed in localities where there are local supplies of oil seeds.', ' Next to Ormiya, the Amhara Region is the largest oil seeds producer in the country. Oil seeds are partly exported and partly used for domestic edible oil production. Edible oil and oil seeds are some of the exports of the Amhara Region to other parts of the country and to foreign markets. Most edible oil exports are produced by small scale operators using small oil crushers. Practically all small and large urban centers in the Amhara Region have a number of oil crushing units. But the oil crushers are either imported or bought in modified version from Addis Baba. Most parts and components of an oil crusher can be manufactured in the Region and there is no reason why whole units of oil crushers have to be imported from outside the Region.', ' Though not as numerous as grain mills, there are many (most likely in thousands) oil crushers in the Amhara Region. With increasing population, additional new oil crushers will be needed in the Region. In addition old oil crushers will be replaced by new crushers. The expansion of oil crushing operation and the need for replacing old crushing machines will create enough demand for establishing viable oil crushing fabrication/assembly plant in the Region.', ' Imports to be imported.', ' Initially the project will buy cast iron castings from suppliers. These then are machined at the unit’s workshop. Again for the first phase (3 to 5 years) gears, worms, agitator, side shaft, etc will be acquired from supplier. Hence the first phase of operation will be assembling parts and components of oil crushers. Gradually, as experience is gained parts will be fabricated and manufactured. Main machinery and equipment needed are lathe machine, shaping machine, heavy duty lathe, pillar drill, welding machine, hand drill, flexible shaft grinder, and some accessories.', ' experience in developing basic (machine-building) industries, savings in foreign exchange and regional financial.', ' 14', ' 1'),

(' Fabrication and Assembly of Grain Mills ', ' Grain mill have become one of the most common modern economic activities in the rural areas of the Amhara Region. There are at least two grain mills in every rural administrative unit. Grain mills have become so instrumental in freeing women from the drudgery of manually grinding grains for the family consumption. ', ' Grain mills like any other mechanical equipments are made from a number of major components such engine, the two grinding stones and the metal part which holds the grain while it is being fed to the revolving grinding stones. In the Amhara Region all these three major parts are imported, two (engine and the stones) from abroad and the funnel- shaped “storage” from Addis Ababa. The funnel shaped “storage” part of a grain mill is made from any steel sheet. This component can be made in any workshop anywhere. There is no reason why this component cannot be made in Bahir Dar, Combolcha or any major urban center in the Region. The grinding stones can be produced in the Region with the participation of a foreign partner. Other parts of the grain mill such as the metal cover of the engine and some spares of the engine can be fabricated in the Region. In the long-run, it will be possible to fabricate most parts of the mill and assemble the engine in the Region.', ' Currently there are our 3000 grain mills in the Amhara Region. These grain mills will require replacements of their components. Besides, other grain mills will be installed in many parts of the Region-some replacing old grain mills and others to create additional milling capacity. The plant to be established will be a general-purpose engineering workshop to be specialized in fabricating components of grain mills. The number of existing mills and new mills will create sufficient market for full operation of the plant.', ' Metal sheets to be imported, ', ' In an engineering workshop which assembles and fabricates a machine, the parts and components are put in proper places in other of their assembly sequence. In another section of the plant, fabrication of metal sheet takes place. Assembling of the parts and component is done and finally the assembled machine is spray painted. ', ' saves resources of the Region, introduces and/or expands new skills and technology, enhances self-sufficiency plus the other common benefits.', ' 14', ' 1'),

(' Fabrication of Household Hand Knitting Machines ', ' Knitting and spinning are household activities usually performed after basic household chores (cooking, cleaning---) are done. There are machines (operated manually) which increase productivity). One of these machines is a hand knitting machine. This machine is used for knithing all kinds of cotton, man-made and woolen yarns to produce different kinds of knit wear. With short term training, women in urban and rural areas can operate this machine and they can earn additional income by selling knitwear products which they can produce at home.', ' Spinning and knitting are income generating activities which supplement the income of many women both in urban and rural areas. In urban areas, some women take knitting as a full-time job, and it is their only source of income. Hand knitting machines are used in some urban areas to a very limited extent. But in the rural areas, these handy and useful machines are not known in the rural areas. But if these machines are widely introduced to the rural areas and women are given training in knitting, rural in come and as a result rural in one will in area. This is why this simple machine should be made in the Amhara Region. ', ': If a mere two percent of the households in the Amhara Region start producing knitwear by using hand knitting machines, there will be a demand of 74,000 such machines in the Region for one year. Since these manual machines are not produced in other parts of the country, additional demand will come from outside the Region. Demand for these machines could easily reach 100,000 a year. This will justify the establishment of a riable plant which will produce hand knitting machines in the Amhara Region. ', ' to be imported in metal sheet form and in parts. ', ' The Main process in the manufacturing of this product is carried on by power press. This is a sheet metal work. In the manufacturing of hand knitting machines, it is assumed that some components will be imported and then assembled in the factory. Main plant and machinery include lathe, pillar, air compressor, double ended bench grinder. ', ' encourages cottage industries, increases the income of urban and rural families, saves foreign exchange and regional financial resources, and introduces new skills and technology ', ' 14', ' 1'),

(' Manufacture of Bench Grinders ', ' Grinding is a process where abrasive wheels are made to revolve at a very high speed so that any metal brought into contact to it is ground against the revolving surface to any desired shape or depth. A grinder is a machine used for grinding operation. A bench grinder is a grinder which is fixed to a bench for operating. The grinder can be moved from place to place according to need. The use of grinders is very wide. Grinders are used in workshops, factories, garages, etc.', ' Bench grinders are those machine tools which are used for a variety of purposes. These are essential tools in the fabrication, casting and forging processes of metals. In many cases, grinders give the final shapes to metal parts and components. Though these important machines are simple to manufacture, no attempt has ever been made to produce these machines in the country. Given the importance of these machines it is time their production be promoted in the Region.', ' All grinders (small and big, portable or fixed) used in the country are imported. Imported figures on grinding machines and for that matter for many many other products are given in tons which are meaningless since weight is not a measure of unit of many industrial products. As a result, it is difficult to determine the number of grinders being imported into the country. However, one can safely assume that it is in the thousands. Grinders are machinery products whose demand increases or decreases with the tempo of economic activities in a country. Though it is not as claimed by some circles, there has been an appreciable increase in the activities of many economic sectors notably construction, transport, energy, etc. These have positive impact on the demand for grinders. Hence, the magnitude of existing demand is large enough to make a bench grinder making factory a viable business enterprise.', ' Most inputs will be imported. ', ' A bench grinder is a motor of very high speed extending its rotor shafts both ends for fixing the grinding wheels of bench grinders follow the following sequence. Casting of body- the main body of the grinder, which works as a motor is cast in a foundry. It has base, mono block type and ends of extending shaft. Machining –the casting is now machined for its straightness on stand and ends. The rotor shaft is also manufactured on a lathe machine. Electrical-both the rotor and starter parts of the motor are made separately and assembled on the motor. The electrical parts could be obtained from supplier. Grinding wheels can also be bought from suppliers. Assembling all parts of the grinder are now assembled and the final product is painted', ' Constitutes a part in machine building industry, saves foreign exchange and regional financial resources, supports the development and operations of other economic sectors, introduces new skills and technology to the Region.', ' 14', ' 1'),

(' Assembly & Fabrication of Bicycles ', ' A bicycle is a very efficient form of personal transport. In some countries especially in South East Asia, bicycles are also used to transport personal belongings in addition to their human cargo. Following the oil embargo of the mid 1970’s, bicycles have become popular means of transport in some European countries, especially in the Netherlands. ', ' Some say Ethiopia is not suitable for using bicycles because it is mountainous. But the experience of other countries shows that bicycles can be as popular in mountainous countries as they are in flat countries. The main difference is that bicycles used in mountainous countries can be fitted with small motors to be used while climbing hills if need be. Even in Ethiopia there are many places where bicycles can be used without any difficulty. The ever increasing prices of petroleum is a warning sign that transport using petroleum consuming vehicles is going to be very expensive in the future. One alternative to the use of petroleum using vehicles is bicycles. The Amhara Region has many places where it is convenient to use bicycles. In fact, compared to other regions of the country, more bicycles are used in the Amhara Region. Bahir Dar has more bicycles per capita than any urban center in the country. Considering these factors, establishing a bicycle assembly plant will meet the existing demand and will also trigger additional demand in the Region and outside the Region.', ' An annual import of bicycles is about 15000 units and people in the business say that there is additional inflow of bicycles illegally through the Ethio-Sudan boarder. Practically all the bicycles are made in China and some other South East Asian countries. Assembling at least one-half of the import will most likely make the plant viable. Assembling a product especially a mechanical, or electrical or electronic product is one step forward towards manufacturing some parts initially and all parts finally of the product. ', ' Compared to other mechanical gadgets, a bicycle appears to be a simple object, but it is composed of at least 20 components and parts- which are by and large metal (steel) and there is a small quantity of rubber for the wheel and pedals. For the first stage of operation, all the parts will be imported; but gradually some parts of the bicycle of will fabricated here.', ' There is not much to say about the assembling process of a bicycle. The main activities are parts are carefully checked whether they are proper for use and if they are of the specified standard. Once checked, parts are carried to the assembly line to be made into the final product. (for each component standards are set and this is known by the manufacturers). Major machinery and tools for the assembly include spoke tightening and deviation adjusting machines, assembly conveyor line, trolley conveyor, roller and compressor. ', ' saving of foreign exchange to the country, saving financial resources to the Region, introduction of new skills and technology to the Region, foundation for manufacturing bicycle parts and components, earning foreign exchange through possible. ', ' 14', ' 1'),

(' Fabrication & Assembly of Wind Mills', ' Wind mill is a mill operated by wind usually acting on oblique vanes or scales which rotate from horizontal shafts. Wind mill is used for grain milling in rural village and pumping of water, where there is no electrification and other source of energy is not available. Wind energy in the form of electricity is stored in lead storage batteries and used when there is no wind. ', ' There are many places in the region with abundant wind power and no energy power available in the near by places. The rural population mainly uses ordinary stones for grinding their grains manually. They also get water from places far away, from streams and rivers. The construction of wind mills in deep inside rural places of the region will alleviate the hard and poor condition of the people. It will be expensive to have electricity in every rural place using electrical grids from near by big towns. Wind mills will resolve the problem by providing energy mainly for grinding grains and pumping water. The region should encourage and establish manufacturing and construction of wind mills. ', ' The rural places of the region are not electrified and more than 40% of the population lives in this area. There is an abundant wind that could be harnessed into energy for milling of grain and pumping of water. A wind mill serves a community of 4000 rural households. If proper promotion and provision of technical assistance to handle a wind mill is provide there is high demand for wind mill energy in the region. It will be important to establish a unit that produces a wind mill production unit in the region.', ' The main raw material for wind mill production are:-

- Rotary blade assembly

- Gear box

- Alternate 100 kw capacity

- Rectifier (silicon) with capacitor

- Lead acid storage batting

- Structural alloy steel

- Steel fabricated material plate

- Bearing nuts. ', '(a) Process The main process of wind mill production is the fabrication of the main units in the workshop and assembles and constructs the wind mill in designated rural place.

b) Machinery and Equipment

- Welding machine

- Precession lather

- Vertical axis milling machine

- Drilling machine

- Grinding machine

- Jigs and fixtures

- Crain and chain blocks

- Hydraulic system for mounting of beams

- Inspection of equipment

- Electric furnace. ', ' The plant for wind mill production can be in one of the places of Gonder, Debre Berhan or Kombolcha. ', ' 14', ' 1'),

(' Fabrication & Assembly of Welding Machines ', ' Welding is the most common and most essential operation in any workshop, engineering and metal fabrication factory, big construction projects, etc. By its very nature, welding is accomplished using automatic electric powered machine. Welding machines come in many forms and sizes. Some are small and portables others are big ones used for industrial welding. ', ' Welding machines are crucial to the operations of many metal based industries. Every year thousands of units are imported to the country. Though the machines are crucial, no attempt has ever been made to assemble let alone manufacture them in the country. On the other hand, these are machines that could be assembled/ manufactured using our current level of technical know- how and technology. Welding machines, pumps, small electrical and diesel motors, small concrete mixers and the like are products where we could start the machine building industry. This was how other had started and moved to more sophisticated machinery and equipment producing industries. ', ' During the last five years import of welding machines was about 89500 units. The machines were of different capacities and sizes. As the economic and social development of the country expands, the import of welding machines will increase. A small manufacturing unit which will produce form 600 to 750 units per year will have sufficient market in the country. ', ' The main “raw” materials are steel sheet, steel profiles, transformers, strip, round-wires and streamlined wires, insulating materials, etc. These “raw” materials will be imported. ', ' A series of activities are involved in the manufacture of welding machines. The main ones include, cutting of metal sheets; winding coil; turning, milling, drilling & grinding; metal working & welding; mechanical and electrical assembly, etc. Main machinery and equipment include lathe, milling, grinding, drilling, winding machines, plastic injection machines and various types of shears and cutting devices. ', ' saving of foreign exchange, acquiring new skills and know- how, resource flow to the Region. ', ' 14', ' 1'),

(' Citrus Juice Extractor Making Plant Citrus Juice Extractor Making Plant ', ' Electric juice extractor is a high speed motor driven home appliance used for extracting juice from citrus fruits like oranges, lemons, etc. It consists of a high speed motor which drives the needled cutter disc which on revolving crushes the contents fed using sharp needles. The Extractor can be made in two models – ½ liter and 1 liter capacity. The appliance is widely used in urban areas in homes, coffee-shops, hotels, restaurants, pastries, etc. ', ' ', ' Juice extractors are mainly used by urban families usually with relatively high income. If we assume that at least 10 percent of the urban families use juice extractor, potential demand for the home appliance will be in the region of 243,000 units. If we add another 20 percent for commercial use, the total demand for the product will reach to about 292,000. This volume is more than the minimum production capacity of a small plant which produces the electrical sad jet. ', ' Main inputs for producing the extractor include plastic granules, electric motors, plastic parts and other items such switches, indicators, etc. all of these will be imported.', ' The manufacturing process includes the following operations: moulding of plastic parts as per designs, purchasing electric motors and other parts, assembling the various components and finally testing and packing. Major machinery and equipment include injection moulding machine, cooling system equipment, scrap grinder, mould and dies, hand grinder, bench grinder, drilling machine and testing equipment.', ' Mostly Similar with other project ideas ', ' 14', ' 1'),

(' Express Coffee Maker Machine Making Plant ', ' The express coffee maker is a common electrical machine used in hotels, restaurants, canteens, coffee shops, and other places where coffee is prepared for mass consumption. The machine is essentially a simple steam generator which is used to heat the coffee mixture and prepare the coffee for consumption. (Steam has much higher heating capacity hot then water). The main component of the machine is a brass container which is filled with water initially and is heated by means of a series of heating coils. The level of water is indicated by means of a tube on the side. Pressure is indicated by a gauge and there is a safety pressure value to prevent the pressure from being built up to a dangerous level. The outer case is made of sheet metal with decorative fittings.', ' There are between 80,000-100,000 coffee making machines in the country; and every year thousands of these machines are imported for replacement and to meet new demands. But no attempt has been made to produce this product at home on commercial level or at industrial level. Given the large demance for coffee making machines, one could have expected the presence of an assembly plant for the product in the country. But this is not the case up to now. One could say that this is time that the country starts assembling/ fabricating these machines to save foreign exchange and to be self-sufficient. If proper promotion measures are taken, the Amhara Region could be the first region to produce coffee making machines for regional as well as national markets. ', ' For many small machines like the coffee making machine, the problem for domestic producers is not limitation of market but limitation in quality and price competitiveness. If the quality is on an acceptable level, there is sufficient demand in the country to justify the establishment of small and medium scale industries in the country. Coffee making machine is one of those products with sufficient market. ', ' The main components and parts of a coffee making machine are made from copper, brass and steel sheet. The first phase of operation will be assembly of parts and components and fabrications of the outer case. Copper and brass components and steel sheet will be imported for fabrication and assembling.', ' As indicated above, parts and components will be purchased from domestic or foreign sources and they will be assembled by trained technicians. The steel sheet will be fabricated at the factory site and the necessary testing will be undertaken before packaging. Plant and machinery needed include shearing machine, bench grinder and fly press, drilling machine, welding set and rolling machine. ', ' Saves foreign exchange for the country and financial resources for the Region, brings in financial resources to the region, promotes self-sufficiency in industrial products, and introduces new skills and technology to the Region.', ' 14', ' 1'),

(' F.H.P. (Fractional Horse Power) Motors Making Plant ', ' FHP motor is name given to motors having output power less than one Horse Power. Such motors have wide applications. For example domestic electric appliances like fans, mixers, coolers, etc use FHP electric motors. These motors are also used for various power driven instruments and tools. ', ' FHP motors are basic sources of power which drive many types of small tools, instruments, household and office appliances and other electrical gadgets. Like in other countries, FHP motors are used for a variety of purposes in Ethiopia. Unlike many other countries, FHP motors used in Ethiopia are imported. The road to the development of machine industry in any country goes through the development of small machines like FHP motors. These and other types of similar machines should be promoted in our country to start the development of the machine industry. The Amhara Region, if it intends to take the initiatives for developing such industry, it should promote and encourage the establishment of plants which can produce FHP motors and other similar small machines.', ' Separate import figures for FHP motors are not available. However, the annual import volume of electrical motors is substantial. Considering the variety of uses of FHP motors, one could expect that share of these motors in the total import volume of electrical motors of different capacities. The first phase in the production of machines in a developing country is assembly of parts which are produced abroad, fabrication of some components such as bodies or cases and in some cases manufacturing of some less sophisticated parts. There is the major pattern of developing machine building industries. Hence the first stage of producing FHP motors in our country will be assembly of parts and fabrication of components. This production process is not subject to rigid economic of scales which require a plant to operate above a given level of production. Assembling of parts to produce a machine does not require huge and expensive production machinery and equipment which require certain level of utilization for being financially viable. In the case of assembling/fabrication of FHP motors, a plant can be viable at a minimum level of production quantity; and the demand for these motors is more than the minimum level of viable production volume.', ' To be imported.', ' The castings are procured from outside and they are machined in the plant. The coils of conducting materials are fitted in the stator slots after proper insulation. The rotor should be properly balanced and then all mechanical fittings are made. Finally the piece is tested for performance. All the parts should be varnished and baked before assembling. Machines needed for the plant include lathe machine, drilling machine, press, coil winding arrangement, backing oven, grinder, balancing machine testing panel.', ' Saves foreign exchange and regional financial resources, brings in financial resources to the Region, contributes to the development of machine industry in the Region, introduces new skills and technology, etc. ', ' 14', ' 1'),

(' Solar Water Heater Making Plant ', ' A solar water heater is a water heater which uses solar radiation energy for heating water. It consists basically of the flat plate collector and an insulated storage tank. The collector is a commonly blackened metal plate with attached metal tubing and is usually provided with a glass cover and a layer of insulation beneath the plate. The collector tubing is connected by a pipe to a storage tank which stores hot water produced in the collector. The storage tank can be further connected to a hot water system of a building. Solar heated water is used in residential, commercial and public buildings. Though the initial cost of solar water heater is higher than the conventional heater, its operating cost is almost nil or very much lower. The heater envisaged in this project idea is a storage tank of 160 liters capacity which can be used by households, hotels, restaurants, etc. ', ' ', ' As hot water is a necessity for life, the means of getting this water is also a necessity. However, some goods or services, however necessary they are, are not readily available for all who want to use them, since they require the ownership of enough money to acquire and use them. All people want hot water and the means (water heaters) to heat the water. But not all can afford to have hot water through the modern heating system. Solar water heater use solar energy to heat the water; and in out country solar energy is available at least 10 months of the year. If the cost of producing and installing solar energy collecting apparatus is reduced through large scale production, solar water heaters will be needed both in urban and rural areas of the country. If only one percent of the rural families use solar water heater, the demand for these heaters will be about 130,000. If these products are introduced into the countryside and effectively promoted with appropriate financing scheme, their demand will grow every year.', ' The main materials needed are steel profile and steel sheet for the frame, steel sheet, steel pipes, single glazing and polyfoam insulation for the collector (absorber). All the major inputs can be obtained from local sources.', ' There are two aspects of the choice of technology in solar water heater production. These are water circulation and solar collector design. Water is circulated between the collector and the storage tank in two different ways by forced circulation (i.e. by means of pump) and by natural convection from the collector towards the tank. Forced circulation has the advantage of higher energy gains and the possibility of positioning the storage tank to any place in the building. However, it has the disadvantages of higher installation costs, frequent maintenance and the necessity to be linked to an electric supply. Hence, considering these advantages, the other technology i.e. circulation by natural convection also referred as the romosylon principle is chosen for this project idea. The manufacturing process employed here mainly uses manually operated workshop equipment which is available in ordinary metal workshops. The process can be divided into four sub-processes:- manufacturing of frame, absorber plate, tubing grid, storage tank and assembly. The frame is manufactured by cutting single iron, hollow square pipe and galvanized steel and welding/faster them as per design. Cutting steel, polishing, cleaning, priming and spray painting operations are involved in the absorber plate manufacturing. The tubing grid is manufactured by cutting pipes, drilling holes and brazing. The storage tank is manufactured by cutting galvanized steel, rolling to from a cylinder and brazing/welding the joining seam and the two ends. The final stage is assembling the various parts of the solar water heater. ', ' utilizes solar energy instead of electric or other forms energy which minimizes costs, improves the standard of public hygiene and health, and introduces new technology and skills.', ' 14', ' 1'),

(' Assembly of Water Pumps ', ' A pump is a mechanism through which an external source of power is used to apply a force to a liquid. A pump develops no power of its own. Its purpose is simply to transfer energy form a source of power to move a fluid. For example, an electric motor may apply power to a water pump, which may take water available for use either by direct transfer or by storage. It may be raised to a higher level for gravity flow or pumped into a pressure tank against a cushion of air, which is compressed either to produce or store energy for withdrawal of water when needed at the point of use., ' Water pump is assembled for moving water form one location to another, especially from lower places to higher places by using tubes or other machines. Access to potable water in Ethiopia is very limited, particularly in rural and small urban areas. Even in big cities such as Addis Ababa and Bahir dar, only a portion of the population has access to protected or potable water. According to the 1994 population and Housing Census, only 2.7% of the rural housing units of the Amhara Region have access to tap water, and only 12.54% of the housing units have access to protected well/ spring water, while 70% of the urban housing units (that of big cities and towns) have access to tap water and 10.4% have access to protected will/spring water. In some small towns and some rural areas water pumps are assembled to distribute protected drinkable water from wells or springs to users in very limited areas. Even in the big cities, there are housing units that have no access to pumped water and are forced to use unprotected water from lakes, rivers, etc. Hence, there is a good ground to encourage investors to involve in the assembly of water pumps to make more people have access to potable water.', ' As indicated above there is a potential demand for protected/ drinkable water supply in many parts of the Amhara region, particularly in rural and small urban areas where majority of the people live. Even in the big cities there are places that have no access to potable water. Hence, there is a strong need for water pump. ', ' All pumps and accessories required for the water pumps are imported from abroad, mainly from France, Japan, Italy and they can be obtained form the importers. ', ' The pump is initially primed in the suction pipe, casing a portion of the delivery pipe up to the delivery valve and completely filled with the liquid (water) to be pumped. Rapid motion imported to the impeller then builds up a centrifugal force, which throws the liquid towards the impeller periphery. This causes pressure gradient in the suction pipe, i.e. a partial vacuum exists at the impeller eye while the liquid in the pump is at a two atmospheric pressure. Consequently, liquid form the pump is sucked in towards the impeller eye. When the liquid passes through the impeller, it receives energy that results in the growth of both pressure and velocity. The casing collects the liquid form the impeller and guides it to the delivery pipe. Since the casing increases in cross-sectional area towards the delivery of kinetic head represented by the higher discharge velocity is spatially transformed into pressure head before the liquid leaves the pump. The process is continued if motion is given to the impeller and there is a supply of liquid to be drawn up on. ', ' The establishment of the plant will enable the people of the Region to have access to protected drinkable water by means of pumps. There will benefits to those who are involved in the assembly of the water pumps. It may encourage investors in other sectors who will need sufficient water supply for their work. It will create employment opportunity in the Region. ', ' 14', ' 1'),

(' Compressors Assembly Plant ', ' An air compressor is a machine that compresses air (a mixture of gases) used for different purposes. Air compressors are normally used for spray painting jobs, for running small pneumatic machines, in manufacturing industries where compressed air is needed, in the repair works of motor vehicles and in type repair shops. Air compressors are able to attain a maximum working pressure of 15kg/cm2. ', ' The national demand for various types (capacities) of air compressors is met through imports. A study undertaken on the market of compressors has estimated that between 1984 and 1993, average annual import of compressors was about 600 pieces or 102 tons. The same study has also projected the demand for air compressors up to 2006 which is 1971 pieces or 331tons. This projected demand will reach about 4500 units in 2013. Production of compressors is mostly an assembly operation. As such it is not highly subject to economies of scale. Thus producing the projected demand for air compressors could make a plant financially viable.', ' the major components required for the manufacture of air compressors are C.I castings, M.S. plate, expanded mesh and M.S sheets, etc. Other components to be procured include pressure gauges, V-belts, electric motors, switches, pressure valves, piston and rings, safety valves, etc. For the first five years, these components will be imported. ', ' Casting of standard grades will be procured from outside and machining of the components will be done in the factory. Parts to be machined will be cylinder block, cylinder head and tools. M.S sheets will be purchased and rolled in the factory to produce the storage tank body. The two end parts of the storage tank will be made and welded in the factory. The piston, piston ring, etc. will be procured and they will be lapped before they are made ready for final assembly. The air compressor will then be assembled.

The pressure controlling and measuring devices will be fitted and the compressor will be put to test in accordance with standard norms. Main plant and machinery needed include universal milling machine, center lathe machine, shaper, vertical boring machine, sharpening machine, hand press sheet rolling machine, bench drilling machine, double ended bench grinder, welding transformer and portable grinder and drill.', ' ', ' Saves foreign exchange promotes self-sufficiency, has potential of export to other regions thereby bringing in financial resources to the region.', ' 14', ' 1'),

(' Boilers Manufacturing Plant ', ' An industrial boiler is a stationery water tube boiler in which steam is generated in a connective tube tanks. A steam boiler is a closed pressure vessel of robust construction, partly filled with water in which water is heated to be converted into steam by direct application of heat resulting from combustion of solid, liquid or gaseous fuels or waste gases or heat generated by electricity, etc. the major parts of a steam boiler are a vertical model three-pass coil type unit, economizer, spirally wound coil shaped pipe which acts as a heat exchanger, and a burner with pressure atomizing type and self-ignition. Steam boilers are widely used in factories, hotels, hospitals, etc. ', ' ', ' All the boiler requirements of the country and met through imports. Between 1985 and 1994, annual average of import of boilers was 36 units. The import volume of boilers depends on the number of factories hotels, hospitals established and which use boilers. During the last 10 years many factories have been established in many parts of the country. Many of these factories use boilers. According to a study on the subject, projected demand for boilers in 2010 will be 189 nits. This level of demand could justify the establishment of a boiler manufacturing plant. This plant could be established in the Amhara Region for distributing its products to all parts of the country. ', ' The main components for manufacturing boilers are metal sheets, tubes and pipes, pumps, motors, and various, types of parts. Practically all the components and parts will import. ', ' ', ' Saves foreign exchange, promotes self sufficiency in basic industrial machinery and equipment, brings in financial resources, and introduces new skill and technology. ', ' 14', ' 1'),

(' Winnowers up To 5.H.P. Making Plant ', ': A winnower is a machine used for winnowing grain i.e cleaning grain from dust, husk, chaff, and other impurities. These machines save farmers from the hard work of manual winnowing in open fields with the help of the wind. Using winnowers, farmers can work comfortably in their sheds where grain stalks are kept. The machine can be hand operated or power operated. ', ' ', ' The market potential of winnowers is too obvious to state. Of the 19.2 million people living in the Amhara Region, about 16.9 million live in rural areas. Among the rural population about 3.4 million are heads of households. We can safely assume that there are two farmers in each household which makes the number of farmers in the region 6.8 million. All these farmers use manual labor for winnowing their grain. Any body who is familiar with rural life in the Amhara Region knows that winnowing of grains is a difficult task. It consumes a lot of labour and time. Any alternative method of winnowing that saves labour and is more efficient will be preferred by farmers. If we assume that at least 5 percent of farmers will buy winnowers as they are supplied to the market, demand will be 340,000. This volume of demand can absorb the production of a number of winnower's assembly/fabrication plants. ', ' The main parts and components are sheet metal, angle iron, motor, etc. The motors will be imported and the rest will be secured from domestic sources. ', ' Fabrication of sheet metal is done for the outer body. For this 18 to 20 SWG sheets are used. The stand is made of angle iron bolted on to the body. Winnowing fan is connected through a pulley and a motor. The hopper is fitted on the top through which the grains are dropped on.

All the parts are fitted together and the outer parts pointed. Main machinery and equipment required are center lathe, sheet folding machine, guillotine shearing machine, sheet roll bending machine, pillar drilling machine, arc welding set, spot welding machine, double ended pedestal grinder, hand tools, jigs and fixtures, spray painting equipment.', ' Similar to other projects ', ' 14', ' 1'),

(' Sewing Machines Assembly Plant ', ' Sewing machine is used for tailoring garments and stitching clothes. In terms of operations, there are three types of sewing machines such as hand operated, foot operated and motor operated. In a modern garment factory, different types of sewing machines perform different tasks for sewing a specific kind of garment. The hand operated sewing machine is usually used by tailors who wok by themselves without much division of labor.', ' ', ' There are five or six garment factories in the country which produce clothes on factory scale. These factories produce mostly shirts and some uniforms which are used only by a small fraction of the population. The overwhelming majority of the people especially those who live in rural areas wear clothes tailored by individual tailors who operate single hand or foot operated sewing machines. These tailors with their sewing machines are scattered in all small and large urban centers in the country. Some of them even operate in large villages. Nobody knows the exact number of sewing machines found in the country. But some rough estimations put the figure between 150,000 and 200,000. If we assume that at least ten percent of these machines are replaced every year, the yearly replacement demand for sewing machines will be between 15,000 and 20,000. Besides, there will an additional demand for sewing machines due to population increase and we will take this to be about 3 percent of existing stock. This translates into a demand figure of 4500 to 6000 per year. Total annual demand for sewing machines will, therefore, be between 19500 to 26000 units. For an assembly plant this is more than sufficient to make it viable.', ' Metal components and parts will be imported for the first five years. Thereafter some components will be fabricated here at home. Non-metal parts such as tables will be made here.', ' Most of the parts like C.I castings for arm and bed plate, pressed components, and other parts and accessories like needles, bobbins, etc. should be imported. The C.I castings are machined and painted. All these components will be assembled using the most appropriate and efficient assembly system. Machinery and equipment needed include double ended bench grinder, add a type milling machine, central lathe, baking oven, painting booth.', ' Similar to other projects. ', ' 14', ' 1'),

(' Crown Cork Making Plant ', ' it is cap made from metal usually steel and used for closing glass bottles which can contain beer, soft drinks, mineral water, liquid cosmetics, etc. ', ' The establishment of one type of factory creates a need for the establishment of another factory which produces inputs for the first factory. The establishment of beer, soft drinks, mineral water and other similar factories in a given Region creates the need for establishing a crown cork producing factory. In the Amhara Region, there are two large breweries (beer factories), two mineral water bottling plants, two soft drinks bottling plants and small liquid cosmetics preparation units. All these factories use crown corks for capping their bottled products; and the crown corks are bought and transported from Addis Ababa. The existing bottling plants located in the Region justify the establishment of a crown cork making plant in the Region.', ' In 2004, total production of crown corks in the country was 4,498,000 gross or 647.71 million pieces of crown corks. Of this production, about one-third is used by bottling plants located in the Amhara Region. This translates into 1,498,000 gross of crown corks. This quantity can be sufficient for establishing a crown cork factory in the region. ', ' The metal sheet from which the corks are to be made will be imported. ', ' Crown cork is manufactured from tin plate which is normally of 0.28 mm thickness and temper grade. The inside surface of the crown is given a protective coating of lacquer of non-toxic quality. The outside surface of the crown will be given a protective coating and may also be given a decorative coating as required by the Client. Main machines needed are automatic crown cork machine, steel cutting machine, automatic gluing and inserting machine.', ' development of ancillary industries, supports the existing beverages factories of the Region, introduces new skills and technology to the Region. ', ' 14', ' 1'),

(' Solar Cookers Producing Plant', ' Solar cookers are made form aluminum sheets and other metal products, such as copper and steel. The cookers have a shape of “Satellite-dish” that receives the sun’s heat and collects it. The collected heat is transferred to a stove made from steel and installed behind the transparent (satellite dish- shape device). The sun’s heat collected by the heat collector heats the stove, and after a few minutes cooking takes place. The cooking is done outside the house wearing special eye-glasses and a hat to protect the eyes of the cook from the sun’s radiation. ', ' The sun is the most powerful source of energy. Nowadays solar energy has become increasingly an attractive source of energy because of its free and inexhaustible supply, and its non-pollution characters which are in stark contrast to fossil fuels, such as coal and petroleum, and firewood. However, the most widely used fuels for cooking in Ethiopia are firewood and cooking gas, such as kerosene. In big cities and some other areas, electricity is also used for cooking purpose. Because of this, the demand for firewood and cooking gas is steadily increasing form time to time. The soaring price of cooking gas and the continued tariff increase in electricity has forced people to use more firewood, which in turn has led to serious deforestation that has already passed a grave threat on the environment. This is also true in the Amhara Region, which is one of the seriously affected areas in the country because of deforestation and environmental imbalance.

Even though the initial investment cost (purchase of the solar cookers) may be high, to reduce reliance on the above mentioned sources of energy for cooking purposes, the use of solar cooker, as one of the alternative energy source is an important issue for the Region. ', ' There are many users of solar cookers in the country, including non-governmental organizations, Embassies, other diplomatic communities, and some households, mainly in Addis Ababa. However, there are only a few plants in the country in this regard, one of them being solar Bereket. If the benefit of solar cookers is properly introduced to the people, no doubt the product will have sufficient market in the Region as well as in other regions. ', ' The main raw materialsfor the production of solar cookers are aluminum sheets which are imported from countries, like France. Other raw materials, such as steel and copper products are available in the domestic market. ', ' The production process involves collection of raw materials, such as aluminum sheets prepared for the purpose, steel and copper (wire). Then a typical active, and “satellite dish-shaped” plate with transparent aluminum sheets facing the sum is made. A blackened metal plate is also prepared at the back of the plate. A stove made of steel is connected with the blackened plate that transfers the sun’s heat from the heat collector (the dish) to the stove. ', ' The introduction of the solar cooker in the Region will decrease reliance on petroleum products (such as kerosene), fire wood and electricity for cooking. It will decrease the rate of deforestation and the threat on the environment. It will create employment opportunity for the people of the Region. It will introduce new the production in the form of profit. Revenue will be generated for the Regional Government in the form of income tax and VAT. It will save foreign currency particularly that is spent for importing petroleum products. ', ' 14', ' 1'),

(' Poultry Equipment Making Plant ', ' This is equipment designed for feeding, watering, housing and egg-laying purposes for chickens. The equipment is used to maximize egg production by providing convenient habitation and comfort for the birds. Small and large scale operators can use the equipment. ', ' ', ' Poultry is mainly an income generating activity practiced by rural and to some extent by urban people. Almost all the poultry supply in the Amhara Region comes from traditional system of poultry farming in which a few chickens are raised in the back-yards of each family. Feeding and housing the chickens is so poor that production is extremely low. Large scale commercial farming of poultry has not yet started in the Region. If the system of poultry farming is modernized and commercialized, this branch of agriculture could be a large source of food and cash income for millions of people. In 2005, the poultry population of the Amhara Region was about 11.2 million which was 31.4 percent of the poultry population of the country. If we assume that at least 40 percent of the poultry birds in the Region are egg-laying, their number is 4.5 million. Each bird needs one poultry equipment at least during its egg-laying period. Hence the potential demand for the equipment is 4.5 million units. If we assume that for the first phase only 10 percent of the birds will be provided with the equipment, the initial demand for the equipment wiil be 450,000. This demand size will accommodate the production of many small plants which could be established in different parts of the Region.', ' Galvanized iron sheets, mild steel wires and rods are the main inputs. These inputs will be bought from factories in Addis Ababa until the Region produces these products. ', ' G.I. sheets and M.S. wires and rods are cut to size by hand shearing or treadle guillotine shearing machines. Then beading and folding operations are performed in folding and hand press brakes. Then the cut pieces are assembled with suitable fixing arrangement. Machinery required includes geared type hand shearing machine, guillotine shearing machine, roll type edge folding machine, bench grinder and multi-purpose grinder.', ' Stimulates poultry production, increases food supply and income.', ' 14', ' 1'),

(' Small Scale Steel Plant ', ' Steel is a product basically made form iron and a small amount of carbon. There are different types of steel depending on their carbon content. Low carbon steel contains less than 0.25% carbon. Medium steel contains between 0.25 and 0.70% carbon. The amount of carbon in steel determines the physical characteristics of the steel. When steel is produced by adding some number of other metals, this is called alloy steel. Steel is the foundation of an industrial economy. All heavy machineries and equipment are made from steel. Railways, ships, trains, motor vehicles, heavy duty trucks, earth moving machines, tanks, guns, artilleries, bridges, dams, high rising buildings, production machines and many other products small and large are basically made from steel. ', ' ', ' Steel is used for making different products. At an early stage of development steel is used based products. In the context of the Amhara region, production of steel will be used to produce small hand tools such as farm implements, construction tools and to produce some components of small machines that could be assembled and fabricated in the region. Metal sheets made from steel can be used to fabricate and assemble grinding mills, hollow blocks making machines, windmills, oil mills and other similar products. In short to build an industrial economy where machines produce other machines, where machines produce metal-based products, the production of steel is a basic requirement. If the Amhara region is to have a strong industrial economy in the future, a start has to be made now. And that start is to build a small-scale steel making plant. ', ' The main raw materials for making steel are pig iron and coal. The pig iron will be imported while coal can be obtained from domestic sources.', ' Basically steel is made by mixing pig iron and coal in a furnace and melting the pig iron. There are different types of processes for making steel. The main ones include the Bessemer process, open hearth process, submerged injection process electric furnace process. The electric furnace process utilizes nearly 100 percent scrap. The different processes have a series of stages for producing steel. The main production machine is the furnace where the pig iron and coal are mixed. There are also other auxiliary machines and facilities. ', ' Forms the foundation for building and industrial economy for the region, supplies inputs for metal based industries, saves foreign exchange ', ' 14', ' 1'),

('3-Wheelers Assembly Plant ', ' A 3-Wheeler is a motorized vehicle used to transport about four people at a time. The vehicle is popular in India and other Southeast Asian countries and it is used as a “taxi”. Recently the vehicle has been introduced to the Ethiopian market and it provides transport services in Bahir Dar and a few other major urban centers. ', ' ',' In urban transport market segmentation, a 3 – wheeler is between a mini-bus and a taxi. It is better than a mini-bus because it is less crowded and it also preferred to the taxi because it is much less expensive. Since it is introduced to the Ethiopian market very recently, no demand pattern for the vehicle has yet emerged. But one can have an intuitive feeling that it will have a good and growing demand in many urban areas especially in areas where the terrain is flat. The Amhara Region can capture the growing market for this vehicle if it starts assembling the vehicle to meet the national demand. It will be possible to sell at least 5000 units of this vehicle per year throughout the country with an effective marketing strategy ', ' For the first phase all the parts and components will be imported. But gradually at will be possible to produce some parts and components locally. ', ' The main process is the orderly arrangement of the parts and components and step - by - step assembling of the parts and components until the vehicle has all its body parts together. An assembly operation does not have much machinery and equipment. It only requires tools, implements and some testing apparatus. ', ' Self-sufficiency, facilitates urban transport ', ' 14', ' 1'),

(' Fabrication of Apparatus Which Converts Sunlight Energy in to Electrical Energy ', ' This is a apparatus with different components whose purpose is to receive sunlight energy, and convert this energy in to electrical energy. The electrical energy produced is used for generating heat and light. The apparatus is installed in individual homes and buildings and it does not require investment in transmission lines. The use of this apparatus in out country has been increasing during the last 10-15 years. Today it is not unusual to see these apparatus son roof tops of big and small buildings in Addis Ababa.', ' ' ,' Solar energy storing and converting apparatus is convenient for supplying electrical energy and light to isolated communities where conventional energy sources such as thermal and hydro-power are too expensive to install and distribute. As of now almost all the rural communities and most of the small urban centers of the Amhara Region are not provided with electric energy and light. The provision of this energy to both urban and rural areas of the region will replace the use of wood and other biomass material there by saving the remaining plant resources of the region. Of the 20 million people 4,000,000 families living in the Amhara region, more than 3.8 million families are not provided with electric light and energy. If solar energy converting apparatuses are supplied and if we assume that about 10 percent of the families with no electric power and light will electric light and energy. If solar energy converting apparatuses are supplied and if we assume that about 10 percent of the families with no electric power and light will buy these apparatuses, the initial demand will be about 380,000 units. As more people are aware about the benefits of these apparatuses, there will be more demand for them in course of time. It is, therefore, obvious that there is a huge potential demand for solar energy storing and converting apparatuses in the Amhara region. Whether or not this potential demand will be converted in to actual demand will depend on the unit price that each apparatus will be sold. ', ' Main components of this apparatus are voltaic cell, metal sheets, electrical cables, storage batteries, etc. most of the components will be imported. ', ' At the initial stage of production, the main process will be assembling the components of the apparatus. Gradually some parts and components will be fabricated and manufactured at the plant site. For the initial stage of operation not much machinery and equipment will be needed. But to start fabrication of components, some basic machinery and equipment will be needed. Bat to start fabrication of components, some basic machines such as shearing, machine, grinding machine, welding machine and other auxiliary machine will be needed. ', ' Improves the lives of rural people, saves forest and biomass resources, saves the energy and time of women ', ' 14', ' 1'),

(' Solar Water Heaters Making Plant ', ' A solar water heater is a water heater which uses solar radiation energy for heating water. It consists basically of the flat plate collector and an insulated storage tank. The collector is commonly blackened metal tubing and is usually provided with a glass cover and a layer of insulation beneath the plate. The collector tubing is connected by a pipe to a storage tank which stores hot water produced in the collector. The storage tank can be further connected to a hot water system of a building. Solar heated water is used in residential, commercial and public buildings. Though the initial cost of solar water heater is higher than the conventional heater, its operating cost is almost nil or very much lower. The heater envisaged in this project idea is a storage tank of 160 liters capacity which can be used by households, hotels, restaurants, etc.', ' ',' As hot water is necessity for life, the means of getting this water I also a necessity. However, necessary they are, are not readily available for all who want to use them, since they require the ownership of enough money to acquire and use them. All people want hot water and the means (water heaters) to heat the water. But not all can afford to have hot water through the modern heating system. Solar water heater use solar energy to heat the water; and in out country solar energy is available at least 10 months of the year. If the cost of producing and installing solar energy collecting apparatus is reduced through large scale production, solar water heaters will be needed both in urban and rural areas of the country. If only one percent of the rural families use solar water heaters will be about 130,000. If these products are introduced in to the countryside and effectively promoted with appropriate financing scheme, their demand will grow every year. ', ' The main materials needed are steel profile and steel for the frame, steel sheet, steel pipes, single glazing and polyfoam insulation for the collector (absorber). All the major inputs can be obtained from local sources. ', ' There are two aspects of the choice of technology is solar water heater production. These are water circulation and solar collector design. Water is circulated between the collector and the storage tank in two different ways by forced circulation. (i.e. by means of pump) and by natural convection from the collector towards the tank. Forced circulation has the advantage of higher energy gains and the possibility of positioning the storage tank to any place in the building. However, it has the disadvantage of higher installation costs, frequent maintenance and the necessity to be linked to an electric supply. Hence, considering these advantages, the other technology i.e. circulation by natural convection also referred as the theromosylon principle is chosen for this project idea The manufacturing process employed here mainly uses manually operated workshop equipment which are available in ordinary metal workshops. The process can be divided in to four sub-processes:- manufacturing of frame, absorber plate, tubing grid, storage tank and assembly. The frame is manufactured by cutting single iron, hollow square pipe and galvanized steel and welding/faster them as per design. Cutting steel, polishing, cleaning, priming and spray painting operations are involved in the absorber plate manufacturing. The tubing grid is manufactured by cutting galvanized steel, rolling to from a cylinder and brazing/ welding the joining seam and the two ends. The final stage is assembling the various parts of the solar water heater. ' , ' Utilized solar energy instead of electric or other forms energy which minimizes costs, improves the standard of public hygiene and health, introduces new technology and skills. ', ' 14', ' 1'),

(' Cotton Yarn Production Plant',' Most woven fabrics and knitwear fabrics are made from cotton yarn which is made in textile spinning factories. Yarn is produced to be an input for the weaving department in textile mills and to be sold in the market to the handloom industry where it is made to traditional clothes for women and men. Though gradually declining, rural people especially women wear clothes woven by traditional weavers and these clothes are made from cotton yarn.', ' There are only two textile mills in the whole Amhara Region, and one of them is about 45 years old with very little renovation during all these years. The two mills produce small quantities of cotton yarn for the local market, but their yarn production is not sufficient to satisfy the yarn demand of the Region. As a result, large quantities of yarn are imported to the Region from other parts of the country. With the existing two textile mills getting old and obsolete, the production of yarn from these factories will decrease. To supply the yarn requirement of the Region from Regional production, one medium scale spinning mill is needed.', ' Between 1992- 1995 E.C average annual production of cotton yarn was 5,679 tons and the share of the Amhara Region was not mote than 500 tons. On the other hand, share of the Amhara Region in the consumption of domestic yarn was about 1,700 tons – indicating the fact the Region is a net importer of yarn. When consumption of imported yarn is included, the demand for cotton yarn in the Region is higher. Textile factories can be built either as integrated units (spinning and weaving) or as separate units like spinning or weaving. Spinning mills can have different capacities and still be viable. The yarn market in the Amhara Region can absorb the production of a small to medium spinning mill which can be viable technically and financially. ', ' The land resources of the Amhara Region can produce all the cotton that the Region needs to produce the textile fabrics and yarn requirement of the people. Of course, to produce this cotton, large scale cotton plantation should be allowed to be started in suitable areas of the region. ', ' The main processes are carding of mixed cotton lint, drawing, combing, roving, spinning, twisting, winding, setting and packing. ', ' Stimulates the agricultural economy of the Region due to the need of establishing cotton plantation, self- sufficiency in yarn production, supports the handloom industry plus all the other benefits associated with the development of industry in any region. ','15', ' 1'),

(' Umbrella Assembly Plant ', ' Different types of umbrellas are used by men and women and also by clergymen during religious holidays. The main use of umbrellas is to protect people from rains or from heat generated by the sun. ', ' There is a small umbrella assembly plant in Addis Ababa built more than 35 years ago. The plant was established not for purely commercial purposes but also to create employment opportunities for disabled people. For some reason, the plant has never been able to produce quality umbrellas especially for women who are more sensitive to quality, style, color and fashion. Probably because of this, most of the demand for umbrellas is met from imports. ', ' Domestic Production of umbrellas is about 450,000 annually. Imports are about 1,800,000 pieces. The Amhara Region has about 27 percent of the population and consumption of umbrellas can be 607,000 units per year. Hence, there is sufficient market for umbrellas in the Region. ', ' Umbrella is made of multicolor fabrics (the quality of the fabrics differ), metal rods, and handles. The fabrics especially the unicolor ones can be produced in our country but the metal parts have to be imported.', ' Umbrella making or assembly involves cutting the cloth or fabrics to size, stitching or sewing, assembling or joining the cloth with the metal ribs, brass and pipe together, checking and packing.', ' ', '15', ' 1'),

(' Socks Manufacturing Plants ', ' Socks are too obvious to describe. They are made by knitting cotton, wool, silk or man-made yarns or fibers. Socks are one of the essential clothing items in developed societies. They are like under wears, shirts, trousers or skirts. ', ' ', ' The use of socks is related with the use of shoes. In today’s Amhara land, at least people who live in urban areas wear shoes and socks. Generally, more men wear socks with shoes than women. In 1997 E.C. there were 932,000 men above the age of five in the Amhara Region. If we assume that one person consumes at least three pairs of socks per year, total consumption of socks by men in the Region is about 2,796,000 pairs of socks. In the last 25 years, increasing number of rural people has started wearing socks and shoes. So, annual consumption of socks could be as large as 4 million pairs. But all these of socks are imported. If there is such a huge market for socks, there is a great opportunity to exploit this market by establishing small scale socks making plants in three or four urban centers of the region.', ' Socks are mode from cotton, woolen or acrylic yarn. Cotton yarn can be obtained from the textile factories of the country while woolen and acrylic yarn will be imported', ' Major production processes include winding, knitting, linking, dyeing. Major machinery and equipment are specialized knitting machines, winding machine, linking machine, and setting machine, dyeing machine, steam iron and boiler for steam. ', ' To the Region’s Economy creates employment, contributes to self-sufficiency in industrial products, creates linkages with the textile industry, keeps financial resources within the Region, saves foreign exchange.', '15', ' 1'),

(' Children Garment Making Plants ', ' Children garment is a clothing product, which is necessary of life and has to be provided in affordable price to the population mass or industrial production of garment normally provide inexpensive standard quality clothing. Children garment is mainly for children of age group from 5 to 14.', ' The degree of children garment wear is higher due to rough handling, frequent dirtying and washing. There is a need of sufficient supply of garment for children both for normal and ordinary cloth and uniforms. Although there is a textile mill in Bahrdar town that produces good quality of textile products for children garment, there is however no factory that produces at industrial scale in the region and at present children and garment are tailored or custom made. It is justifiable to establish children garment making plant on industrial scale. ', ' Current population of children age group is growing rapidly in the region. The demand for clothing grows progressively with growing population and rising income. Domestic industrial production of children garment is limited. Ready-made garments are imported. Current demand does not appear to be satisfied particularly in relation to affordable price. ', ' Major raw materials which are available locally are:

- Cloth

- Lining cloth or fabric

- Fasteners (Buttons, Zippers, Tasks)

- Sewing thread

- Packing material

5. Production Process and Technology

a) Production Process:-

Children garment making involves basically the process of pattern making, cutting, sewing finishing and packing.

b) Production Equipment

- Sewing machine - Trimming equipment

- Folding machine - Press and iron

- Buttonhole machines - Cutting tables

- Collar shapers - Others (trolleys, material

- Tack settings machine boxes, racks, benches etc)

- Electric knives

All the major machinery and equipment are assumed imported. ', ' ', ' ', '15', ' 1'),

(' Surgical Bandages Making Plant ', ' Bandages are used extensively in health care institutions. The uses of bandages range from simple dressing of superficial wounds to holding together fractured bones or body parts for rehabilitation and recovery. ', ' There are 15 hospitals, 682 clinics, 79 health centers and 410 health posts in the Amhara Region. All these health care institutions need bandages to treat their patients. All the bandage requirement of the Region is imported either from other Regions or from abroad. The production of bandages requires strips of woven garment made from cotton yarn and this can be produced in the Region since there are textile factories which produce yarn or cotton fabrics.', ' The existence of a captive market for bandages in the Region is obvious by the fact that all health care institutions use bandages brought from outside the Region. Even if some health personnel resist in using locally produced bandages, there will be sufficient market to justify the establishment of a bandage producing plant in the region.', ' The main raw material is either cotton yarn or cotton fabrics. This raw material can be obtained from the textile factories of the Region.', ' The process of manufacturing surgical bandages passes through the following stages: - (a) purchasing or weaving the bandage cloth (b) clearing and removing of organic impurities (c) washing and bleaching (d) drying and calendaring (e) rolling and cutting and (f) packing. Machines required for the plant include sizing machines, weaving looms, rolling, and packing machines and compressors. ', '(a) creates employment (direct and indirect), (b) stimulates economic activities in cotton plantation, ginnery, and yarn production (c) makes the Region self-sufficient in the production of this product (d) creates the possibility of exporting surgical bandages to other neighboring zones and bordering countries. ', '15', ' 1'),

(' Absorbent Cotton Making Plants ', ' Absorbent cotton is used for sanitary use and in surgical operation. As the name implies the product absorbs excess liquid or fluid which the body generates or produces due to injury or natural process. Besides it use in surgical operation, absorbent cotton is used by women during their monthly menstrual cycle. But in our country, it is mostly women who live in urban areas who use absorbent cotton. ', ' Of the 19 million people who live in the Amhara Region, about 9.6 million are women and of these, 7.6 million are between the age of 15 and 49 years- the period of reproduction. Again, among this group 6.8 million live in rural areas. Probably due to ignorance these women do not use absorbent cotton during their “monthly period”. Even women who live in so called small “towns” which are large villages with some semblance of urban life do not use absorbent cotton. The fact that these women do not use this product puts them in very inconvenient and sometime embarrassing situation during their periods. Anyone who grew in a rural area knows the problem women face during their periods because they do not use absorbent cotton. If rural women are properly informed about the benefit and convenience of using absorbent cotton, and if smart businessman produces absorbent cotton which is not fancy but practical and whose price is affordable by rural women, there will be a huge market for absorbent cotton in the Region. And this is one of those projects which should be activity promoted by the Region’s Health Bureau.', ' Women of reproductive age group are the potential market for this product. If one woman uses 3 pieces of absorbent cotton per month, 7.6 million women will use 22.8 million pieces per month and 273.6 million pieces per year. For those who are aware about its benefit, the use of absorbent cotton is not an option but a must. The problem in rural areas is that rural women do not know the existence of such a product. Investors not only take advantage of existing markets, but they exploit latent markets. ', ' The main raw material is ginned cotton which can be obtained from ginneries operating in the Region. Or alternatively raw cotton can be bought from farmers and it can be ginned using labor through outsourcing. In other words, raw cotton can be given to women living around the factory site, and these women could process the cotton and bring it to the factory for further processing and packing. Besides, cotton there are manmade materials which can substitute cotton.', ' The are two methods of marking absorbent cotton:- one is automatic and the other is manual. The manual process involves the following stages of production. (a)Cleaning of the raw cotton (b) treating of the cotton with caustic soda and soda ash (c) pressing the cleaned cotton and bleaching (d) washing the bleached cotton (e) drying of the bleached and washed cotton (f) cutting the cotton to standard size and (g) packing of the absorbent cotton.

Machinery needed for the plant include carding machine, croytein, boiler, drying chamber, hydro extractor, rolling machine, circular, lifting machine and other testing machine ', ' Creates employment, stimulates production of raw cotton, makes the Region self-sufficient in this product and improves the health standard of millions of women. ', '15', ' 1'),

(' Terry Towel Making Plant ', ' Towels are essential household items that are also used in home, hotels and restaurants. They are used as bath towels, wash towels, hand towels etc. Towel is made from terry fabric or cloths in more than one design and types. ', ' Towels are important items for washing and cleaning and up keeping of health by drying a wet body. It is used daily in every household by each person. It uses domestic raw material of cotton yarn, which is produced in the region and manufactured in textile mills. Medium quality towel type is made town from either bleached/dyed cotton yarn or gray cotton yarns, which can be beached/dyed after weaving. Towels can be manufactured by small and medium enterprise and create employment to many people. The establishment of small-scale towel making plant has to be encouraged by the regional government. ', ' Currently demand for towels is met from domestic production by big textile mills like Kombolcha textile mills. There is a large amount of smuggled towels in the market. Demand grows with growing urbanization, growing exposure of the rural sector to urban goods and rising income of urban and rural households. There will be sufficient demand for the production of small-scale towel making plants. ', ' The main raw material, which are available locally are as follows:

- Cotton yarn (of specific count)

- Bleaching agent and dyes (if the material is bleached or dyed at the plant).

- Sewing threads

- Silk screen with designs (if dying/ printing is done at the plant)

- Packing material ', ' (a) Process production of towels involves basically the process of cotton yarn bleaching/dying, drying, rewinding, preparation for weaving (yarn classification), sectional working, tying, reaching-in-etc), weaving, inspecting of cloths, bleaching/dyeing (if yarns woven are not already bleached or dyed) drying, finishing (cutting, lock or overlook stitching, that is edge sewing) and packing.

a) Machinery and Equipment

- Winding and rewinding machines

- Bleaching/dyeing and rinsing vats (if bleached) dyed yarn are not bought.

- Drying machine (if yarn bleached/dyed at plant)

- Power and water treatment equipment (if yarn bleached/dyed at plant).

- Weaving preparation equipment (wrap tying, reaching in etc).

- Power looms

- Inspecting equipment

- Stitching/sewing machine

- Other (laboratory and workshop equipment, accessories etc) machinery and equipment are assumed improved. ', ' ', '15', ' 1'),

(' Knit Wear Making Plants ', ' Clothing which is made out of woven or knitted fabrics are essential item to large section of population knitted cloth like outwear, that is sweater and the like useful for wear in cold seasons and also are used as casual wear for all season wear. ', ' Most of the Amhara region is mountainous and has cold climate. The people use warming out fit cloths like of "Netela" and "Gabi" to protect them selves from cold. The availability of knitwear cloth will serve the same purpose and is conducive to their casual daily wear. Industrial knitwear like sweaters will satisfy the huge demand. Presently the rural people use hand weaven-knitted wear. Most of the knitwear is imported from outside the region. Knitwear manufacturing is a small-scale industry. ', ' There is a high-unsatisfied demand for knitwear in the region. The product serves both the rural and urban population. The demand increases with the rise in population and income. The primary and secondary school student use uniform made of knitwear of acrylic wool material. Knitwear products are also used for bed covers children blankets and as a covering material. It is advantages to establish knitting mills as they provide employment and import substitute. ', ' The main raw materials for knitted wears are:

Yarn (acrylic and/or other)

Sewing thread', ' Process knitwear production processing involves simply the winding of raw material yarn on cones, setting of the cones on knitting machine inspection of knitted fabrics (for knitting damage) seaming and linking of the different parts of the products.

a) Production Equipment

Hand flat knitting machine

Over look sewing machine

Miscellaneous (steam iron, beaches... etc)

Except the benches all machinery and equipment are assumed imported. ', ' ', '15', ' 1'),

(' Mattress and Pillow Making Plants ', ' Mattresses and pillows are basic consumer goods in all urban centers. Even “well-to do” farmers in rural areas have started using mattresses and pillows. Mattresses are basically made using three main raw materials- spring and cotton, cotton only and sponge. Some low-quality mattresses are made from by-products of garment making industries and also from straws. ', ' Mainly due to low income, practically all rural families do not use mattresses and pillows. Anybody who is familiar about rural life is aware how rural people live. Even in the urban areas, people use mattresses and pillows mostly made from rags and waste cotton. For those who use mattresses and pillows made from spring and cotton and sponge, these mattresses are imported from Addis Ababa. Making mattresses and pillows requires simple operations and simple production machines. Provided that the market justifies the establishment of a mattress and pillow making plant, there is no reason why these products cannot be produced in the Region.', ' In 2005, the urban population of the Amhara Region was estimated to be about 2.2 million. With five person’s per-family, there were 440,000 urban families in the Region. If we assume that at least two mattresses and four pillows are required by each family, total requirement of mattresses and pillows in the urban areas of the Region are 880,000 and 1,760,000 respectively. If we assume that at least 10 percent of the rural population will use mattresses and pillows, total requirement of these products will be 677,000 mattresses and 1,354,000 pillows (ten percent of the rural population of the region is about 1.7 million). Combined requirement of mattresses and pillows is 1,557,000 mattresses and 3,114,000 pillows. If only 10 percent of the products are replaced every year, annual requirement will be 155,700 mattresses and 311,400 pillows. The proposed plant will concentrate on the production of spring and sponge mattresses and pillows. Mattresses to be made from waste cotton, rags and straw will be left to the cottage industry.', ' The main raw materials are springs, cotton and fabrics or fabrics and sponge. Cotton fabrics and sponge can be obtained from domestic factories. The spring has to be imported.', ' Production process involves the cutting of cloth casings, preparation of the springs, or cutting the sponge, stitching, cleaning of in-fill or stuffing the in-fills then quilting and tufting of the stuffed mattresses at intervals according to desired patterns. Only stitching and preparation of the springs require mechanical work; the rest could be performed manually. Major machinery required include cutting machine, stuffing or in-fill mixing machine, sewing machine, stuffing pressing equipment, accessories and hand tools. ', ' Self–sufficiency in these particular industrial products, additional demand for the Region’s lint cotton and cotton fabrics, introduction of new skills, saving of regional financial resources. ', '15', ' 1'),

(' Surgical Dressing Making Plant ', ' Surgical dressing is an essential material used in health care institutions, and it includes different types of products which are manufactured from white bleached cotton gauge cloth of suitable quality. The products are used for covering wounds, burns to prevent added infection, enhance the building of delicate tissues by protecting the wound from further injury during healing, absorb excretion from the wound. ', ' All the raw materials used in the manufacture of surgical dressing are found in our country. But the country does not produce surgical dressing. On the other hand, surgical dressings are among the essential items that the country needs like medicines and other pharmaceutical products. If the raw materials are found in the country and if the product is essential not as a consumer item but as a health care item, there is no reason why this product can not be produced in the country. The Amhara region has the raw material for making surgical dressings and it could produce those products. ', ' One can imagine the quantity of surgical dressing being consumed in all health care institutions in the country every year. It is a large quantity indeed. If a fraction of this quantity is produced in one plant, the plant can be a viable plant financially and technically. The essence of this project idea is import substitution and it is by establishing such plants that the country can become self-sufficient in such critical items as surgical dressings. ', ' The main raw materials are lint cotton and cotton fabrics both of which can be obtained from domestic sources.', ' The main processing stages include opening and cleaning of the raw material, pickling and lapping, kiering, bleaching and washing, carding, sterilization and packaging. For surgical bandages, the main machinery and equipment include cloth winding machine, bandage compressing machine, boiler and sterilizer. For surgical cotton about 15 types of machinery and equipment are needed. ', ' Facilitates health services in the country, saves foreign exchange resource, conserve financial resources of the Region, and introduces new technology and skills. ', '15', ' 1'),

(' Textile Welding for Garments Making Plant ', ' One of the products of “textile welding for garments” is raincoats. Raincoats from plastic sheets are manufacturing mainly by heat sealing process. Raincoats are extremely useful especially for farmers during the rainy season. ', ' Of the 18.5 million people of the Amhara region, more than 17 million live in rural areas where farming and cattle raising are the main activities. Most farming activities such as ploughing, planting, weeding and livestock herding are done during the rainy season. In this season, practically every member of a farming family is out in the open field doing farm working or taking care of the animals. When it rains (and it rains every day) farmers and their children do not have anything to protect them against the rain. It is very common to see people socked with rainwater and still working on farm fields. Umbrellas are not convenient to use while somebody is doing farm work. Raincoats are very convenient to use when doing farm works during the rainy season. When one imagines the number of people working on farm fields and suffering from the rains, he or she can only identity a project idea which can solve this perineal problem facing every peasant farmer and his family.', ' The highest potential demand for raincoats can be 17.1 million pieces i.e. equal to the rural population of the region. Even if we assume that only one percent of the rural population will buy raincoats, this will amount to 171,000 raincoats. And producing this quantity will make a plant viable. ', ' The P.V. sheets from which the raincoat is to be made will be imported until they are produced at home by importing the P.V. material.', ' PVC sheet is cut as per pattern, size and design of the raincoat. The different parts that make up the raincoat are then thermo welded (joined). Zips, buttons, and elastic tapes are also fixed by thermo-welding and then decorative designs, paints, labels, etc. are put ouor fixed. Main machines required are high frequency welding machine, cutting tubes, measuring, and cutting tools.', ' Improves the welfare of farmers, improves working hours and productivity of farm activities, introduces new skills and technology to the Region, ', '15', ' 1'),

(' Acrylic Yarn Production Plant ', ' Acrylic yarn is a type of yarn made from man made fibers. The yarn is used for making fabrics which are, in turn, used for making clothes. Fabrics made from acrylic and other synthetic yarns are popular in the rural areas of the Amhara region. They are used by both men and women.', ' Probably because of their durability, fabrics made from acrylic yarn are widely used in the rural areas of the Region. These fabrics are made as jackets, trousers, skirts, shirts, etc. Even the garment called “Gojam Azene” is woven from acrylic yarn; and this garment is worn by practically every male in the rural areas of the Region. But the fabrics made from acrylic yarn and the yarn itself is all imported from abroad. With practically everybody wearing clothes made from acrylic fabrics, one could have expected the existence of both an acrylic fabric and acrylic yarn making plants in the Region. But this is not the case. Given the fact that the majority of the rural population wear clothes made from acrylic fabric, it is necessary to establish an acrylic yarn producing plant and an acrylic fabric making factory in the Region. The acrylic yarn producing plant will produce yarn for the cottage weaving and knitting industries. It can also supply acrylic yarn for some of the textile mills which will use the yarn for blending purposes.', ' Of the 19 million people in the Amhara region about 8.5 million are male who live in the rural areas. Among the rural male population, 5.78 million are above the age of ten. If we assume that at least one individual uses 4 m2 of acrylic fabric every year, total annual consumption of this fabric will be 23.1 million m2. This is more than the production capacity of the Combolcha Textile Mills which was 20 million m2. If we include the consumption of acrylic fabrics by rural women and some portion of the urban population, the total annual demand for acrylic fabrics will be much more than 23 million m2. This quantity is more than the viable production capacity of a modern medium size textile factory. This is about 9,200 tons of yarn.', ' Synthetic fibers like acrylic yarn are made from different raw materials. Some are made from petroleum products: others are made from coal and trees. Still others are made from chemicals. Production of the substance from which the acrylic yarn is to be made requires huge investment and complex technology and this is done in industrially advanced countries. Hence the “raw material or the “artificial cotton” from which the yarn will be made will be imported. ', ' Production of acrylic yarn or synthetic fiber follows the pattern of cotton yarn production. The main processing stages are drawing, combing, roving, spinning, twisting, winding, setting and packing. Depending on the type of plant to be established, the production process could start from spinning. Main plant and machinery include roving, spinning, twisting, winding and setting machines.', ' Saves foreign exchange and regional financial resources, self-sufficiency in a basic consumer product, introduces new skills and technology.', '15', ' 1'),

(' Sweater Making Plants ', ' Sweaters (knitwears) are popular types of clothes both in the rural and urban areas especially among the female population. Sweaters are worn both by children and adults. In rural areas, the formal dress for women (in special occasions such as holidays) include sweater which is worn on top of skirts. Uniforms of students mostly include sweaters. ', ' There are very small scale manually operated sweater making units in the main cities (Dessie, Gondar, Bahir Dar) of the Region. But they only cater to their respective local markets. The bulk of the sweater consumption of the Amhara Region comes from Addis Ababa where there is large- and small-scale sweater making factories. Most sweaters are made from synthetic yarns. Since the technology and the skill of making sweater is common, the Amhara region has the capacity to produce these mass consumer products. ', ' Go to any marketplace in any market day in rural Amhara, you find bundles of sweaters of different sizes, color and quality in the clothing rows of the marketplace. All these sweaters are made in Addis Ababa. Of the 19 million people in the Region, at the minimum 5 percent can be assumed to wear sweaters. This translates to a consumption figure of 0.90 million pieces of sweaters. The consumption volume is the production capacity of many small and medium size sweater making plants. This opportunity should be exploited by investors by establishing sweater making plants in the Region. ', ' Sweaters are made from acrylic, wool, and cotton yarn. Acrylic yarn and cotton yarn can be purchased from domestic sources while wool yarn will be imported. ', ' The process of making sweaters involves the following:

Winding of the raw material-yarn on cones

Setting of the cones on knitting machines

Knitting (semi-manually)

Inspection of the knitted fabrics

Cutting of the knitted fabrics according to needs

Stitching

Over locking and fixing of buttons etc.

Pressing and packing

Main machines required include hand and feet knitting machine, over locking machine, sewing machine, chain lock stitching machine, electric presses, set of working tools. ', ' Promotes self-sufficiency, saves regional financial resources, and increases supply of regionally produces clothing material for the Region’s population.', '15', ' 1'),

(' Cotton Blankets Making Plant ', ' A blanket is a piece of woven fabric which is raised to make it warm when used. It is usually made from cotton, synthetic or wool waste. It is mainly used for night wear. Blankets are manufactured in standard sizes. The standards are based on the surface area of the blankets and their specific weight. Blankets could be light or heavy weight. Light weight blankets have a specific weight of 450 gm/cm2. Medium weight blankets have specific weight of 550 gm/ cm2. Standard blankets have sizes of 160X220cm. Family size blankets are either 180X220cm or 200X220cm. ', ' Until the late 1990’s there was only one blanket making factory in the country, and this factory produces the medium weight type of blanket which is made from wool and acrylic waste. This blanket mainly due to its weight extent has not been appropriate for use in rural areas of “Kola” and “woinadega” climatic zones. What is convenient in these climatic zones is a type of blanket which is lighter in weight, smaller in size and which is made from cotton or light weight synthetic fiber. In recent years, one or two factories have been established which produce light cotton blankets. However, there are no such factories in the Amhara Region where more than 30 percent of the market for blankets exists.', ' About 3.84 million families live in the Amhara region and 3.26 million of them live in rural areas. Light weight cotton blankets are very convenient for use in the rural areas. If we assume at least 25 percent of the rural families want to use these blankets, total demand for this blankets will be 815000 pieces; which is (1.60X2.20mX815,000) 2.87 million square meters. Total production of blankets in the country in 2004 was about 937,000 pieces which indicates a per capita consumption of domestic blankets as 0.01 pieces or 0.04 m2. Production of cotton blankets during the same year was only 90,300 pieces. As indicated above, potential demand for cotton blankets in the Amhara region alone is about 815,000 pieces which is 86 percent of the total blankets production of the country in 2004 or nine times higher than the cotton blankets production of 2004. What these figures show is that there is more than sufficient demand for cotton blankets in the Amhara region which warrants the establishment of at least one cotton blanket factory in the region.', ' Main inputs are cotton yarn and chemical dyes. Cotton yarn will be obtained from domestic sources and the dyes will be imported.', ' The five basic processes in the manufacture of cotton blankets are carding spinning, weaving, dying and raising. There are more than 23 types of production machinery and equipment and other auxiliary machines. ', ' Saves financial resources of the region, promotes self-sufficiency in a basic industrial product, stimulates production of cotton and cotton yarn in the region.', '15', ' 1'),

(' Polyester Fabrics Production Plant ', ' Fabrics are made from cotton, wool, silk or man-made yarns. Man-made or synthetic yarns are made from coal, wood, hydrocarbons and other chemicals, A few of the most common synthetic yarns are nylon, polyester and acrylic. These yarns are used to manufacture fabrics and knitwear. Fabrics made from synthetic yarns are popular among the rural population of our country. Fabrics made from such yarns are believed to have longer service life than cotton fabrics. They are also easy to wash and wear.', ' The use of synthetic fabrics for various types of clothes jacket and trousers or shorts for the male, dresses for the female have become popular in the Amhara Region during the last twenty or so years. If one travels through the Region, it is possible to observe women, men and children mostly is rural areas wearing clothes made of synthetic fabrics. The traditional home spun and woven cotton fabrics from which women dresses were made have been largely replaced by factory made (mostly imported) synthetic fabrics. Men’s clothes made from cotton fabrics (produced at home) are replaced by clothes made from synthetic yarn. All this change in the choice of synthetic fabrics has taken place in the last twenty years. One major factor for the popularity of synthetic fabrics for clothing is that their price is cheaper than the price for cotton fabrics.', ' In the late 1980’s, the domestic production of cotton fabrics had reached about 110 million m2 per year. Probably due to stiff competition from imports because of liberalization of the country’s foreign trade, production of domestic fabrics had decreased starting in the early part of the 1990’s. For example, average annual production of cotton fabrics in the country between 2000 and 2004 was 42.7 million m2. This was a dramatic decrease from the production of the late 1980’s. While there was a decrease in domestic production in fabrics, there was a big increase in imports which replaced domestic production. Currently one can safely say that more than 80, percent of fabrics consumption in the country is met by importing various types of synthetic fabrics. Of the 19.2 million people living in the Amhara region, close to 17 million live in rural areas; and 69 percent or about 12 million of the rural people are above the age of 10. This group of people are the main consumers of synthetic fabrics. If we assume that one person consumes about 10 m2 of fabrics per year, total consumption (demand) of synthetic fabrics in the rural Amhara Region could be 120 million m2. This is the potential demand for synthetic fabrics in the Amhara Region. Even if the per capita consumption is reduced by half, the potential demand will be about 60 million m2. This demand is 12 times the annual capacity of Ethio-Japan Nylon Factory. In other words, the demand for synthetic fabrics in the Amhara Region will absorb the production of a number of factories.', ' The main raw materials are synthetic yarn or synthetic “cotton” and dyes. These will be imported.', ' The main processing stages of producing synthetic fabrics is the preparation of the yarn, weaving and finishing. Within each major stage, there are several activities which are too many to mention at this stage. Plant and machinery include various types of spindles, looms and sets of finishing machines. In addition, other auxiliary machines will also be required.', ' saves foreign exchange and regional financial resources, promotes self-sufficiency, and introduces new skills and technology.', '15', ' 1'),

('Grain Mill Belt Production Plant ', ' Grain mill belts are thickly woven cotton straps used to connect engines with wheels. Grain mill belts are used for power transmission purposes in flour or grain mills. The belts connect the engine of the mill and the grinding stones. Power from the engine is transmitted by the belt to the grinding stones which makes one of the stones to rotate around pressing the grains against the other (lower) stone and thereby grinding the grains to change them to flours. ', ' It was around the turn of the last century that grain mills were introduced into our country. Though it has been more than one hundred years, the use of grain mills was concentrated mainly in the urban areas. It was only during the last 25 years that grains mills were widely introduced into the rural areas. Now the number of grain mills installed in the country is probably not less one hundred thousand. And this number increases ever year. Due to the large increase in the demand for grain mills, some components of the mill are being fabricated at home, However, no attempt has been made to produce grain mill belt which is made from cotton yarn. Like the engine, the grinding stones and some other components of the mill, the belt is also imported. But it is possible to produce this product using locally produced yarn and by importing special purpose looms for weaving the belt.', ' As indicated above, currently there are probably 100,000 grain mills throughout the country. Each grain mill requires one belt; and the service life of one belt may not be more than four years. The demand for grain mill belt is composed of replacement and additional requirement. Subject to further verification through detailed market study, the demand for grain mill belt may not be less than 25,000. ', ' Cotton yarn which is the principal raw material will be obtained from domestic sources. ', ' Cotton yarn in the form of hank is purchased from spinning or textile factories. The yarn is wound on wooden reels and pirn. From the wooden reels warp is made and place on the tape loom. Cotton beltings are woven and wrapped and converted into pools which become ready for marketing. Major plant and machinery needed include tape loom-6 section (heavy duty type) with motor, warping loom 16 section with motor, napping machine and creel stand, winding and pirn winding machine and spool making machine.', ' Saves foreign exchange and regional financial resources, promotes self-sufficiency, stimulates production of local cotton yarn,', '15', ' 1'),

(' Carpet Making Plant ', ' Carpet is a woven or knotted thick covering for floors and stairs in residential, commercial and public buildings. It is made of woolen, cotton, or synthetic yarn and mostly has artistic patterns or design woven or knotted into it. The use of carpets gives comfort to users, warmth, and beauty to the floors. ', ' Constructions of residential and commercial buildings are expanding in all the major urban centers of the country. Almost all the floors of commercial buildings and of high-income residential buildings are covered with carpets imported or locally produced. Local production of carpets (i.e., factory-made) is limited in terms of quantity and design. Only the solid color or mono-color type of carpets are produced by a local factory. And annual production of this factory is about 22,821m2 per year which is far short of current demand. Consequently, an average annual import of this product was almost 74,000 m2 between 1984 and 1993. With limited domestic capacity and one type of brand, the demand for imported carpets will grow in the future. This necessitates the establishment of another carpet making factory; and this factory can the established in the Amhara Region. ', ' A market study undertaken in 1997 indicates that in 2006, the projected demand for carpets is 172000 m2 which is 149,000 m2 larger than the present domestic capacity. This demand gap can sustain the production of six plants whose/individual capacity will be similar to that of the existing factory.', ' The main raw materials are woolen cotton and synthetic yarn and dyes and chemicals. Except the cotton yarn, the others will be imported. ', ' The manufacturing process of carpets involves essentially the following operations.

Purchasing, spanning, washing and drying the yarn

Drawing the design on a graph paper and then memorizing

Setting up the loom

Weaving, (knotting) the carpet by using suitable yarns

Pressing down in each row by using a heavy toothed metal comb

Making the carpet look smooth and even by cutting away the fringes left after knotting the woolen yarn weft.

Washing the carpet and drying

Wrapping and packing

The major plant machinery and equipment required for the project are hand-operated loom, winders and pin winding machines. ', ' saves foreign exchange, and regional financial resources, stimulates the production of cotton yarn and cotton creates possibilities of export to other regions, becomes a foundation for establishing carpet making factories for export, and introduces new skills and technology.', '15', ' 1'),

(' Nylon Yarn Production Plant ', ' Nylon filament yarn can be manufactured in different degree of orientation such as low oriented (conventional) partly oriented and fully oriented yarn. The yarn may be produced as multifilament or mono filament in a wide range of degree of finesse (deniers). It is also available in bright and semi-dull lusters. The filament yarn is generally specified by finesse grade (deniers), number of filaments and twists per meter length. Nylon yarn is used to produce different consumer goods such as textile fabrics, upholstery, umbrella clothes, tire cords, fishnets, ropes, carpets, etc.', ' uses that nylon yarn has, one could have expected the presence of a factory that produces this product. But except the nylon textile factory located in Mojo, there are no plants which produce nylon yarn in the country. Consequently, all the nylon yarn requirement of the country is met by imports. A visit to any urban market center will reveal how the market is flooded with imported nylon ropes. The demand for nylon yarn for other uses is also met by imports. As the demand for products which are made of nylon yarn are bound to increase so will the demand for nylon yarn. Given this, it is prudent to promote the establishment of a nylon yarn factory; and the Amhara Region could be the second region to establish a nylon product making factory.', ' As mentioned above, nylon yarn is used to make fabrics (of different grades and for different uses) and other assorted products. The use of these products in the country is wide-spread. For example, textile fabrics made form nylon yarn are used by women in the rural areas of the country. Nylon fabrics are used for making umbrellas produced in the country. Ropes made from nylon yarn are used extensively both in rural and urban areas. Nylon ropes are used even to make household furniture like chairs, stools, and sofas the demand for all these products increase as the population and increases and as urbanization expands. As the demand for nylon yarn is a derived demand, its demand will grow as the demand of products made from the yarn increases. According to a study, the projected demand for nylon yarn will be 208 tons in 2008 and 263 tons in 2015. Unless a local capacity is created, all this yarn will be imported. ', ' The manufacturing process of nylon yarn can be broadly divided into the Following production steps: -

Polymerisation of caprolactum to manufacture nylon chips

Extraction and drying chips

Melt spinning of chips to manufacture spun yarn

Processing of spun yarn

Monomer recovery and

Recycling of nylon waste. The machineries needed for the plant are grouped into poly condensation/polymerisation, spinning, drawing process, auxiliary units and recovery units. There are different machines in each group. (Local Production of the yarn could start from spinning stage. This will reduce investment cost.)', ' ', ' Like other identified project ideas', '15', ' 1'),

('Cotton Under-Garments Making Plant ', ' Under garments are clothes worn close to the body or those clothes which have direct contact with the body. These are clothes like pants, sweaters, etc. Under garments are also called under wears. These garments are made from knitted or woven fabrics.', ' The supply of under-wears especially pants is completely dominated by imports. Apart from some production of sweaters (kanatira) by one or two local textile mills, the bulk of domestic consumption of under wears is met by imports. Under wears are composed of two pieces of garment the upper part which is the sweater and the lower part which is the pants. The upper part is always made from knitted fabrics while the lower part is made either from knitted or woven fabrics. In Europe and North America almost all under wears are made from knitted fabrics. The domestic market of under wears is composed of products made from knitted and woven fabrics. How the market from under wears is flooded by imports from the Far East can be observed by looking at the street markets, so-called boutiques, and garment shops. There seems there is an oversupply (excessive import) of these and other similar products. Under wears are simple products which require only sewing. They are not subject to fashion changes. They do not require highly skilled designers and tailors. There are standard designs for these products both for men and women. But they are not produced in the country in the required quantity and quality. As a result, the country spends precious foreign exchange resources for products which can be produced at home. This project idea is to promote the establishment of a plant which will produce under wears from knitted or woven cotton fabrics.', ' Of the 19.2 million people in the Amhara region, 2.2 million live in cities and towns. Again out of the 2.2 million, about 1.7 million are above 10 years of age. This portion of the urban population uses under wears. If we assume that each persons consumes at least 3 pairs of under wears per year, annual demand for under wears in the Region could be as high as 5.1 million pairs of under wears or 5.1 pieces of sweaters and 5.1 pieces of pants. Even in rural areas many people have started wearing under wears; and as time passes more and more rural people will wear under wears. This will increase the demand for under wears. One can safely state the demand for under wears is, at the “minimum” about 10 million pairs.', ' Mostly under wears are made from cotton fabrics knitted or woven. Both types can be obtained from domestic sources.', ' Making under wears is basically a cut, make and trim operation. Knitted or woven fabric is spread on tables and cut by means of automatic or manual scissors according to desired sizes. The cut pieces are then over locked and the under wears so obtained are labled, pressed and packed. Main machines needed for the plant include over lock machines, flat-lock machines, pressing tables, electric irons, stools, and scissors.', ' Saves foreign exchange and regional financial resources, promotes self-sufficiency, introduces new skills and technology, and stimulates the textile sector.', '15', ' 1'),

(' Stove Wicks Making Plant ', ' Stove wicks are braided cotton yarns used in domestic wick stoves for burning the kerosene in the stove for producing heat for cooking.', ' Wick stoves are becoming common household items especially in the urban areas. They have become the main cooking instrument in many homes. Though they use foreign exchange for buying the kerosene, the use of wick stoves saves part of our forests from being destroyed for fuel wood. In another section of this document the fabrication of wick stoves was included as one project idea. This project idea is to promote the production of wicks in the Amhara Region. Production of the item is very simple and it can be done by establishing a small stove wicks making plant. ', ' Wick stoves are not yet common in the rural areas of the Amhara Region. Hence, for the time being market potential for wicks will be in the urban areas of the Region. With an urban population of a bout 2.2 million, there are 440,000 households in the Region. If we assume that at least 30 percent of these households have wick stoves, the number of these stoves could reach about 132,000. Supplying wicks for these and other new stoves will be a viable business for any investor who will establish stove wicks producing plant. ', ' The raw material is cotton yarn and this will be obtained from the two textile factories located in the Region.', ' Cotton/staple yarn in 6s single and 10s single count is used for making wicks. The yarn is braided in long dories along with cotton filling on automatic braid machine. Braid is the formation of comparatively narrow fabrics or rope like structure by interlacing diagonally, three or more strands of materials. Braid is formed by crossing strands diagonally in a such a way that one or more strands pass alternatively over and under one or more strands being laid in the opposite direction. Main machinery includes braiding machines (32 spindles), winding machines, miscellaneous tools and ancillaries.', ' Saves foreign exchange and regional financial resources promotes self-sufficiency for the Region, introduces new skills and technology, and creates additional demand for the Region’s textile factory.', '15', ' 1'),

(' Sewing Thread Making Plant ', ' Industrial sewing thread is broadly classified by type of fiber-cotton and synthetic. Cotton sewing thread is mostly used for cotton fabrics and synthetic sewing thread is for fabrics made of synthetics. In Ethiopia, since cotton fiber is the dominant material most of the thread produced is likely to be from cotton fiber. The second criterion for classifying thread type is by count. Currently, counts ranging from 30/3 to 8/3 are being used in garment factories. Industrial sewing is primarily used for fabrics. However small quantities of thread are used in shoe industry, knitwear factories, furniture and upholstery, blanket manufacturing for sewing ribbons and households for manual sewing.', ' ', ' Existing domestic capacity for sewing thread is about 180 tons per year and current demand for the product is 1330 tons. The difference between domestic production and total demand (1330-180) 1150 tons is met by imports. The share of the Amhara Region is 346 tons. This estimated demand of sewing thread for the Amhara Region is almost two times the domestic production capacity. Or alternatively, the demand for the Amhara region can absorb twice the existing production capacity. This evidently means that there is sufficient demand for sewing thread in the region which can absorb almost 350 tons of sewing thread per year. ', ' The raw materials and other inputs required to manufacture sewing thread are cotton and synthetic yarn, dye stuffs, chemicals, cones and bobbins. The cotton yarn will be secured here at home and the remaining inputs will be imported. ', ' Winding of the cotton yarn twisting to promote the twinning ability as well as to offer the necessary strength to the thread, dyeing-done under high or normal pressure and the dyeing process is done in open vessels, drying and packing. Major machines needed are winding, twisting, reeling, doubling, dyeing, squeezing, drying sizing machines, compressor, auto-process control, and laboratory equipment. ', ' Stimulates cotton and cotton yarn production, saves foreign exchange and regional financial resources, promotes self-sufficiency, and introduces now skills and technology.', '15', ' 1'),

(' Small Scale Weaving Plant ', ' Weaving is a method of creating fabric by interlacing two sets of yarn threads, which are called the Warp and the Weft. The Warp threads form the base for weaving. They are arranged parallel to one another and held in tension on a loom. The weft is a single thread that is passed over and under the warp threads in a systematic way to create a solid or patterned piece of cloth. Ethiopians in urban and rural areas use woven clothes. They are also used as National Dresses. ', ' Clothing constitutes one of the most basic important needs of human beings. Woven clothes are particularly important needs of low-income groups in the country. They are relatively cheap and are used by many Ethiopians are basic clothing and national dress. It is, therefore, important to promote the production of textile products such as woven clothes, which are both inexpensive and durable, to minimize fraction of income of the groups spent on the more expensive clothes in the Region. ', ' Woven clothes are demanded by both urban and rural people in many parts of the Region because of their cheap price and for their durability. There will be also the possibility of selling the products to other regions, and even for foreign visitors (tourists). ', ' The raw materials from which weaving threads are produced vary from animal fibers such as wool, mohair, camel hair, rabbit hair etc., to vegetable fibers such as cotton, wood and leaf, fibers such as flax hemp jute, etc. Most of these raw materials are available in many parts of the Amharic Region. ', ' The basic process of weaving consists of passing the filling threads alternately over and under the warp threads. More advanced weaving work on large piece is done by using the treadle loom, a large and expensive, machine that holds long warp threads and can make quick and complicated changes in the placement of these threads to allow for many patterns. ', ' It meets the clothing needs of the low-income groups in the Region. It creates employment opportunity. It Generates earnings for the investors as profit, generates revenue for the Regional State in the form of income tax and VAT. ', '15', ' 1'),

('Modern Garment Making Plant for Export and Re-export ', ' The garment work consists of the manufacturing of clothing by cutting and sewing fabrics. Garment is one of the major activities which consume huge labor. The high potential input for garment production is textile which is produced in various textile factories in the country. It has high market demand in the country (including the Amhara Region) and in many parts of the world. Important garment products include shorts, shirts, T-shirts, under wears, fur apparel, pants, trousers, sport wears, work clothes and jackets. ', ' Textile and garment industry have enormous potential and opportunities for progress. However, although there is a high potential to produce raw materials, such as textile and leather, the garment industry has not yet developed in the country. The demand for garment products, in various parts of the world is steadily growing. There is high potential for cotton production, which supplies basic raw materials for the textile factories, which in turn, are major raw material suppliers for the garment industry. Thus, the existing potential for cotton and textile production and the availability of cheap labor is one the major parameters for considering the sub sector as one of the strategic export- promoting sector in the country. Garment industry is labor intensive; requires relatively small capital investment; has high market demand in the world market. Thus, the garment and textile industry has been identified as one of strategic economic areas that have been given great attention and support by the government. There is an opportunity to get skilled manpower for making the product as there is a textile and Garment Industry Support Institute at the Bahir Dar University for training professional skilled manpower. Given the potential of the raw material and the priority of the government for the textile and garment sub-sector, the garment industry has a major role to play in the Region’s economy in general and export trade. ', ' The demand for garment in the world market is increasing. Garment products of Ethiopia have high market demand in many parts of the world, particularly in the United States of America, Western Europe, and Japan. Therefore, there will be sufficient demand for the product in the international markets. ', ' The main raw materials for the plant will be the textiles factories such as Akkaki Textile Factory, Bahir Dar Textile Factory, Kombolcha Textile Factory and Awassa Textile Factory; and Sometimes raw materials are imported from countries such Italy.', ' The production process includes designing, measuring, and cutting of the fabric. Then sewing machine, machine designed to join pieces of fabric or leather by means of either a lockstitch or a chain stitch is used for the process (tailoring). The lockstitch which is used in modern sewing is formed form two threads and the chain stitch from a single thread. Other machines, such as shuttle, loop and needle are used in the process. ', ' The garment industry has enormous benefits for the Region as well as for the country. It will create employment opportunity for the growing labor force of the Region. It will generate foreign exchange since it has an increasing demand in the international market. There will be earnings for the investors in the form of profit. It will generate revenue for the Regional State in the form of income tax and VAT.', '15', ' 1'),

(' Military Supplies Production Plant ', ' In this project idea military supplies refer to uniforms of military personnel, belts, tents, bangs and other clothing items used by members of the defense forces. Most military uniforms are made from cotton or polyester fabrics. These include jackets, shirts and trousers. In addition, belts, tents, bags, bullet pockets, etc. are made from thickly woven cotton or synthetic fabrics. These military supplies constitute a substantial portion of the military budget in any country. ', ' The ordinary uniforms of the country’s military and police personnel are produced by local garment factories and the fabrics are also manufactured by domestic textile factories. So far the Amhara Region does not have any share in the production of military uniforms though the Region has textile factories which can produce the fabrics. Military uniforms and other domestic purchases for the military are made using public funds through the budgetary process. In developed countries, spending by the government (especially which involves large sums of money) is done by considering regional distribution of the expenditures. The objective is to distribute the purchases to regions, states or provinces so that each entity gets its fair share of the money. For example, if fabrics for military uniforms are bough from one region, the tailoring of these uniforms is done by factories located in another region. In this way, the tax money collected from different regions is distributed back to the different regions through purchases by the government.

The Amhara Region should get its share of federal government spending by establishing factories which produce military supplies such as uniforms, food rating, etc. this project idea is to establish garment factories which will produce military uniforms. ', ' Government Purchases of goods and service are determined by government decision based on government revenue and borrowing. Thus, the market for producing military uniforms is determined by the authority responsible for this task. If this authority orders that a certain portion of the military uniforms should be produced in the Amhara Region, then the envisaged plant will have a market. ', ' Cotton and polyester fabrics can be obtained from domestic factories or they can be imported if preferred by the government. ', ' The process of a garment factory is simple. Fabrics are put on long tables; designs are made on papers and these papers and put on the fabrics. Power operated scissors cut the fabrics according to the designs. The pieces are then sent or transferred to the tailoring department. There, different parts of a given cloth are tailored though division of tasks. Finally, the clothes are ironed and packed. Main machines needed include different types sewing machines, tables, irons, powered scissors, etc. ', ' Brings financial resources to be region, ', '15', ' 1'),

(' Jeans Garments Making Plant ', ' Jeans garments are clothes such as pairs of trousers, jackets, shirts, skits, shorts, etc made from jeans fabrics. These garments are used by people of all ages especially by the young. The clothes are practical, have longer life and they are casual. They are used for heavy duty work, in offices, schools, shops, etc. they have become almost the universal cloth of the young generation. ', ' Clothes made form jeans have almost become universal. Except in some Muslim countries, young people every where wear jeans. In developed countries, jeans are worn by people both in urban and rural areas. In developing countries where there is limited urbanization, jeans are worn by people in urban areas. In our country, jeans have become so popular that once can hardly see any type of cloth worn by the urban youth except jeans. Practically all young people in Addis Ababa, Awassa, jima, Bahir Dar, mekele or anyh other urban center (small or big) wear clothes made from jeans. One can say that jeans have become the national dress of the youth in almost all countries. While there is so much demand for jeans clothes in the country, there is no any textile plant that produces jeans or any garment factory which produces jeans clothes. Given the present level of consumption of jeans clothes, there is a captive market for a garment factory that can produce jeans cloth or products. Of course, the plant has to be competitive in terms of price, style and quality of fabrics. ', ' The Major consumers of jeans clothes are those between the age of 10 and 30 and who live mainly in urban areas. Urban people of this age group number about 2.8 million in Ethiopia and 0.5 million in the Amhara Region. If we assume that at least 80 percent of these people wear jeans clothes of any type, the number of jeans consumers is about 2.24 million in Ethiopia and 0.4 million in the Amhara Region. Again, if we assume that one consumer wears about 4m2 of jeans cloth (equivalent to two pairs of jeans trousers), total annual consumption of jeans in Ethiopia will be 8.96 million m2 (equivalent to 2.24 million pairs of trousers) and 1.6 million m2 is the Amhara region. this annual consumption is large enough to make a jeans garment factory operational for a full year. ', ' The main raw materials for a jeans garment factory are jeans fabrics, zippers, sewing thread and buttons. The fabrics will be imported and the other in puts will be secured from domestic sources. ', ' A garment factory is at tailoring factory where there is division of labour and specialized machines for performing different portions of sewing a garment (trousers, jackets, skirts etc). hence the main stages are making designs, cutting the fabrics according to designs, sewing the different parts of the garments, putting buttons, ironing (if necessary) folding and packing. Main machines needed include electric scissors, different types of sewing machines, electric irons, etc. ', ' Saves foreign exchange and regional financial resources, promotes self-sufficiency ', '15', ' 1'),

(' Cotton Ginnery Plant ', ' A cotton gin plant is a service provider which does not have final products for consumption. Its products are lint cotton and cotton seeds which are intermediate products ready as raw materials for textile and oil mill industries respectively. Hence the processing of cotton starts at the gin which separates the line from the seed. The proportion of lint cotton and cotton seed is 65 and 35 percent respectively. ', ' The cotton ginning is a process by which cotton fiber is separated from the cotton seed. By doing so, the gin facilitates the marketing and transporting of lint cotton and cotton seed. Lint cotton and cotton seed and used as raw materials in different set of industries. Transporting raw or seeded cotton will be cumbersome and expensive to the textile industries. The same is true for oil mill industries. Hence separating the fiber form the seed will enable to transport the cotton lint to textile industry and cotton seed to oil mill industry. For export markets, ginning will reduce transport or fright cost tremendously. ', ' The cotton gin is where cotton fiber is separated from cotton seed. This is a very important function in facilitating the marketing and transporting of lint cotton and cotton seed separately to their desired destinations. Hence cotton gin is an integral part of cotton production. As long as there is a cotton production there will be a compatible demand for cotton gin capacity. ', ' Cotton gin requires seeded cotton as raw materials. Raw or seeded cotton produced by cotton farms in the region will be supplied to the gin. The gin capacity should be designed as compatible to the regional cotton production volume. Metallic strapping tapes and jute bag will also be required as packing materials.', ' The processing of cotton starts at the gin, a machine which separates the lint from the seed. Cotton seeds are dried artificially be for ginning starts. The first steps in the ginning process is vacuumed the cotton into tubes that carry it to a dryer to reduce moisture and improve the fiber quality. Then it runs through cleaning equipment to remove the immature bolls, leaf trash, sticks and other foreign matter. The fiber is separated form the seed either with saw gins or roller gins depending on the staple length of the cotton. The lint then it passed through another series of pipes to a press where it is compressed into bales, banded with steel straps, wrapped for protection and ready for shipment to its destination. ', ' Cotton gin increases the quality of lint cotton. It also facilitates the marketing and transporting of lint and seed cotton. It also crates income for employees in the form of wage and salary, profit for the investors and revenue for the regional government. ', '15', ' 1'),

('Self- Gripping Woven Fabric Tapes', ' These are synthetic type fasteners and are manufactured from nylon yarn. A combination of nylons and polyester yam may also call look and loop tapes. Self-gripping woven fabric tapes are mostly used in garments and other dress materials such as dresses, leather garments leather purses, shoes handbags etc. The product is also used for physiotherapy as therapeutic aids in muscle or body joint strains to put disjointed human body organs in place after massaging. ', ' ', ' All the self-gripping woven fabrics tapes consumed in the country are imported. Demand for the tapes was estimated to be about 100 tons in 1997 and this will grow to around 150 tons in 2008. Since the main consumers of the tapes are garment factories the demand for the tapes is a positively affected by population growth as the demand for garments is a function of population growth. In other words, with population growth demand for garments will increase and when demand for garments increases, the demand for self-gripping woven fabrics tapes will also increase? The share of the Amhara region in the demand for the tapes will be about 38 tons or 38,000 kg. This demand volume could justify the establishment of a self-gripping woven fabrics tapes making plant. ', ' The main raw material or inputs are nylon yarn, coating material (methyl, ethyl, and ketene) and these inputs will be imported. ', ' The tapes will be woven, warp pile in narrow fabric construction process. The monofilament auxiliary warp ends shall be woven in the form of raised loops. The raised loops will be heat set to retain their shape. They can be cut near the cut of the loops to form a free look engaging section. On the other hand, the loops will be napped to form a uniform disoriented surface of uncut loops. The product will be stabilized for maximum flatters, evenness, and dimensional stability. The black of the tapes can be coated with a flame-resistant coating or elastomeric coating.

Main plant and machinery needed include automatic needle weaving machine, multipurpose coating machine, heat setting machine, loop cutting machine, reeling machine and other auxiliary instruments. ', ' Facilities the development of garment industries, saves foreign exchange, potential to export to other regions. ', '15', ' 1'),

(' Plant for Dyeing, Pointing and Finishing Fabrics ', ' Cotton fabrics or fabrics from man-made fibers are first produced in grey forms. That is they are not dyed, printed or finished. In fabrics production, there are two basic sages- production of the grey fabrics and production of the finished fabrics. The finishing process includes dyeing printing, sanforizing etc. Depending on the size of textile factory, production of the grey fabrics and finishing the fabrics could be dove either in one factory or in separate factories. If the textile factory is large and has all the required plant and machinery, grey fabrics production and finishing could be done in one factory. Otherwise, the two stages of production are done in two or more separate factories. In our country, the Arba Minch Textile Factory was planned to produce grey fabrics. And the Awassa Textile Factory was planned to receive grey fabrics from Arba Minch and complete the production process, by dyeing, printing, and finishing the grey fabrics. This project idea is t establish a plant that will dye, print, and finish grey fabrics that it will receive from other textile weaving plants. The advantage of this arrangement is that is each plant will require less investment which makes it affordable by investors. ', ' ', ' The 20 million people now living in the Amhara region require at the minimum 6 m2 of fabrics for clothing. This is the bare minimum need. The textile mills of the region do not produce more than 20 million m2 of fabrics - leaving a shortage gap of 40 million m2 of fabrics. This indicates that the region is not even self- sufficient in textile fabrics which is the most essential need of a people. Along with other textile project ideas, this project idea is suggested to make the region self- sufficient in the production of fabrics. ', ' Grey fabrics will be feed to different dyeing and printing machines. Dyeing or printing will take place on the fabrics; the fabrics will undergo different operations for washing, drying, and finishing. Finally, the finished fabrics will be rolled and packed for dispatching. Machinery required will include sets of dyeing machines, printing machines, sarforyzing machines, other auxiliary machines, and equipment. ', ' ', ' Promotes self-sufficiency, saves foreign exchange, and saves regional financial resources. ', '15', ' 1'),

(' Mobile Saw Mill ', ' Products from saw mill operation include different types of lumber and these are produced by processing (cutting, slicing, splitting, smoothing, shaping, etc) logs of different tree species. These wood products are used in the construction, furniture and fittings, packaging, civil engineering etc. industries. Lumber from different tree species are used for different uses depending on their strengths. ', ' The building, construction and furniture industries in the Amhara Region require different types of lumber. Though the forest resources of the Region are depleted, most of the lumber requirement is met from the remaining “forests” and tree stands found in scattered and isolated localities. This is more so in the western part of the Region than in the eastern part where the depletion of forests is more severe. With careful utilization and proper management, the existing forest resources coupled with those which must developed with can supply part of the lumber requirement of the Region. However, the number of trees that could be turned to logs in one specific area may not be sufficient to meet the raw material need of a saw ill permanently located in the locality. Given the small size of forests in localities where these patches are found, the viable option of utilizing these forests is to have a mobile sawmill which will move from one locality to another for processing logs to be obtained in each locality. ', ' Due to shortages of logs (because of deforestation), the sawmill industry in Ethiopia is not expanding as demand for its products requires. Even with this constraint, production of lumber has been increasing between 1999 and 2003. For example, 3080m3 was produced in 1999 and 7220m3 was produced in 2003. But this production was a small fraction of the demand. To compensate this shortage, lumber is being imported from abroad. In fact, most of the lumber requirement of the construction industry (especially formwork) is met form imports. Like other regions of the country, the Amhara Region requires lumber for its various needs. The lumber requirement of the Region will increase as the construction and other lumber consuming industries expand. Hence demand for lumber will not be a constraining factor for a sawmill operation. In other woreda, for any quantity of lumber to be produced from the existing meager forest resources, there will be enough market. In fact, the Region will need additional lumber which will be imported from other parts of the country of from abroad. ', ' The small forests found in a number of localities in the Region. ', ' The main production process include-leading logs jto log turner, log dogging, set working, cutting the log into halves, cutting into quadric section, cutting into boards and squares. Main machinery include band and circular saw, bank stretcher, conveying equipment, large and medium types of saw sharpeners. ', ' Utilization of the Region’s natural resource, support to the construction industry, promotion of to self-sufficiency. ', '15', ' 1'),

(' Chip or Particle Board Making Plant ', ' Chipboard is a rigged panel made from process eucalyptus tree and other wood. It is used in the construction and woodwork industries. ', ' Agro-forestry product of eucalyptus tree which abundantly grows in various places in the region can be used to make chip board panels. Well planned forest of eucalyptus tree can be a constant supply for chip wood making plant. The rural population and private investors can be encouraged to grow eucalyptus tree to supply for the chip wood factory. The forest farming and the chip wood factory creates employment for many people. There is no chip wood making plant in the region. The product is imported from Addis Ababa. The chip wood making plant with wide development of forest can contribute a lot to the development of the region. ', ' Chip wood boards are highly demand by building construction and furniture and other wood works. With the growth of these sectors and rising income and urbanization the demand for chipboard also increase. Thus the demand will be sufficient to cater the production of the chip wood making plant. ', ' The main raw material, which are available locally are:

- Eucalyptus tree

- Glue ', ' Chipboard making process involves basically cleaned eucalyptus trees from foreign matter, filling the tree into hopper, formation of by glue of the board, drying, cutting in to prescribed dimension and end sealing.

a) Machinery and Equipment

- Waste separator (cleaning machine)

- Wood feed hoper

- Slab forming machine

- Cutting and sealing machine

The machinery and equipment are imported. ', ' ', '15', ' 1'),

(' Straw Board for Building ', ' Straw board is a panel made from clean, dry and non-pulped cereal straw or similar fibrous material. The panel is used in the construction and wood works industries as a substitute to chip wood or other boards. It can also be used for making containers for packaging purposes.', ' Chip wood and straw board panels are used for roofing and for wall portioning in the construction and for making tables, cupboards, shelves, beds in the wood working industries. Currently both types of panels are not produced in the Amhara region. However, the Amhara region is basically a cereals growing region where straw, as a residue of cereal production, can be found in sufficient quantities. Up to now, the straw is partly used as animal feed in some parts of the region and in others it is Regt on the farm after harvesting. For many construction purposes, panels made from straw board is a good and cheaper substitute for chip wood. Since the raw material is there and the product can be absorbed by the growing building industry, the establishment of a straw board making plant in the region will contribute to the further expansion of the building industry in the region. ', ' If not like Addis Ababa and other few areas, the building industry is expanding in the Amhara region. Many construction activities are going on in urban areas like Bahir Dar, Gondar, Dessie, Debre Markos, Woldiya and other smaller urban centers. All the buildings require panels for inside footing. Chip wood is very expensive in the region and it is imported from Addis Ababa. It also uses a lot of wood thereby putting more pressure on our remaining forest resources. Therefore, straw board will have sufficient market in the building industry of the region.', ' : Straw from cereals is the main raw material and this is found in practically all parts of the Amhara region especially in the Dega and Woina Dega areas of the region.', ' Processes collecting and cleaning the raw material, steaming, warming, slabs pressing, paper lining, gumming, cutting, drying, winding and packing. Machinery and equipment include, waste separator, straw feed hopper, slab forming, paper lining, cutting and sealing machines.', ' Facilitates the building industry, self- sufficiency in an important building material, economic utilization of an agricultural residue-straw, introduces new skills and technology to the Region plus the other common benefits.', '15', ' 1'),

(' Fuel Briquette from Biomass Making Plants ', ' Briquettes are made from agricultural residues by binding them by a briquette machine to be used as fuel which supplement or substitute traditional fuels (fuel wood and charcoal). ', ' Various studies indicate that over 90% of the national energy requirement is currently met from fire wood and other fuels. The scarcity and high cost of these fuels have become prevalent in major towns of the region. The deforestation of natural forests have created the recent acute problem of draught in the region. In the face of persistent foreign exchange constraints imported fuel substitutes cannot provide adequate solution to the problem. The annual surplus of agricultural residue (crop stalks, straws, husks... etc) that are presently damaged or left to rot or burned in the region can be made into briquette and serve as fuel wood both in the urban and rural areas of the region. Presently there is no factory that makes briquette in the region. ', ' There is high demand for fuel in urban areas, which have become scarce and expensive. Briquette from agricultural residues can serve the growing demand. They are in expensive to transport and store, can be adopted to domestic cooking apparatus and industrial stoves. ', ' The raw material, agricultural residue is found in abundance in the region. The main materials are agricultural residues and binding additives that are all available locally. ', ' The process of briquette making involves, basically screening (to remove foreign matters) crushing and drying of input residues, feeding of the residues a binding agent into briquette machine, cutting of the briquette into predetermined standard size, cooling and packing.

b) Machinery and Equipment

The required production equipment are:

- Briquette machine

- Shredders (manual)

- Briquette cutter

- Drive motors (electric)

- Other (solar drying trays, slides, weight scale etc) ', ' ', '15', ' 1'),

(' Briquettes from Coal Making Plant ', ' Brequetting of coal is the processing of natural coal (found in Chilga-North Gondar) to increase its heat value and make it transportable to other parts of the Region to be sold for fuel. ', ' Wood is the main source of fuel in the Amhara Region. In fact more than 95 percent of people in the Region depend on wood for fuel. This has caused widespread deforestation throughout the Region. Because of depletion of the forest resources of the Region, fuel wood has become so scarce and people partly depend on cow dung to get some fuel. Shortage of fuel wood will be more acute in the future since trees destroyed for fuel wood are not replaced by planting trees.

Several studies have indicated that there is a substantial deposit of coal in Chilga Woreda of North Gondar Zone. Some estimates put the volume of deposits at 14.5 million tons. Until now the most economical use of the coal deposits is not yet determined. However, considering the acute shortage of fuel wood in the Region, one possible and immediate use of this coal could be to make briquettes out of it and sell the briquetted coal for fuel. The briquetted coal will be more convenient to pack and transport to other parts of the Region. With distribution points at strategic locations, the coal could be sold to urban and rural users. This will save the remaining in the Region from being cut-down for fuel.', ' If the price is affordable for the majority of the population of the Region, briquetted coal will have a captive market since fuel is one of the essential products for every day life. One strategy to make the product accessible to as many people as possible (both in urban and rural areas) is sell it in small quantities in retail stores.', ' The raw material source will be the natural coal deposits at Chilga.', ' Not much physical or chemical transformation takes place for producing brequetted coal from natural brown coal. What is needed is the extraction of the brown coal from the ground and compacting in a machine designed for this and packing it for shipment. Except the compacting (brequetting) process, the other production activities will be done using human labor as much as it is practical and economical.', ' Saves forest resources from being cut down for fuel wood, utilizes a natural resource of the Region which has never been utilized, introduces new skills and technology.', '15', ' 1'),

(' Pencil Making Plant ', ' Pencils are made from soft wood and lead. As everybody knows pencils are basic instruments for learning and for many types of office work such as writing, sketching, calculating ', ' The soft wood which one of the basic raw materials for making pencils is found in the western parts of the Amhara Region especially along the Amhara- Beneshangul boarder areas. The Amhara Region is considered as the best and a project was to be implemented in the Bahir Dar by the previous government. So far, there is no a single factory which produces pencils in the whole country; but it has been confirmed that and opportunity exists for establishing a viable pencil making factory in the country. Since some parts of the Amhara Region have one of the major raw materials, it is logical that this project should be promoted and supported so that the Region should have the first pencil making factory in the country.', ' The major groups of consumers of pencils are students. The 2.2 million students in the Amhara Region consume about 11 million pencils every year. If consumption by other people is assumed about 30 percent of the students’ consumption, total consumption in the Region could be as high as 14.3 million pencils. This is the market potential for pencils in the Amhara Region alone. It is easy to imagine the potential in the whole country. There is sufficient market for pencil to justify the establishment of a pencil making plant in the Region.', ' Lead will be imported and softwood will be obtained from some parts of the Region.', ' Basically pencil making passes through three stages:- wood working process; preparation of the lead slip and lacquering and final treatment and finishing. These stages have sub- stages which include- grooving, gluing, and drying rough cutting, shaping, painting, fin cutting, stamping, painting and packing. Main plant and equipment include, slant sizing, grooving, shaping, coloring, cutting, stamping, gluing, etc, machines.', ' Self sufficiency, saving of foreign exchange, potential of export to other regions, transfer of new technology and skill to the Region plus the other common benefits.', '15', ' 1'),

(' Plywood Making Plant ', ' The word plywood designates a wood panel of three or more layers or veneers (plies) bonded together usually with the grains of adjacent veneers running at right angles to each other. The advantage of plywood over solid wood is its near uniform distribution of strength properties along the length and width of the panel. Plywood is used in the construction and furniture industries. It is widely used in cabinet making, decorative wall paneling and partition wall and as door skins or cover.', ' Plywood is made from timber and this implies that there must be a sufficient supply of timber to establish a plywood making plant. However, the required timber could be grown through tree plantation projects which will augment the existing supply of natural timber. Even the existing tree stands found in many localities of the Region can supply the required input for the proposed plant. The plywood need of the Region is currently met through imports from Addis Ababa and from abroad via Addis Ababa. The current consumption of the product especially in the furniture and joinery industries in quite substantial. With increasing urbanization and its concomitant expansion of the furniture industry, the demand for plywood will increase in the coming years. To promote self-sufficiency, the Amhara Region should promote the establishment of a small plywood factory in the Region. ', ' The small furniture and joinery units scattered throughout the Region use plywood and this plywood is brought from Addis Ababa, most of it imported from abroad. Though it is difficult to quantify the plywood consumption in the Amhara Region, informed judgment indicates about the existence of a demand which can absorb the production of a small size plywood making plant. ', ' Localities where the plant will be established and imports for adhesives and chemicals. ', ' Timber is received from the forests in the form of logs. The logs are put under water in a pond if possible or they are kept wet by water spray, to prevent decay and splitting and to keep them in a condition suitable for peeling. The logs are cross cut into bolts of suitable length and then graded according to their quality and are ready for peeling. Veneer cutting may be done by peeling, slicing, or sawing. The wet veneers are fed to the clipping machines to be cut to the desired width and to remove such defects as knots, wormudes and discoloration. The remaining processes are drying, preparation of veneer, gluing, pressing, and finishing. Main plant and machinery include cross cut saw, veneer rotary lathe, veneer knife grinder, veneer drier, electric hoist, veneer slicer, wet veneer clipper, dry veneer clipper, veneer joiner, glue mixer, hydraulic hot press, drum sander, glue spreader. ', ' Saves foreign exchange and regional financial resources, promotes the development of the furniture and joinery industries, introduces new skills and technology, utilizes existing natural resource, stimulates the development of tree plantations. ', '15', ' 1'),

(' Seasoned Wood Producing Plants ', ' Seasoned wood is wood which has been dried to the extent that its moisture content is less than 15 percent. This type of wood does not shrink or get distorted due to variations of weather conditions. Seasoning of wood also prevents decay of the wood and protects it from attack by fungus, insects, etc. Seasoned wood is lighter and stronger than green (unseasoned) wood and it has got better thermal and electrical insulation properties. It gives better finish after working and gives better adhesion to paints and varnishes. Seasoned wood is used in building and furniture works.', ' ', ' Using seasoned wood in the construction and furniture industries is practically unknown in the Amhara Region. All the wood used in the industries are used in green (unseasoned) form. As a result, the advantages of using seasoned wood instead of green wood are not recognized in the Region. With effective marketing strategy, demand for seasoned wood could be created easily first in the major urban centers of the Region. Since wood is used widely in the Region for building houses, fences, barns, etc and for making furniture, there will be enough demand for seasoned wood in the Region for. ', ' There are many localities in the Amhara Region where there are sufficient forestry resources which can supply enough quantity of green or unseasoned wood. ', ' Two types of processes are used for seasoning wood. These are air seasoning and kiln seasoning. In air seasoning, which is the easiest process, sawed or cut timber is stacked with the help of thin strips of wood known as “grosser” over raised plat- form in a clean, dry and shaded place. Horizontal staking is done for sawed timber, planks, poles, bamboos and railway sleepers while vertical stacking is suitable for preliminary drying of non refractory light woods. The stacks should be dried in heat produced from the sun and dry winds. The period of seasoning varies depending upon climate, thickness of the wood, time of year and location. It can be any length of time between 10 days and 3 months. Kiln seasoning is appropriate for thin planks of 2 inches or less in thickness. The kiln is equipped with devices to control temperatures, humidity and air circulation. The temperature is controlled by steam coils and blowers. Loading and unloading is done by trolleys. Saturated humid air is removed from the kiln through the chimneys and fresh air is drown from the bottom of the kiln. As soon as the percentage of moisture in the timber comes to desired level, the timber is taken out and new timber is put in. The time of seasoning can be between 40-150 hours. Machinery required for the kiln process include steam heated internal fan (kiln), transfer trucks, boilers, electric oven, and some laboratory equipment. ', ' Improves the quality of wood used in construction and furniture making thereby increasing their service life, introduces new skills and technology, stimulates development of free farming and the sustainable use of existing forests. ', '15', ' 1'),

(' Production of Chemically Treated Wood Poles ', ' Wooden poles are used to make temporary partitions, stadiums, tents, electric poles, etc. They are made of young hard wood, having diameter of 16-10 inches and of length varying from 3 meters to meters. They may or may not have metal strips round them.', ' Wood poles are needed for different uses. They are used as basic structural materials in the construction of wood houses; they are used as fences, electric poles. The commercial production of wood poles is necessary to assist the development of the construction industry; it will also help the development of forests.', ' Though wood poles are widely used for different purposes in the Amhara Region, they are not chemically treated. As a result, most wood poles deteriorate within a short period of time, thereby affecting (shortening) the service life of the object for which the wood poles are used to construct. So far chemical treatment of wood poles has not started in the Region; and every wood pole is put to use in its raw form which makes it service life short. With all the different uses, that wood pole is put into use, any process that will increase the life of the wood pole will be of great help to the economy. ', ' Localities where there are natural and man-made forests. ', ' Trees are cut from natural or man-made forests. First they are freed from the branches and the pole is debarked. Then they are cut to the specified length and are given a treatment with copper sulphate solution. The poles are put in the treatment solution for about 23-30 days and dried in shade and stacked. Machinery required are circular saw and hand tools. ', ' improves the service life of wood poles and the objects which are made from wood poles, introduces new skills and technology, better utilization of the Region’s natural resources.', '15', ' 1'),

(' Production of Brushes from Natural Bristles/Fibers ', ' Brushes are hand tools which are composed of bristles or fibers of hairs or other like material set in a suitable back or handle as of wood, or plastic and used for different purposes mainly for painting or laying on colors on walls and ciellings of buildings. Various types of brushes with natural bristles, e.g. vegetable fibers and hairs (cow tail, horse tail, goat hair, badger hair, squirrel hair, etc.) are used.', ' Brushes are used for putting colors on walls or for painting, for shoe polishing, for removing dust from clothes. Almost all of the brushes that the country needs are imported. The Amhara Region gets its supply of brushes from Addis Ababa. The bulk of brushes that are brought to the Region are used for painting purposes. Since building construction is expanding in the Region, similar to other regions, the need for brushes will also increase. The Region will be better of if it produces the brushes that it needs for its construction industry. Brush making is usually a cottage industry activity which makes it viable even at a very small scale of operation. ', ' As of now, there is no unit that produces any type of brush in the Region. Since this is the case, the current and the future need for these products will require the establishment of one or two small units of brush making plants in the Region. The products of these plants could also be sold to other regions of the country.', ' Currently the fibers or bristles that are used for making brushes are either natural or synthetic. The handles can also be made from wood or plastic. Thus, the natural fibers and the wood handles can be obtained from local sources while the plastic materials will be imported.', ' Solid are dressed and bundles are prepared. These are straightened to fine point. It is dried and bundled according to size and length by weighing. These bundles are filled on to metal ferrule and the other end is dipped into rubber vulcanizing solution. It is dried in oven or hair drying is done by setting it in air for 48 hours. At this stage, the wooden handles are inserted. After this, bristles is polished and fine paints are buffed. Finally, the brushes are packed. Machinery required include circular saw, disc sender, multient bobbin wood working lathe, polishing and buffing machine and electric drying oven hand press, ferrule folding and crimping press, dipping tank, hand tools. ', ' Saves foreign exchange for the country and financial resources for the regions, introduces new skills and technology, has export potential to other regions, utilizes resources of the region-hair of different animals. ', '15', ' 1'),

(' Organic Fertilizer ', ' Organic fertilizer is made by converting straw in to compost by bringing the straw in contact with suitable converting medium produced by a small quantity of carefully measured mineral salts and water to promote development of aerobic micro-organisms. The straw compost when incorporated with the soil will promote the development of micro flora which are essential for plants to assimilate minerals in the soil. Organic fertilizer increases the productivity of soil from 50 to 130 percent. ', ' With declining soil fertility because of soil erosion, farms in many parts of the country need fertilizer to maintain and/or increase their level of productivity. Presently almost the entire requirement of fertilizer is met though imports which have adverse effects on the country’s limited foreign exchange resources. The production of organic fertilizer in the country will partially substitute imported fertilizer and it will be used by many low-income farmers because of its lower prices. The Amhara Region being the largest grain growing region in the country produces the largest volume of straw which can be used as the main raw material for producing organic fertilizer. With the severe soil erosion affecting the region and the consequent decline of soil fertility, the establishment of small plants to produce organic fertilizer will be rewarding to investors as well as farmers of the region. ', ' With 3.5 million farming families and more than 5 million hectares of land under cultivation, the potential demand for organic fertilizer is high. One can safely assume that any production volume in any locality will be sold to farmers in the surrounding areas. ', ' Straw, the main raw material, will be collected form the surrounding farms. Other inputs will be obtained from their sources. ', ' The main production process include milling the straw using a hammer mill, mazing chemical additives into the mass of straw, arranging the milled straw in piles and regularly watering and turning of the piles. Main machinery includes hammer mills, mixing equipment and tools and other accessories. ', ' Increase crop production of the regions saves foreign exchange resources of the country, utilizes crop residue for producing a much-needed product, and introduces new skills and technology. ', '15', ' 1'),

(' Modern or High Standard Office and Household Furniture', ' ', ' ', ' ', ' ', ' ', ' ', '15', ' 1'),

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