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');