Modern Agriculture of India.

Introduction:-

The pomegranate has been grown since ancient times for its delicious fruits and as an ornamental garden plant for its red, orange or occasionally, creamy yellow flowers. The pomegranate (Punica granatum L.) belongs to the punicaceae family. It is also known as the Chinese apple or Apple of Carthage or Apple with many seeds. Pomegranate is known as a super fruit of next generation and is a native of Iran to Himalayan region and is extensively grown in Iran, Spain, India and USA as well as in most Near and Far East countries . In India, pomegranate is considered as a crop of the arid and semi arid regions because it withstands different soil and climate stresses. It thrives best under hot dry summer and cold winter provided irrigation facilities are available [2]. Owing to its low maintenance cost, tolerant to biotic and abiotic stresses, high yielding potential, better keeping quality and higher nutraceutical fruit value, popularity of pomegranate is increasing among the growers and consumers worldwide. It is found growing wild in the hills of Himalayas covering the entire hilly tract of Jammu and Kashmir, Himachal Pradesh and parts of Uttar Pradesh. The main pomegranate growing states in India are Maharashtra, Karnataka, Gujarat, Rajasthan, Uttar Pradesh, Andhra Pradesh and Tamil Nadu. India ranks first in the pomegranate production (8.07 lakh tones) in the world, on an area of 1.09 lakh hectares with productivity of 7.40 t/ha. Maharashtra, a pomegranate basket of India, covers 0.82 lakh ha area (75%) with the production of 5.50 lakh tones (68% of the total pomegranate production in the country). More than 90 percent of the fresh produce is utilized for domestic fresh consumption and export. Spain (45%) and Iran (15%) competes the India in International market.

People in this sector faces some problems and I found some challenges and strategies in the sector. These are as follow

Challenges, Concerns & Strategies:-

- At a macro level, the first challenge is to shift the government's priorities from heavy support and protection to promotion of agricultural diversification, processing, and commercialization.

- Farmers are not going to get rich by growing cereals when there are already national surpluses, demand growth is slow, and world markets are glutted with the subsidized production of rich-country farmers (providing agri subsidies of nearly US$ 1 bn per day).

- A set of public policies and investments is required that must include additional public investment in the kinds of rural infrastructure and technologies needed for these new high-value activities, improvements in marketing and distribution systems for higher-value and more perishable foods, and further liberalization of the Agroindustrial sector.

• The pomegranate supply chain involving the entire network of raw material handlers, transportation of produce, temporary storage and retail marketing are plagued by intermediaries. This leads to a cost build up, which in turn is passed onto the end consumers, thereby increasing retail prices of pomegranates. Farm gate price of the processed product is only about 35% of the retail price. In other words, the margin at each level leads to an overall price increase of pomegranates. Thus more the intermediaries, more will be the mark-up at each level.

• Issues that plague supply chains in India include non-transparent pricing, limited financial capability, primitive sorting and grading facilities, rampant wastage, lack of quality and hygiene packaging and absence of market determined prices.

• The private business sector can and should play a dominant role in these higher-value market chains, and public policy must strengthen the enabling environment. Although some of the funding for these new investments will come from the private sector, new public investments are also needed. The needed funds might be obtained by reducing some of the huge subsidies that are still maintained on fertilizers, credit, and water for the agriculture sector and that no longer serve a useful purpose.

• Another challenge for the "new" high-value agriculture including agro processing is to make it pro-poor. Left to market forces alone, the major beneficiaries of the new high value agro and agro processing will be mostly the larger and commercially oriented players, as well as farms that are well connected to roads and markets.

• There is a need to guide the new high value agriculture so that small farms and even many less-favoured regions can be major participants.

• Achieving broad participation will require improving infrastructure and education in many less favoured regions and communities, ensuring that small farms get the technologies and key inputs they need, and promoting producer marketing organizations that can link small farmers to the new market chains (supermarkets, contractors, processors, exporters etc). A major effort must be made to reform the rural credit delivery system to reach smallholders.

• Innovative institutions promoting vertical coordination between farms, firms, and forks (supermarkets) would reduce transaction costs and market risks and would also act as a conduit to funnel more credit into this venture, especially for smallholders.

• Public policy can make a major contribution by facilitating farmer organizations, standardization, transparent food safety policies, and contract security between farmers and the processing and retail industry.

• It is imperative to develop a network of cottage and small-scale food processing enterprises in rural areas for primary processing of pomegranates to provide opportunities of employment and income generation, good quality raw material to local/rural population at relatively lower rates and primary processed good quality raw material to large industry in cities.

• Attracting capital infusion into the food processing sector calls for initiatives from the government in playing an enabling role, both at the policy level as also in terms of providing suitable institutional framework.

• Factors that can help in facilitating the growth of the food processing sector through, inter alia, increased investment flows include Contract Farming, Infrastructure Development and adequate flow of Institutional Credit and Farm Insurance.

• Technologies that can be upscaled with relatively lower amount of investments should be promoted with full thrust.

• In this context, promotion of small and medium enterprise (SME) projects based on Central Food Technological Research Institute (CFTRI) technologies in overseas market, locating suitable partners for facilitating R&D collaboration abroad and technology transfer to foreign companies in the area of food processing, particularly for fruits and vegetables, would be useful.

• At present, hardly 2% of the fruits and vegetables produced in the country go through the processing route. Hence, strategies for diversification of agriculture would involve a separate road map for value addition and processing in the fruits and vegetable sector.

• The government of India is setting up food parks in different parts of the country. The idea behind setting up food parks is to enable small and medium entrepreneurs to find access to capital intensive facilities, such as cold storage, warehouse, quality control labs, effluent treatment plants, etc.

• The development of such facilities is expected to increase the efficiency of the processing industry.

• To encourage and enable the farmers to grow pomegranates in Maharashtra of appropriate and acceptable quality, backward linkages need to be promoted.

• This calls for strengthening the link between the processing industry and the farmer.

• The existing institutional infrastructure like local bodies, cooperatives and self-help groups can work in unison to effectively strengthen the backward linkages.

• There is also a need to establish strong linkage between the processor and the market in order to effect cost economies by elimination of avoidable intermediaries.

• Establishing a marketing network with an apex body to ensure proper marketing is crucial. The approach should aim at the development of marketing capabilities both with regard to infrastructure and quality, in order to promote competitive capabilities, to face not only the WTO challenge but also to undertake exports in a major way.

• The role of ICT in agribusiness is now seen to be indispensable. Case studies have demonstrated significant benefits to small and marginal farmers in almost every respect.

• To be of use to farmers, the information should be rendered into locality specific knowledge that pomegranate farmers can use to plan their activities and maximize the benefits.

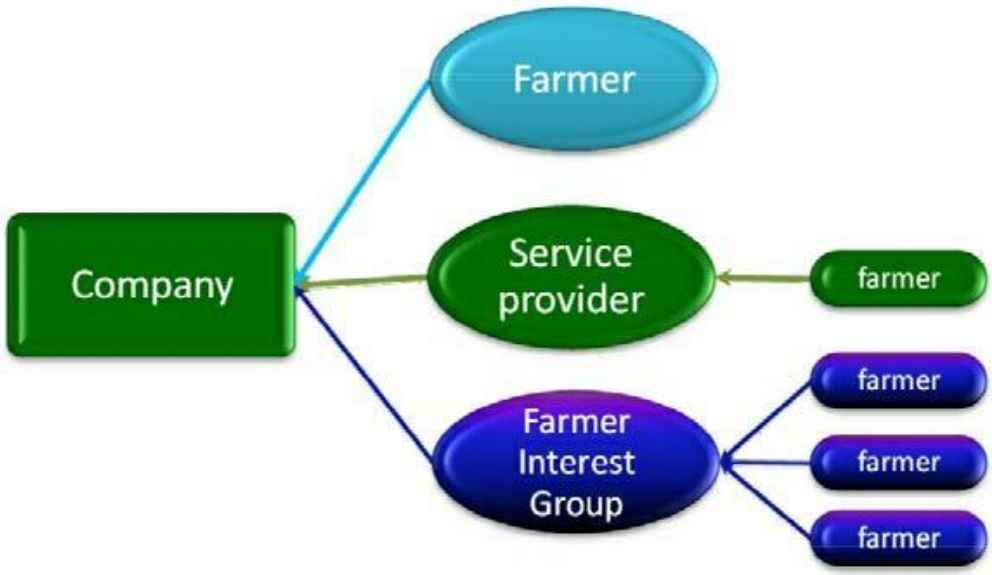
• R&D requires multi-dimensional focus to improve the capability of the food processing sector to service export markets.

• Some of the activities, where R&D interface increases export competitiveness include understanding the overseas market requirements and opportunities, developing commercially successful production varieties of pomegranate, identifying new applications/usage of pomegranates to gain consumer acceptance in overseas markets, cold storage facilities, supply chain management for improving the

quality and shelf life of produce, high-tech packaging to extend the shelf life, and application of disinfestations technology to reduce the use of chemicals and integrated pest management technology to meet international residue standards for pomegranate.

SUPPLY OF HARVESTED PRODUCE:-

This is current supply of harvested produce. We are following company chain with improvement and better integration



• The advantage to the farmer is that he need not pay the commission to the agent as he is eliminated.

• The advantage for the company is that he is close to the farmer and there is a relationship building between the company and the farmer. Even the company need not pay any commission to the service providers and it can pay a better price to the farmer to see that he is satisfied.

• Limitation: The Company has to handle everything which needs more manpower and it is cumbersome. The company should spend lot of time in locating the pomegranate farmers and their harvesting schedules.

• Company can go in the below mentioned three ways to procure the pomegranate. Currently it is operating in the middle path. It can operate in the other two paths to eliminate service provider which makes him to deal with the farmers directly and also helps in getting good rapport with the farmer.

Vision and Goals:-

1. To start the pomegranate aril processing plant.
2. Subsequently start new range of pomegranate products.
3. To build brand as Pom Wonderful.
4. To create supply chain.
5. To promote cooperative agriculture.
6. To provide technical, expert support for farmers.
7. Putting advanced technologies like AI and Precision Agriculture at work.
8. Provide cold storage services.
9. Creating Agriculture database

Company Description:-

We are huge producers of pomegranate but we hardly process it. I have seen a great opportunities in these sector. In India, I haven't seen any processing plant. We are living in pomegranate producing region. We have seen these agricultural since long time and we thinks that this is right time to start new plant as production reaching new heights.

• Fresh pomegranate arils tedious, difficult and time consuming procedure in the preparation of the arils, makes the pomegranate fruit unpopular as a table fruit.

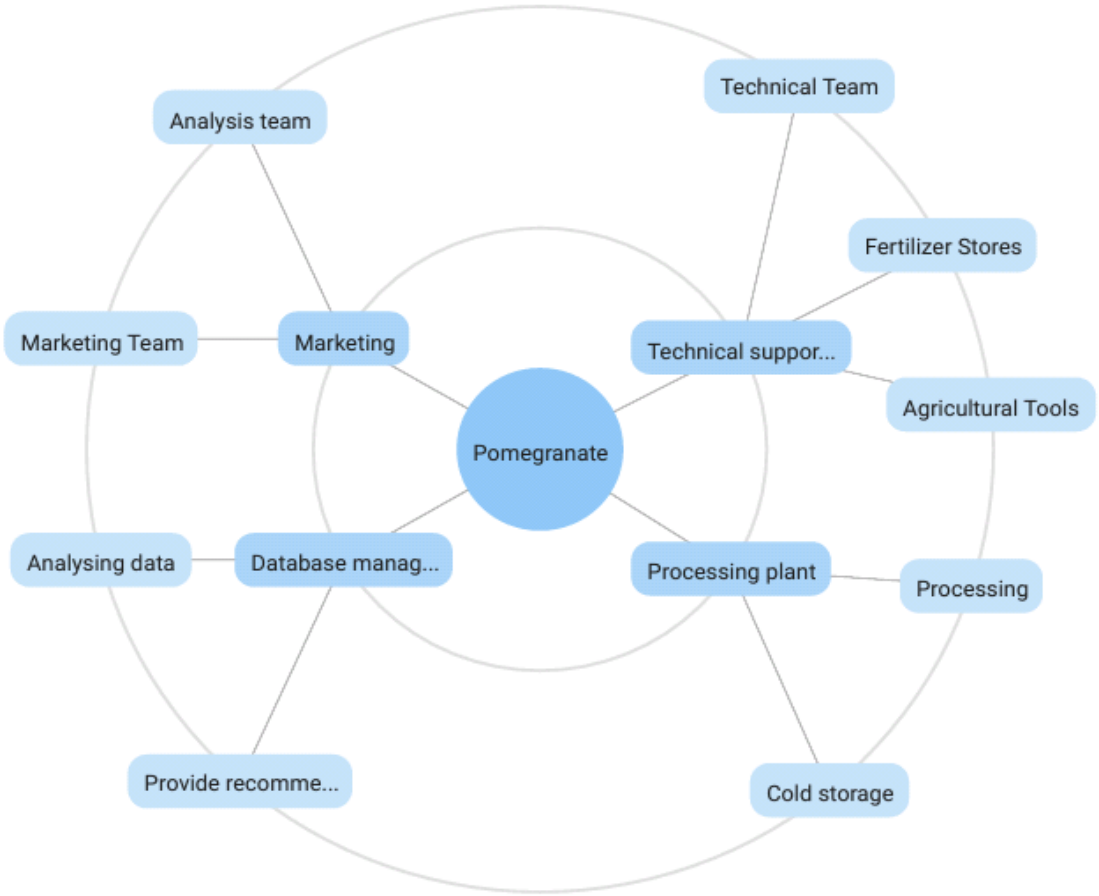
• It is for these reason that the development of 'ready to eat pomegranate arils has been a challenge that has been approached by several research groups in Spain and the USA.

• In recent years, minimally processed "ready-to-eat" pomegranate arils have become popular due to their convenience, high value, unique sensory characteristics and health benefits.

James Caleb reported that with increasing global interest in postharvest handling and nutritional value of pomegranate, MAP of minimally processed pomegranate arils offers additional tool for optimal use and value addition, including the utilization of the lower grade fruits with superficial peel defects like cracks, splits, sun burnt and bacterial blight. Maintaining the nutritional and microbial quality of pomegranate arils is a major challenge as the minimally processed arils easily deteriorate in texture, colour, overall quality and a reduction in shelf life. Minimal processing of pomegranate mainly consists of washing with the sanitizing agents to reduce the initial microbial load, pH modifications, use of antioxidants, modified atmosphere packaging and temperature control. The best results with the cultivar 'Mollar de Eche' were obtained washing the arils with the chlorine solution, followed by a mixture of ascorbic and citric acids and storing the seeds at 1°C in polypropylene films that allowed the formation of a modified atmosphere appropriate for the conservation of these arils. The preparation of the arils under very clean conditions and at temperatures close to 0°C prolonged the life of this product

and maintained its quality. Storage at the higher temperatures (4-8°C) produced the product with lower quality and a shorter commercial life. The novel technologies such as smart packaging offers potential of increase in the shelf life of pomegranate arils by ensuring the microbial safety and monitoring the storage temperature with TTI. Also, the use of natural or non destructive products as preservatives (such as honey and UV-C radiation) should be done in combination with MAP.

Original Business Idea:-



“I had a dream to design a plant pomegranate processing plant. I am looking for starting a small scale industries which will process the pomegranate and introduce a new range of products in the market. “

The idea is not limited to Pomegranate. We can apply this business model for any crop. I have designed this model based on the Pomegranate.

Lets explore how this business idea look like on real ground.

Fruit Processing Industry:

From above discussion You realized what is current state of processing industry in India. We had many opportunities in this sector. This is most important sector as world will face food shortage in the upcoming years. Now I am not expert in this industry and We need lot of R&D in this field. I think it will be better If we take support of some companies Like POM Wonderful in Pomegranate.

https://www.pomwonderful.com/

This is US company with 16 million $ sales in 2016. If It can happen in US then it can happen in India too. I contacted some traders regarding the Pomegranate Chilling machine. I got this quote from them.

https://drive.google.com/open?id=0B5KwBOlJXbL3eTJwMGJ6S3VLOU8waGhSdmRYRUpxS1ZTbDc4

Mesh size 12 to 18 mm, such as pomegranate varieties, special needs to indicate when you order it.

Technical Parameter:

Product name	Model	Number	Dimension	ReducerKw	Factory Price

Contact : Ms Laura **Mobile: 0086-18539906796**

GELGOOG

Henan Gelgoog Machinery CO., LTD

Tel : 0086-371-86110690 **Fax : 0086-371-86110692**

Pomegranate peeling machine	1-1.5T/H	1	2000x620x1750mm (Single layer does not lengthen)	1.1，+2.2	9400USD
	3-4T	1	2700x880x2230mm (Double crush)	2.2+2.2+4	16500USD
	5T	1	2700x880x2565mm (Double crush)	3+3+5.5	27000USD

My plan for this field is like lets start with Small processing plant of Pomegranate food processing and then expands to other food products.

Below are the products of POM Wonderful. We can start with the same product as We had hardly any competition in India. Those products are not yet In market.

Co-Operative Agriculture:

This is another emerging and important field. In the past, many companies has tried to service the farmers with contract farming but all have failed with some achievement. The problem with this type of approach is that farmer community hate restriction and constraints of the companies. No one wants to give control of their land to someone else and that's why many ideas failed. Now we are entering into new era of technology where we have different way to deal with model.

The things we cant do without contract farming, Now this can be done with new Technlogies. We can provide store solution for each village and then we can apply those technologies.

Lets talk about those technologies one by one.

IBM Watson:

This is really powerful AI service provided by IBM. Now a days, IBM is designing new technology for agriculture. It is joint Partership of IBM and wheather.com.

https://www.ibm.com/blogs/research/2018/09/smarter-farms-agriculture/

https://business.weather.com/blog/evolution-modern-agriculture

Now With the help of IBM Watson, We can have

Disease & Pest Indicators

High Definition Normalized Difference Vegetation Index (HD-NDVI) for Crop Health Monitoring

High Definition and real time Soil Moisture (HD-SM)

Once we got a data from all the sources, We will put data in Watson Algorithm. Algorithmic model will process the data and it will give us suggestion regarding the pests or fertilizer needs to be used, future course of action needed to maintain quality of fruit depending upon wheather forcast.

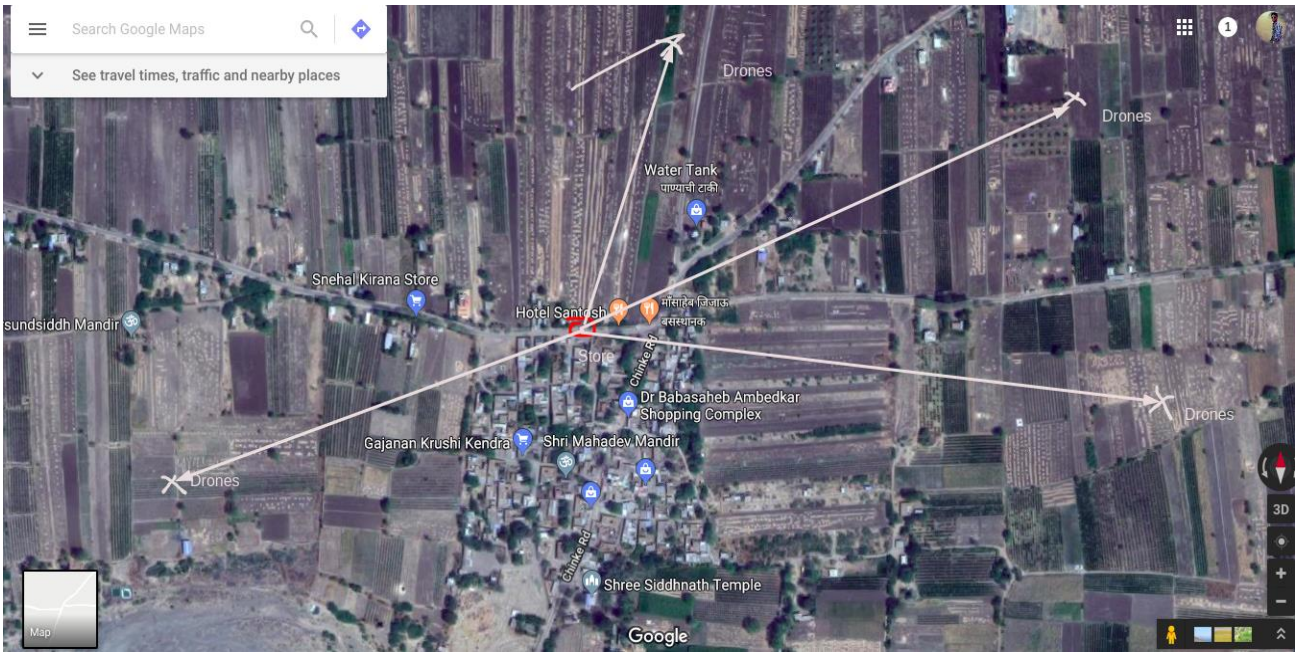
Now the time for real business model, Most of farmers purchase pests, chemical and fertilizer on regular basis and most of time, they don't know that are this chemicals are really useful for plant and crop or not. They apply it depending upon their understanding.

We will take data from their land and create a profile for each farmer and their land. We will apply machine learning algorithm for their land and We will provide them suggestions and pesticides they needed.

Now you are retailing company and you will get benefited from the retailing the products you have.

This will further improve quality of crop and benefits the farmer multifold.

Working of the model:



Precision Agriculture:

This is something at a grand scale. Lets understand the concepts and then I will explain business model.

http://precisionag.org/where-we-work/india/pad-lab

Presion agricuture is **Precision agriculture** (PA), satellite **farming** or site specific crop management (SSCM) is a **farming management** concept based on observing, measuring and responding to inter and intra-field variability in crops.

PAD is the organization working in this sector. It is US based company working in India and all over the world.

Now PA has great benefits if we apply same model with IBM Watson. Lets see how?

Now consider we have applied precision agriculture over Maharashtra.

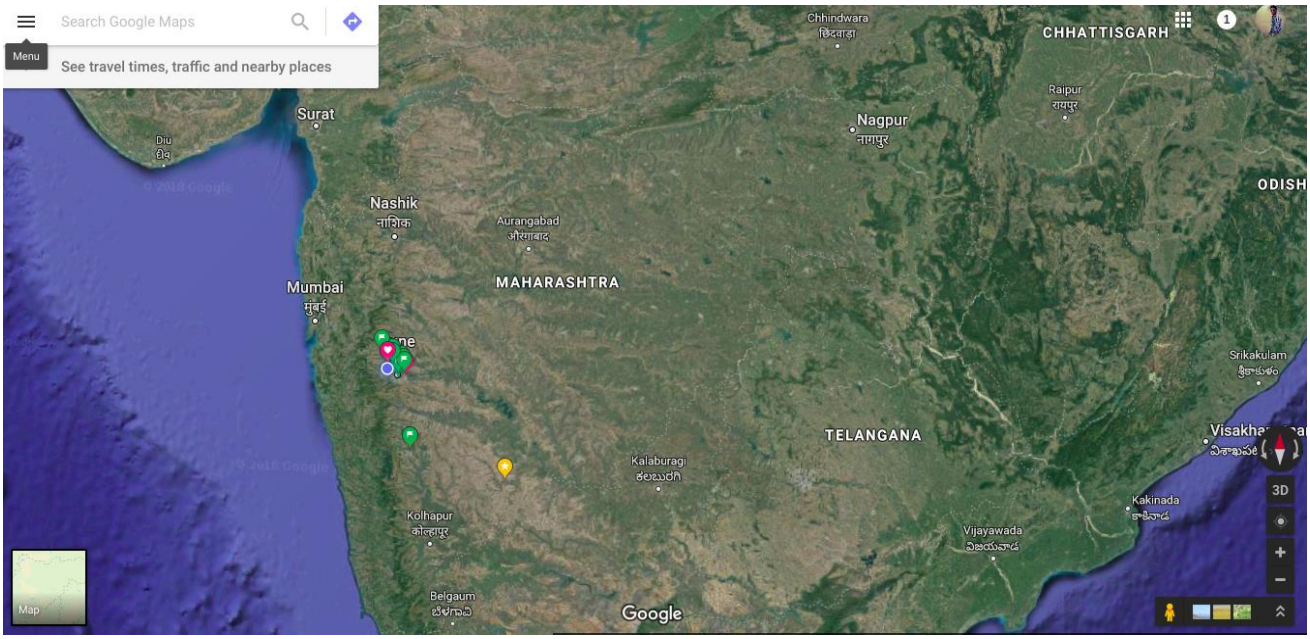
In the below map we can get data from each and every village. Now this data can be combined with IBM watson data. This is the data that we have obtained from satellite imaginary.

Now because of ground data of the IBM Watson, We know what will be yields in upcoming days. If we apply regression algorithm over the past year data, We can predict future prices.

Now we know what is yield in what area and we know what will be demand, We can suggest the proper crops for the farmer and farmer will get right price for its product.

https://www.kaggle.com/rdmisal/lets-understand-indian-agriculture

The same idea inspired me to do one more thing that provide facility of cold storage.



Cold Storage:

This is most interesting thing we can do. Now we know that what will be demand and what will be supply for the market each and every day. We have stores in each village and those village are completely interconnected.

Now market has low demand while supply is high. We can buy the farmers product and keep it in cold storage. We can buy at higher price than market, Which will create company value.

Now we have high demand and supply is low. We can sell the cold storage stock at much more price than we had buy.

The amount at which we sold minus the amount with which we buy is the profit.

This will be very profitable business if our algorithms works well.

Retailing:

Everyone know that Amazon and flipkart has low penetration rural region. This can overcome by creating joint partnership in rural region. We had great connectivity in Rural region. We had stores in each village and all are interconnected.

So we can provide ground support for them and in exchange for this we can earn profits. We can be source of marketing in rural region. We had resources to do advertising in each village. This will be greatly beneficial.

Smart Tractor:

https://www.ibm.com/blogs/research/2018/12/hello-tractor/

This is idea that came to mind last year and I was looking any implantable technology. I knew this technology can transform the ground agriculture to great extent.

We can build a app that will works like Ola in rural region. Suppose we have database of all farming tractor and we can nevigate to the land where he can cultivate. We can provide the time when it will cultivate.

This idea is really great. We can extend support to the all modern farming tools and everyone will get good benefits. We can provide many services like this.

I have dreamed of such a important and transforming Agriculture Company. And making it reality is my dream. I devote this organization to welfare of farmers family.

Competitive Advantage:-

According to our study, we are the first one to entering into this business in India. Pom wonderful is the leader in these market but it is operating in US and Europe. They are not distributing in India. I have seen a market space in India. At present the procurement of Pomegranate is done only for the export purpose. Since the cultivation of the Pomegranate in India is done in patches, the major areas of concentration for procurement of the Pomegranate by the Field Fresh are Maharashtra and Karnataka. The reasons for their selection was, those two states account for more than 90% of the total Indian Pomegranate production. Also the farmers in those two states are progressive and have a fair understanding of the crop. The soils and climate are also very much congenial for Pomegranate growth.

Firstly we will start a small scale pomegranate packaging plant. The standard pomegranate packaging will be as above. Later on we will concentrate on co operate agricultural and data base creation.

Conclusion:-

The pomegranate fruit is considered as the suitable fruit for the processing and utilization due to its excellent flavour, colour, physicochemical constitution and therapeutic properties. It is referred as the 'Super fruit' due its high nutritional value, high antioxidant capacity and consumer appeal. But in spite of high nutraceutical value, the consumption of pomegranate is not wide spread due to tedious and time consuming peeling and irritations and staining of hands during handling of fruits. The pomegranate processing and product diversification has played important role in the increased consumption and utilization of pomegranate. Last few years, the research and development activities on pomegranate fruit have aimed to develop technologies for new pomegranate derived food products. The pomegranate can be processed into products like minimally processed fresh arils, juice, squash, beverage, molasses, juice concentrates, frozen seeds, jam, jelly, marmalades, grenadine, wine, seeds in syrup, pomegranate spirits, pomegranate powder, pomegranate rind powder, anardana, confectionery, pomegranate seed oil etc. These products are not yet popularized in large scale due to lack of the commercially viable processing technologies. The keen and immediate attention is required in meeting the research and developmental

gaps for the commercialization and popularization of pomegranate processing technology and pomegranate products. The major aspects which requires immediate attention in pomegranate processing includes industrial method of peeling, standardization of extraction and proper clarification methods of pomegranate juice, development of standards for packaging and storage of pomegranate derived products, application of the new inline technologies such as MAP, ultra filtration for pomegranate utilization and popularization of pomegranate based products. Hence, for the commercialization and utilization of pomegranate processing technology and pomegranate products, experimental studies should be carried out with more informative output on the metabolic properties of pomegranate and derived products under various conditions in order to develop the scientific database and to enable the successful application of the available technology.

There is need for backward and forward linkages by adopting contract farming in pomegranate.

Contract farming based on centralized model may be adopted. As the processor buys the commodity from a large number of farmers under contract with the firm.