BVFP 365S

Preparation of Food Processing Plant Proposal (Skill based)

reporting,

ONION PROCESSING UNIT

Submitted by,

BHARAT R. DANDEKAR

ROLL NO.04

Submitted to,

M.V.P. Samaj's

Arts, Science & Commerce College, Uttam Nagar CIDCO, Nashik 08

(Affiliated to SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

Under the guidance of

Prof.A.K.TIWARI

(Assistant Professor, Department Food Processing Technology)

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M.V.P. Samaj's
Arts, Science & Commerce College, Uttam Nagar CIDCO, Nashik 08
(Affiliated to SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

CERTIFICATE

This is to certify that,

Mr. Bharat Ramesh Dandekar, Roll no. 04 of VI semester, of B.Voc. (**Food Processing Technology**) has completed the necessary work for the requirement of Course No.**BVFP 365S** Course Title: **Preparation of Food Processing Plant Proposal (Skill based)** in the year 2020-21. he has under gone fair exposure to start new industry on food processing and agro based includes present market position and expected future demand, market size, statistics, trends, SWOT analysis and forecast

Course Teacher	**Head of Department**	**Co-ordinator**	**Principle**
Prof. A.K. Tiwari	Prof. Manoj Kumar	Dr. Prof. M.S.Girase	Dr. J.D. Sonkhaskar

DATE – 24/06/2021
PLACE - Nashik

DECLARATION

I'am hereby declare that this report is record authentic work carried out by us during the VIth semester and has not been submitted to any other university or institute.

Student name

Bharat R. Dandekar
Roll no. 04

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ABBREVIATIONS

MT	Million Tons
MOFPI	Ministry Of Food Processing Industries
ISO	International Organization for Standards
FSSAI	Food Safety & Standards Authorities Of India
CAGR	Compound Annual Growth Rate
NHRDF	National Horticultural Research & Development Foundation
DPR	Detailed Project Reports
HEPA	High Efficiency Particulate AirFilter
FME	Micro Food Enterprises
UAE	United Arab Emirates
RTU	Ready To Use
RTS	Ready To Serve
TOA	Taste Odour Appearance

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1. Introduction

India is known as the second largest fruits and vegetables producer in the world followed by China. India, during 2017-18 has produced about 97358 Thousand MT fruits and 184394 Thousand MT vegetables in about 6506 Thousand Ha and 10259 Thousand Ha areas, respectively (Horticultural Statistics At a Glance, 2018, MoA&FW, GoI). Unfortunately, fruits and vegetables being perishable in nature get wasted to the tune of 20-30 per cent in the supply chain due to improper handling, transportation and poor post harvest management; and only 2 per cent are processed in to value added products and the rest is consumed as fresh. Therefore, processing of fruits and vegetables offers immense scope for wastage minimization and value addition; thus can generate significant income and employment in Indian agrarian economy.

Onion is one of the important vegetables consumed extensively on daily basis in India. India is the second largest **Onion** growing country in the world. Indian onions are famous for their pungency and are available round the year. However, because of poor post harvest infrastructure and value addition, a huge quantities of onion get spoiled in the supply chain. Therefore, processing of onion in to various value added products can minimize the losses and offers huge scope for entrepreneurship development at micro, small or medium scale levels using effective government schemes such as PM-Formalization of Micro Food Processing Enterprises Scheme of MoFPI, Government of India.

1.2 Current status

- Rabi harvesting and storage has been completed.
- As on 30th June sowing of Kharif Onion is on in Karnataka, Andhra Pradesh, Tamilnadu and Maharashtra.
- With increased production and sufficient availability/Storage of Rabi Onion, and slightly more area covered under Kharif Onion this year, supply situation is expected to be comfortable in coming months.
- The availability of Onion is expected to be normal/comfortable in coming months.
- State-wise monthly market arrivals and average wholesale prices of Onion for the months

of June, 2020, May, 2020 (previous month) and June, 2019 (corresponding month of previous year) are given in Table-1.1.

- The arrivals were 51.60 % less in June 2020 as compared to June 2019, but higher (8.42 %) than May, 2020, indicating subdued demand this year due to COVID-19 pandemic.
- Though arrivals are lower this year in comparison with last year; good production and subdued demand has ensured that the wholesale prices this year are not higher than last year. Infact, wholesale prices in June 2020 is 33% lesser than the wholesale prices in the corresponding month of last year.

2. The Project at a Glance

1. Name of the proposed project	:	Onion Processing Unit
2. Name of the entrepreneur/FPO/SHG/Cooperative	:	
3. Nature of proposed project	:	Proprietorship/Company/Partnership
4. Registered office	:	
5. Project site/location	:	
6. Names of Partner (if partnership)	:	
7. No of share holders (if company/FPC)	:	
8. Technical advisor	:	
9. Marketing advisor/partners	:	
10. Proposed project capacity	:	150 MT/annum (70, 80 & 90% capacity utilization in the 2nd, 3rd and 4th years' onwards respectively)
11. Raw materials	:	Onion
12. Major product outputs	:	Onion dehydrated flakes, powder, paste and vacuum packed onion
13. Total project cost	:	Rs. 30 Lakhs
• *Land development, building & civil construction*	:	*Rs. 2.00 Lakhs (only for expansion of existing built-up area)*
• *Machinery and equipments*	:	*Rs. 20 Lakhs*
• *Utilities (Power & water facilities)*	:	*Rs. 1.20 Lakhs*
• *Miscellaneous fixed assets*	:	*Rs. 1 Lakh*
• *Pre-operative expenses*	:	*Rs. 0.29 Lakhs*
• *Contingencies*	:	*Rs. 0.50 Lakhs*
• *Working capital margin*	:	*Rs. 5.01 Lakhs*
14. Working capital requirement		
• *2nd year*		*Rs. 15.06 Lakhs*
• *3rd year*		*Rs. 17.21 Lakhs*
• *4th year*		*Rs. 19.35 Lakhs*
15. Means of Finance		
• *Subsidy grant by MoFPI (max 10 lakhs)*	:	*Rs. 10.00 Lakhs*
• *Promoter's contribution (min 20%)*	:	*Rs. 6.00 Lakhs*
• *Term loan (45%)*	:	*Rs. 14.00 Lakhs*
16. Debt-equity ratio	:	2.33:1

17. Profit after Depreciation, Interest & Tax
    - *2nd year* : *Rs. 44.84 Lakhs*
    - *3rd year* : *Rs. 53.26 Lakhs*
    - *4th year* : *Rs. 61.66 Lakhs*
18. Average DSCR : 18.49
19. Benefit-Cost Ratio : 2.20
20. Term loan repayment : 7 Years with 1 year grace period
21. Payback period for investment : 2 Years

3.1 Project description

Onion is one of major bulb crop grown in India which presently attracting attention of all persons due to rise in prices. Both immature and mature bulbs are used as vegetable and condiment. The Onion is the world's leading news publication, offering highly acclaimed ,universally revered coverage of breaking national, international, and local news events.
A 100 percent export oriented unit is one, which would export its entire production, except for the permitted levels of rejects .Onion is mainly exported in the form of dehydrated onion, canned onion and onion pickle. When establishing a dehydration industry, considerable thought should be given to the procurement of fresh onions for dehydration
All onions for processing are grown from specific varieties best suited for dehydration. Specific strains of the Creole Onion, Southport Globe Onion, and the Hybrid Southport Globe were developed by the dehydration industry. They are white in color and process a higher solid content which yields a more flavorful and pungent onion.

3.2 Technological process

1) Solution Extraction Method :- By this method, the low-polar solvent, such as ether, dichloromethane, etc., is used to extract onion oil from the fresh onions. The solvent extraction method has advantages of mild extraction conditions; less destroy of flavor components and high extraction rate. However, there is a problem of residual solvent; as a result, the application scope method is being narrowed down. of this

2) Supercritical Extraction Method : - This kind of extraction is conducted under not really high temperature with less consumption of heat-sensitive compounds. High-quality onion oil with no residual solvent can be obtained.

3) Onion oil technological process :- Fresh onions-cleaning/rinsing-onion slicing-onion freezing oil extraction-finished oil product

4) Tips :- When using the supercritical extraction, the onion should be freeze-dried into onion slices or powder.
   In the extraction process, 15% absolute ethyl alcohol should be added as entrainer.

5) Processing parameter :- Taking the freeze-dried red onion powder with a particle size of 0.45-0.90 mm as the raw materials, the extraction pressure is 27.98 MPa , the temperature is 42.18 ℃, time is 216.6 minutes, extraction rate is 0.483%. The finished onion oil is of a strong flavor of fresh onions.

Processing of Onion Flakes and Powder

Raw Onion

↓

Grading, Stem Cutting and Peeling

↓

Slicing (Size reduction 1/8 – 1/4" thickness)

↓

Blanching (80^0C 5 for min)

↓

Osmosis 1-3% brine, 30 min

(During osmosis 0.1-0.3% acidulant)

↓

Tray Drying of Onion Slices (50-70^0C 8-10 hrs)

↓

Onion Flakes

↓

Pulverizing

↓

Onion Powder

↓

Packing of Flakes and Powder

Fig no.1 Onion flakes

Fig no.2 Onion powder

Processing of Onion Puree and Paste

Raw Onion

↓

Grading, Stem Cutting and Peeling

↓

Pulping

↓

Heating (110^0C)

↓

Onion Paste

(32^0 brix, 2% NaCl. 0.1% citric acid)

↓

Filling ($70\text{-}80^0$C)

↓

Cooling

↓

Storing

Fig no.3 Boiled Onion paste

3.3 Quality control

1) Uniformity :-The contents of each package (or lot for produce presented in bulk in the transport vehicle) must be uniform and contain only onions of the same origin, variety or commercial type, quality and size. However, a mixture of onions of distinctly different commercial types and/or colours may be packed together in a sales package, provided they are uniform in quality and, for each commercial type and/or colour concerned, in origin. However, in case of those mixtures uniformity in size is not required. The visible part of the contents of the package (or lot for produce presented in bulk in the (transport vehicle) must be representative of the entire contents.

2) Packaging :- Onions must be packed in such a way as to protect the produce properly. The materials used inside the package must be clean and of a quality such as to avoid causing any external or internal damage to the produce. The use of materials, particularly of paper or stamps bearing trade specifications, is allowed, provided the printing or labeling has been done with non-toxic ink or glue. Stickers individually affixed to the produce shall be such that, when removed, they neither leave visible traces of glue nor lead to skin defects. Packages (or lots for produce presented in bulk in the transport vehicle) must be free of all Foreign matter.

3) Storage :- Before onions are put in storage rooms, it is important to dry or cure them. The aim is to dry the neck and the outer layers to protect them from possible diseases. The moisture content must be reduced in 10%, which is equivalent to 3 to 10% loss of weight. The drying process may take place in the field if the environmental conditions allow to do so (dry climate). If not, they use artificial drying systems, like forced air, either environmental temperature or hot air. During storage, it is important to avoid the bulb sprouting and the secondary roots. For this purpose it is important to keep low temperatures and modified atmospheres. However, in some cases other methods are used, like the application of chemical products and irradiation. Among the chemical products used there is the maleic hydracid, that is applied shortly before harvesting. Irradiation consists of exposing the bulbs to ionizing gamma ray radiation to inhibit sprouting. For this process they use very low doses.

4) Temperature :- The moisture levels must be kept between 65 and 75%, and temperatures should not be lower than -0,8ºC. However, for short storage up to 5 weeks, the temperature recommended is 15ºC.

3.4 Standards

As per Food Safety and Standard regulations for dehydrated onions the product shall conform to the below the mentioned standards: –

- It shall be free from mould, disease, outer skin, leaves, and roots.
- It shall be free from stalks, peels, stems and extraneous matters and scorched particles.
- The finished product shall be free from discoloration or enzymatic reaction.
- The product on rehydration shall be of characteristic flavour, free from foreign and off flavour, mustiness, fermentation and rancid flavour.
- It shall be free from mould, living and dead insects, insect fragments and rodent contamination.

- The product shall be free from any added colouring agents and other harmful substan When in powdered form, it shall be free flowing and free from agglomerates.
- The products may contain food additives permitted in Appendix – A of Food Safety and Standard Regulation.

According to FSSAI, dehydrated onion shall conform to the following standards: –

S.No.	Parameters	Standards
1.	Extraneous matter	Not more than 0.5 percent by weight
2.	Moisture: –	
a)	In case of powdered onion	Not more than 5.0 percent by weight
b)	Any other matter than powdered onion	Not more than 8.0 percent by weight
3.	Total Ash on dry basis	Not more than 5.0 percent by weight
4.	Ash insoluble in dilute HCl	Not more than 0.5 percent by weight
5.	Peroxidase	Negative

4.1 Production of onion in India

States	June, 2020		May, 2020		June, 2019	
	Market Arrivals (in Tonnes)	Average Wholesale Prices (Rs/Qtl.)	Market Arrivals (in Tonnes)	Average Wholesale Prices (Rs/Qtl.)	Market Arrivals (in Tonnes)	Average Wholesale Prices (Rs/Qtl.)
Madhya Pradesh	163633.00	612.70	50367.01	452.04	414871.00	616.78
Maharashtra	90311.00	778.92	109772.00	652.05	467512.00	1142.63
Uttar Pradesh	73763.80	999.38	84582.29	1029.32	80120.70	1055.71
Karnataka	72907.00	880.11	80222.00	768.41	59815.00	1187.10
Telangana	67866.40	935.56	22274.70	872.92	125366.00	945.20
Gujarat	62904.30	1195.96	122988.07	958.89	50119.10	1104.46
NCT of Delhi	21133.70	873.19	13063.79	725.29	34964.40	1004.58
Rajasthan	20218.10	1016.06	26548.50	682.75	32820.60	851.95
West Bengal	16132.00	1382.71	14903.55	1304.65	19763.30	1442.98
Punjab	13601.90	951.96	15911.94	845.33	19616.30	1001.7

Odisha	9050.38	1511.81	8922.77	1659.79	7554.90	1730.10
Haryana	8927.35	999.70	19302.01	879.16	13211.00	1141.54
Jammu and Kashmir	8420.20	1336.09	8346.8	1278.64	3054.45	1502.80
Kerala	6806.41	2527.72	5364.85	2308.71	7100.92	2877.26
Uttrakhand	5206.70	1095.38	8029.10	1062.16	5296.40	957.29
Chhattisgarh	4849.00	967.35	4279.50	890.8	3264.60	1264.89
Andhra Pradesh	3742.00	NA	5154.50	NA	2615.30	1572.43
Tripura	2997.02	2724.19	214.81	2215.44	51.30	2045.96
Chandigarh	2084.75	NA	2964.24	NA	2347.08	1005.19
Himachal Pradesh	865.92	1407.19	1251.41	1279.73	973.99	1579.19
Jharkhand	234	1449.57	NA	NA	62.53	1466.69
Goa	34.51	1082.73	115.15	1343.99	288.33	**1168.13**
All India Total	**655820.00**	**1236.41**	**604883.99**	**1116.32**	**1355039.00**	**1849.38**

Table-1.: STATE-WISE MARKET ARRIVALS AND AVERAGE WHOLESALE PRICES OF ONION

4.2 Varieties of onions

Table 2: Onion Varieties in India	
White Onion	Bhima Shubra, Bhima Shweta, Bhima Safed, Pusa White Round, Arka Yojith, Pusa White Flat, Udaipur 102, Phule Safed, N25791, Agrifound White.
Red onion	Bhima Super, Bhima Red, Bhima Raj, Bhima Dark Red, Bhima Shakti, Punjab
	Selection, Pusa Red, N2-4-1, Pusa Madhavi, Arka Kalyan, Arka Lalima.
Small Onion	Agrifound Rose, Arka Bindu
Spanish Brown	Bhima Light Red, Bhima Kiran, Phule Suvarna, Arka Niketan, Arka Kirthiman
Multiplier Onion	Co 1, Co 2, MDU 1, Agrifound Red

4.3 Types of products

Onion can be processed into a wide variety of products. Minimally processed ready to use or ready to cook fresh onions, onion paste, dehydrated onion flakes, onion powder, onion oil, onion vinegar, onion sauce, pickled onion, onion wine and beverage etc. The demand for the processed products is increasing day by day due to its convenience to handle and use. As per the estimate, approximately 6.75% of the onion produced is going for processing (by counting total losses, consumption, export and bulb seed requirement the remaining percentage is considered for processing).

(1) Minimally processed onions: These are peeled and/or cut onions for ready to use that retain its freshness, packed in suitable packaging material and stored at refrigerated conditions or frozen conditions.

(2) Onion paste: Onion is grounded yet retaining its freshness. Preparation of minimally processed onions and onion paste entails optimization of proper preservatives and packaging materials to increase the shelf life of these products.

(3) Dehydrated onions: Dehydration of onions reduces the bulk to transport and also increases the shelf life of onions significantly due to less moisture, which arrests the growth of microorganism. Dehydrated onion flakes can be processed into onion powder by proper grinding. Onion powder dissolves very easily and reconstitute quickly compared to onion flakes. Onion powder incorporates the flavour of onion in a variety of foods. Use of suitable packaging techniques is the most important to increase the shelf life of dehydrated onion flakes and powder as these are very hygroscopic in nature.

(4) Pickles: An age old practice to preserve the onions is by means of a process called pickling. Most widely used pickling for onions are vinegar based pickling and oil based pickling. While vinegar based pickling is popular in the United States and Europe, oil based pickling is widely adopted in Asia and Africa.

(5) Oil: It is another flavoring substance which is widely used in the seasonings of processed products. Onion oil is also used as a natural food preservative in some food products. Onion oil can be extracted by different methods like distillation, solvent extraction, super critical fluid extraction etc.

(6) Vinegar/Beverage/Sauce: As the onions are rich in sugars and other nutrients they can be processed into onion vinegar and onion wine. Onion can also be processed into onion beverage and onion sauce.

4.4 Nutritional Value of Onion

Onion is rich in nutrition and per 100 gram contains:

Moisture	88g
Carbohydrate	8.1 g
Carotene	0.02mg
Vitamin B2	0.02mg
Protein	1.1g
Crude fiber	0.9g
Vitamin B1	0.03mg
Vitamin C	8mg

5. **Present market position**

Dehydrated Onions Market value was estimated at $1.01 billion in 2020, projected to grow at a CAGR of 4.31% during the forecast period 2021-2026. Drying or removing moisture from the onions results in dehydrated onions, it is the best way of preserving onions for future purpose. The active medicinal components in onions are vitamin C for rotting and tonic and the component Clokinin is like insulin that regulates blood sugar. Onions have been found to have more antibiotics than penicillin, uremayocin and sulphate that cures tuberculosis, syphilis, gonorrhoea. Unlike, seasonal availability of onions, this product is readily available throughout year and is not affected by any seasonal price change and this the major factor driving the markets growth. High demand for fresh onions coupled with low market awareness among consumers are the factors restraining the markets growth.

Manufacturers are constantly striving to provide nutrition-rich dried products through their offerings of on-the-go or ready-to-cook meals and snacks, which is believed to be another key factor impacting adoption of dry vegetables globally. Rising consumer awareness about the improved shelf life of dehydrated foods has contributed to the growing adoption of dry onions among consumers, especially within developing economies. Volatility in production and pricing of vegetables primarily due to seasonal variations, and availability and utilization of resources, has been identified to be a decisive factor influencing the market scenario

6. **Expected future demand**

The onion based value added products such as paste, powder, flakes or vacuumed packed o are part and parcel of daily consumption pattern both in rural and urban India. These products fall under commonly consumed culinary products across households. Therefore, demand for onion paste, powder, flakes are always are prevalent across length and breadth of the country throughout the year. Dehydrated onion flakes & powder can be used in soups, sauces, salad.sprinkles, seasoning, pizza and other purposes. Paste also has huge demand in culinary and other purposes. Vacuum packed onion has increased shelf life and can be used/ consumed at later stage.

The increasing urbanization offers huge market for readily available onion based products like paste, powder, flakes and vacuumed packed onion. Urban organized platforms such as departmental stores, malls, super markets can be attractive platforms to sell well packaged and branded onion products. Processors can also have tie-up with hotels and restaurants for supply

7.1 **Market size**

The Indian onion powder market size was at about 12,450 tons in the year 2020. The Indian onion powder market is further expected to grow at a CAGR of 6% between 2021 and 2026 to reach a volume of almost 17,661 tons by 2026. The onion powder industry in India is contributing to the growth of the global market.

Red onions are estimated to be the fastest growing segment poised to grow at 5.1% CAGR during forecast period owing to the usage of red onion in producing dehydrated onion powder. The dehydrated red onion powder is mostly used in various food preparations when there is a need for desired onion’s texture, taste and flavour and appearance. Various population studies sates that the individual who consumes food products rich in anthocyanin showed a reduced risk of cardiovascular

diseases, this is increasing the demand for red onion powder.
Onions are one of the oldest vegetables in continuous cultivation dating back to at least 4,000 BCE. The ancient Egyptians are known to have cultivated this crop along the Nile River. There are no known wild ancestors, however; the center of origin is believed to be Afghanistan and the surrounding region. Onions are among the most widely adapted vegetable crops. They can be grown from the tropics to subarctic regions

7.2 Common Varieties of Onions Grown in India

7.2.1 Big Onions

Agrifound Dark Red: Bulbs are dark red in colour, globular in shape with tight skin, moderately pungent. Mature in 95–110 days after transplanting. Recommended for growing in Kharif season all over the country.
Agrifound Light Red: Bulbs are globular in shape with tight skin and light red colour. Mature in 110–120 days after transplanting and keeping quality is good. Recommended for growing in Rabi season all over country.
NHRDF-Red (LINE-28): Bulbs are attractive dark red in colour. This variety is very popular among farmers in North India because of its attractive dark red colour and better storage performance. Mature in 110–120 days after transplanting. Recommended for cultivation in Northern, Central and Western India in Rabi season.
Agrifound White: Bulbs are globular in shape, with tight skin and silvery attractive white colour. Mature in 110–130 days after transplanting and keeping quality is good. Suitable for cultivation in late Kharif and Rabi seasons. Good variety for dehydration. Recommended for Maharashtra, Madhya Pradesh and Gujarat.

7.2.2 Small Onions

Agri found Rose: Bulbs are flattish round in shape, deep scarlet red in colour. Mature in 95 to 110 days from sowing. This variety is suitable for growing in Kharif in Andhra Pradesh and in all three seasons in Karnataka.
2.3.3 Multiplier Onions
Agrifound Red: Average size of cluster is 7.15 cm with weight of 65–67 g. Average number of bulblets per cluster is 5–6. Colour of bulblets is light red. Mature in 65–67 days after planting. Recommended for cultivation in Kharif and Rabi seasons in Tamil Nadu, Karnataka and Kerala.

8. Statistics

8.1 Fixed capital investment

8.1.1 Land & building machinery

This DPR is for FME scheme to upgrade/formalize existing micro enterprises which already has land & built-up area. However, they can invest to expand the built-up area (Table 5) as required.

Table 3: Land and Civil Infrastructures	
i. Land 10000 Sq ft	Assumed land already developed and has 6000 sq m built in area. So additional 1000 sq
ii. Built-up processing area 6000 sq ft	

iii. Storage area 1000 sq ft	ft can be built in @ Rs. 200/sq ft Rs. 2.00 Lakhs
Total	**Rs. 2.00 Lakhs**

8.2 Machinery & Equipment: Rs. 20 Lakhs

Table 4: Machineries & Equipments

S.No	Descriptions	Power required	Area required (Sq.ft)	Qty	Amount (Rs.) in lakhs
1.	Onion Grader Capacity : 100 kg /hr	2 HP	25	1	2.00
2.	Onion Peeler Capacity : 100 kg /hr	210V	16	1	5.00
3.	Compressor Working pressure: 11 bar	10 HP	10	1	2.00
4.	Conveyor Capacity : 100 kg /hr	2 HP	25	1	3.00
5.	Vacuum Packaging unit Capacity : 50 kg /hr	2 HP	25	1	2.50
6.	Solar Dryer Capacity 200 kg	0.37 KW	150	1	1.50
7.	Ball Mill/ Hammer Mill with cyclone Capacity : 25 kg /hr	4 HP	25	1	1.00
8.	Form, Fill and Seal Machine Capacity : 25 kg /hr	1 HP	25	1	0.75
9.	Vegetable Slicer Capacity : 25 kg /hr	1 HP	10	1	0.25
10	Blancher Capacity : 15 kg /hr	1 KW	10	1	0.25
11	Colloidal mill Capacity : 25 kg /hr	1 HP	15	1	0.75
12	Liquid Filling Machine Capacity : 20 kg /hr	1 HP	25	1	1.00

8.3 Other Fixed Assets

Table 5: Other Fixed Assets		
i.	Furniture and Fixtures	Rs. 1 Lakh
ii.	Plastic trays capacity	
iii.	Electrical fittings	

8.4 Pre-operative Expenses

Table 6: Pre-operative Expenses	
Legal expenses, start-up expenses, establishment cost, consultancy fee, trial runs, & others	Rs.29000
Total Pre-operative Expenses	**Rs.29000**

8.5 Total Fixed Capital Investment

Total Fixed Capital Investment = (Land & Building + Machinery & Equipment+ Utilities and Fittings + Other Fixed Assets + Pre-operative Expenses) = Rs. (2+20+1.20+1+0.29) Lakhs = Rs. 24.49akhs

8.6 Working Capital Requirement

Table 7: Working Capital Requirement (Rs. in Lakh)				
Particulars	**Period**	**Year 2 (70%-105 MT)**	**Year 3 (80%-120 MT)**	**Year 4 (90%-135 MT)**
Raw material stock	7 days	0.73	0.84	0.94
Work in progress	15 days	2.15	2.46	2.76
Packing material	15 days	0.05	0.06	0.06
Finished goods' stock	15 days	5.38	6.15	6.92
Receivables	30 days	10.76	12.30	13.84
Working expenses	30 days	1.00	1.14	1.28
Total current assets		20.07	22.95	25.80
Trade creditors		0	0	0
Working capital gap		20.07	22.95	25.80
Margin money (25%)		5.01	5.74	6.45
Bank finance		15.06	17.21	19.35

8.7 Total Project Cost and Means of Finance

Table 8: Total Project Cost and Means of Finance	(Rs. in Lakhs)
Particulars	**Amount**
i. Land and building	2.00
ii. Plant and machinery	20.00
iii. Utilities & Fittings	1.20
iv. Other Fixed assets	1.00
v. Pre-operative expenses	0.29
vi. Contingencies	0.50
vii. Working capital margin	5.01
Total project cost (i to vii)	**30**
Means of finance	
i. Subsidy	10
ii. Promoter's contribution	6
iii. Term loan	14

8.8 Manpower Requirement

Table 9: Manpower Requirement		
Particulars	**No. & Wage**	**Total Monthly Salary (Rs.)**
i. Manager (can be the owner)	1 @ Rs. 20000	20000
ii. Skilled worker	2 @ Rs. 10000	20000
iii. Semi skilled	2 @ Rs. 7500	15000
iv. Helper	1 @ Rs. 5000	5000
v. Sales man	1 @ Rs. 7500	7500
Total	**7 persons**	**Rs. 67500/- per month**

Note: Manager, two skilled workers are permanent staffs only (Salary Rs. 40000/month). Others are causal staffs.

8.9 Location of the Proposed Project and Land

The entrepreneur must provide description of the proposed location, site of the project, distance from the targeted local and distant markets; and the reasons/advantages thereof i.e. in terms of raw materials availability, market accessibility, logistics support, basic infrastructure availability etc. The entrepreneur must mention whether project is proposed in self owned land or rented/allotted land in any industrial park or private location. Accordingly, he/she must provide ownership document, allotment letter/ lease deed. Land clearance certificate must be from village authority/municipality or any other concerned authority. ***The ideal locations for establishment of exclusive Onion Processing Units are in the production clusters of the major onion growing***

states such as Maharashtra, Madhya Pradesh, Karnataka, Bihar, Rajasthan, Gujarat, Andhra Pradesh, Haryana, West Bengal and Tamil Nadu where adequate quantities of surplus raw materials can be available for processing.

8.10 Installed Capacity

The maximum installed capacity of the Integrated Onion Processing Unit in the present model project is proposed as150 tonns/annum. The unit is assumed to operate 300 days/annum @ 8-10 hrs/day. The 1st year is assumed to be construction/expansion period of the project; and in the 2nd year 70 percent capacity, 3rd year 80 percent capacity and 4th year onwards 90 percent capacity utilization is assumed in this model project.

8.11 Raw Material Requirements

A sustainable food processing unit must ensure maximum capacity utilization and thus requires an operation of minimum 280-300 days per year to get reasonable profit. Therefore, ensuring uninterrupted raw materials supply requires maintenance of adequate raw material inventory. The processor must have linkage with producer organizations preferably FPCs through legal contract to get adequate quantity and quality of raw materials which otherwise get spoiled. In the current model onion processing project, the unit requires 350 kg/day, 400 kg/day and 450 kg/day raw onion at 70, 80 and 90 percent capacity utilization, respectively.

8.12 Plant Layout

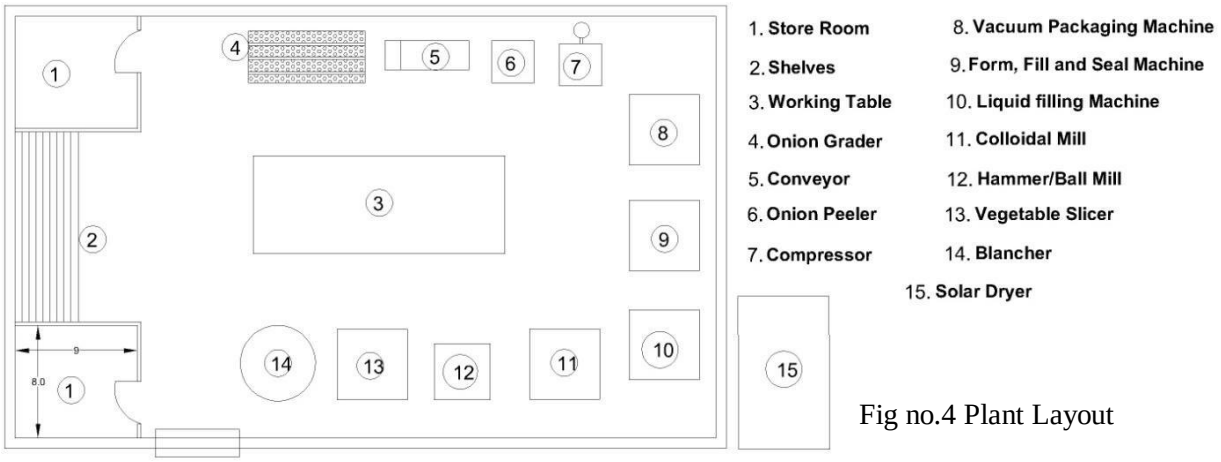

Fig no.4 Plant Layout

8.13 Detailed Project Assumptions

This model DPR for Onion Processing Unit is basically prepared as a template based on certain assumptions that may vary with capacity, location, raw materials availability etc. An entrepreneur can use this model DPR format and modify as per requirement and suitability. The assumptions made in preparation of this particular DPR are given in Table 4. This DPR assumes expansion of existing unit by adding new onion based product lines. Therefore, land and civil infrastructures are assumed as already available with the entrepreneur.

Table 10: Detailed Project Assumptions

Parameter		**Value Assumed**
Capacity of the onion processing unit	:	150 MT/annum raw onion
Utilization of capacity	:	1st year implementation, 70% in 2nd year, 80% in 3rd year and 90% in 4th year onwards.
Working days per year	:	300 days
Working hours per day	:	8-10 hrs.
Interest on term and working capital loan	:	12%
Repayment period	:	Seven years with one year grace period is considered.
Average prices of raw material	:	Rs. 30/Kg.
Average sale prices	:	Onion Flakes Rs. 700/kg, powder Rs. 800/kg, onion paste Rs. 80/kg & vacuum packed onion Rs. 60/kg.
Recovery rate	:	15% dry flakes & powder, 90% paste & vacuumed onion

9. SWOT Analysis

9.1 Strengths

- Moderately diverse climate permits onion production almost all over the country burning few coastal pockets.
- Development of diverse genotypes
- Good scope for expanding area in non-traditional areas
- Wide variability of germ plasm is available for breeders for crop improvement.
- Marginal and small farmers share maximum percent of peasantry in India, onion cultivation is more suitable to them as they have higher cost benefit ratio than cereals
- Availability of cheap labour.
- Being short duration crops in nature, these crops can fit into any cropping system and juvenile orchards
- Onions have got strong processing traits and attract good agro-based industries.
- Onions have got old and strong export tradition, Availability of imined scientific manpower and good inter-institutional collaboration.

9.2 Weaknesses

- Poor seed multiplication programmed of released varieties.
- Inferior local genotypes still dominate 70 percent of onion production . Most of the available genotypes have low productivity and are highly susceptible to pests and diseases.
- Lack of hybrids in short day onion
- Lack of availability of yellow onion varieties with mild pungency having consumer acceptance for export to European Union,
- Lack of varieties for processing
- Inadequate extension services.
- Very high fluctuations in market prices, which affect cropping production plan Lack of sound export policy.
- Poor infrastructure for storage and transport of perishable export commodities .

9.3 Opportunity

- The geographical position of the country;
- Increasing demands from industry;
- Increasing seed onions demand in neighbouring
- Processors can also have tie-up with hotels and restaurants for supply.
- Innovative product development with new flavours of untraditional fruits and organic products.
- Penetration of the developing urban markets for paste, powders, and preserves.

9.4 Threats

- High production costs due to high input prices:
- High pressure for seed potatoes from foreign seed companies;
- Risk of epidemic of quarantine diseases due to inadequate control mechanism;
- Global climate change.
- In peak time Public purchased generally branded Jam and local manufacturers are ignored.
- Highly qualified employees are required in big brands.

- Huge investment on advertisement by other brands.
- Change is needed according to trend and customers preferences.

10. Market Growth Drivers

Onion can be processed into a wide variety of products. Minimally processed ready to use or ready to cook fresh onions, onion paste, dehydrated onion flakes, onion powder, onion oil, onion vinegar, onion sauce, pickled onion, onion wine and beverage etc. The demand for the processed products is increasing day by day due to its convenience to handle and use. As per the estimate, approximately 6.75% of the onion produced is going for processing (by counting total losses, consumption, export and bulb seed requirement the remaining percentage is considered for processing).

Demand for Fresh Onions:- The preference for the fresh onions along with low awareness are the factors hampering the markets growth. In addition to this the fluctuation of raw products owing to the seasonal variations is another factor that hinders the market growth.
Developing countries such as India and China in Asia-Pacific region, are accessible to onions only during particular seasons, thus providing a beneficial opportunity especially for dehydrated onion manufacturer to provide customers with a fair choice, particularly during off-seasons.

- The per-capita income of the Indian population has increased, thus increasing the disposable income in their hands.
- The growing population of the smart generation is a major behind the Paste , dry powders of onion
- industries rapid growth.
- Westernization and change in lifestyle also aid in the growth of the industry.

11. Factors limiting market growth

When the market falls badly, farmers turn to other crop than onions. So, in the next season the rate of onions shoots up to sky. This gives a good amount to the farmers directly. Then, in the next season, large number of farmers again shift to onions. The extra produce results in the falling of prices. And so on. This is the cycle of crisis. Over the last thirty years, this has been happening season after season.

Government Policies :-
According to experts, there are number of things that the government could do to help the farmers in getting good prices. "The most important policy could be the 'Bhavantar Scheme'. Government should decide the production cost of onions per kilogram. Suppose if it is Rs. 8 per kg and if farmers are getting just Rs. 3 or 4 then the remaining price should be given to the farmer as allowance. So, that their production costs are evened out and the farmers are not forced to take any extreme step like suicide," suggested Nanasaheb Patil, director of the National Agricultural Cooperative Marketing Federation of India Limited (NAFED).

Marketing of onions was done on an individual basis and farmers in a particular location faced usually small number of buyers for their product. This marketing situation puts farmers' bargaining power on prices lower and they have to accept what the buying trader offers in order to avoid lossdue to lack of market. From the 10 independent variables, the quantity of onion productions in2014, access to extension contact and market information were statistically significant determined quantity of onion supplied to the market.

12. Current market trends

Onion powder is trend prepared commercially using of raw onions by dehydrating, freeze-drying, vacuum-shelf drying and flow drying. It comprises of many vital nutrients like carbohydrate, fiber, protein, cholesterol, vitamin B-6 and C, manganese, calcium, iron, folate, potassium, phosphorus and magnesium. In addition to this, onion powder is less pungent in taste but its concentrated disposition makes it last for a prolonged time span. Onion powder is widely used in India for several culinary purposes owing to its advantages such as long-shelf life, easy transportation, wide availability and insignificant calorie count. According to the latest report, titled "Indian Onion Powder Market: Industry Trends, Share, Size, Growth, Opportunity and Forecast 2021-2026", the Indian onion powder market exhibited moderate growth during 2015-2020

Rapid urbanisation , hectic schedules and rising working population, the demand for onion powder is witnessing a tremendous growth, particularly in India. In order to save time, consumers are not willing to indulge in difficult cooking procedures such as chopping onions. Apart from this, food processing represents one of the largest sectors in India which is bolstering the demand for onion powder.

Moreover, onion powder is used in ready-to-eat food products, like packaged soups, sauces, oats, noodles, pasta, frozen food and instant mixes. Further, onion powder is used in seasonings, dry rubs, marinades and condiments for preparing appetisers, seafood and meat.

Dehydrated products are the largest export products for international markets & international clients who desire for quality products. These products are 100% export oriented to countries like UK, Canada, Germany and many more .

13. Market structure

The term structure refers to something that has organization and dimension-shape, size and design; and which is evolved for the purpose of performing a function. The term market structure refers to the size and design of the market. It also includes the manner of the operation of the market. Some of the expression describing the market structure are;

1. Market structure refers to those organization characteristics of a market which influence the nature of competition and pricing, and effect the conduct of business firms.

2. Market structure refers to those characteristics of the market which affect the traders' behavior and their performances.
3. Market structure is the formal organization of the functional activity of a marketing institute.

An understanding and knowledge of the market structure is essential to identify the imperfections in the performance of a market.

Components of a market structure

The components of the market structure, which together determine the conduct and performance of the market are;

1. **Concentration of market power**:

The concentration of market power is an important element determining the nature of competition and thus market conduct an performance. This is measures by the number and size of the firms existing in the market. The extent of concentration represents the control an individual firm or a group of firms

over the buying and selling of the produce. A high degree of market concentration restricts the movement of goods between buyers and sellers at fair and competitive prices, and creates an oligopoly or oligopoly situation in the market.

2. **Degree of product differentiation**:

Whether or not product are homogeneous affects the market structure. If the products are homogeneous, the price variation in the market will not be wide. When products are heterogeneous, the firms have the tendency to charge different prices for their products.

3. **Conditions for entry of firms in the market**:

Another dimension of the market structure the restriction, if any, on the entry of firms in the market. Sometimes, a few big firms do not allow new firms to enter the market or make their entry difficult by their dominance in the market. There may also be some government restrictions on the entry of firms.

4. **Flow of market information**:

A well-organized market intelligence information system helps all the buyers and sellers to freely interact with one another in arriving at prices and striking deals.

5. **Degree of integration**:

The behavior of an integrated market will be different from of a market where there is no or less integration either among the firms or of their activities. Firms plan their strategies in respect of the methods to be employed in determining prices, increasing sales, co-ordinating with competing firms and adopting predatory practices against the rivals or potential entrants.

14.Key Highlights

- Introduction And Current Status of Onion Processing Unit
- Project at a glance & Production in all over India.
- Study of Onions Varieties, types of products and Nutritional Value of Onions
- Different methods using in technological process.
- Analysis of Quality Control and Food Safety Standards
- SWOT Analysis and Onion Market Growth Drivers
- Analysis of Onion Market Growth Drivers and Factors Limiting Market Growth