



Model Detailed Project Report

ONION PROCESSING UNIT

*Under the Formalization of Micro Food Processing Enterprises Scheme
(Ministry of Food Processing Industries, Government of India)*



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Contents

Sl. No.	Topic	Page
1.	The Project At a Glance	1
2.	General Overview of Production, Post Harvest Management and Value Addition of Onion in India	2
	2.1. Introduction	2
	2.2. Origin and Distribution of Onion in India	2
	2.3. Production of Onion in India	3
	2.4. Showing, Transplanting and Harvesting of Onion in India	4
	2.5. Onion Varieties in India	4
	2.6. Nutritional Value of Onion	5
	2.7. Cultivation, Harvesting, Post Harvest Management and Storage of Onion	5
	2.8. Processing and Value Addition of Onion	8
3.	Model Integrated Onion Processing Unit under FME Scheme	10
	3.1. Introduction	10
	3.2. Form of the Business Enterprise	10
	3.3. Background of the Promoters/Owners and Required Documents	10
	3.4. Background of the Proposed Project	11
	3.5. Location of the Proposed Project and Land	11
	3.6. Installed Capacity	11
	3.7. Raw Material Requirements for the Unit	12
	3.8. Product Profile of the Unit	12
	3.9. Manufacturing Process of Vacuum Packed Onion, Paste, Flakes and Powder	12
	3.10. Technology Accessibility	14
	3.11. Market Demand and Supply	14
	3.12. Marketing Strategy	15
	3.13. Detailed Project Assumptions	15
	3.14. Fixed Capital Investment	16
	3.14.A. Land & Building	16
	3.14.B. Machinery & Equipment	16
	3.14.C. Utilities and Fittings	17
	3.14.D. Other Fixed Assets	17
	3.14.E. Pre-operative Expenses	17
	3.14.F. Total Fixed Capital Investment	17
	3.15. Working Capital Requirement	17
	3.16. Total Project Cost and Means of Finance	18
	3.17. Manpower Requirement	18
	3.18. Expenditure, Revenue and Profitability Analysis	19
	3.19. Repayment Schedule	20
	3.20. Assets' Depreciation	21
	3.21. Financial Assessment of the Project	21
	3.22. Plant Layout	23
	3.23. Machinery Suppliers	23
4.	Limitations of the Model DPR and Guidelines for Entrepreneurs	24
	4.1. Limitations of the Model DPR	24
	4.2. Guidelines for the Entrepreneurs	24

1. 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 2 nd , 3 rd and 4 th 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		
• 2 nd year		Rs. 15.06 Lakhs
• 3 rd year		Rs. 17.21 Lakhs
• 4 th 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		
• 2 nd year	:	Rs. 44.84 Lakhs
• 3 rd year	:	Rs. 53.26 Lakhs
• 4 th 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

2. General Overview of Production, Post Harvest Management and Value Addition of Onion in India

2.1. 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.

2.2. Origin and Distribution of Onion

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. This adaptation is primarily due to differing response to day length. Onions are grouped into three groups based on their response to hours of

day length. The short-day varieties bulb with day lengths of 10-13 hours, intermediate varieties bulb with day lengths of 13-14 hours and long-day onions with day lengths greater than 14 hours.

2.3. Production of Onion in India

Table 1: State-wise Onion Production in India						
(‘000 Tonnes)						
States/UTs	Five year Average (2013-14 to 2017-18)		2017-18		2018-19 (1st A.E.)	
	Production	% Share	Production	% Share	Production	% Share
Maharashtra	6668.64	31.77	8854.09	38.06	8474.73	35.89
Madhya Pradesh	3187.73	15.19	3701.01	15.91	3725.21	15.78
Karnataka	2804.85	13.36	2986.59	12.84	3076.19	13.03
Bihar	1257.67	5.99	1240.59	5.33	1302.86	5.52
Rajasthan	1049.38	5.00	996.73	4.28	1073.01	4.54
Andhra Pradesh	859.54	4.10	915.73	3.94	994.07	4.21
Haryana	680.52	3.24	701.50	3.02	908.83	3.85
West Bengal	473.32	2.25	633.60	2.72	638.38	2.70
Gujarat	1233.98	5.88	546.20	2.35	540.67	2.29
Uttar Pradesh	422.59	2.01	439.64	1.89	440.38	1.87
Chhattisgarh	367.38	1.75	421.21	1.81	426.07	1.80
Odisha	392.91	1.87	379.34	1.63	379.34	1.61
Telangana	399.94	1.91	326.59	1.40	326.59	1.38
Tamil Nadu	433.01	2.06	301.14	1.29	311.18	1.32
Jharkhand	295.90	1.41	289.04	1.24	287.54	1.22
Assam	60.64	0.29	80.37	0.35	243.50	1.03
Punjab	196.87	0.94	214.55	0.92	233.96	0.99
Jammu & Kashmir	64.58	0.31	57.96	0.25	55.84	0.24
Himachal Pradesh	46.73	0.22	52.19	0.22	52.62	0.22
Uttarakhand	40.92	0.19	44.09	0.19	44.09	0.19
Sikkim	8.42	0.04	35.00	0.15	35.35	0.15
Nagaland	7.40	0.04	7.20	0.03	7.20	0.03
Manipur	5.45	0.03	6.84	0.03	6.76	0.03
Meghalaya	4.60	0.02	5.06	0.02	5.19	0.02
Mizoram	7.71	0.04	7.93	0.03	1.80	0.01
Tripura	2.07	0.01	1.05	0.00	0.98	0.00
Kerala	0.26	0.00	0.31	0.00	0.20	0.00
Others	17.49	0.08	16.77	0.07	17.49	0.07
Total	20990.01	100.00	23262.33	100.00	23610.01	100.00

Source: Department of Agriculture, Cooperation & Farmers' Welfare, Govt. of India

2.4. Showing, Transplanting and Harvesting of Onion in Different Regions of India

Table 2: Showing, Transplanting and Harvesting of Onion in Different Regions of India			
Season	Time of seed sowing	Time of transplanting	Time of harvesting
Maharashtra and some parts of Gujarat			
1. Early <i>Kharif</i> 2. <i>Kharif</i> 3. Late <i>Kharif</i> 4. <i>Rabi</i>	Feb.-Mar. May-June Aug.-Sept. Oct.-Nov.	April-May July-Aug. Oct.-Nov. Dec.-Jan	Aug.-Sept. Oct.-Dec. Jan.-Mar. Apr.-May
Tamil Nadu, Karnataka and Andhra Pradesh			
1. Early <i>Kharif</i> 2. <i>Kharif</i> 3. <i>Rabi</i>	Feb.-April May-June Sept.-Oct.	April-June July-Aug Nov.-Dec.	July-Sept. Oct.-Nov. Mar.-Apr.
Rajasthan, Haryana, Punjab, UP and Bihar			
1. <i>Kharif</i> 2. <i>Rabi</i>	June-July Oct.-Nov.	July-Aug. Dec.-Jan.	Oct.-Nov. May-June
West Bengal and Orissa			
1. <i>Kharif</i> 2. Late <i>Kharif</i> 3. <i>Rabi</i>	June-July Aug.-Sept. Sept.-Oct.	Aug.-Sept. Oct.-Nov. Nov.-Dec.	Nov.-Dec. Feb.-Mar. Mar.-Apr.
Hilly areas			
1. <i>Rabi</i> 2. Summer (Long day type)	Sept.-Oct. Nov.-Dec.	Oct.-Nov. Feb.-Mar.	June-July Aug.-Oct.

2.5. Onion Varieties in India

Table 3: Onion Varieties in India	
<i>White Onion</i>	Bhima Shubra, Bhima Shweta, Bhima Safed, Pusa White Round, Arka Yojith, Pusa White Flat, Udaipur 102, Phule Safed, N25791, Agrifound White.
<i>Red onion</i>	Bhima Super, Bhima Red, Bhima Raj, Bhima Dark Red, Bhima Shakti, Punjab

	Selection, Pusa Red, N2-4-1, Pusa Madhavi, Arka Kalyan, Arka Lalima.
<i>Small Onion</i>	Agrifound Rose, Arka Bindu
<i>Spanish Brown</i>	Bhima Light Red, Bhima Kiran, Phule Suvarna, Arka Niketan, Arka Kirthiman
<i>Multiplier Onion</i>	Co 1, Co 2, MDU 1, Agrifound Red

2.6. 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

2.7. Cultivation, Harvesting, Post Harvest Management and Storage of Onion

Cultivation

Onions can be grown from seeds, seedlings and bulblets. Red loam to black soils with good drainage facilities is highly favourable for cultivation of onion. Onion performs well at a soil pH 6-7 and mild season without extremes of heat and cold. The medium sized bulbs are sown during April – May and October – November. Bulb needs sufficient soil moisture during growing period but heavy rains during bulb germination and bulb formation affects the crop growth. 1000 kg bulb/ha is required. Seeds rate is generally @ 8kg/ha. Seed sowing is the most common method practiced for irrigated crop as it results in high yield and large size bulbs. In plains, seeds are sown during October-November for a rabi crop. In hills, seeds are sown from March to June. Seeds are first sown in well prepared nursery beds of 90-120 cm width, 7.5-10.0 cm height and convenient length. Ratio between nursery area and main field is about 1:20. Seed rate varies from 8 to 10 kg/ha. Seedlings of 15 cm height and 0.8 cm neck diameter are ideal for transplanting and this is achieved in 8 weeks. However, it varies from 6-10 weeks depending on

soil, climate and receipt of rain. There is a practice of topping seedlings at the time of transplanting if seedlings are over-grown. The land is ploughed to a fine tilth and ridges and furrows are formed at 45 cm spacing and bulbs or seedlings are planted in rows of 20 cm spacing and 12 cm between plants. Irrigation is given at the time of planting of seedlings and on the third day and later at weekly intervals.

Harvesting, Pulling and Windrowing

The mature plants' neck can no longer support the weight of the foliage, thus it falls over and plants doesn't put on new leaves, leaves start drying and the plant is resistant to pull out of the ground. Irrigation is stopped at maturity about one to two weeks before harvest to prevent bulbs from being water logged. Bulbs are harvested during the cooler part of the day (early morning and late evening) but not on a wet day. This will prevent the occurrence of brown stains and black mould. Fork can be used to loosen the bulbs before pulling the top by hand. Care must be taken when pulling out but avoid damaging the bulbs.

Onions shouldn't be pulled until at least 50% of the plants have lodged. Lodging occurs when the onion plant has fallen over. After lodging, bulb size increases by about 25-33%. In order to ensure that the bulb isn't harvested until it is fully bulbed, it is recommended to carry out a pulling test. Pulling test involves gently pulling the individual plant from the ground. If the plant comes out of the ground easily then it is ready for harvest but if not it is an indication that the root is still very active and bulbing isn't complete.

Avoid pulling onions and leaving them in the sun when the temperature are very high (80%-90%) because they can get sunscald. Clip off the top of the foliage approximately 1 inch above the bulb and trim the roots. This will prevent the bulb from decaying and sprouting during storage. Also, if wet onions are placed in boxes, it takes longer for them to cure properly and the high moisture encourages diseases development, rooting and sprouting. Yield is about 12-16 t/ha in 70 to 90 days.

Field drying and Curing

The onion bulbs must be layered in such a way that the leaves lay over top the bulbs to protect them from direct sun impact. The bulbs can also be dried in a green house or high tunnel. The temperature should be below 85⁰F. Curing is the drying process intended to dry off the neck and outer scale leaves of the bulbs to prevent the loss of moisture and the attack by decay during storage. Heat, good ventilation and low humidity are essential for curing. Usually, the outer layer of the bulb that is contaminated by soil falls away easily when the bulbs are cured. This exposes the more attractive under-layer. A cured onion bulb would lose 3-5% of its weight, the neck is tight and outer scales are dried until they rustle. Onions can either be dried in the field or collected in trays and stacked in a warm, covered area with good ventilation. Onions can also be cured by tying the tops of the bulbs bunches and hanging them on a horizontal pole in well-ventilated shades. Curing in shade is advisable because it improves bulb color and reduces significantly losses during storage.

Grading and Packaging

Onions are graded before they are stored or transported to the market. The thick necked, bolted, doubles, injured, and decayed bulbs are picked out. The onions are graded into extra-large (> 6 cm diameter), medium (4-6 cm diameter), and small (2-4 cm diameter).

Packaging should be small for easy handling during transportation. Onions can be packed in open mesh jute bags or wooden basket. The use of nylon net bag for packaging onions is recommended because it results in less storage loss due to the good ventilation it provides.

Storage

Onions shouldn't be stored unless adequately dried either on the field or by artificial means. It is important to dry the neck tissue and outer scales until they rustle when handled otherwise the bulb will rot in storage. Onions may be stored in bulk in special houses made up with thatched roof and walls made up of bamboo and wire mesh for good air circulation. Onions are spread on dry and damp proof floor or racks.

Major storage problems

- Sprouting and rooting are major challenges of onion storage. Sprouting is controlled by temperature while rooting is controlled by relative humidity. A temperature below 10-25⁰C increases sprouting and the higher the relative humidity the higher rooting occurrence. Sprouting can be prevented if maleic hydrazide at 2500 ppm is sprayed at 75-90 days after transplanting to field.
- Weight loss is higher when temperature is above 35⁰C. Onions are stored at a temperature of 30-35⁰C with relative humidity of 65-70% but for cold storage, onions are kept under temperature between 0-2⁰C at relative humidity of 60-70%.
- Storage rot can be prevented through proper cleanliness in the store and crops can be sprayed with 0.1% carbendazim after 90 days if transplanting and just before harvest.

Storage Care

- Periodic turning of onion bulbs and the removal of the rotten, damaged and sprouting bulbs is essential while storing onions.
- Avoid direct sunlight on onion bulbs to reduce sunscald, fading colour and quality deterioration.

2.8. Processing and Value Addition of Onion

Onion offers a huge potential for value creation through processing. Advances in the field of processing makes it possible to produce different value added products from onion i.e. minimally processed ready to use or ready to cook fresh onion, onion paste, dehydrated onion flakes, onion powder, onion oil, onion vinegar, onion sauce, pickled onion, onion wine and beverages etc.

Minimally processed onions are peeled and/or cut onions which retain its freshness. Availability of minimally processed onions to cook or ready to use purpose reduces the overall food preparation time. Alternatively, onions are used by way of frozen onion rings where the raw onions are sliced into rings, freeze dried and stored in a suitable packaging material under low

temperatures. The frozen onion rings have a long storage life of 12 months and can be readily used for direct consumptions or for adding to soups and dressings.

Onion paste is another product where the onion is grounded yet retaining its freshness. Dehydrated onion flakes can be processed into onion powder by proper grinding. Onion powder dissolves very easily and reconstitute quickly compared to onion flakes. It is successfully used in the preparation of baked products like pizza and bread, and also for spicing up grilled chicken.

Onion oil is another flavoring substance which is widely used in the seasoning of processed products and is also used as a natural used preservative in some food products.

Onion salt is another common ingredient in the spice mix and can be used at the place of table salt to offer a refreshing new taste to the household.

3. Model Integrated Onion Processing Unit under PM-FME Scheme

3.1. Introduction

The Central Sector scheme for Formalization of Micro Food Processing Enterprises under Ministry of Food Processing Industries, Government of India is an important scheme that offers for formalization and mainstreaming the unorganized home based or micro food processing units. The scheme is useful for expansion of the existing units in terms of capacity and technology through installation of new machineries and additional civil infrastructures. Further, the scheme promotes establishment of new micro units on the principle of ODOP (One District One Product)

Establishment or expansion of **Integrated Onion Processing Unit** is an attractive option in potential onion growing states in India as onion offers huge scope for value addition and market demand. A model generalized DPR is therefore, prepared for expansion of existing un-formalized Onion Processing Unit. A detailed account of the model DPR prepared on the basis of certain generalized assumptions is discussed in the sequent sections. *An entrepreneur can use this model DPR template and modify according to his/her need in terms of capacity, location, raw materials availability etc.*

3.2. Form of the Business Enterprise

The entrepreneur concerned must specify about the form of his/her business organization i.e. whether Sole Proprietorship, Cooperative, FPO/FPC, SHG Federation, Partnership Firm or Company and accordingly attach all the required documents. The documents may be registration certificate, share holding pattern, loan approval certificate etc as specified in the FME scheme guidelines.

3.3. Background of the Promoters/Owners and Required Documents

The detailed bio-data of promoter/promoters inter-alia name, fathers name, age, qualification, business experience, training obtained, contact number, email, office address, permanent address, share holding pattern, definite sources of meeting the commitment of promoters contribution,

details of others business along with certified balance sheet and profit loss account for the last 3-4 years, tax registration, PAN number, income tax return etc for 3-4 years and other requirements as specified in the FME guidelines must be provided with the DPR.

3.4. Background of the Proposed Project

The entrepreneur must specify whether it is a new project or expansion of the existing project. If new project is proposed then the reason to go in to the project and if expansion of the existing project, the must specify what kind of expansion is proposed in terms of capacity, product, machines, civil infrastructure etc.

3.5. 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.*

3.6. Installed Capacity

The maximum installed capacity of the Integrated Onion Processing Unit in the present model project is proposed as 150 tons/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.

3.7. Raw Material Requirements

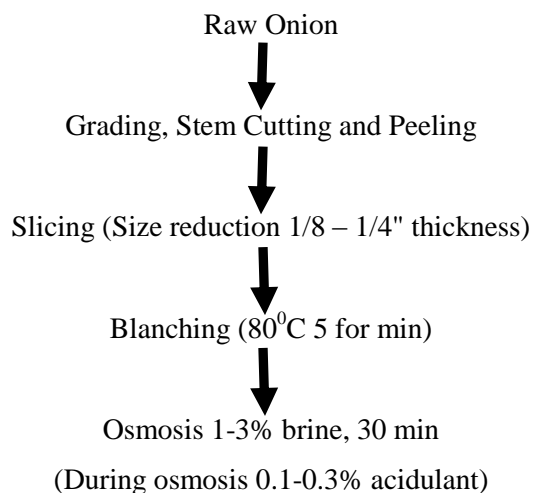
A sustainable food processing unit must ensure maximum capacity utilization and thus requires an operation of minimum 280-300 days per year to get reasonable profit. Therefore, ensuring uninterrupted raw materials supply requires maintenance of adequate raw material inventory. The processor must have 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.

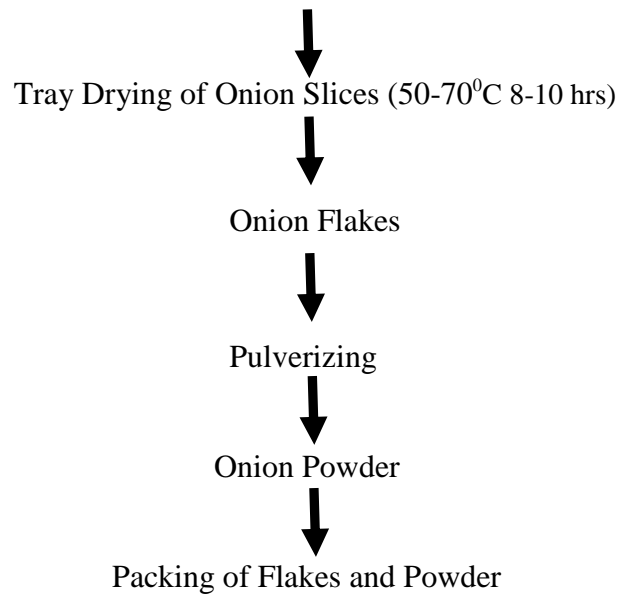
3.8. Product Profile of the Unit

In the present model Integrated Onion Processing unit, the targeted product output is taken as onion flakes, powder, paste and vacuum packed onions. These products have huge market in India and abroad. Dehydrated onion flakes & powder can be used in soups, sauces, salad sprinkles, seasoning, pizza and others. Paste also has huge demand in culinary and other purposes. Onion paste can be made from red, white big and small onions. Vacuum packed onion has increased shelf life and can be used/ consumed at later stage.

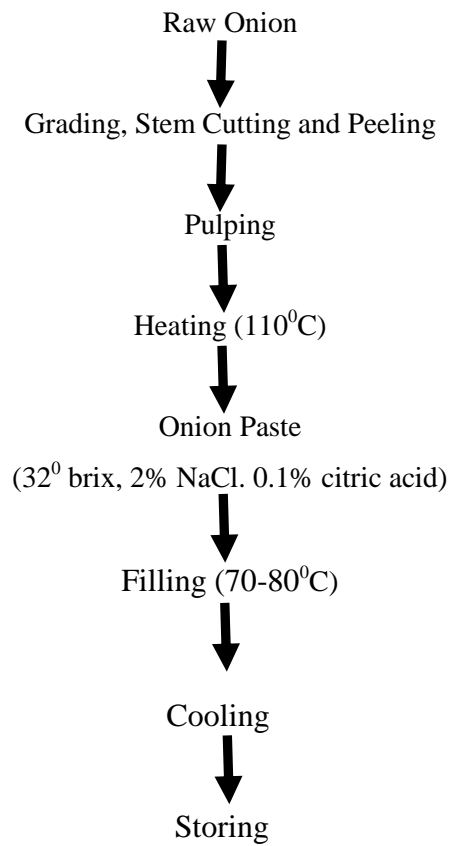
3.9. Manufacturing Process of Vacuum Packed Onion, Paste, Flakes and Powder

Processing of Onion Flakes and Powder





Processing of Onion Puree and Paste



Vacuum packing is a method of packaging that removes air from the package prior to sealing. Vacuum packing reduces atmospheric oxygen, limiting the growth of aerobic bacteria or fungi and preventing the evaporation of volatile components. It helps to extend the shelf life of food products with flexible package forms and to reduce the volume of the contents and package.

Processing of Vacuumed Packed Onion

Peeled fresh onion placed within the vacuum packing machine



The lid is closed and air is removed



Heat sealed inside the chamber



The lid is then opened and the product is removed



Storing

3. 10. Technology Accessibility

IIFPT and its liaison offices at Guwahati and Bhatinda have all the technical knowhow on onion processing. These technologies are available through training, incubation and consultancy. The entrepreneur can first avail training or consultancy and then undergo business incubation before venturing into the business. Other than IIFPT, NIFTEM, CFTRI and other institutes also have the technical knowledge and training facilities.

3.11. Market Demand and Supply

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.

3.12. Marketing Strategy

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.

3.13. 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 4: Detailed Project Assumptions	
Parameter	Value Assumed
Capacity of the onion processing unit	: 150 MT/annum raw onion
Utilization of capacity	: 1 st year implementation, 70% in 2 nd year, 80% in 3 rd year and 90% in 4 th 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

3.14. Fixed Capital Investment

3.14.A. Land & Building

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.

i. Land 10000 Sq ft	Assumed land already developed and has 6000 sq m built in area. So additional 1000 sq ft can be built in @ Rs. 200/sq ft
ii. Built-up processing area 6000 sq ft	
iii. Storage area 1000 sq ft	
Total	Rs. 2.00 Lakhs

3.14.B. Machinery & Equipment: Rs. 20 Lakhs

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

3.14.C. Utilities and Fittings

Table 7: Utilities and Fittings	
i. Power	Rs. 1.20 Lakhs
ii. Water	

3.14.D. Other Fixed Assets

Table 8: Other Fixed Assets	
i. Furniture and Fixtures	Rs. 1 Lakh
ii. Plastic trays capacity	
iii. Electrical fittings	

3.14.E. Pre-operative Expenses

Table 9: Pre-operative Expenses	
Legal expenses, start-up expenses, establishment cost, consultancy fee, trial runs, & others	Rs.29000
Total Pre-operative Expenses	Rs.29000

3.14.F. 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. 24.49 Lakhs

3.15. Working Capital Requirement

Table 10: 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

3.16. Total Project Cost and Means of Finance

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

3.17. 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.

3.18. Expenditure, Revenue and Profitability Analysis

Table 13: Expenditure, Revenue and Profitability Analysis									
	Particulars	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year	8th Year
A	Total Installed Capacity	150 MT/Year Raw Onion							
	Capacity utilization (%)	Under const. (0%)	105 MT (70 %)	120 MT (80 %)	135 MT (90 %)	135 MT (90 %)	135 MT (90 %)	135 MT (90 %)	135 MT (90 %)
B	Expenditure (Rs. in Lakh)								
	Raw onion (Av. Price @ Rs. 30/Kg)	0.00	31.50	36.00	40.50	40.50	40.50	40.50	40.50
	Packaging materials @ Rs. 3/Packet	0.00	0.94	1.08	1.21	1.21	1.21	1.21	1.21
	Utilities (Electricity, Fuel)	0.00	4.20	4.80	5.40	5.40	5.40	5.40	5.40
	Salaries (1 st yr only manager's salary)	2.40	8.10	8.10	8.10	8.10	8.10	8.10	8.10
	Repair & maintenance	0.00	0.50	0.57	0.64	0.64	0.64	0.64	0.64
	Insurance	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
	Miscellaneous expenses	0.50	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	Total Expenditure	3.2	47.54	52.85	58.15	58.15	58.15	58.15	58.15
C	Total Sales Revenue (Rs. in Lakh)	0	107.73	123.12	138.51	138.51	138.51	138.51	138.51
	Sale of Onion Flakes @ Rs. 700/Kg of 40% raw material assuming 15% recovery.	0.00	44.10	50.40	56.70	56.70	56.70	56.70	56.70
	Sale of Onion Powder @ Rs. 800/Kg of 40% raw material assuming 15% recovery.	0.00	50.40	57.60	64.80	64.80	64.80	64.80	64.80
	Sale of Onion Paste @ Rs. 80/Kg of 10% raw material assuming 90% recovery.	0.00	7.56	8.64	9.72	9.72	9.72	9.72	9.72
	Sale of Vacuum Packed Peeled Onion @ Rs. 60/Kg of 10% raw material assuming 90% recovery.	0.00	5.67	6.48	7.29	7.29	7.29	7.29	7.29
D	PBDIT (Total exp.-Total sales rev.) (Rs. in Lakh)/Cash Inflows	-3.20	60.19	70.27	80.36	80.36	80.36	80.36	80.36
	Depreciation on civil works @ 5% per annum	0.10	0.09	0.09	0.09	0.08	0.07	0.07	0.07
	Depreciation on machinery @ 10% per annum	2.00	1.80	1.62	1.46	1.31	1.18	1.06	0.96
	Depreciation on other fixed assets @ 15% per annum	0.15	0.13	0.11	0.09	0.08	0.07	0.05	0.05
	Interest on term loan @ 12%	1.68	1.68	1.44	1.20	0.96	0.72	0.48	0.24
	Interest on working capital @ 12%	0.00	1.81	2.06	2.32	2.32	2.32	2.32	2.32

E	Profit after depreciation and Interest (Rs. in Lakh)	-7.13	54.68	64.95	75.2	75.61	76	76.38	76.72
F	Tax (assumed 18%) (Rs. in Lakh)	0.00	9.84	11.69	13.54	13.61	13.68	13.75	13.81
G	Profit after depreciation, Interest & Tax (Rs. in Lakh)	-7.13	44.84	53.26	61.66	62.00	62.32	62.63	62.91
H	Surplus available for repayment (PBDIT-Interest on working capital-Tax) (Rs. in Lakh)	-3.20	48.54	56.52	64.5	64.43	64.36	64.29	64.23
I	Coverage available (Rs. in Lakh)	-3.20	48.54	56.52	64.50	64.43	64.36	64.29	64.23
J	Total Debt Outgo (Rs. in Lakh)	1.68	3.68	3.44	3.20	2.96	2.72	2.48	2.24
K	Debt Service Coverage Ratio (DSCR)	-1.90	13.19	16.43	20.16	21.77	23.66	25.92	28.67
	Average DSCR	18.49							
L	Cash accruals (PBDIT- Interest-Tax) (Rs. in Lakh)	-4.88	46.86	55.08	63.3	63.47	63.64	63.81	63.99
M	Payback Period (on Rs. 30 Lakhs initial investment)	2 Years							

3.19. Repayment Schedule

Year	Outstanding loan at start of yr.	Disbursement	Total outstanding Loan	Surplus for repayment	Interest payment	Repayment of principal	Total outgo	o/s Loan at the end of the yr.	Balance left
1	0	14	14	-3.20	1.68	0	1.68	14	-4.88
2	14		14	48.54	1.68	2	3.68	12	44.86
3	12		12	56.52	1.44	2	3.44	10	53.08
4	10		10	64.50	1.20	2	3.20	8	61.30
5	8		8	64.43	0.96	2	2.96	6	61.47
6	6		6	64.36	0.72	2	2.72	4	61.64
7	4		4	64.29	0.48	2	2.48	2	61.81
8	2		2	64.23	0.24	2	2.24	0	61.99

13.20. Assets' Depreciation

Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year
Civil works	2.00	1.90	1.81	1.72	1.63	1.55	1.48	1.41
Depreciation	0.10	0.09	0.09	0.09	0.08	0.07	0.07	0.07
Depreciated value	1.90	1.81	1.72	1.63	1.55	1.48	1.41	1.34
Plant & Machinery	20.00	18.00	16.20	14.58	13.12	11.81	10.63	9.57
Depreciation	2.00	1.80	1.62	1.46	1.31	1.18	1.06	0.96
Depreciated value	18.00	16.20	14.58	13.12	11.81	10.63	9.57	8.61
Other Fixed Assets	1.00	0.85	0.72	0.61	0.52	0.44	0.37	0.32
Depreciation	0.15	0.13	0.11	0.09	0.08	0.07	0.05	0.05
Depreciated value	0.85	0.72	0.61	0.52	0.44	0.37	0.32	0.27
All Assets	23.00	20.75	18.73	16.91	15.27	13.80	12.48	11.30
Depreciation	2.25	2.02	1.82	1.64	1.47	1.32	1.18	1.08
Depreciated value	20.75	18.73	16.91	15.27	13.8	12.48	11.3	10.22

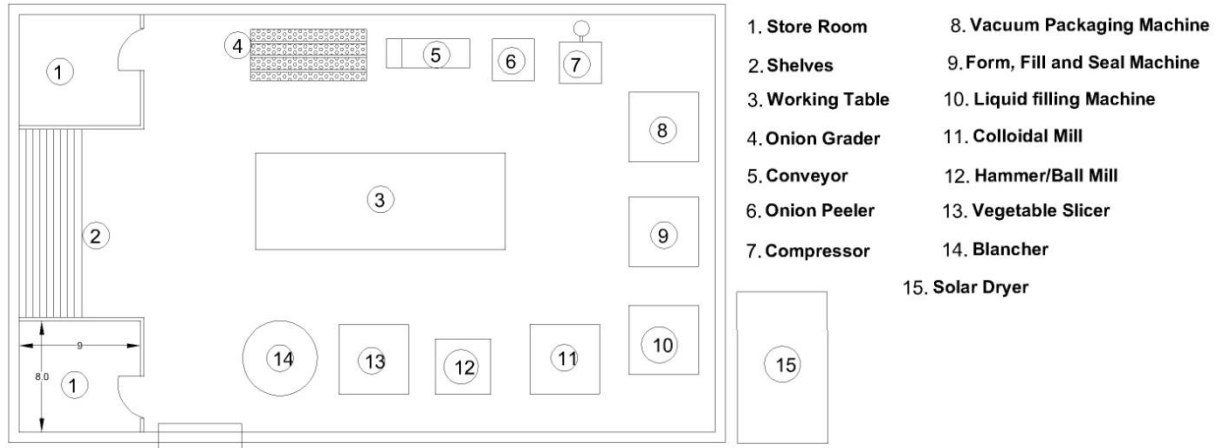
3.21. Financial Assessment of the Project

Sl.	Particulars	1 st Yr	2 nd Yr	3 rd Yr	4 th Yr	5 th Yr	6 th Yr	7 th Yr	8 th Yr	
i.	Capital cost (Rs. in Lakh)	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ii.	Recurring cost (Rs. in Lakh)	3.20	47.54	52.85	58.15	58.15	58.15	58.15	58.15	
iii.	Total cost (Rs. in Lakh)	33.20	47.54	52.85	58.15	58.15	58.15	58.15	58.15	424.34
iv.	Benefit (Rs. in Lakh)	0	107.73	123.12	138.51	138.51	138.51	138.51	138.51	
v.	Total Depreciated value of all assets (Rs. in Lakh)								10.22	
vi.	Total benefits (Rs. in Lakh)	0	107.73	123.12	138.51	138.51	138.51	138.51	148.73	933.62
	Benefit-Cost Ratio (BCR): 2.20 (Highly Profitable project)									
	Net Present Worth (NPW): 509.28									

Break Even analysis indicates costs-volume-profit relations in the short run. This is the level at which, the firm is in no loss no profit situation.

Sl.	Particulars	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year
	Capacity utilization	Under const. (0%)	105 MT (70 %)	120 MT (80 %)	135 MT (90 %)	135 MT (90 %)	135 MT (90 %)	135 MT (90 %)	135 MT (90 %)
A	Fixed Cost (Rs. in Lakh)								
	Permanent staff salaries	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80
	Depreciation on building @ 5% per annum	0.10	0.09	0.09	0.09	0.08	0.07	0.07	0.07
	Depreciation on machinery @ 10% per annum	2.00	1.80	1.62	1.46	1.31	1.18	1.06	0.96
	Depreciation on other fixed assets @ 15% per annum	0.15	0.13	0.11	0.09	0.08	0.07	0.05	0.05
	Interest on term loan	1.68	1.68	1.44	1.20	0.96	0.72	0.48	0.24
	Insurance	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
	Total Fixed Cost (Rs. in Lakh)	9.03	8.8	8.36	7.94	7.53	7.14	6.76	6.42
B	Sales Revenue (Rs. in Lakh)	0	107.73	123.12	138.51	138.51	138.51	138.51	138.51
C	Variable Cost (Rs. in Lakh)								
	Raw onion (Av. Price @ Rs. 30/Kg)	0.00	31.50	36.00	40.50	40.50	40.50	40.50	40.50
	Packaging materials @ Rs. 3/Package	0.00	0.94	1.08	1.21	1.21	1.21	1.21	1.21
	Casual staff salaries	0.00	3.30	3.30	3.30	3.30	3.30	3.30	3.30
	Utilities (Electricity, Fuel)	0.00	4.20	4.80	5.40	5.40	5.40	5.40	5.40
	Repair & maintenance	0.00	0.50	0.57	0.64	0.64	0.64	0.64	0.64
	Miscellaneous expenses	0.50	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	Interest on working capital @ 12%	0.00	1.81	2.06	2.32	2.32	2.32	2.32	2.32
	Total Variable Cost (Rs. in Lakh)	0.50	44.25	49.81	55.37	55.37	55.37	55.37	55.37
D	Break Even Point (BEP) as % of sale	-	14.00	11.00	10.00	09.00	09.00	08.00	08.00
	Break Even Point (BEP) in terms of sales value (Rs. in Lakhs)	-	15.08	13.54	13.85	12.47	12.47	11.08	11.08

3.22. Plant Layout



3.23. Machinery Suppliers

The entrepreneur must provide tentative supplier list and quotations with respect to his project. However, there are many machinery suppliers available within India for onion processing machineries and equipments. Some of the suppliers are:

- i. SS Engineers and Consultants, Rajamundry, Andhra Pradesh
- ii. Nexgen Drying Systems Private Limited, Pune, Maharashtra
- iii. APS Industries, Ahmedabad, Gujarat
- iv. Sri Krishna Industries, Trissur, Kerala
- v. Sivan Industrial engineering, Erode, Tamil Nadu
- vi. Laxhmi Engineering Products, Coimbatore, tamil Nadi
- vii. Proveg Engineering & Food Processing Pvt. Ltd. Pune, Maharashtra

4. Limitations of the Model DPR and Guidelines for Entrepreneurs

4.1. Limitations of the Model DPR

i. This model DPR has provided only the basic standard components and methodology to be adopted by an entrepreneur while submitting a proposal under the Formalization of Micro Food Processing Enterprises Scheme of MoFPI.

ii. This is a model DPR made to provide general methodological structure not for specific entrepreneur/crops/location. Therefore, information on the entrepreneur, forms and structure (proprietorship/partnership/cooperative/ FPC/joint stock company) of business, background of proposed project, location, raw material base/contract sourcing, entrepreneur's own SWOT analysis, market research, rationale of the project for specific location, community advantage/benefit, employment generation etc are not given in detail.

iii. The present DPR is based on certain assumptions on cost, prices, interest, capacity utilization, output recovery rate and so on. However, these assumptions in reality may vary across places, markets and situations; thus the resultant calculations will also change accordingly.

iv. This particular DPR is made on three components of means of finance i.e. grant, owner's contribution and loan/debt as followed in many central sector schemes.

4.2. Guidelines for the Entrepreneurs

i. The success of any prospective food processing project depends on how closer the assumptions made in the initial stage are with the reality of the targeted market/place/situation. Therefore, the entrepreneurs must do its homework as realistic as possible on the assumed parameters.

ii. This model DPR must be made more comprehensive by the entrepreneur by including information on the entrepreneur, forms and structure (proprietorship/partnership/cooperative/ FPC/joint stock company) of entrepreneur's business, project location, raw material

base/contract sourcing, entrepreneurs own SWOT analysis, detailed market research, comprehensive product mix based on demand, rationale of the project for specific location, community advantage/benefit from the project, employment generation, production/availability of the raw materials/crops in the targeted area/clusters and many more relevant aspects for acceptance and approval of the competent authority.

iii. The entrepreneur must be efficient in managing the strategic, financial, operational, material and marketing aspects of a business. In spite of the assumed parameter being closely realistic, a project may become unsustainable if the entrepreneur does not possess the required efficiency in managing different aspects of the business and respond effectively in changing situations.

iv. The machineries should be purchased after thorough market research and satisfactory demonstration.

v. The entrepreneur must ensure uninterrupted quality raw materials' supply and maintain optimum inventory levels for smooth operations management.

vi. The entrepreneur must possess a strategic look to steer the business in upward trajectory.

vii. The entrepreneur must maintain optimum (not more or less) inventory, current assets. Selecting optimum source of finance, not too high debt-equity ratio, proper capital budgeting and judicious utilization of surplus profit for expansion is must.

viii. The entrepreneur must explore prospective markets through extensive research, find innovative marketing strategy, and maintain quality, adjust product mix to demand.

ix. The entrepreneur must provide required documents on land, financial transaction, balance sheet, further project analysis as required by the competent authority for approval.

x. The entrepreneur must be hopeful and remain positive in attitude.