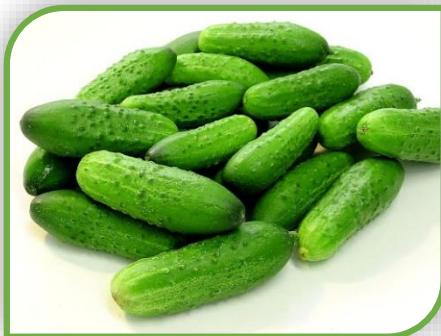




PM Formalisation of Micro Food Processing Enterprises Scheme

MODEL DETAILED PROJECT REPORT GHERKIN PROCESSING



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CHAPTER 1: THE PROJECT AT A GLANCE

1. Name of the proposed project	: Gherkin 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 Partners (if partnership)	:
7. No. of share holders (if company/FPC)	:
8. Technical advisor	:
9. Marketing advisor/partners	:
10. Proposed project capacity	: 120 MT/ annum (60,70%, 80% & 90% capacity utilization in the 2 nd , 3 rd , 4 th & 5 th years respectively)
11. Raw materials	: Gherkins
12. Major product outputs	: Processed Gherkins
13. Total Project Cost	: Rs. 32.45 Lakhs
• Land development, building & civil construction(only for expansion of existing built-up area)	: Rs 2.00 Lakhs
• Machinery and equipments	: Rs 20.00 Lakhs
• Utilities (Power & water facilities)	: Rs 2.00 Lakhs
• Miscellaneous fixed assets	: Rs 2.00 Lakhs
• Pre-operative expenses	: Rs 0.25 Lakhs
• Contingencies	: Rs 2.00 Lakhs
• Working capital margin	: Rs 4.06 Lakhs
14. Working capital requirement	
• 2 nd year	: Rs 16.25 Lakhs
• 3 rd year	: Rs 19.90 Lakhs
• 4 th year	: Rs 22.69 Lakhs
15. Means of Finance	
• Subsidy grant by MoFPI (max 10 lakhs)	: Rs 10.00 Lakhs
• Promoter's contribution (min 20%)	: Rs 7.40 Lakhs
• Term loan (42%)	: Rs 15.00 Lakhs
16. Debt-equity ratio	: 2.03:1
17. Profit after Depreciation, Interest & Tax	
• 2 nd year	: Rs 4.59 Lakhs
• 3 rd year	: Rs 14.91 Lakhs
• 4 th year	: Rs 18.81 Lakhs
18. Average DSCR	: 3.93
19. Benefit-Cost Ratio	: 1.24
20. Term loan repayment	: 5 years with 1year grace period
21. Payback period for investment	: 4 years

CHAPTER 2

General Overview of Production, Post Harvest Management and Value Addition of Gherkins in India

2.1. Introduction

Gherkin (*Cucumis anguria*) belongs to family *Cucurbitaceae* which comprises of 118 genera and 825 species. Members of this family are spread mainly in tropical and subtropical regions of the world even though they have an Asian origin. Gherkins and commercial cucumbers belong to the same species (*Cucumis*), but are from different cultivar groups. Most cucumbers are consumed in fresh forms, while gherkins have a great popularity among the world as fermented pickles. ‘Pickling’ refers to the processing by adding salt, vinegar and spices etc.

India has' today emerged as the origin of the finest gherkin cultivation, processing and exporters to the every-growing world requirement. Gherkin cultivation, processing and exports were started in India during the early 1990s with a modest beginning in Karnataka State in South India and later extended to the neighbouring states of Tamil Nadu and Andhra Pradesh. It has now reached a volume of 1.89 lakh MT of Cucumber & Gherkins, worth Rs. 1241.22 crores / 173.50 U.S. Million dollars during the year 2019-20.

Gherkins are a major dietary constituent to many European countries and the USA. Hence, almost the entire volume of gherkins produced in India is exported, with little or no domestic demand, except for some five star hotels. India exports to all major countries like USA, France, Germany, Australia, Spain, South Korea, Canada, Japan, Belgium, Russia, China, Srilanka, Israel, etc.

The export of processed gherkin is done by about 51 companies located in Karnataka, Tamilnadu and Andhra Pradesh. These companies grow gherkins in contract with small and marginal farmers, to have a better quality control.

The potential for value added products provides an extremely viable opportunity for sustainable promotion of rural as well as urban livelihoods. Processing of gherkins into value added products at small scale/ village level and selling to the markets directly/ tying up with big aggregators will help both the farmers and the consumers.

Therefore, processing of Gherkins into value added products can ensure nutritional and food security, improved profitability and also 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 Gherkins

Gherkin is a tropical cucurbitaceous climbing plant that originated in India. The word may have originated from the Swedish word 'gurka' or the German word 'gurke' both meaning 'cucumber'. Though gherkin originated in India, the first ever mention of it, in the recorded history, is related to Mesopotamia. It is believed to be the first ever pickle in recorded history, enjoyed by the people of Mesopotamia around 4500 years ago.

Gherkins were thought to be a sacred food of the Yaskxia people of Russia. Pickled gherkin is mentioned in English in the 17th century. Pickled gherkins were associated with central European and European Jewish cuisine, but are now found more widely. Virginia Gazette of 1792 carries an advertisement for sale of gherkin to the American public, thus introducing it to the Americans. It conquered the American palate so quickly that it became 'the pickle' to the American within a century. During the Second World War, 40% of all pickles manufactured in the US were allocated for the soldiers engaged in war as a delicacy they would like and remind them of their homes. Pickles would make up for the lack of appetizers and tasty side dishes that would be lacking in the makeshift kitchens on the warfront. Gherkin pickle in glass jar became a commercial product in France in the 1820s. 'Cornichon' is the French word for gherkin.

2.3. Production of Gherkins in India

Gherkin cultivation, processing and exports started in India during the early 1990s with a modest beginning in Karnataka State in South India and later extended to the neighbouring states of Tamil Nadu and Andhra Pradesh. India exported 1.90 lakh MT of Cucumber & Gherkin to the world 1,241.22 crores / 173.50 USD Millions during the year 2019-20. with major destinations being U S A, France, Russia, Spain, and Germany

Gherkins are cultivated exclusively on "contract farming" basis in India. Currently there are more than 1 lakh small and marginal farmers who are engaged in the production of gherkins.

The Indian gherkin manufacturers prescribe and support the entire gamut of activities in the cultivation practices to be followed by the farmers. This strict protocol is adhered to by the farmers to produce very high quality gherkins for the world markets. The contract farmers receive all inputs and technical support from the companies and also the farmers are assured guaranteed buy back of crop at pre-declared prices.

Table 1: Area and production of Gherkins in India

Year	Area (in '000 Hectare)	Production (In ' 000 MT)
2015-2016	71	1202
2016-2017	74	1142
2017-2018	82	1260

Source: Ministry of Agriculture and Farmers Welfare, Govt. of India, 2018

2.3.1. Production and yield of Gherkins in major states in India

Gherkin cultivation and production in India is mainly concentrated in the three southern states of Karnataka, Andhra Pradesh and Tamil Nadu. Karnataka accounts for almost 60 percent of the Gherkin production. Also, Tamil Nadu and AP each account for 20%. The climatic and soil conditions are favourable for two harvesting seasons, allowing for the distinct advantage of processing the produce for 10 months each year.

2.4. Composition and Nutritional value of Gherkins

Table 2: Composition of Gherkins (per 100 g of edible portion)

Parameters	Quantity per 100g
Energy	13(Kcal)
Moisture	96.3(g)
Protein	0.4 (g)
Fat	0.1 (g)
Ash	0.3(g)
Crude fibre	0.4(g)
Carbohydrate	2.5 (g)

Source: Nutritive value of Indian foods, NIN, 2019

Table 3: Nutritive Value of Cucumbers (per 100 g of edible portion)

Composition	Per 100 g
Minerals	
Calcium	16 mg
Iron	0.28 mg
Magnesium	13 mg
Phosphorus	24 mg
Potassium	147 mg
Sodium	2 mg
Zinc	0.20 mg
Copper	0.041 mg
Selenium	0.3 mcg
Vitamins	
Vitamin C (total ascorbic acid)	2.80 mg
Thiamine	0.027 mg
Riboflavin	0.033 mg
Beta carotene	45.00 mcg
Beta Cryptoxanthin	26.00 mcg
Lutein + Zeaxanthin	23.00 mcg
Pantothenic acid	0.259 mg
Vitamin B6	0.04 mg
Choline	6.00 mg
Folate (total)	7 mcg
Vitamin A (IU)	105.00 IU
Vitamin E (α -tocopherol)	0.03 mg

Source: USDA Nutritional Database

2.5. Health benefits of Gherkins

1. Cucumbers are comprised with unique anti-oxidants such as β -carotene and α -carotene, vitamin-C, vitamin-A, zeaxanthin and lutein in moderate ratios. These antioxidants help to protect from free radicals accumulation by scavenging them.

2. Cucumber juice is a good source of Silica which is beneficial for healthy connective tissues, ligaments, cartilages etc.
3. Cucumbers have mild diuretic property due to availability of its free-water, potassium and low sodium content. This helps in checking weight gain and high blood pressure.
4. They have a high amount of Vitamin-K. It has been found to have a potential role in bone strength by promoting osteotrophic (bone mass building) activity and used in the treatment of Alzheimer's disease patients by limiting neuronal damage in their brain
5. Cucumber improves nutritional value of a food through increased vitamin levels and improved digestibility. Cucumbers also provide folate, an essential B-vitamin that reduces stroke risk.
6. Fermentation secures safety by removing anti-nutritional factors and provides medicinal benefits while improving cultural and social well-being.
7. There are many advantages of consuming processed cucumber, much more than raw cucumbers. Pickled cucumbers have value added properties such as probiotic characteristics, nutritional enhancements and extended shelf life etc.
8. Cucurbitacins are a natural compound found in cucurbitant vegetables. There are multiple variations of cucurbitacins that work together to inhibit cancer growth, and breast cancer appears to be particularly sensitive to their effects. In addition, cucumbers contain the flavonoid fisetin, which shows antioxidant and anti-cancer behavior.
9. Cucumbers are non-starchy vegetables, one of the best categories of food for managing diabetes. The fiber and water content of fresh cucumbers makes them an ideal choice for glycemic control.
10. Cucumbers are 95% water, making them a great way to rehydrate and replace the electrolytes and water lost by the body.

2.6. Gherkin Varieties in India

High yielding gherkin hybrids are known to respond favourably to temperature, light intensity and day length. Varieties named cassata, Azax, Sparta and Vlasset are prevalent due to their marketable yield, high yield and sensory attributes.

Ajax variety is having wide adaptability, high yield in early age and suitability for all grades. Vlasset is a popular hand pick hybrid that features a blocky fruit shape and length to diameter ratio in the 2.8 range which nicely matches the needs of many hand pick green and brine stock programs. Cassata has a high number of fruits per plant and high per plant yield.

10.1. Cultivation and Harvesting of Gherkins

2.7.1 Climatic and soil requirements

The Gherkin plant is frost-sensitive and it develops physiological disorders (e.g. stunting) at a night temperature of below 5°C. The Gherkin plant germinates and grows at a minimum temperature of approximately 12°C and opens its flowers from 15°C.

Well-drained sandy loam with a pH range of 6.0 to 6.8 is optimum for Gherkin farming. Heat-absorbing, humus-rich soil with good water holding capacity and good structure is normally suited for cultivating gherkins. These contain humic loamy sand and sandy loam as well as black soil. The pH-optimum level lies in the range of pH 5.8 to 7.

2.7.2. Land preparation

Land is leveled by a tractor or bulldozer as per the requirement, soil type and gradient. Raised beds of 120 cm width at an interval of 30 cm should be done and the laterals should be placed at the centre of each bed. Before cultivation, 25 t/ha of Farm Yard Manure should be applied. The ridges and furrows should be made one metre apart.

2.7.3. Planting

A good weather should be chosen for direct sowing. Soil insecticides should be used before sowing. A Shallow sea bed (3-5 cm) should be created and kept wet. Seeds should be sown on the wet soil and covered with thin layer of soil. The soil should be irrigated again in case of drying out.

Seed rate is 800 g per hectare. The seeds should be sown at 30 cm spacing on sides of the ridges with 2 seeds per hill after treating with *Trichoderma viride* @ 4 g or *Pseudomonas* @ 10 g or carbendazim @ 2 g/kg of seeds.

After cultivation, the plants should be earthed up 25 days after sowing. Support should be provided to plants as and when vines start trailing.

2.7.4. Manuring

Fertilization is one of the main important determining factors of intensive Gherkin production. If the amount of nutrients is insufficient, yields and income will be lower, also the plants that have a weakened condition are more susceptible to diseases. If the Gherkin plants are wastefully over-fertilized, the costs will quickly increase and the income of the season

will stay below the expectations. The concentrated soil solution may cause the burning down of the capillary roots and the plant is not being able to take up the nutrients from the soil.

At three and five weeks after sowing, N - 150 kg, P - 75 kg and K - 100 kg/ha should be applied in 3 equal splits as basal fertilizer. The recommended dose of fertilizers viz., 150:75:100 Kg NPK / hectare should be fertigated on every third day after sowing.

2.7.5. Weeding & irrigation

The inter-rows can be sealed with soil-applied herbicide film and in case of torrential rain, there is the danger of illuviation. As soon as weeds have emerged hand-high and the fleece is opened, weeds in the plant sowing holes have to be pulled out by hand. Between the planting rows, hoeing can be done mechanically or a total herbicide can be applied if a spray screen is used. In the latter case, the fleece should not be closed earlier than half a day or a day later.

Irrigation has to be done once or twice per summer day. Gherkin plants evaporate a lot of moisture and lack of irrigation leads to abortion of young fruits and hollow spaces in large fruits. Drip irrigation system with main and sub-main pipes should be installed and the inline lateral tubes should be placed at an interval of 1.5m. The drippers in lateral tubes should be placed at an interval of 60 cm and 50 cm spacing with 4 and 3.5 litres per hour capacities respectively.

2.7.6. Plant protection

To control pests like leaf miner, whitefly, aphids, and thrips Dimethoate 1.5 ml/l or Monocrotophos 1.5 ml/l or Malathion 1.5 ml/l should be sprayed. To control diseases, Carbendazim 0.05 % (0.5 g/l) should be sprayed.

2.7.7. Harvesting

The crop is ready for harvest in 30 to 35 days. The price of the product is decided by the stage of maturity. Only the tender immature Gherkin fruits are highly suited for processing. Smallest fruit (stage 1) which will weigh approximately 4.0g (250 fruits per kg) will fetch the maximum price followed by stage 2 and stage 3.

To maintain the grade the harvesting of fruits must be done every day. A day's break would end up with outsized or overgrown gherkin crops means a loss to the farmer. Direct and sharp

sun and high temperature should be avoided while harvesting, hence picking should be done in the early mornings or late evenings.

The fruits must be harvested by retaining the stalk on the plant. Harvested fruits should be collected under shade. The flower head has to be removed from fruit and water sprinkling on harvested fruits should not be done at any stage. The surface moisture must be dried by proper ventilation.

2.8 Post Harvest Operations, Processing and Storage of Gherkins

2.8.1 Post harvest operations for Gherkins

After harvesting, jute bags alone have to be used and plastic bags must be avoided collection of fruits.

a. Pre-cooling

Pre-cooling is essential immediately after harvest to minimize water loss, avoid decay and reduces the physiological and metabolic activities. In pre-cooling, the temperature is quickly brought down within 2-6 hours by fast and prompts cooling. This will help to extend the shelf-life and maintain the appearance of the fruit. Hydro-cooling or forced-air cooling or drenching fruit with cold well water in bulk containers can be used for pre-cooling.

b. Sorting

Sorting is done to cull out the broken, decayed, deformed and spoiled fruits are removed from the lot. It is generally done manually. A rectangular shed with the top and three sides covered would be sufficient to function as a temporary storage facility till the fruit reaches the industry. A clean tarpaulin may be spread on the floor and the fruits spread out on it for a last inspection for disqualifying defects. Ventilation and protection from sun and rain are important.

The post harvest quality of the fruit depends fully on the proper care taken after harvesting of the crop. The removal of undesirable and unsuitable fruits at initial stage improves the appearance and quality of the product and reduces the spoilage during later stages.

c. Transportation

The harvested produce should be transported to the factory on the same day before dusk and leaving the gherkin unprocessed overnight would result in poor quality produce.

Alternatively, they can be brought to a collection center for sorting and then consolidated and delivered to the factory in the shortest duration of time.

2.8.2 Processing of Gherkins

a. Sorting

The gherkins are inspected on a conveyer belt to sort out crooked and bent vegetable, manually. To obtain a uniform product, crushed, unsound, decomposed, defective and too mature cucumbers should be removed from the lot. Flowers, stalks, damaged and infected vegetable are removed. Clean, fresh and green gherkins are taken for further processing.

b. Washing

Gherkins are washed using brush washers or drum washers to remove the surface dust and mud particles. This is followed by visual inspection wherein gherkins that have any mold infection or are bruised are discarded.

c. Grading

Grading is the sorting of gherkins by size on the basis of count per kg. Gherkins are graded by diameter & volume. Mechanical grading is preferable. The following table shows the criteria for grading and the order in which grade is given the market value.

Fruit count/ kg weight	Size of Fruit, mm	Order of grade, in terms of high value
300+	14 mm and below	1
100+	17 mm	2
60+	19 mm	3
30+	25mm	4
30 -	>25 mm	5

d. Brine preparation

The three categories of gherkins according to the media of packing are

- Gherkins 'in brine',
- Gherkins 'in natural vinegar' and

➤ Gherkins ‘in acetic acid’.

Changes to these are effected according to the specifications laid down by the buyers from time to time.

The common ingredients for the media are as follows

- Common salt (having less than 1% of impurities)
- Acetic acid or natural vinegar (to increase acidity of initial media)
- Calcium chloride (to prevent softening in fermented cucumber slices and ensures firmness& crispiness post-pasteurization)

The proportion of the ingredients vary depending on the three categories mentioned above, as required by the customers. Brine solution is prepared by dissolving the above ingredients in water. Then it is filtered to remove any impurities.

The following table shows the salinity and acidity levels that are required in the brine, for the different categories.

Product	Salt %	Vinegar %	Salinity (as % NaCl)	Acidity (as % Lactic acid)
Gherkins in brine	15	0	15±1	0.6
Gherkins in vinegar/ acetic acid	3-5	3-5	4±0.2	3.2±0.2

e. Spice mix and Gherkin filling

Glass jars with metal caps or metal cans that are to be used are checked for any faults and then properly cleaned. Spices such as Dill leaves, Onion, Garlic, chillies etc are filled in the base of the jars. Over the layer of spices, the graded gherkins are filled to the specific weight. The filling can be done manually.

Pack out ratio is the ratio of the weight fruits to the volume of brine/ media used and this should be in the range of 1.2 and can go till 2 depending on requirement and batch size.

The gherkins can be cut into long slices or dices or any fancy cuts based on customer requirements.

f. Brine filling

The jars filled with spices and the gherkins are then filled with the prepared media. Media is usually filled as a stream flowing over the bottles passing in a conveyor.

In case of fermented gherkin processing, the vats or HDPE barrels or pails are pre-filled with 20% of the required media. After that, the graded gherkins are filled into the vat/ barrels and then the balance media is added, based on the pack out ratio. The vats/ barrels are closed properly and left for fermentation for up to 1 month.

For gherkins packed in media in HDPE barrels/ pails, processes such as proper sealing, quality monitoring and curing are done. After curing is achieved, they are labelled and marketed.

In case of vat fermented gherkins, draining & washing of the fermented gherkins is done after the 4 week curing. The gherkins are washed with potable water and filled in glass jars with fresh brine and sent for capping. These jars go to capping and pasteurization.

g. Capping

The capping of the jars is done automatically by the Capping machine. If Cans are used, they are also sealed automatically. Exhausting is done following it to remove the air in the jars; a minimum 100 mbar vacuum is ensured inside the jars. This is essential for long product shelf life along with an effective pasteurization process.

h. Pasteurization

The products packed in glass jars/ cans should be pasteurized at between 80 to 85°C for 12 to 18 min in a pasteurization tunnel. The temperature of processing should be kept under strict control so that a minimum core temperature of 70°C should be obtained for the gherkin. This stage is very crucial as it is done to inhibit/eliminate the viable microbial load (pathogens) and to increase shelf life of product.

i. Cooling & Labelling

The pasteurized jars/ cans are then cooled to ambient temperature by blowing of cool air to arrest cooking. They are then labelled according to the requirements and specifications required by the customer. The jars are then packed into secondary packaging and then stored, ready for marketing.

CHAPTER 3

MODEL GHERKIN PROCESSING UNIT UNDER PM-FME SCHEME

3.1 Introduction

The Central Sector scheme for Formalization of Micro Enterprises in Food Processing sector 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 Gherkin Processing Unit is an attractive option in potential Gherkin growing states in India as Gherkin has a lot of export potential. A model generalized DPR is therefore, prepared for expansion of existing unformalized Gherkin 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 Gherkin Processing Units are in the production clusters of the major Gherkin growing states such as Karnataka, Tamil Nadu and Andhra Pradesh where adequate quantities of Gherkins will be available for processing.

3.6 Installed Capacity

The maximum installed capacity of the Gherkin Processing Unit in the present model project is proposed as 120 tonnes/ 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 60 percent capacity, 3rd year 70 percent capacity and 4th year 80 percent and 5th year onwards 90 percent capacity utilization is assumed in this model project.

3.7 Raw Material Requirements for the Unit

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 deteriorated. In the current model Gherkin processing project, the unit requires 0.13 Tonnes/ day, 0.15 Tonnes/ day, 0.18 Tonnes/ day and 0.20 Tonnes/ day of fresh Gherkins at 60, 70, 80 and 90 percent capacity utilization, respectively.

3.8 Product Profile of the Unit

In the present model Gherkin processing unit, the targeted product output is taken as Processed Gherkins (preserved or provisionally preserved).

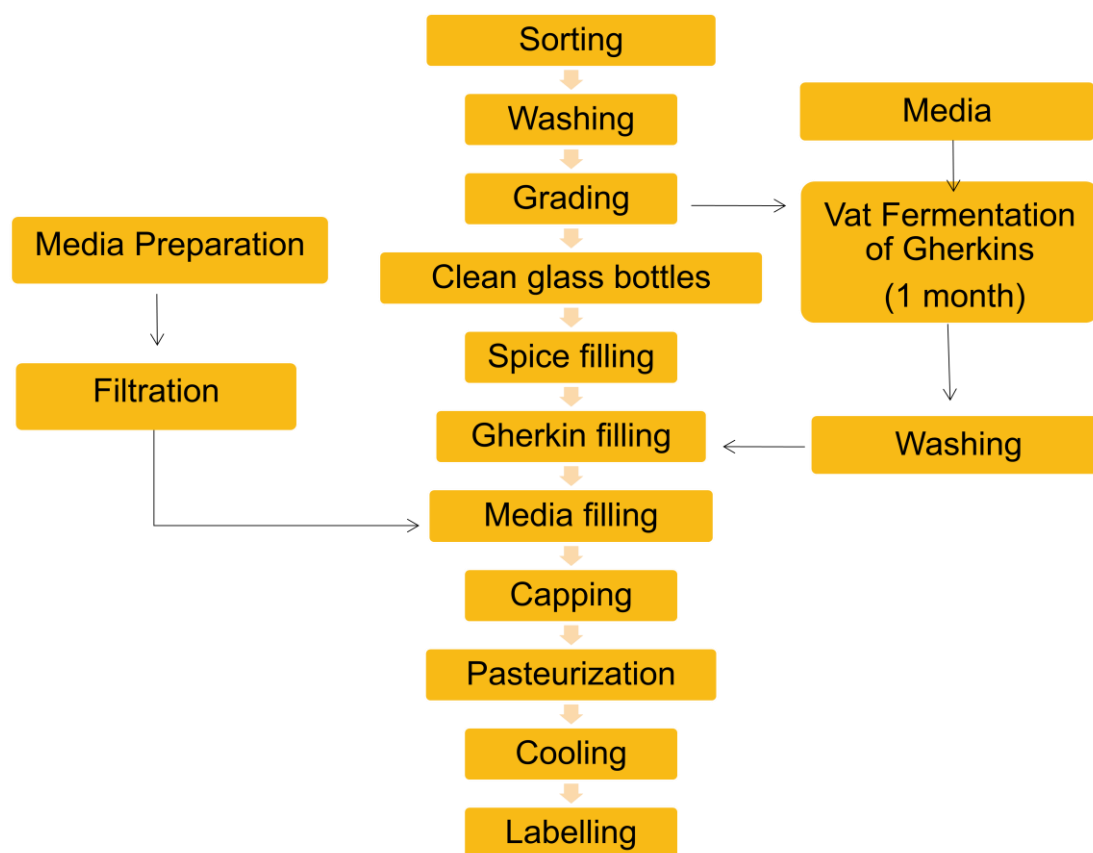
India has' today emerged as the origin of the finest gherkin cultivation, processing and exporters to the world demand. India has achieved an export volume of 1.89 lakh MT of Cucumber & Gherkins, worth Rs. 1241.22 crores / 173.50 USD Millions during the year 2019-20. Gherkins are a major dietary constituent to many European countries and the USA. Hence, almost the entire volume of gherkins produced in India is exported, with little or no domestic demand, except for some five star hotels. India exports to all major countries like USA, France, Germany, Australia, Spain, South Korea, Canada, Japan, Belgium, Russia, China, Srilanka, Israel, etc.

The export of processed gherkin is done by about 51 companies located in Karnataka, Tamilnadu and Andhra Pradesh. These companies grow gherkins in contract with small and marginal farmers, to have a better quality control.

Since the market is totally export oriented, the quality control of raw material as well as processing facilities need to be in tandem with the stringent quality standards prescribed by the importing countries.

Therefore, value addition of Gherkins has great potential in terms of maintaining the export quality standards, nutritive quality of the product, minimizing post-harvest losses, enhancing the non seasonal availability through increased shelf life and the ability increase the revenue potential for the gherkin cultivating farmers.

3.9 Manufacturing Process of Processed Gherkins



3.10 Technology Accessibility

IIFPT and its liaison offices at Guwahati and Bhatinda have all the technical knowhow on Gherkin 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

Gherkins are a major dietary constituent to many European countries and the USA. The cucumber and gherkins market is expected to grow by USD 1.07 billion by 2025. The market is expected to progress at a CAGR of 4% during this period. The growth in global online retailing will offer immense growth opportunities.

The Indian export market is now dominated by less than 100 players sharing the chunk. Gherkins are exported from India in two forms – ready to eat (in jars/ cans) and bulk (need

further processing); India is the market leader in both these categories 21.4% of total global exports of the former and a 51.9% share in the latter market.

Their exporters can also be broadly classified into the same two categories. The ready-to-eat gherkins exporters can be further categorised into two – MNCs that export only under their own brand, and others who apart from exporting under their own brand also contract manufacture for large MNC brands, retail chains and quick service restaurants (QSRs).

There is a need of heavy capital investments to develop products that suit the local taste of importing countries and to compete with established brands in different markets. To have a better control over raw material quality, contract farming is the best model.

Hence there is a huge potential to manufacture under larger brands, as the expertise of the larger brands in this side can be taken advantage of by a small producer, if he enters into processing under contract for a larger brand.

3.12 Marketing Strategy

The producer may enter into agreements for supplying to larger manufacturers who have their own brand or have a large market volume. It is safe and more sustainable to manufacture in bulk for established branded players.

The producer may also enter into agreements with local retail chains, quick service restaurants, etc, as well as e-commerce channels as the liking for western cuisine is on a rise and the local demand for gherkins will hence be boosted.

3.13 Detailed Project Assumptions

This model DPR for Gherkin 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 Gherkin processing line. Therefore, land and civil infrastructures are assumed as already available with the entrepreneur.

Table 4: Detailed Project Assumptions

Parameter	Value	
Assumed Capacity of the Gherkin processing unit :	120 MT/ annum	
Utilization of capacity :	Year 1	Implementation
	Year 2	60%
	Year 3	70%
	Year 4	80%
	Year 5 onwards	90%
Working days per year:	300 days	
Working hours per day:	8-10 hours	
Interest on term loan	12.00%	
Interest on working capital loan	12.00%	
Repayment period	Five years with one year grace period is considered.	
Average price of raw material:	Rs. 50/ kg	
Average sale price of product	Rs. 140/ kg	

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 8) as required.

Table 5: Land and Civil Infrastructures

i. Land 1000 Sq ft	Assumed land already developed and has 6000 sq ft built in area. So additional 1000 sq ft can be built in @ Rs. 200/sq ft Rs. 2,00,000
ii. Built-up processing area 6000 sq ft	
iii. Storage area 1000 sq ft	
Total	Rs. 2,00,000

3.14. B. Machinery & Equipment: Rs. 20.00 Lakhs

Table 6: Machineries & Equipments						
S.No	Description	Power required	Area reqd (Sq.ft)	Unit Price, (Rs.)	Qty	Amount (Rs. In Lakhs)
1.	Weighing scale	0.5 HP	50	100000	1	1.00
2.	Washer	5 HP	100	200000	1	2.00
3.	Grader	5 HP	100	200000	1	2.00
4.	Inspection Conveyor	2 HP	100	200000	1	2.00
5.	Overflow brine filler	5 HP	100	200000	1	2.00
6.	Exhausting cum Capping line	10 HP	50	200000	1	2.00
7.	Pasteurizer	5 HP	300	600000	1	6.00
8.	Boiler	5 HP	100	300000	1	3.00
	Total					20.00

3.14. C. Utilities and Fittings

Table 7: Utilities and Fittings	
Power	Rs. 1.20 Lakhs
Water	Rs. 0.80 Lakhs
Total	Rs. 2.00 Lakhs

3.14. D. Other Fixed Assets

Table 8: Other Fixed Assets	
Furniture and fixtures	Rs. 2.00 lakhs
Utensils, trays, thermometer, refractometer, etc	
Total	Rs. 2.00 Lakhs

3.14. E. Pre-operative Expenses

Table 9: Pre-operative Expenses	
Legal expenses, start-up expenses, establishment cost, consultancy fee, trial runs, & others	Rs. 25,000.00
Total Pre-operative Expenses	Rs. 25,000.00

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. (2.00+20.00+2.00+2.00+0.25) = **Rs. 26.25 Lakhs**

3.15. Working Capital Requirement

Table 10: Working Capital Requirement (Rs. In lakhs)				
Particulars	Period	year 2 (70% - 70 MT)	year 3 (80% - 80 MT)	year 4 (90% - 90 MT)
Raw material stock	7 days	0.64	0.74	0.85
Packing material	15 days	1.50	1.75	2.00
Work in progress	15 days	3.27	3.88	4.39
Finished goods' stock	15 days	3.14	3.85	4.37
Receivables	30 days	7.70	9.68	11.08
Total current assets		16.25	19.90	22.69
Trade creditors		0.00	0.00	0.00
Working capital gap		16.25	19.90	22.69
Margin money (25%)		4.06	4.98	5.67
Bank finance		12.19	14.92	17.02

3.16. Total Project Cost and Means of Finance

Table 11: Total Project Cost and Means of Finance (Rs. In lakhs)	
Particulars	Amount
i. Land and building	2.00
ii. Machinery and equipments	20.00
iii. Utilities & Fittings	2.00
iv. Miscellaneous Fixed assets	2.00
v. Pre-operative expenses	0.25
vi. Contingencies	2.00
vii. Working capital margin	4.06
Total project cost (i to vii) (Rounded off)	32.40
Means of finance	
i. Subsidy	10.00
ii. Promoter's contribution	7.40
iii. Term loan	15.00

3.17. Manpower Requirement

Table 12: Manpower Requirement			
Particulars	No. of persons	Monthly Wage (Rs.)	Total Monthly Salary (Rs.)
i. Manager (can be the owner)	1	20000	20000
ii. Skilled worker	2	10000	20000
iii. Semi skilled	3	7500	22500
iv. Helper	3	5000	15000
v. Salesman	1	7500	7500
Total	10		85000

Note: Only the manager and two skilled workers are permanent staffs (Salary Rs. 40000/ month). Others are causal staffs.

3.18. Expenditure, Revenue and Profitability Analysis

Table 13: Expenditure, Revenue and Profitability Analysis									
	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
A	Total Installed Capacity	120 MT/Year Processed Gherkins							
	Capacity utilization (%)	Under const. (0%)	72 MT (60%)	84 MT (70%)	96 MT (80%)	108 MT (90%)	108 MT (90%)	108 MT (90%)	108 MT (90%)
B	Expenditure (Rs. in Lakh)								
	Raw materials*	0.00	30.56	35.66	40.75	45.85	45.85	45.85	45.85
	Packaging materials @ Rs. 50/ kg	0.00	36.00	42.00	48.00	54.00	54.00	54.00	54.00
	Utilities (Electricity, Fuel)	0.00	4.40	4.87	5.34	5.82	5.82	5.82	5.82
	Salaries (1st yr only manager's salary)	2.40	7.14	7.91	8.67	9.44	9.44	9.44	9.44
	Repair & maintenance	0.00	0.69	0.69	0.69	0.69	0.69	0.69	0.69
	Insurance	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
	Miscellaneous expenses	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
	Total Expenditure	3.20	79.59	91.93	104.25	116.60	116.60	116.60	116.60
C	Total Sales Revenue (Rs. in Lakh)								
	Sale of Processed Gherkins @ Rs. 140/ kg	0.00	92.40	116.20	133.00	149.80	151.20	151.20	151.20
D	PBDIT (Total Sales Revenue-Total Expenditure) (Rs. in Lakh)	-3.20	12.81	24.27	28.75	33.20	34.60	34.60	34.60
	Depreciation on civil works @ 5% per annum	0.10	0.10	0.09	0.09	0.08	0.08	0.07	0.07

	Depreciation on machinery @ 10% p.a	2.02	1.82	1.64	1.47	1.32	1.19	1.07	0.97
	Depreciation on other fixed assets@ 15% p.a	0.91	0.77	0.65	0.56	0.47	0.40	0.34	0.29
	Interest on term loan @ 12% p.a	1.79	1.79	1.55	1.20	0.82	0.57	0.00	0.00
	Interest on working capital @ 10% p.a	0.00	1.46	1.79	2.04	2.29	2.31	2.31	2.30
E	Profit after Depreciation and Interest (Rs. in Lakh)	-8.02	6.87	18.55	23.39	28.22	30.05	30.81	30.97
F	Tax (assumed 15%) (Rs. in Lakh)	0.00	2.28	3.64	4.58	5.57	5.81	5.94	6.01
G	Profit after depreciation, Interest & Tax (Rs. in Lakh)	-8.02	4.59	14.91	18.81	22.65	24.24	24.87	24.96
H	Surplus available for repayment (PBDIT-Interest on Working Capital -Tax) (Rs. in Lakh)	-3.20	9.07	18.84	22.13	25.34	26.48	26.35	26.29
I	Coverage available (Rs. in Lakh)	-3.20	9.07	18.84	22.13	25.34	26.48	26.35	26.29
J	Total Debt Outgo (Rs. in Lakh)	1.79	4.79	4.55	4.20	3.82	3.57	-	-
K	Debt Service Coverage Ratio (DSCR)	-1.79	1.89	4.14	5.27	6.63	7.42	-	-
	Average DSCR	3.93							
L	Cash accruals (PBDIT- Interest-Tax) (Rs. in Lakh)	-4.99	8.74	19.08	22.97	26.81	28.22	28.66	28.59
M	Payback Period (on Rs. 32.50 Lakhs initial investment)	4 years							

* Raw material cost:

Gherkins: Rs 50 per kg; Brine ingredients: Rs. 30 per kg; Gherkins: Brine ratio = 55:45

3.19. Repayment Schedule

Table 14: Repayment Schedule (Rs. in Lakh)									
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	15.00	15.00	-3.20	1.79	0	1.79	15	-4.99
2	15		15	9.07	1.79	3	4.79	12	4.28
3	12		12	18.84	1.55	3	4.55	9	14.29
4	9		9	22.13	1.20	3	4.2	6	17.93
5	6		6	25.34	0.82	3	3.82	3	21.52
6	3		3	26.48	0.57	3	3.57	0	22.91

3.20. Assets' Depreciation

Table 15: Assets' Depreciation (Written Down Value Method) (Rs. in Lakh)								
Particulars	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year	8th Year
Civil works	2.02	1.92	1.82	1.73	1.64	1.56	1.48	1.41
Depreciation	0.10	0.10	0.09	0.09	0.08	0.08	0.07	0.07
Depreciated value	1.92	1.82	1.73	1.64	1.56	1.48	1.41	1.34
Plant & Machinery	20.19	18.17	16.35	14.71	13.24	11.92	10.73	9.66
Depreciation	2.02	1.82	1.64	1.47	1.32	1.19	1.07	0.97
Depreciated value	18.17	16.35	14.71	13.24	11.92	10.73	9.66	8.69
Other Fixed Assets	6.04	5.13	4.36	3.71	3.15	2.68	2.28	1.94
Depreciation	0.91	0.77	0.65	0.56	0.47	0.40	0.34	0.29
Depreciated value	5.13	4.36	3.71	3.15	2.68	2.28	1.94	1.65
All Assets	28.25	25.22	22.53	20.15	18.03	16.16	14.49	13.01
Depreciation	3.03	2.69	2.38	2.12	1.87	1.67	1.48	1.33
Depreciated value	25.22	22.53	20.15	18.03	16.16	14.49	13.01	11.68

3.21. Financial Assessment of the Project

Table 16: Benefit Cost Ratio (BCR) and Net Present Worth (NPW)										
S. No	Particulars	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	
i	Capital cost (Rs. in Lakh)	28.25	0	0	0	0	0	0	0	
ii	Recurring cost (Rs. in Lakh)	3.20	79.59	91.93	104.25	116.60	116.60	116.60	116.60	
iii	Total cost (Rs. in Lakh)	31.45	79.59	91.93	104.25	116.60	116.60	116.60	116.60	773.62
iv	Benefit (Rs. in Lakh)	0.00	92.40	116.20	133.00	149.80	151.20	151.20	151.20	
v	Total Depreciated value of all assets (Rs. in Lakh)								11.68	
vi	Total benefits (Rs. in Lakh)	0.00	92.40	116.20	133.00	149.80	151.20	151.20	162.88	956.68
Benefit-Cost Ratio (BCR): 1.24 (Profitable Project) Net Present Worth (NPW): 183.06										

3.22. Break Even Analysis of the Project

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.

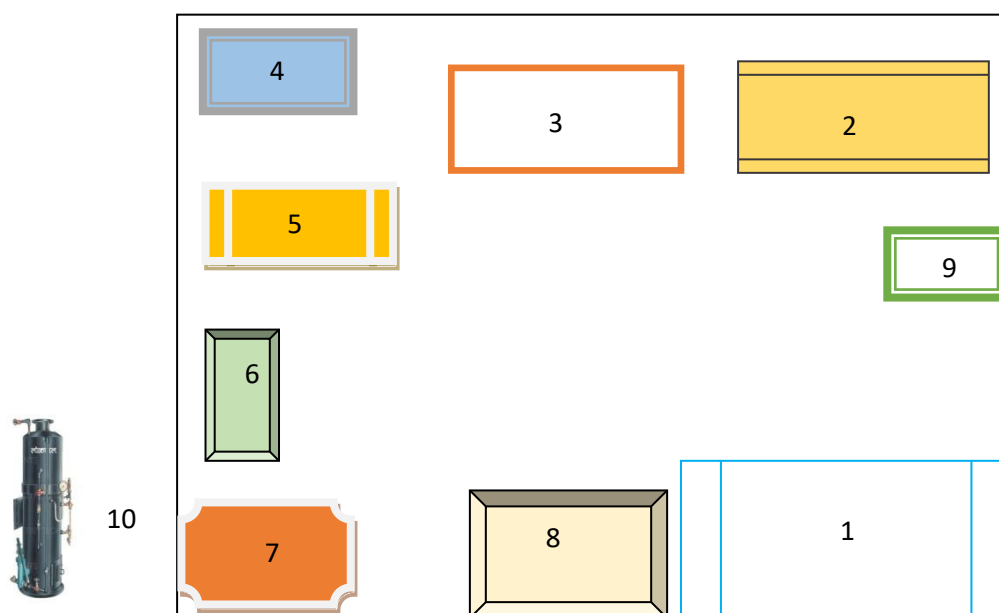
Table 17: Break-Even Analysis									
S.No	Particulars	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year
	Capacity utilization	Under const (0%)	72 MT (60%)	84 MT (70%)	96 MT (80%)	108 MT (90%)	108 MT (90%)	108 MT (90%)	108 MT (90%)
A	Fixed Cost (Rs. in Lakh)								
	Permanent staff salaries	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
	Depreciation on building @ 5% p.a	0.10	0.10	0.09	0.09	0.08	0.08	0.07	0.07
	Depreciation on machinery @ 10% p.a	2.02	1.82	1.64	1.47	1.32	1.19	1.07	0.97
	Depreciation on other fixed assets @ 15% p.a	0.91	0.77	0.65	0.56	0.47	0.40	0.34	0.29
	Interest on term loan 12% p.a	1.79	1.79	1.55	1.20	0.82	0.57	0.00	0.00
	Insurance	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	Total Fixed Cost (Rs. in Lakh)	7.67	7.33	6.78	6.17	5.54	5.09	4.33	4.18
B	Sales Revenue (Rs. in Lakh)	0.00	92.40	116.20	133.00	149.80	151.20	151.20	151.20
C	Variable Cost (Rs. in Lakh)								
	Raw materials*	0.00	30.56	35.66	40.75	45.85	45.85	45.85	45.85
	Packaging materials @ Rs.50/ Unit	0.00	36.00	42.00	48.00	54.00	54.00	54.00	54.00
	Casual staff salaries	0.00	4.59	4.59	4.59	4.59	4.59	4.59	4.59
	Utilities (Electricity, Fuel)	0.00	4.40	4.87	5.34	5.82	5.82	5.82	5.82

	Repair & maintenance	0.00	0.69	0.69	0.69	0.69	0.69	0.69	0.69
	Miscellaneous expenses	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Interest on working capital	0.00	1.46	1.79	2.04	2.29	2.31	2.31	2.30
	Total Variable Cost (Rs. in Lakh)	0.50	78.20	90.10	101.91	113.74	113.76	113.76	113.75
D	Break Even Point (BEP) as % of sale	0.00	51.62%	25.98%	19.85%	15.36%	13.60%	11.57%	11.16%
	Break Even Point (BEP) in terms of sales value (Rs. in Lakhs)		47.70	30.19	26.39	23.01	20.56	17.49	16.88

* Raw material cost:

Gherkins: Rs 50 per kg; Brine ingredients: Rs. 30 per kg; Gherkins: Brine ratio = 55:45

3.23 Plant Layout



- | | |
|-----------------------|-----------------------------|
| 1 Storage | 6 Exhausting & Capping Line |
| 2 Grader | 7 Pasteurizer |
| 3 Inspection conveyor | 8 Bulk filling area |
| 4 Washer | 9 Weighing scale |
| 5 Filling table | 10 Boiler |

3.24. 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 Gherkin processing machineries and equipments. Some of the suppliers are:

1. Sujay Industries

Shed No. A267, 6th Main, 2nd Stage, Peenya Industrial Estate, Bangalore – 560058

Karnataka, India

Jayaram : 9845195720; Sudhir : 9845201201

Tel: +91.08028362210 / 11; email : info@sujayindustries.com

2. Accelor Food Tech Private Limited,

No. 22, RVL Nagar, Uppilipalayam, Neelikonampalayam, Coimbatore - 641015,

Tamil Nadu, India. Contact Number: Balaji: 08048724337

3. Laxmi Enterprises

Shop No. 11, Vishwa Kumud Apartment, 525, Narayan Peth, Near Modi Ganpati, Pune-411030, Maharashtra, India

Ph: 08048580537

4. Shiva Engineers

T Block, Plot No. S 33, Bhosari MIDC, Pune - 411026, Maharashtra, India

5. Spursh Udyog

5th Avenue, Block D1/D2, 3rd Floor, Dhole Patil Road, Aundh, Pune - 411001, Maharashtra, India

6. SLV Engineering,

Sy No 96, Koraluru Village, Thirumalasettyhalli, Bangalore – 560067

Factory Landline No: 080 28549066

7. Packolabel Systems Private Limited G-65, Sec-63, 201301, Noida, Uttar Pradesh, India

Ph. +91 9811157589

8. SS Engineers & Consultants

11-49, Morampudi Junction, Pidimgoyya Panchayati, Rajahmundry - 533107, East Godavari, Andhra Pradesh, India

Ph: 08042958925

9. Shivosu Canadian Clear International Limited (Chennai)

No.6B Parivakkam Road, Leelavathi Nagar, Cheneerkuppam, Parivakkam,

Chennai-600056, Tamil Nadu, India

10. Specific Conveyors

Plot No. 28 & 38, Sy No. 160 to 163, Cherlapalli, Hyderabad - 500051,

Telangana, India Ph: 08048573750

CHAPTER 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.



Contact Us

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