



Model Detailed Project Report

ICE CREAM PROCESSING UNIT

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



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1. The Project at a Glance

1. Name of the proposed project	:	Ice Cream 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	:	135 Thousand litre/annum (70, 80 & 90% capacity utilization in the 2 nd , 3 rd and 4 th years' onwards respectively)
11. Raw materials	:	Milk, milk powder, glucose, sugar, fat, stabilizer, clour, flavour
12. Major product outputs	:	Different flavoured soft ice creams in cup
13. Total project cost	:	Rs. 40 Lakhs
• Land development, building & civil construction	:	Rs. 2.00 Lakhs (only for expansion of existing built-up area)
• Machinery and equipments	:	Rs. 26.25 Lakhs
• Utilities (Power & water facilities)	:	Rs. 2.00 Lakhs
• Miscellaneous fixed assets	:	Rs. 1 Lakh
• Pre-operative expenses	:	Rs. 0.24 Lakhs
• Contingencies	:	Rs. 1.00 Lakhs
• Working capital margin	:	Rs. 7.51Lakhs
14. Working capital requirement		
• 2 nd year		Rs. 22.53 Lakhs
• 3 rd year		Rs. 25.76 Lakhs
• 4 th year		Rs. 28.97 Lakhs
15. Means of Finance		
• Subsidy grant by MoFPI (max 10 lakhs)	:	Rs. 10.00 Lakhs
• Promoter's contribution (min 22.50%)	:	Rs. 9.00 Lakhs
• Term loan (52.50 %)	:	Rs. 21.00 Lakhs
16. Debt-equity ratio	:	2.33:1
17. Profit after Depreciation, Interest & Tax		
• 2 nd year	:	Rs. 59.46 Lakhs
• 3 rd year	:	Rs. 70.22 Lakhs
• 4 th year	:	Rs. 81.04 Lakhs
18. Average DSCR	:	16.26
19. Benefit-Cost Ratio	:	1.97
20. Term loan repayment	:	7 Years with 1 year grace period
21. Payback period for investment	:	2 Years

2. General Overview of Ice Cream Production, Processing and Value Addition in India

2.1. Introduction

Ice cream is the frozen food mostly consumed as a dessert. Ice cream is made with the use of cream and milk or fruits and flavoring agents. Sugar or artificial sweeteners are used to sweeten ice cream. Colorings, flavorings and stabilizers are also used. The mixture is whisked to combine air spaces and cooled down to the water's freezing point in order to prevent formation of detectable ice crystals. It forms semi-solid and smooth foam which becomes solid in low temperatures. It is consumed with spoons or placed in cones. It is also used to make the desserts such as sundaes, ice cream floats, baked items and milk shakes.

As the world population grows, urbanization rates rises and global economies improve, the demand for indulgence products like ice cream and frozen desserts have been steady and the forecasts are promising. Ice creams are unique frozen food because they are consumed in the frozen state, usually as a scooped product or as a single serving item, sometimes on a stick and often with other confectionery items. These products rely on a concomitant freezing and whipping process to establish the desired structure and texture. The manufacturing process for most of these products is similar. It involves the preparation of a liquid mix, which is prepared by blending the desired ingredients, followed by pasteurization, homogenization and aging. It is followed by whipping and freezing the mix dynamically under high shear to soft, semifrozen slurry. The flavouring ingredients are then incorporated in this partially frozen mix. It is then placed in moulds for desired shaping and packaging the product. It is further subject to freezing (hardening) under static, quiescent conditions. Swept-surface freezers are used for the first freezing step, while forced convection freezers, such as air blast tunnels or rooms, or platetype conduction freezers are used for the second freezing step. A wide variety of ingredients are used to produce ice creams. Even any one kind of ice cream can be made by combining the ingredients in any of several different combinations of ingredients. Ice cream mix is the unfrozen mixture of the ingredients, consisting of all the components of ice cream with the exception of air and flavouring materials. The composition of ice cream is usually expressed as a percentage

of its constituents, for example, percentage of milk fat, milk solids-not-fat, sugar, egg solids, stabilizers, and the total solids.

Therefore, processing of Ice Cream especially offers huge scope for entrepreneurship development at micro or small scale level through government schemes such as PM-Formalization of Micro Food Processing Enterprises Scheme of MoFPI, Government of India.

2.2. Ice Cream Varieties

Different types of Ice cream categorized according to their shapes, size and ingredient are:

A. Hard Ice Cream

It is made with cream, sugar, milk and eggs. It contains the flavoring ingredients such as chocolate, vanilla and fruit.

B. French Ice Cream

It is made with a base of custard that contains cream, milk, egg yolks, flavorings, sugar and stabilizers.

C. Soft Ice Cream

It is made with milk, sugar, cream, stabilizers and flavorings. It is stored as liquid ice cream mix which is served in a cone or bowl.

D. Light Ice Cream

It is formed with the use of milk ingredients, stabilizers, sugar and flavorings which have 25% low milk fat in comparison to hard ice cream.

E. Reduced Fat Ice Cream

It is made with low fat milk ingredients, stabilizers, sugar and flavorings. The fat content differs.

F. Fat-free Frozen Dairy Dessert

It is formed with ingredients of modified milk, natural sweeteners as well as stabilizers. It has 0.1% fat in a serving.

G. No Sugar Added Ice Cream or Frozen Dairy Dessert

It is made with stabilizers and milk ingredients. It has low amount of fat in comparison to other ice cream.

H. Lactose-free Ice Cream

It is made with added lactase enzyme and has no detectable lactose.

I. Gluten-Free Ice Cream

It is great for the people who are sensitive to gluten.

J. Organic Ice Cream

It is made with organic milk and various ingredients.

K. Italian-style Gelato

It is made with more amount of milk in comparison to cream, sugar, egg yolks, sweeteners and flavorings. It has got intense flavour.

2.3. Nutritional Value of Ice Cream

The nutritional profile of ice cream varies depending on brand, flavor, and type.

Table 1: Nutritional value of 4 common varieties of vanilla soft ice cream per 100 gram

	Regular	Premium	Low-fat	No added sugar
Calories	140	210	130	115
Total fat	7 grams	13 grams	2.5 grams	5 grams
Cholesterol	30 mg	70 mg	10 mg	18 mg
Protein	2 grams	3 grams	3 grams	3 grams
Total carbs	17 grams	20 grams	17 grams	15 grams
Sugar	14 grams	19 grams	13 grams	4 grams

In a serving size of 100 grams of other than vanilla, we could find

- 137 calories
- 40.26 grams of moisture
- 2.31 grams of protein
- 7.26 grams of fat
- 0.59 grams of ash
- 15.58 grams of carbohydrate
- 0.5 grams of dietary fibre
- 14.01 grams of total sugars
- 33.33% of Vitamin D
- 20.74% total lipid fat
- 12.15% of vitamin B2
- 11.98% of carbohydrate
- 11.33% of Vitamin C
- 11.14% of Vitamin A
- 10.83% of Vitamin B12
- 9.86% of phosphorus
- 8.40% of calcium
- 7.72% of Isoleucine
- 7.66% of Vitamin B5
- 6.82% of tryptophan
- 6.77% of valine
- 5.65% of leucine
- 5.45% of threonine
- 5.08% of lysine

2.4. Processing and Value Addition of Ice Cream

Processing

Ice cream mix comprises milk fat, milk solids-not-fat (MSNF), sweeteners, stabilizers, colours, emulsifiers, and water. Dairy and other ingredients used to supply these components are chosen on the basis of their cost, availability, and quality of the finished product. The source of fat that is derived from milk ingredients (e.g., cream and butter) is common and many other parts of the world, while fat derived from non-dairy sources (e.g., coconut oil and palm kernel oil) is more common in parts of Europe and Asia. The triglycerides in milk fat have a wide melting range of 40 to 40 C. Consequently, at refrigeration temperatures, there is always a combination of liquid and crystalline fat within the globules. The resulting solid–liquid ratio at freezer barrel temperatures is important for formation of ice cream structure, as crystalline fat is required for partial coalescence. Non-dairy fat sources must also be chosen to provide a suitable solid fat content.

Value addition in Ice Cream

Innovate with Ingredients

In a global data survey, 85% of respondents in India said that they often/sometimes try new or different varieties when purchasing ice cream products. While classic and fruity flavours continue to hold their appeal, consumers are also curious to experiment with new tastes. In India, youth less than 26 years old account for 53% of the population, making them the key demographic for the ice cream and frozen dessert sector. This appetite for diversity is leading a trend in the use of novel and unusual ingredients such as hot sauces, salted caramel, cheddar cheese, and rosemary.

2.5. Health Concerns of Consumers

Although, the Indian population seeks out indulgences, more consumers are becoming aware of the high fat and high sugar content of ice cream. In India, the standard fat content in ice cream has decreased to as low as 5%. Sugar content in desserts is generally quite high throughout India, and consumers enjoy their sweet flavours but it will not be long enough when low sugar content will also become an important parameter in ice creams.

3. Model Ice Cream Processing Unit under PM-FME Scheme

3.1. Introduction

The ice-cream/frozen desserts category has witnessed substantial evolution in the recent past. Up to a decade ago, the category was largely limited to ice-creams with traditional flavors, e.g. vanilla, chocolate and strawberry, along with some other variants like kesarpista, mango, elaichi etc. During the past decade, the category has grown, with an array of innovations in ice-creams and new subcategories like frozen yoghurt coming up.

Although the per capita ice-cream consumption is lower in comparison to other major markets, it is however an evolving one, growing at a CAGR of 10-15%. This growth will give momentum to ice-cream consumption, especially in the branded and new/innovative categories. With the growing consumer base, increasing disposable income, and greater trend toward eating-out, the market stands poised to incorporate bigger players and more innovative concepts.

The central sector scheme PM- Formalization of Micro Food Processing Enterprises under Ministry of Food Processing Industries is an important scheme useful 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. A detailed account of the model Ice Cream processing 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 PM-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 locations for establishment of Ice Cream processing unit can be anywhere in the cities across India as Ice Cream consumption is gaining momentum across India; however, raw materials must be available for processing.***

3.6. Installed Capacity of the Ice Cream Processing Unit

The maximum installed capacity of the ice cream processing unit in the present model project is proposed as 135 Thousand Litre/annum final ice cream output or 450 Litre/day final ice cream output. 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 (94.5 Thousand litre Ice cream output), 3rd year 80 percent capacity (108 Thousand litre Ice cream output) and 4th year onwards 90 percent capacity utilization (405 Thousand litre Ice cream output) is assumed in this model project. The unit is assumed to run 8-10 hrs per day to complete all operations for 2 batches of Ice cream/day except aging operation. The unit is assumed to run 2 batches per day of ice cream.

3.7. Raw Material Requirements for the Unit

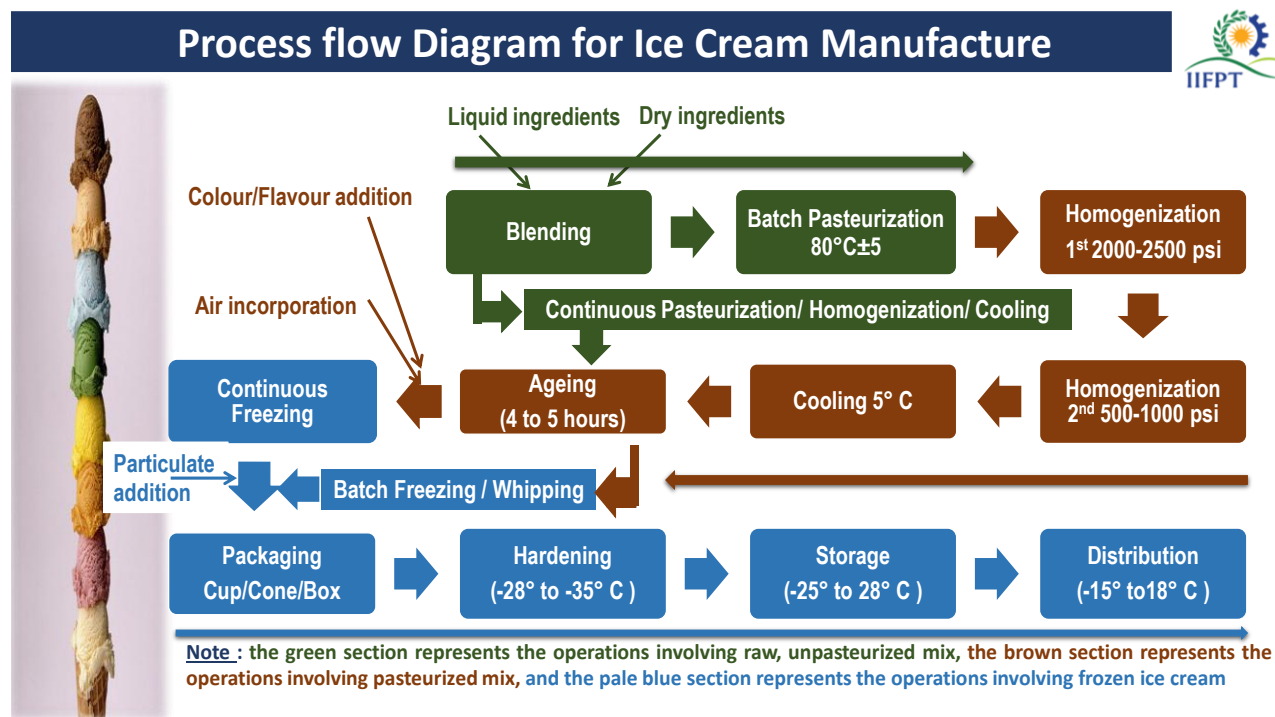
Table 2: Commercial Ingredients for Ice Cream				
Items	Basic Composition	70% Capacity (for 2 batches/day)	80% Capacity (for 2 batches/day)	90% Capacity (for 2 batches/day)
i. Dairy Milk	0.56 Litre	86.56 Lt	98.92 Lt	111.29 Lt
ii. Milk Powder	0.08 Kg	12.59 Kg	14.39 Kg	16.19 Kg
iii.. Liquid Glucose	0.05 Litre	7.87 Lt	8.99 Lt	10.12 Lt
iv. Fat	0.08 Kg	12.59 Kg	14.39 Kg	16.19 Kg
v. Sugar	0.22 Kg	34.62 Kg	39.57 Kg	44.52 Kg
vi. Stabilizer	0.01 Kg	0.94 Kg	1.08 Kg	1.21 Kg
Total Liquid Ice Cream Mix/Raw Material	1.00 Litre	155.17 Litre	177.34 Litre	199.51 Litre
Total Ice Cream Output	2.03 Litre	315.00 Litre	360.00 Litre	405.00 Litre

A sustainable food processing unit must ensure maximum capacity utilization and thus requires an operation of minimum 300 days per year to get reasonable profit. Therefore, ensuring uninterrupted raw materials supply requires maintenance of adequate raw material inventory. In the current model Ice Cream processing unit, the unit requires 155.17 litre ice cream mix/day, 177.34 litre ice cream mix/day and 199.51 litre ice cream mix/day at 70, 80 and 90 percent capacity utilization, respectively.

3.8. Product Profile of the Unit

In the present model Ice Cream processing unit, the targeted product output is different types of flavoured soft Ice Creams to be served in cup or cone.

3.9. Manufacturing Process of Ice Cream:



Equipment's required (Capacity: 100 ltr/Batch, 2 batch/day, 8 hr/batch)

The basic steps in the manufacturing of Ice Cream are blending of the mix ingredients, pasteurization, homogenization, aging, freezing, packaging and hardening

1. Blending of the mix ingredients

First the ingredients are selected based on the desired formulation and the calculation of the recipe from the formulation and the ingredients chosen, then the ingredients are weighed and

blended together to produce what is known as the "ice cream mix". Blending requires rapid agitation to incorporate powders, and often high speed blenders are used.

2. Pasteurization of the mix

The mix is then **pasteurized** at 69° C for 30 min. or 80° C for 25 sec. For that the product is heated in the vat to at least 69° and held for 30 minutes for pasteurization, necessary for the destruction of pathogenic bacteria. The heat treatment must be severe enough to ensure destruction of pathogens and to reduce the bacterial count to a maximum of 100,000 per gram.

3. Homogenization of the mix

Homogenization of the mix should take place at the pasteurizing temperature. The high temperature produces more efficient breaking up of the fat globules at any given pressure and also reduces fat clumping and the tendency to thick, heavy bodied mixes. No one pressure can be recommended that will give satisfactory results under all conditions. The higher the fat and total solids in the mix, the lower the pressure should be. If a two stage homogenizer is used, a pressure of 2000 - 2500 psi on the first stage and 500 - 1000 psi on the second stage should be satisfactory under most conditions. Two stage homogenization is usually preferred for ice cream mix.

4. Ageing of the mix

The mix is then **aged** for at least four hours and usually overnight. Aging is performed in insulated or refrigerated storage tanks. Mix temperature should be maintained as low as possible without freezing, at or below 5° C. An aging time of overnight is likely to give best results under average plant conditions.

5. Freezing/Whipping of Ice Cream

Following mix processing, the mix is drawn into a flavour tank where any liquid flavours, fruit purees, or colours are added. The mix then enters **the dynamic freezing process which**

both freezes a portion of the water and whips air into the frozen mix. The "barrel" freezer is a scraped-surface, tubular heat exchanger, which is jacketed with a boiling refrigerant such as ammonia or freon. Mix is pumped through this freezer and is drawn off the other end in a matter of 30 seconds, (or 10 to 15 minutes in the case of batch freezers) with about 50% of its water frozen. There are rotating blades inside the barrel that keep the ice scraped off the surface of the freezer and also dashers inside the machine which help to whip the mix and incorporate air.

6. Packaging and Hardening

After the particulates have been added, the ice cream is packaged and is placed into a blast freezer at -30° to -40° C where most of the remainder of the water is frozen. Below about -25° C, ice cream is stable for indefinite periods without danger of ice crystal growth; however, above this temperature, ice crystal growth is possible and the rate of crystal growth is depend upon the temperature of storage. This limits the shelf life of ice cream.

Hardening involves static (still, quiescent) freezing of the packaged products in blast freezers. Freezing rate must still be rapid, so freezing techniques involve low temperature (-40°C) with either enhanced convection (freezing tunnels with forced air fans) or enhanced conduction (plate freezers).

3. 10. Technology Accessibility

IIFPT and its liaison offices at Guwahati and Bhatinda have all the technical knowhow on Ice Cream 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 for Ice Cream

The ice-cream market has been through an evolution wherein the category has grown in shape and form right from consumer perception to the products and services being offered. Ice-cream, which was considered an indulgent category in the past, has now evolved to a stage where it is largely and happily perceived as a snacking option by consumers. The demand is increasing because of increasing disposable incomes and greater discretionary spending. Also, the growing reach of the media has allowed operators in this category to expand their range and recall value. The change in the perception of consumers has allowed the category to grow in volume. The category's growth has provided impetus to international and regional players who are foraying into the industry. National operators like Amul and Mother Dairy, along with international players like Unilever, Cream Bell, Movenpick, etc. occupy the centre stage circled by many regional operators. Amul is the market leader in the ice-cream category making up an almost one-third of the market, followed by Hindustan Unilever and Mother Dairy. The growing consumer base, product acceptability, and stiffening competition has pushed operators to strive for competitive advantages through innovations with respect to product offerings and delivery of service. Specifically, the Indian market is expected to register the overall value growth of over 50 % from 2019 to 2022. Interestingly enough, the ice cream consumption per capita in India is currently very low when compared to global consumption and considering the amount of dairy India is producing for the world. The yearly ice cream consumption in India is currently 400 millilitres per capita. Meanwhile in the USA, it is 22,000 millilitres and 3,000 millilitres in China. Forecasts expect Indian consumption to catch up with China and see nearly a seven-fold increase in the market. While the global ice cream market is forecasted to record a CAGR of 4.7% by 2020, the Indian ice cream sector is expected to grow up at a CAGR of 12.4% by 2022.

3.12. Marketing Strategy for Ice Cream

The ice-cream market has been through an evolution wherein the category has grown in shape and form right from consumer perception to the products and services being offered. Ice-cream, which was considered an indulgent category in the past, has now evolved to a stage where it is largely and happily perceived as a snacking option by consumers. The demand is increasing

because of increasing disposable incomes and greater discretionary spending. Though, the Ice Cream market in India is dominated by big players such as Amul, Mother Dairy, along with international players like Unilever, Cream Bell, Movenpick etc; there is huge scope for micro and small scale players in the regional and local markets provided they maintain compliance with quality standards, and get their marketing mix right. A new or small player in Ice Cream market must adopt proper branding; use innovative promotional platforms such as different social media; reaching out to consumers with local distribution options such as hotels, restaurants, malls etc and adopting innovative marketing mix options in terms of product and price.

3.13. Detailed Project Assumptions

This model DPR for Ice Cream processing unit is basically prepared as a template based on certain assumptions (Table 3) 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 3. This DPR assumes expansion of existing unit by adding new Ice Cream line. Therefore, land and civil infrastructures are assumed as already available with the entrepreneur.

Table 3: Detailed Project Assumptions		
Parameter		Value Assumed
Capacity of the Ice Cream unit	:	135 Thousand litre/annum Ice Cream
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 sale prices	:	Rs. 25/150 ml cup

3.14. Fixed Capital Investment

3.14.A. Land & Building

The DPR is for PM-FME scheme to upgrade/formalize existing micro enterprises which already has land & built-up area. However, the built-up area can be expanded as required (Table 4).

Table 4: Land and Civil Infrastructures	
i. Land 10000Sqft	Assumed land already developed and has 5000sq m built in area. So additional 1000 sqft can be built in @ Rs. 200/sqft Rs. 2.00 Lakhs
ii. Built-up processing area 5000sqft	
iii. Storage area 1000sqft	
Total	Rs. 2.00 Lakhs

3.14.B. Machinery & Equipment: Rs. 26.25 Lakhs

Table 5: Machinery & Equipment			
S.No.	Machine Name	Capacity	Amount (Rs.)
1.	Batch pasteurizer	100 ltr	1.25
2.	Pump	½ HP 2800 rpm or 1HP/kW 2880 rpm Head	0.20
3.	High pressure homogenizer	100 LPM/LPH	1.25
	Plate heat exchanger	100 LPM	0.60
4.	Ageing vat – 2 nos	100L/hr	2.50
	Flavour tank	100 LTR	0.20
5.	Continuous freezer	100L	3.00
6.	Cup filling	1200 CPH	10.00
7.	Hardening Tunnel	4-5 mould	2.5
8.	Candy plant	4-5 mould	2.5
9.	Coco dip tank	1mould	0.25
10.	Deep freezer	500 ltr.	1.00
11.	Cooling tower, SS filtration system, accessories, mould, trays, trolleys, racks etc.	-	1.00
Total			26.25

3.14.C. Utilities and Fittings

Table 6: Utilities and Fittings	
i. Power	Rs. 2.00 Lakhs
ii. Water	

3.14.D. Other Fixed Assets

Table 7: Other Fixed Assets		
i.	Furniture and Fixtures	Rs. 1 Lakh
ii.	Plastic trays capacity	
iii.	Electrical fittings	

3.14.E. Pre-operative Expenses

Table 8: Pre-operative Expenses	
Legal expenses, start-up expenses, establishment cost, consultancy fee, trial runs, & others	Rs.24000
Total Pre-operative Expenses	Rs.24000

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+26.25+2.00+1+0.24) Lakhs= Rs.31.49 Lakhs

3.15. Working Capital Requirement

Working capital is critical input in Ice Cream unit and thus need to maintain high inventories.

Table 9: Working Capital Requirement (Rs. in Lakh)				
Particulars	Period	Year 2 (70%) 94.50 Thousand Litre	Year 3 (80%) 108 Thousand Litre	Year 4 (90%) 121.5 Thousand Litre
Raw material stock	7 days	1.42	1.62	1.82
Work in progress	15 days	3.93	4.50	5.06
Packing material	15 days	0.08	0.09	0.10
Finished goods' stock	15 days	7.87	9.00	10.12
Receivables	30 days	15.74	18.00	20.24
Working	30 days	1.00	1.14	1.28

expenses				
Total current assets		30.04	34.35	38.62
Trade creditors		0	0	0
Working capital gap		30.04	34.35	38.62
Margin money (25%)		7.51	8.59	9.66
Bank finance		22.53	25.76	28.97

3.16. Total Project Cost and Means of Finance

Table 10: Total Project Cost and Means of Finance(Rs. in Lakhs)	
Particulars	Amount
i. Land and building	2.00
ii. Plant and machinery	26.25
iii. Utilities& Fittings	2.00
iv. Other Fixed assets	1.00
v. Pre-operative expenses	0.24
vi. Contingencies	1.00
vii. Working capital margin	7.51
Total project cost (i to vii)	40.00
Means of finance	
i. Subsidy	10
ii. Promoter's contribution	9
iii. Term loan	21

3.17. Manpower Requirement

Table 11: 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 casual staffs.

3.18. Expenditure, Revenue and Profitability Analysis

Table 12: 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	135 Thousand Litre (TL)/Year Ice Cream							
	Capacity utilization (%)	Under const. (0%)	94.50 TL (70 %)	108 TL (80 %)	121.50 TL (90 %)	121.50 TL (90 %)	121.50 TL (90 %)	121.50 TL (90 %)	121.50 TL (90 %)
B	Expenditure (Rs. in Lakh)								
	1.Total Liquid Ice Cream Mix & other Raw Material	0.00	60.70	69.39	78.02	78.02	78.02	78.02	78.02
	Liquid Milk @Rs. 50/Lt	0.00	12.98	14.84	16.69	16.69	16.69	16.69	16.69
	Milk Powder @Rs. 400/Kg	0.00	15.11	17.27	19.43	19.43	19.43	19.43	19.43
	Liquid Glucose @Rs. 150/Lt	0.00	3.54	4.04	4.55	4.55	4.55	4.55	4.55
	Fat @Rs. 300/Kg	0.00	11.33	12.95	14.57	14.57	14.57	14.57	14.57
	Sugar @Rs. 40/Kg	0.00	4.15	4.75	5.34	5.34	5.34	5.34	5.34
	Stabilizer @Rs. 1500/Kg	0.00	4.23	4.86	5.44	5.44	5.44	5.44	5.44
	Clour @Rs. 2000/Lt	0.00	4.68	5.34	6.00	6.00	6.00	6.00	6.00
	Flavour @Rs. 2000/Lt	0.00	4.68	5.34	6.00	6.00	6.00	6.00	6.00
	2.Packaging materials @ Rs. 0.25/Cup	0.00	1.57	1.80	2.02	2.02	2.02	2.02	2.02
	3.Utilities (Electricity, Fuel)	0.00	4.20	4.80	5.40	5.40	5.40	5.40	5.40
	4.Salaries (1 st yr only manager's salary)	2.40	8.10	8.10	8.10	8.10	8.10	8.10	8.10
	5.Repair & maintenance	0.00	0.50	0.57	0.64	0.64	0.64	0.64	0.64
	6.Insurance	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
	7.Miscellaneous expenses	0.50	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	Total Expenditure	3.20	77.37	86.96	96.48	96.48	96.48	96.48	96.48
C	Total Sales Revenue (Rs. in Lakh)	0.00	157.50	180.00	202.50	202.50	202.50	202.50	202.50
	Sale of 150 ml Ice Cream Cup @ Rs. 25/Cup	0.00	157.50	180.00	202.50	202.50	202.50	202.50	202.50
D	PBDIT (Total exp.-Total sales rev.) (Rs. in Lakh)/Cash Inflows	-3.2	80.13	93.04	106.02	106.02	106.02	106.02	106.02
	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	2.63	2.36	2.13	1.91	1.72	1.55	1.40	0.26
	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%	2.52	2.52	2.16	1.80	1.44	1.08	0.72	0.36
	Interest on working capital @ 12%	0.00	2.70	3.09	3.48	3.48	3.48	3.48	3.48

E	Profit after depreciation and Interest (Rs. in Lakh)	-8.4	72.51	85.64	98.83	99.38	99.91	100.44	101.94
F	Tax (assumed 18%) (Rs. in Lakh)	0.00	13.05	15.42	17.79	17.89	17.98	18.08	18.35
G	Profit after depreciation, Interest & Tax (Rs. in Lakh)	-8.40	59.46	70.22	81.04	81.49	81.93	82.36	83.59
H	Surplus available for repayment (PBDIT-Interest on working capital-Tax) (Rs. in Lakh)	-3.20	64.38	74.53	84.75	84.65	84.56	84.46	84.19
I	Coverage available (Rs. in Lakh)	-3.20	64.38	74.53	84.75	84.65	84.56	84.46	84.19
J	Total Debt Outgo (Rs. in Lakh)	2.52	5.52	5.16	4.80	4.44	4.08	3.72	3.36
K	Debt Service Coverage Ratio (DSCR)	-1.27	11.66	14.44	17.66	19.07	20.73	22.70	25.06
	Average DSCR	16.26							
L	Cash accruals (PBDIT- Interest-Tax) (Rs. in Lakh)	-5.72	61.86	72.37	82.95	83.21	83.48	83.74	83.83
M	Payback Period (on Rs. 40 Lakhs initial investment)	2 Years							

3.19. Repayment Schedule

Table 13: 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	21	21	-3.20	2.52	0	2.52	21	-5.72
2	21		21	64.38	2.52	3	5.52	18	58.86
3	18		18	74.53	2.16	3	5.16	15	69.37
4	15		15	84.75	1.80	3	4.80	12	79.95
5	12		12	84.65	1.44	3	4.44	9	80.21
6	9		9	84.56	1.08	3	4.08	6	80.48
7	6		6	84.46	0.72	3	3.72	3	80.74
8	3		3	84.19	0.36	3	3.36	0	80.83

13.20. Assets' Depreciation

Table 14: Assets' Depreciation (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	2.00	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	26.25	23.63	21.26	19.14	17.22	15.50	13.95	12.56
Depreciation	2.63	2.36	2.13	1.91	1.72	1.55	1.40	1.26
Depreciated value	23.62	21.27	19.13	17.23	15.50	13.95	12.55	11.30
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	29.25	26.38	23.79	21.47	19.37	17.49	15.8	14.29
Depreciation	2.88	2.58	2.33	2.09	1.88	1.69	1.52	1.38
Depreciated value	26.37	23.8	21.46	19.38	17.49	15.8	14.28	12.91

3.21. Financial Assessment of the Project

Table 15: Benefit Cost Ratio (BCR) and Net Present Worth (NPW)										
Sl.	Particulars	1stYr	2ndYr	3rdYr	4thYr	5thYr	6thYr	7thYr	8thYr	
i.	Capital cost (Rs. in Lakh)	40.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ii.	Recurring cost (Rs. in Lakh)	3.20	77.37	86.96	96.48	96.48	96.48	96.48	96.48	
iii.	Total cost (Rs. in Lakh)	43.20	77.37	86.96	96.48	96.48	96.48	96.48	96.48	689.93
iv.	Benefit (Rs. in Lakh)	0.00	157.50	180.00	202.50	202.50	202.50	202.50	202.50	
v.	Total Depreciated value of all assets (Rs. in Lakh)								12.91	
vi.	Total benefits (Rs. in Lakh)	0.00	157.50	180.00	202.50	202.50	202.50	202.50	215.41	933.62
	Benefit-Cost Ratio (BCR): 1.97 (Highly Profitable project)									
	Net Present Worth (NPW): 672.98									

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 16: Break-Even Analysis									
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%)	94.50 TL (70 %)	108 TL (80 %)	121.50 TL (90 %)	121.50 TL (90 %)	121.50 TL (90 %)	121.50 TL (90 %)	121.50 TL (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 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	2.63	2.36	2.13	1.91	1.72	1.55	1.40	0.26
	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%	2.52	2.52	2.16	1.80	1.44	1.08	0.72	0.36
	Insurance	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
	Total Fixed Cost(Rs. in Lakh)	10.50	10.20	9.59	8.99	8.42	7.87	7.34	5.84
B	Sales Revenue(Rs. in Lakh)	0.00	157.50	180.00	202.50	202.50	202.50	202.50	202.50
C	Variable Cost(Rs. in Lakh)								
	Total Liquid Ice Cream Mix & other Raw Material	0.00	60.70	69.39	78.02	78.02	78.02	78.02	78.02
	Packaging materials @ Rs. 0.25/Cup	0.00	1.57	1.80	2.02	2.02	2.02	2.02	2.02
	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	2.70	3.09	3.48	3.48	3.48	3.48	3.48
	Total Variable Cost (Rs. in Lakh)	0.50	74.97	84.95	94.86	94.86	94.86	94.86	94.86
D	Break Even Point (BEP) as % of sale	-	12.36	10.09	8.35	7.82	7.31	6.82	5.43
	Break Even Point (BEP) in terms of sales value (Rs. in Lakhs)	-	18.90	18.00	16.20	15.80	14.78	13.77	10.94

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 Ice Cream processing machineries and equipments. Some of the suppliers are:

- Dairy Processing Equipment Fullwood Ltd., Grange Road, Ellesmere, Shropshire, SY12 9DF, UK. Website: www.fullwood.com
- Liquid Foods Engineering. NASHIK
- Rozi Engineering Works. PUNE
- Eskimo Refrigeration Industries. PUNE
- A.K. Bhavnagarwala & Co. JALGAON
- VCS India Private Limited, Ahmedabad
- Hindchef Pvt Ltd, Udyog Nagar, new Delhi
- Bhimboys Cold Foods, Chennai

Note: This is a selective list of suppliers and does not imply endorsement by IIFPT

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 PM-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.