

DETAILED PROJECT REPORT

LIME SQUASH MANUFACTURING UNIT.



INDIAN INSTITUTE OF FOOD PROCESSING TECHNOLOGY

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Project At a Glance

1	Name of the Project	Lime squash
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 shareholders (if company/FPC)	
8	Technical advisor	
9	Marketing advisor/partners	
10	Proposed project capacity	150 MT/annum (55, 65, 75,90 & 100% capacity utilization in the 2nd, 3 rd , 4 th , 5 th & 6 th years' onwards respectively
11	Raw materials	Lime fruit
12	Major product outputs	Lime squash
13	Total project cost (Lakhs)	29.55
	Land development, building & civil construction	5.18
	Machinery and equipment	16.46
	Utilities (Power & water facilities)	0.8
	Miscellaneous fixed assets	0.9
	Pre-operative expenses	0.90
	Contingencies	1.20
	Working capital margin	4.11
14	Working capital Management (In Lakhs)	
	Second Year	12.32
	Third Year	14.56
	Fourth Year	19.85
15	Means of Finance	
	Subsidy grant by MoFPI (max 10 lakhs)	9.89
	Promoter's contribution (min 20%)	7.23
	Term loan (45%)	12.40
16	Debt-equity ratio	1.71 : 1
17	Profit after Depreciation, Interest & Tax	
	2nd year	33.98
	3rd year	41.99
	4th year	49.98
18	Average DSCR	2.16
	Benefit Cost Ratio	2.13
	Term Loan Payment	7 Years with 1 year grace period
	Pay Back Period for investment	2 Years

Note: All the data/contents of this DPR are taken from the available information on IIFPT site.

1 GENERAL OVERVIEW OF LIME PRODUCTION, CLUSTERS, POST-HARVEST MANAGEMENT AND VALUE ADDITION IN INDIA

1.1 INTRODUCTION

The **lemon**, *Citrus limon*, is a species of small evergreen tree in the flowering plant family Rutaceae, native to South Asia, primarily North eastern India.

Lime (*Lime aurantifolia*) belongs to family rutaceae is the third important lime fruit crop in India next to mandarins and sweet oranges. This lime species is grown in every state of India, but the leading producer states are Andhra Pradesh, Maharashtra, Assam and Karnataka. Out of the total production, only 1 per cent lime fruits is used for processing and approximately 0.5 per cent processed products of lime are exported to the other countries. Lime is not eaten directly due to sour in taste, but can be consumed as squash. Fruits, whether fresh or dried, have always formed a part of the staple diet of human beings. The reason for this is that, they are rich in nutrients and provides some of the essential minerals and vitamins which are useful to our body. Fruit is rich in vitamin C, excellent source of calcium, phosphorus, iron. Besides, high nutritive value, it is well for its excellent medicinal properties. Limes contain unique flavonoid compounds that have antioxidant and anticancer properties, but it is a natural antiseptic and smells divine. It is a digestive stimulant and improves both digestion and appetite. Lime juice added to one meal each day helped protect people from contracting cholera, cramping. The vitamin C in lime juice boosts immune function and acts as one of the most powerful dietary antioxidants. Lime has been shown to have both medicinal and cosmetic values. Lime juice benefits are very diverse, Lime juice can be used as a flavoring food, beverages, refreshments, citric acid preservative and cleaning up the rust on the dirty metal and leather.

The tree's ellipsoidal yellow fruit is used for culinary and non-culinary purposes throughout the world, primarily for its juice, which has both culinary and cleaning

uses. The pulp and rind are also used in cooking and baking. The juice of the lemon is about 5% to 6% citric acid, with a pH of around 2.2, giving it a sour taste. The distinctive sour taste of lemon juice makes it a key ingredient in drinks and foods such as lemonade and lemon meringue pie.

1.2 ORIGIN, DISTRIBUTION AND PRODUCTION OF LIME

The origin of the lemon is unknown, though lemons are thought to have first grown in Assam (a region in northeast India), northern Burma or China. A genomic study of the lemon indicated it was a hybrid between bitter orange (sour orange) and citron.

Lemons entered Europe near southern Italy no later than the second century AD, during the time of Ancient Rome. However, they were not widely cultivated. They were later introduced to Persia and then to Iraq and Egypt around 700 AD. The lemon was first recorded in literature in a 10th-century Arabic treatise on farming, and was also used as an ornamental plant in early Islamic gardens. It was distributed widely throughout the Arab world and the Mediterranean region between 1000 and 1150. An article on Lemon and lime tree cultivation in Andalusia of Spain is brought down in Ibn al-'Awwam's 12th-century agricultural work, *Book on Agriculture*.

The first substantial cultivation of lemons in Europe began in Genoa in the middle of the 15th century. The lemon was later introduced to the Americas in 1493 when Christopher Columbus brought lemon seeds to Hispaniola on his voyages. Spanish conquest throughout the New World helped spread lemon seeds. It was mainly used as an ornamental plant and for medicine. In the 19th century, lemons were increasingly planted in Florida and California.

In 1747, James Lind's experiments on seamen suffering from scurvy involved adding lemon juice to their diets, though vitamin C was not yet known as an important dietary ingredient. The origin of the word *lemon* may be Middle Eastern. The word draws from the Old French *limon*, then Italian *limone*, from the

Arabic *laymūn* or *līmūn*, and from the Persian *līmūn*, a generic term for citrus fruit, which is a cognate of Sanskrit (*nimbū*, “lime”).

In 2018, world production of lemons (combined with limes for reporting) was 19.4 million tonnes. The top producers – India, Mexico, China, Argentina, Brazil, and Turkey – collectively accounted for 65% of global production.

India is the leading producer of Lime globally. The major regions producing almost 80% of limes in India are Gujarat, Madhya Pradesh, Andhra Pradesh, Karnataka, and Odisha. The production of lime in India is continuously increasing due to the growing demand of foods that include lime as an ingredient (including squash, juice, jams, bakery, and confectionery) in India. The growing demand for limes due to health benefits will drive the market during the forecast period.

Lime is used as an ingredient in the production of pectin, citric acid, lime oil, lime juice and many other products. This growing market creates a steady demand for these products throughout the year. Pectin and citric acid are two products that have witnessed a continuous demand during last few decades. India consumes the maximum portion of lime in the Asia-Pacific region.

1.3 VARIETIES

There are different varieties of Lime growing nationwide. Varieties of Lime growing nationwide are described below.

Punjab Baramasi: Shoots dropping are usually ground touching. Lemon has yellow fruits, round shaped with tapering base. Seedless fruits and are juicy in nature. The average fruit yield is 84 kg per tree.

Eureka: Semi-vigorous tree. Lemon-yellow skin color, juice is strongly acidic having excellent flavor. Fruit ripens in the month of August.

Punjab Galgal: Vigorous trees with light green foliage color. Medium size, oval shaped fruit. Juice is very acidic with 8-10 seeds per fruit. Fruits mature in the months of November-December. The average fruit yield is 80-100 kg per tree.

PAU Baramasi: The right time of fruit maturing is first week of July. It contains very less amount of seeds. It gives an average yield of 84kg per tree.

PAU Baramasi-1: The right time of fruit maturing is last week of November month. The fruit is seedless. It gives an average yield of 80kg per tree.

Other States Varieties

Rasraj: Developed by IIHR. Yellow colored fruits content 70% juice and 12 seeds. Its acidity is 6% and TSS content is about 8 brix. It is resistant to bacterial blight and canker disease.

Lisbon lemon: It is resistant to frost and high wind velocity. Fruit are of medium size, having lemon yellow color with smooth surface.

Lucknow seedless: Fruits are of medium size with yellow color.

Pant Lemon: Dwarf variety having medium size juicy fruits. It is resistant to scab, canker and gummosis

1.4 HEALTH BENEFITS AND NUTRITIONAL INFORMATION

Nutritional value:

Lemons contain very little fat and protein. They consist mainly of carbs (10%) and water (88–89%).

The nutrients in 1/2 cup (100 grams) of raw, peeled lemon are:

- **Calories:** 29
- **Water:** 89%
- **Protein:** 1.1 grams
- **Carbs:** 9.3 grams
- **Sugar:** 2.5 grams
- **Fiber:** 2.8 grams
- **Fat:** 0.3 grams

CONSTITUENTS AND HEALTH BENEFITS OF LIMES

Lemons also have many potential health benefits.

Health benefits:

1. Support Heart Health:

Lemons are a good source of vitamin C. One lemon provides about 31 mg of vitamin C, which is 51% of the reference daily intake (RDI). Vitamin C reduces your risk of heart disease and stroke.

2. Prevent Kidney Stones:

Kidney stones are small lumps that form when waste products crystallize and build up in your kidneys. They are quite common, and people who get them often get them repeatedly. Citric acid may help prevent kidney stones by increasing urine volume and increasing urine pH, creating a less favorable environment for kidney stone formation

3. Protect Against Anemia:

Iron deficiency anemia is quite common. It occurs when you don't get enough iron from the foods you eat. Lemons contain some iron, but they primarily prevent anemia by improving your absorption of iron from plant foods

4. Improve Digestive Health:

Lemons are made up of about 10% carbs, mostly in the form of soluble fiber and simple sugars. The main fiber in lemons is pectin, a form of soluble fiber linked to multiple health benefits. Soluble fiber can improve gut health and slow the digestion of sugars and starches. These effects may result in reduced blood sugar levels.

1.5 CULTIVATION, BEARING & POST HARVEST MANAGEMENT:-

The lemon is rounded and slightly elongated, it belongs to the family of citrus fruit and therefore it shares many of the characteristics of other species of citrus, as for instance the thick skin.

The pulp is pale yellow, juicy and with an acid flavor; it is divided in gores. The skin is yellow and especially bright when it is ripen.

It is used fresh for cooking, and its juice is used in the industry for processed foodstuffs. For the pharmaceutical industry it is the raw material for many medicine manufactures, and at home it is used for different homemade remedies.

Cultivation and Bearing:-

The lemon plant forms an evergreen spreading bush or small tree, 3–6 metres (10–20 feet) high if not pruned. Its young oval leaves have a decidedly reddish tint; later they turn green. In some varieties the young branches of the lemon are angular; some have sharp thorns at the axils of the leaves. The flowers have a sweet odour and are solitary or borne in small clusters in the axils of the leaves. Reddish-tinted in the bud, the petals are usually white above and reddish purple below. The fruit is oval with a broad, low, apical nipple and forms 8 to 10 segments. The outer rind, or peel, yellow when ripe and rather thick in some varieties, is prominently dotted with oil glands. The white spongy inner part of the peel, called the mesocarp or albedo, is nearly tasteless and is the chief source of commercial grades of pectin. The seeds are small, ovoid, and pointed; occasionally fruits are seedless. The pulp is decidedly acidic.

The flowers are big and purple, are grouped in inflorescences. There is a characteristic that distinguishes the lemon tree from the rest of citrus: it bears more than one flowering per year, that is to say, the lemon trees are re-flowering. In the same tree we can find lemons in different stages of growth. This phenomenon has allowed us to obtain, by controlling the production, some lemons in the time of the year when they are scarce. Besides, by controlling the flowering, lemons can be stored for long periods of time without quality loss.

Lemons can be grown in all types of soils. Light soils having good drainage are suitable for its cultivation. pH range of soil should be 5.5-7.5. They can also grow in slightly alkaline and acidic soils.

Light loam well drained soils are best for lemon cultivation and should be ploughed, cross ploughed and leveled properly. Planting is done on terrace against slopes in hilly areas. High density planting is also possible in such areas.

Lemon requires irrigation at regular intervals. Lifesaving irrigation should be given in winters and summers. Irrigation is necessary for Flowering, Fruiting and proper plant growth. Over irrigation may also leads to disease like Root rot and collar rot. High frequency irrigation is beneficial. Salty water is injurious for crop plants. Partial drying out of soil in spring may not affect plants.

Post-harvest management:-

There are some fruit handling management after harvesting to avoid post-harvest losses. Following are Post-harvesting handling practices:

- Fruits are graded according to their size and color. All the diseased, deformed, bruised and unripe fruits are sorted out.
- Ethylene gas is used for treating the unripe lemons such that they develop yellow or lemon color.
- Do not leave harvested fruit out in the hot sun;
- Do not pick cold, wet fruit. When wet turgid fruit is handled the oil
- Glands can be ruptured. The released oil burns the fruit surface (oleocellosis) and also stimulates fungal spores to germinate. The burn Marks can take 2-3 days to develop;
- Wear cotton gloves when harvesting. This reduces chances of getting injured.
- Use picking bags. This reduces damage as a result of abrasion on

- Wooden or metal picking bins and allows fruit to be gently lowered into
- Bulk harvesting bins;
- Do not leave stems on fruit or damage buttons by “plugging”;
- Use clean, smooth harvesting bins;
- Make sure packing line equipment is cleaned regularly. This reduces dirt and wax buildup which can cause fruit abrasion;
- Reduce packing line abrasion by using foam, rubber and smooth belts to Cushion fruit;
- Remove old and rotten fruit regularly from the packing shed and surrounds;
- Treat harvested fruit with a registered fungicide within 24hrs of harvest;

The general practice is to wash the harvested fruits with chlorine and coat them with a shine wax so that the fruits look fresh. They are dried at a temperature of 50-55°C after coating. If the fruits have to be transported over longer distances, then they are packed in wooden boxes else baskets made of bamboo and mulberry are used for packing lemons. The boxes or baskets have to be ventilated and the fruits should be wrapped in tissue paper or newspaper for protection.

1.6 PROCESSING & VALUE ADDITION:-

Amongst the various fruits particularly grown in the tropical and subtropical regions, lime is one of the important commercial fruit crop which having the excellent processing qualities. Being non climacteric fruits, lime cannot be stored for a long period. Limes can be kept out at room temperature where they will stay fresh for up to one week. Therefore, the development of appropriate processing technology and product standardization will definitely help in better utilization of lime fruits particularly during the seasonal glut. The processed products prepared from well matured lime fruits are pleasant, best flavored, good storable and eventually represents better value added form that aids to conserve the excess fruit production and fast perishability.

Lime is specially used on large scale in the preparation of pickles and other processed products like squash, cordial, carbonated beverages and syrups. It is consumed not only as a fresh fruit but also used for flavoring and garnishing the dishes of vegetables, fish, meats, salads, etc. In India, excellent sherbet is prepared from lime juice which is not substituted by any other synthetic drink for quenching summer thirst. Lime, being a highly acidic fruit, it is not possible to maintain this high juice level in the lime squash which may otherwise result into a sour RTS after dilution.

Processing lime provides an economical way to store and transport lime from regions of production to distant markets. Processing allows small and medium sized businesses to create jobs in growing, processing, and marketing and to contribute to the economic growth of a region.

Ripe lime fruit are utilized either as fresh fruit or processed into juice, squash and special products.

Lime Piece: Lime Pieces are prepared by hand-cutting lime into 4/8 pieces and preserving with salt. Our assortment of lime Pieces is in huge demands in the markets for freshness and high nutritional value.

Dry Lime Peel: Dry Lime Peels is made after extracting the juice from the limes and then sun-dried them. Pack dry lime Peels in required packing to retain its natural qualities.

Lime Juice: lime Juice is obtained by a concentration process in which the water is physically removed from the juice until it has not less than 20% of solids by weight. It is then reconstituted with water before consumption. Unfermented, it may or may not be

frozen. Juice is obtained by mechanical extractors, or by pressing, and is then submitted to various processes. Unfermented, it may or may not be frozen.

Lime Squash: This is the most popular beverage. It contains 25% juice or pulp, 40% total soluble solids (TSS) and 3.5% acid. It is made by blending Lime juice with nutritive sweeteners, water and with or without salt, aromatic herbs, peel oil and any other ingredients suitable to it.

2. MODEL LIME SQUASH PROCESSING UNDER FME SCHEME

2.1 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 main Lime growing states in India are Andhra Pradesh, Karnataka, Maharashtra, Gujarat, Bihar, Himachal Pradesh and Tamil Nadu.

2.2 INSTALLED CAPACITY OF THE LIME SQUASH PROCESSING UNIT

The maximum installed capacity of the Lime squash manufacturing unit in the present model project is proposed as 150 tons/annum or 500 kg/day Lime squash. 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 55 percent capacity, 3rd year 65 percent capacity, 4th year 75 percent capacity, 5th year 90 percent capacity & 6th year onwards 100 percent capacity utilization is assumed in this model project.

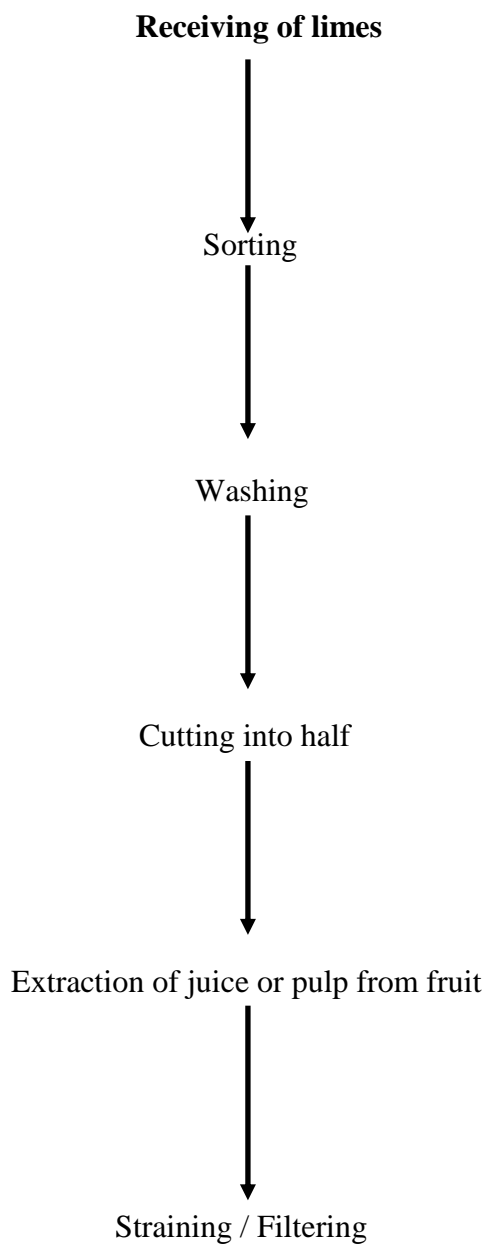
2.3 RAW MATERIAL REQUIREMENTS FOR THE UNIT

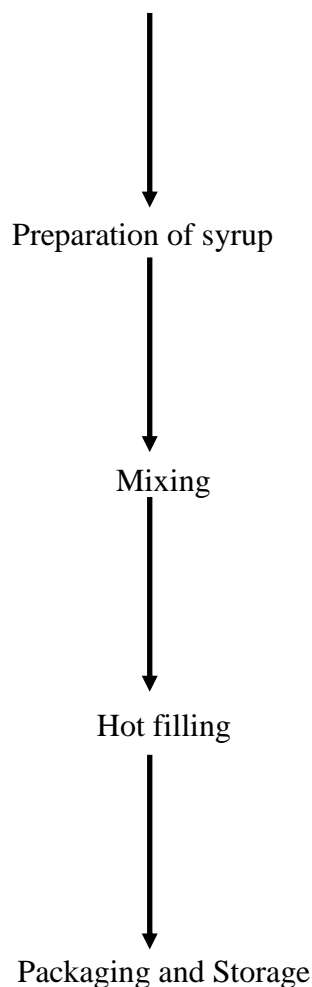
A sustainable fruit processing unit must ensure maximum capacity utilization and thus requires an operation of minimum 280-300 days per year to get reasonable profit. Therefore, ensuring uninterrupted raw materials supply requires maintenance of adequate raw material inventory. The processor must have linkage with producer organizations preferably FPCs through legal contract to get adequate quantity and quality of raw materials which otherwise get spoiled. In the Lime squash manufacturing

project, the unit requires 393.25 kg/day, 464.75 kg/day, 536.25 kg/day, 643.5 Kg/day & 715 kg/day lime grain at 55, 65, 75, 90 & 100 percent capacity utilization, respectively.

2.4 MANUFACTURING PROCESS OF THE LIME squash

Flow chart for Lime squash:





Packaging of squash can be done in Glass bottle, PET bottle, Aluminum can, Modified atmospheric packaging and Paper-plastic composite materials etc.

2.5 MARKET DEMAND AND SUPPLY FOR LIME SQUASH

Amongst the various fruits particularly grown in the tropical and subtropical regions, lime is one of the important commercial fruit crop which having the excellent processing qualities. Being non climacteric fruits, lime cannot be stored for a long period. Limes can be kept out at room temperature where they will stay fresh for up to one week. Therefore, the development of appropriate processing technology and product standardization will definitely help in better utilization of lime fruits particularly during the seasonal glut. The processed products prepared from well matured lime fruits

are pleasant, best flavored, good storable and eventually represents better value added form that aids to conserve the excess fruit production and fast perishability.

Typically fruits and vegetables have a low price when they are in the raw state, but can be processed into a range of dried foods, jams, juice, pickles and etc, which have a considerably higher value. The high added value means that the amount of food that must be processed to earn a reasonable income is relatively small. Hence, the size and type of equipment required to operate at this scale can kept to levels that are affordable to most aspiring entrepreneurs. In many countries, vegetables and fruits are among the most accessible raw materials for processing.

2.6 MARKETING STRATEGY FOR LIME SQUASH

The increasing urbanization and income offers huge scope for marketing of grains based products. Urban organized platforms such as departmental stores, malls, super markets can be attractive platforms to sell well packaged and branded Lime products.

2.7 DETAILED PROJECT ASSUMPTIONS

This model DPR for Lime squash 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 This DPR assumes expansion of existing beverages processing unit by adding new fruit based beverage processing line. Therefore, land and civil infrastructures are assumed as already available with the entrepreneurs.

- Herewith in this DPR, we have considered the assumptions as listed below in the tables of different costs, which may vary as per region, seasons and machinery designs and supplier.

1. Lime cost considered @ Rs.7/-per kg.
2. 1 kg lime will produce 22% recovery.
3. 1 Batch size is approximately 500 kg.
4. No. of hours per day are approximately 8-10 hours.
5. Batch yield is 95%.

Detailed Project Assumptions		
Parameter	Assumption	
Capacity of the Lime squash Unit	150	MT/annum
Utilization of capacity	1st Year Implementation, 55% in second, 65% in third, 75% in fourth year, 90% in fifth & onwards	
Working days per year	300	days
Working hours per day	10	hours
Interest on term and working capital loan	12%	
Repayment period	Seven year with one year grace period is considered.	
Average prices of raw material	7	
Average sale prices per Kg	120	Rs/kg
Pulp extraction	22	
LIME SQUASH	1 kg Lime squash from 1.43 Kg Lime fruits	

2.8 FIXED CAPITAL INVESTMENT

2.8.1 MACHINERY AND EQUIPMENT

Sr No.	Equipment	Capacity	Quantity	Price (Rs. In Lacs)
1	Cold store	1	4000 kg	8
2	Washing tank	1	500 liter	0.4
3	Fruit juice extractor	1	Continuous	1.5
4	Feed pump	1	Suitable	0.25
5	Sugar syrup preparation tank	1	100 Liters	1
6	Mixing/blending tank	1	100 Liters	0.8
7	Filter press	1	100 Liters	0.7
8	Homogenizer	1	100 Kg/batch	1.8
9	Hot Bottle filling line	1	Suitable	1.45
10	Weighing balance	1	Suitable	0.06
11	Accessories	1	Suitable	0.5
			Total	16.46

2.8.2 OTHER COSTS:-

Utilities and Fittings:-

Utilities and Fittings	
1.Water	Rs. 0.8Lacs total
2.Power	

Other Fixed Assets:

Other Fixed Assets	
1. Furniture & Fixtures	Rs. 0.9 lac total
2. Plastic tray capacity	
3. Electrical fittings	

Pre-operative expenses

Pre-operative Expenses	
Legal expenses, Start-up expenses, Establishment cost, consultancy fees, trials and others.	0.9 LAC
Total preoperative expenses	0.9 LAC

Contingency cost to be added as approx.1.2 Lac.

So total startup cost at own land & Premise may be somewhat similar to 29.55 lacs. This is according to survey done at X location India. This may vary on location, situation and design change over.

2.9 WORKING CAPITAL REQUIREMENTS

Particulars	Period	Year 2 (55%)	Year 3 (65%)	Year 4 (75%)
Raw material stock	7 days	1.13	1.34	1.82
Work in progress	15 days	2.26	2.67	3.64
Packing material	15 days	0.90	1.06	1.45

Finished goods' stock	15 days	3.76	4.44	6.05
Receivables	30 days	7.51	8.88	12.10
Working expenses	30 days	0.87	1.02	1.40
Total current assets		16.42	19.41	26.46
Trade creditors		0.00	0.00	0.00
Working capital gap		16.42	19.41	26.46
Margin money (25%)		4.11	4.85	6.62
Bank finance		12.32	14.56	19.85

2.10 TOTAL PROJECT COST AND MEANS OF FINANCES

Particulars	Amount in Lakhs
i. Land and building	5.18
ii. Plant and machinery	16.46
iii. Utilities & Fittings	0.8
iv. Other Fixed assets	0.9
v. Pre-operative expenses	0.90
vi. Contingencies	1.20
vii. Working capital margin	4.11
Total project cost (i to vii)	29.55
Means Of finance	
i. Subsidy	9.90
ii. Promoters Contribution	7.24
iii. Term Loan (@10%)	12.41

2.11 MANPOWER REQUIREMENTS

Total Monthly Salary (Rs.)	No	Wages	Total Monthly	Total Annualy
Supervisor (can be the owner)	1	18000	18000	216000
Technician	1	14000	14000	168000
Semi-skilled	2	7600	15200	182400
Helper	1	5500	5500	66000
Sales man	1	8000	8000	96000
			60700	728400

2.12 EXPENDITURE, REVENUE AND PROFITABILITY ANALYSIS

	Particulars	1st Year	2nd Year	3rd Year	4th Year	5th year	6th year
A	Total Installed Capacity (MT)	214.5 MT Lime fruits/Annum	82.5	97.5	112.5	135	150
	Capacity utilization (%)	Under Const.	55%	65%	75%	90%	100%
B	Expenditure (Rs. in Lakh)	0					
	Lime fruit (Av. Price @ Rs. 7/Kg)	0.00	8.26	9.76	11.26	13.51	15.02
	Sugar @ Rs. 35/kg	0.00	16.49	19.49	22.48	26.98	29.98
	Other materials	0.00	1.24	1.46	1.69	2.03	2.25
	Packaging materials	0.00	9.90	11.70	13.50	16.20	18.00
	Utilities (Electricity, Fuel)	0.00	0.91	1.08	1.24	1.49	1.66
	Salaries (1st yr only manager's salary)	2.16	7.28	7.28	7.28	7.28	7.28
	Repair & maintenance	0.00	0.70	0.80	0.90	0.90	0.90
	Insurance	0.30	0.30	0.30	0.30	0.30	0.30
	Miscellaneous expenses	0.50	2.30	2.30	2.30	2.30	2.30
	Total Expenditure	2.96	47.38	54.17	60.96	70.99	77.68
C	Total Sales Revenue (Rs. in Lakh)	0.00	99.00	117.00	135.00	162.00	180.00
	Sale of Lime squash (Av. Sale Price @ Rs.120/kg)	0.00	99.00	117.00	135.00	162.00	180.00
D	PBDIT (Total exp.-Total sales rev.) (Rs. in Lakh)/Cash Inflows	-2.96	51.62	62.83	74.04	91.01	102.32
	Depreciation on civil works @ 5% per annum	0.26	0.25	0.23	0.22	0.21	0.20
	Depreciation on machinery @ 10% per annum	1.65	1.48	1.33	1.20	1.08	0.97
	Depreciation on other fixed assets @ 15% per annum	0.12	0.10	0.09	0.07	0.06	0.05
	Interest on term loan @ 12%	1.29	1.25	1.20	1.14	1.08	1.01

	Interest on working capital @ 12%	0.00	1.46	1.75	2.38	2.38	2.38
E	Profit after depreciation and Interest (Rs. in Lakh)	-6.28	48.55	59.98	71.41	88.57	100.08
F	Tax (assumed 30%) (Rs. in Lakh)	0.00	14.56	17.99	21.42	26.57	30.02
G	Profit after depreciation, Interest & Tax (Rs. in Lakh)	-6.28	33.98	41.99	49.98	62.00	70.05
H	Surplus available for repayment (PBDIT-Interest on working capital-Tax) (Rs. in Lakh)	1.29	1.25	1.20	1.14	1.08	1.01
I	Coverage available (Rs. in Lakh)	1.29	1.25	1.20	1.14	1.08	1.01
J	Total Debt Outgo (Rs. in Lakh)	0.43	0.48	0.53	0.58	0.64	0.71
K	Debt Service Coverage Ratio (DSCR)	3.00	2.62	2.28	1.97	1.69	1.44
	Average DSCR	2.16					
L	Cash accruals (PBDIT- Interest-Tax) (Rs. in Lakh)	-4.25	35.81	43.64	51.48	63.35	71.28
M	Payback Period	2.5 Years					
	(on Rs. 29.5 Lakhs initial investment)						

2.13 REPAYMENT SCHEDULE

Year	Beginning	PMT	Interest	Principal	Ending Balance
1	1,240,909.33	172,137.93	129,054.57	43,083.36	1,197,825.97
2	1,197,825.97	172,137.93	124,573.90	47,564.03	1,150,261.95
3	1,150,261.95	172,137.93	119,627.24	52,510.69	1,097,751.26
4	1,097,751.26	172,137.93	114,166.13	57,971.80	1,039,779.46
5	1,039,779.46	172,137.93	108,137.06	64,000.86	975,778.60
6	975,778.60	172,137.93	101,480.97	70,656.95	905,121.64
7	905,121.64	172,137.93	94,132.65	78,005.28	827,116.37

8	827,116.37	172,137.93	86,020.10	86,117.83	740,998.54
9	740,998.54	172,137.93	77,063.85	95,074.08	645,924.46
10	645,924.46	172,137.93	67,176.14	104,961.78	540,962.68
11	540,962.68	172,137.93	56,260.12	115,877.81	425,084.87
12	425,084.87	172,137.93	44,208.83	127,929.10	297,155.77
13	297,155.77	172,137.93	30,904.20	141,233.73	155,922.04
14	155,922.04	172,137.93	16,215.89	155,922.04	-
		2,409,931.00	1,169,021.66	1,240,909.33	(1,240,909.33)

2.14 ASSET'S DEPRECIATION

Assets' Depreciation (Down Value Method)							Amounts in Lakhs	
Particulars	1st Year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year
Civil works	5.18	4.92	4.67	4.44	4.22	4.01	3.81	3.62
Depreciation	0.26	0.25	0.23	0.22	0.21	0.20	0.19	0.18
Depreciated value	4.92	4.67	4.44	4.22	4.01	3.81	3.62	3.44
Plant & Machinery	16.46	14.81	13.33	12.00	10.80	9.72	8.75	7.87
Depreciation	1.65	1.48	1.33	1.20	1.08	0.97	0.87	0.79
Depreciated value	14.81	13.33	12.00	10.80	9.72	8.75	7.87	7.09
Other Fixed	0.80	0.68	0.58	0.49	0.42	0.35	0.30	0.26

Assets								
Depreciation	0.12	0.10	0.09	0.07	0.06	0.05	0.05	0.04
Depreciated value	0.68	0.58	0.49	0.42	0.35	0.30	0.26	0.22
All Assets	22.44	20.42	18.59	16.93	15.44	14.08	12.86	11.75
Depreciation	2.03	1.83	1.65	1.50	1.35	1.23	1.11	1.01
Depreciated value	20.42	18.59	16.93	15.44	14.08	12.86	11.75	10.74

2.15 FINANCIAL ASSESSMENT OF THE PROJECT

Benefit Cost Ratio (BCR) and Net Present Worth (NPW)

Particulars	1st Year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	
Capital cost (Rs. in Lakh)	29.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Recurring cost (Rs. in Lakh)	2.96	47.38	54.17	60.96	70.99	77.68	77.68	77.68	
Total cost (Rs. in Lakh)	32.51	47.38	54.17	60.96	70.99	77.68	77.68	77.68	499.04
Benefit (Rs. in Lakh)	0.00	99.00	117.00	135.00	162.00	180.00	180.00	180.00	
Total Depreciated value of all assets (Rs. in Lakh)								10.74	
Total benefits (Rs. in Lakh)	0.00	99.00	117.00	135.00	162.00	180.00	180.00	190.74	1063.74
Benefit-Cost Ratio (BCR): (Highly Profitable project)	2.132								
Net Present Worth (NPW):	564.70								

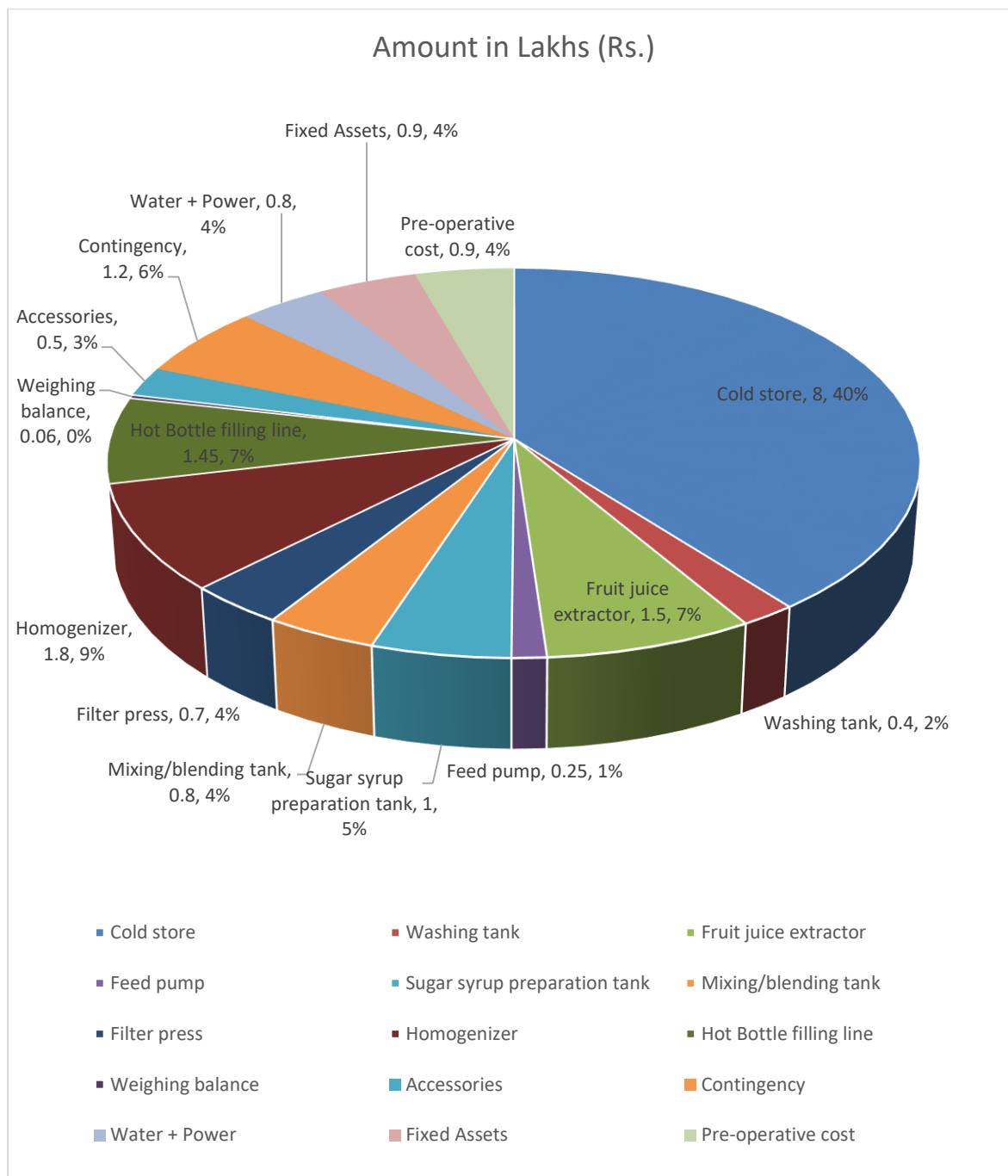
2.16 BREAK EVEN ANALYSIS

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.

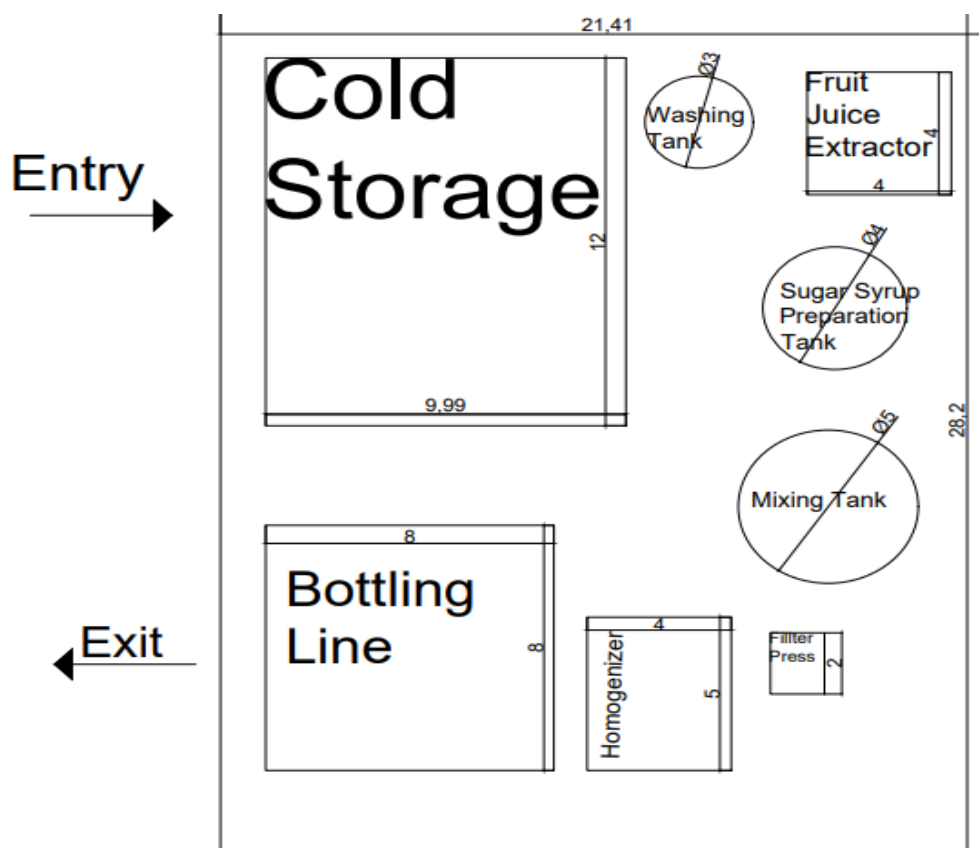
Particulars	1st Year	2nd year	3 rd year	4th year	5th year	6th year	7th year	8th year
Capacity utilization (%)	Under Const.	55%	65%	75%	90%	100%	100%	100%
Production MT/Annum		82.5	97.5	112.5	135	150	150	150
Fixed Cost (Rs. in Lakh)								
Permanent staff salaries	7.284	7.284	7.284	7.284	7.284	7.284	7.284	7.284
Depreciation on building @ 5% per annum	0.26	0.25	0.23	0.22	0.21	0.20	0.19	0.18
Depreciation on machinery @ 10% per annum	1.65	1.48	1.33	1.20	1.08	0.97	0.87	0.79
Depreciation on other fixed assets @ 15% per annum	0.12	0.10	0.09	0.07	0.06	0.05	0.05	0.04
Interest on term loan	1.29	1.25	1.20	1.14	1.08	1.01	0.94	0.86
Insurance	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total Fixed Cost (Rs. in Lakh)	10.89	10.65	10.43	10.22	10.01	9.82	9.63	9.45
Sales Revenue (Rs. in Lakh)	0	99	117	135	162	180	180	180
Variable Cost (Rs. in Lakh)								
Lime fruits (Av. Price @ Rs.7/Kg)	0.00	8.26	9.76	11.26	13.51	15.02	15.02	15.02
Sugar @ 35 per kg	0.00	16.49	19.49	22.48	26.98	29.98	29.98	29.98
Other ingredients	0.00	1.24	1.46	1.69	2.03	2.25	2.25	2.25
Packaging materials	0.00	9.90	11.70	13.50	16.20	18.00	18.00	18.00
Casual staff salaries	0.00	5.78	5.78	5.78	5.78	5.78	5.78	5.78
Utilities (Electricity, Fuel)	0.00	0.91	1.08	1.24	1.49	1.66	1.66	1.66

Repair & maintenance	0.00	0.70	0.80	0.90	0.90	0.90	0.90	0.90
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	1.46	1.75	2.38	2.38	2.38	2.38	2.38
Total Variable Cost (Rs. in Lakh)	0.50	46.76	53.81	61.24	71.27	77.96	77.96	77.96
Break Even Point (BEP)								
as % of sale	-	12.00	10.00	8.00	8.00	7.00	7.00	6.00
Break Even Point (BEP) in terms of sales value (Rs. in Lakhs)	-	11.88	11.70	10.80	12.96	12.60	12.60	10.80

2.17 PIE CHART FOR BETTER UNDERSTANDING OF EXPENSES OF EACH HEAD:



2.18 TYPICAL LIME SQUASH MANUFACTURING UNIT LAYOUT



2.19 MACHINERY SUPPLIERS

There are many machinery suppliers available within India for grains based beverage processing machineries and equipment. Some of the suppliers are:

1. Bajaj Process pack Limited, Noida, India
2. Shriyan Enterprises. Mumbai, India

3. LIMITATIONS OF MODEL DPR & GUIDELINES FOR ENTREPRENEURS

3.1 LIMITATIONS OF THE DPR

- i. This 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 DPR is 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.

3.2 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 costing base/contract sourcing, detailed market research, comprehensive dehydrated 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 while all situations.



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