

**DETAILED PROJECT REPORT**  
**KODO MILLET COOKIES MANUFACTURING UNIT.**



**INDIAN INSTITUTE OF FOOD PROCESSING TECHNOLOGY**

**Ministry of Food Processing Industries, Govt. of India**

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## The Project at a Glance

1	Name of the Project	Kodo millet cookies
2	Name of the entrepreneur/FPO/SHG/Cooperative	
3	Nature of proposed project	Proprietorship/Company/ Partnership
4	Registered office	
5	Project site/location	
6	Names of Partner (if partnership)	
7	No of share holders (if company/FPC)	
8	Technical advisor	
9	Marketing advisor/partners	
10	Proposed project capacity	150 MT/annum (55, 65, 75,90 and 100% capacity utilization in the 2nd, 3rd, 4th year, 5th year and 6th year onwards respectively
11	Raw materials	Kodo millet flour
12	Major product outputs	Kodo millet cookies
13	Total project cost (Lakhs)	20.14
	Land development, building & civil construction	5.18
	Machinery and equipments	6.31
	Utilities (Power & water facilities)	0.8
	Miscellaneous fixed assets	0.9
	Pre-operative expenses	0.90
	Contingencies	1.20
	Working capital margin	4.85
14	Working capital Management (In Lakhs)	
	Second Year	14.55
	Third Year	17.19
	Fourth Year	23.45
15	Means of Finance	
	Subsidy grant by MoFPI (max 10 lakhs)	9.87
	Promoter's contribution (min 20%)	4.83
	Term loan (45%)	5.44
16	Debt-equity ratio	2.35 : 1
17	Profit after Depreciation, Interest & Tax	
	2nd year	33.30
	3rd year	40.90
	4th year	48.49
18	Average DSCR	2.16
	Benefit Cost Ratio	2.048650013

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 KODO MILLET PRODUCTION, CLUSTERS, POST-HARVEST MANAGEMENT AND VALUE ADDITION IN INDIA

### 1.1 INTRODUCTION

*Paspalum scrobiculatum*, commonly called **Kodo millet** or **Koda millet**, is an annual grain that is grown primarily in Nepal (not to confuse with **Kodo** (Finger millet, *Eleusine coracana*) and also in the India, Philippines, Indonesia, Vietnam, Thailand, and in West Africa from where it originated. It is grown as a minor crop in most of these areas, with the exception of the Deccan plateau in India where it is grown as a major food source. It is a very hardy crop that is drought tolerant and can survive on marginal soils where other crops may not survive, and can supply 450–900 kg of grain per hectare. Kodo millet has large potential to provide nourishing food to subsistence farmers in Africa and elsewhere.

Kodo millet scientifically known as *Paspalum scrobiculatum*, is an annual grain that is grown primarily in India, but also in the Philippines, Indonesia, Vietnam, Thailand, and in West Africa where it originates. It is grown as a minor crop in most of these areas, with the exception of the Deccan plateau in India where it is grown as a major food source. Kodo millet falls in the category of minor millets which are small-seeded species crops, grown around the world for food and fodder. Essential similarities of the members of this group of species are the resilience and ability to thrive in harsh environments, along with nutritious seed content. They have been cultivated since immemorial time. Some of the popular common names of the kodo millet plant are Indian paspalum, Creeping paspalum, Ditch millet, Scrobic paspalum, Water couch, Scorbic, Mau'u-laiki, rice grass, rice grass paspalum, Veld paspalum and native paspalum. Kodo is a popular fast or upvas food in some parts of India. The millet is certainly

superior to rice, gluten free and rich in fiber, vitamins and minerals. It has large potential to provide nourishing food to subsistence farmers in Africa and elsewhere.

**Kodo Millet in India** is largely grown in the states of Madhya Pradesh, Chattisgarh, Maharashtra, Tamil-Nadu and Karnataka. It is also cultivated in the Jhum field of Arunachal Pradesh.

## 1.2 ORIGIN, DISTRIBUTION AND PRODUCTION OF KODO MILLET

*Paspalum scrobiculatum var. scrobiculatum* is grown in India as an important crop, while *Paspalum scrobiculatum var. commersonii* is the wild variety indigenous to Africa. The kodo millet, also known as cow grass, rice grass, ditch millet, Native Paspalum, or Indian Crown Grass originates in tropical Africa, and it is estimated to have been domesticated in India 3000 years ago. The domestication process is still ongoing. In southern India, it is called varaku or koovaraku. Kodo is probably a corrupt form of kodra, a Hindi name of the plant. It is grown as an annual. It is a minor food crop eaten in many Asian countries, primarily in India where in some regions it is extremely important. It grows wild as a perennial in the west of Africa, where it is eaten as a famine food. Often it grows as a weed in rice fields. Many farmers do not mind it, as it can be harvested as an alternative crop if their primary crop fails. In the Southern United States and Hawaii, it is considered to be a noxious weed.

## 1.3 VARIETIES

There are different varieties of Kodo millet growing nationwide. Varieties of Kodo millet growing nationwide are described below.

Sl No.	State	Varieties
1	Madhya Pradesh	RK - 65 - 18, JK 439, RBK 155, JK 13, JK 65 and JK 48, JK 137, RK 390- 25, JK 106, GPUK 3
2	Tamil Nadu	KMV 20 (Bamban), CO 3, TNAU 86, GPUK 3
3	Gujarat	GK 1 and GK 2, GPUK 3
4	Chattisgarh	RBK 155 and JK 43 9, Indira Kodo - 1, Indira Kodo - 48, GPUK 3
5	Karnataka	GPUK 3, RBK 155
6	Hill states	VL-124, VL-149

## 1.4 HEALTH BENEFITS AND NUTRITIONAL INFORMATION

### Nutritional value:

Kodo millet is a rich source of protein, iron, and calcium. Calcium is vital for our bone health. It also has a negligible amount of B Vitamins, which are essential for your nervous system.

100 grams of Kodo millet provides the following nutrients:

- **Calories:** 353 kcal
- **Dietary Fiber:** 5.2 grams
- **Protein:** 9.8 grams

- **Carbohydrate:** 66.6 grams
- **Fat:** 3.6 grams
- **Iron:** 1.7 mg
- **Vitamin B-6:** 0.15 mg
- **Calcium:** 35 mg
- **Vitamin B2:** 0.09 mg
- **Vitamin B3:** 2 mg

## CONSTITUENTS AND HEALTH BENEFITS OF KODO MILLETS

Kodo millets also have many potential health benefits. Eating kodo millets may lower your risk of heart disease, cancer, and kidney stones.

### Health benefits:

#### 1. Anti-diabetic:

Kodo millet intake is found to reduce fasting blood glucose level and promotes significant increase in serum insulin level. Anti-diabetic compounds in Kodo are quercetin, ferulic acid, p-hydroxybenzoic acid, vanillic acid and syringic acid. Thus regular use is recommended for diabetic patients.

#### 2. Anti-obesity

Kodo is high in fiber and prevents gain in weight. It also helps to prevent rise in cholesterol and triglyceride levels and is a functional food to manage weight and promotes weight loss.



### 3. **Anti-cholesterol and anti-hypertension:**

Kodo is very beneficial for post-menopausal women suffering from signs of cardiovascular disease, high blood pressure and high cholesterol levels. Hence, regular consumption of Kodo millets is recommended for all.

### 4. **Helps in weight management:**

Kodo millet consists of low fat content and fiber content is higher and makes to feel fuller after consuming less quantity itself, therefore it avoids over eating and lessens the weight, thereby controls obesity. An obese person should include this cereal in their diet and see the difference on their weight.

### 5. **Antioxidant and anti-microbial activity**

Kodo millet grains consist of polyphenols and antioxidants. The polyphenols possess antimicrobial action against certain bacterias (*Staphylococcus aureus*, *Leuconostoc mesenteroides*, *Bacillus cereus* and *Enterococcus faecalis*).

### 6. **Cholesterol reduction:**

Regular consumption of Kodo millet helps to lower the triglycerides and C-reactive protein, thus it lowers the bad cholesterol and ideal for your heart. Thus heart protective food too.

### **Traditional uses and benefits of Kodo Millet**

- Regular consumption of kodo millet is very beneficial for postmenopausal women suffering from signs of cardiovascular disease, like high blood pressure and high cholesterol levels.



- Kodo Millet helps hydrate your colon to keep your system regular and keep you from being constipated.
- Kodo Millet helps in controlling Blood sugar and Cholesterol.
- It is easy to digest, contains a high amount of lecithin and is excellent for strengthening the nervous system.
- It is rich in photo chemicals, phytate that helps in reduction of cancer risks.
- It helps to reduce the body weight and beneficial for postmenopausal women.
- It is good for those suffering from signs of cardiovascular disease, like high blood pressure and high cholesterol levels.
- Also, it is good for diabetics, its anti – diabetic compounds like quercetin, ferulic acid, p – hydroxybenzoic acid, vanillic acid and syringic acid from Varagu prevents obesity.
- Kodo millets contain no gluten and are good for people who are gluten intolerant.
- Kodo millets can be used for traditional as well as novel foods.
- Unprocessed or processed grain can be cooked whole or decorticated and if necessary ground to flour by traditional or industrial methods.
- In tribal sectors, it is cooked as rice also and out of flour tribal population prepares different recipes.
- Traditionally the grains of Paspalum scrobiculatum are used in the management of diabetes mellitus.
- Grains are also useful in the treatment of inflammation, hemorrhages and general debility.

## **1.5 CULTIVATION, BEARING & POST HARVEST MANAGEMENT:-**

Kodo millet is a monocot and an annual grass that grows to heights of approximately four feet. It has an inflorescence that produces 4-6 racemes that are 4–9 cm long. Its slender, light green leaves grow to be 20 to 40 centimeters in length. The seeds it produces are very small and ellipsoidal, being approximately 1.5 mm in width and 2 mm

in length; they vary in colour from being light brown to a dark grey. Kodo millet has a shallow root system which may be ideal for intercropping.

### **Cultivation and Bearing:-**

Kodo millet is a highly drought resistance crop. It is the coarsest of all food grains. The kodo millet, also known as cow grass, rice grass, ditch millet, Native Paspalum, or Indian Crown Grass originates in tropical Africa, and it is estimated to have been domesticated in India 3000 years ago. The grain is covered with a horny seed coat which should be removed before cooking. The grain contains 8.3 per cent protein, 1.4 per cent fat, 65.6 per cent carbohydrates and 2.9 per cent ash. The grain is recommended as a substitute for rice to patients suffering from diabetes disease.

Kodo is grown mostly in warm and dry climate. It is highly drought tolerant and, therefore, can be grown in areas where rainfall is scanty and erratic. It is well thrive in areas receiving only 40 to 50 centimetre annual rainfall.

Kodo is grown from gravelly and stony upland poor soils to loam soils. Deep, loamy, fertile soils, rich in organic matter, are preferred for satisfactory growth. Well-drained soils with adequate moisture supply are required for uninterrupted growth of this crop.

During dry periods, irrigations are required every 4-7 days depending on the severity of the drought and type of soil.

First irrigation at 25-30 DAS and second irrigation at 40-45 DAS. Drain out the excessive rain water from the field during heavy and continuous rains.

## **Post-harvest management:-**

There are some grain handling management after harvesting to avoid post-harvest losses.

Following are Post-harvesting handling practices:

- Grains are graded according to their size. All the diseased, infected, grains are sorted out.
- Do not leave harvested grain out in the hot sun/ rainy weather;
- Wear cotton gloves when harvesting. This reduces chances of getting injured.
- Use picking bags.
- Jute bag, gunny bags are used for storing grains;
- Use clean harvesting bags;
- Make sure packing line equipment is cleaned regularly.
- Remove old and rotten fruit regularly from the packing shed and surrounds;
- Treat harvested grain with a registered fungicide within 24hrs of harvest;

## **1.6 PROCESSING & VALUE ADDITION:-**

Millets are one of the oldest food grains known to mankind and possibly the first cereal grain used for domestic purposes. For centuries, millets have been a prized crop in India and are staple diet for nearly 1/3rd of the world's population. They can adapt themselves to marginal soils and varied environmental conditions. Small millets are more than just finger millet (*Eleusine coracana*) and include kodo millet (*Paspalum scrobiculatum*), little millet (*Panicum sumatrense*), foxtail millet (*Setaria italic*), proso millet (*Panicum miliaceum*) and barnyard millet (*Echinochloa frumentaceae*). Millets are most commonly available in the form of pearled and hulled kind. Millets are tasty grains that have a mildly sweet, nut-like flavour. Millets are rich sources of protein, dietary fiber, energy and minerals when compared to rice. These millets have diversified high food value but the consumption of these millets has declined for want of standardized processing techniques to compete with fine cereals. Hence an effort was made to increase the utilization of small millets in popular foods which would

find ready acceptability with the tag of 'HEALTH FOODS'. Small millet based value added products including traditional recipes, bakery products, pasta products, flaked and popped products instant food mixes were developed and standardized. The products which are commonly prepared by the farmers using cereals were replaced with small millets to increase their utilization.

Value added products from small millet flakes - aval uppma, kitchadi, payasam, masala flakes, boli, sweet balls, lemon bath, tamarind bath and tomato bath. Value added products from popped small millets - uppma, bhelpoori, masala corn, cheeian.

Cookie is a small flat, baked product, commonly called biscuit. Cookie usually prepared from wheat flour, eggs, sugar and fat, sometimes toppings with raisins, oats or chocolate chips. Generally, wheat is one of the cereals used extensively throughout the world for the preparation of cookie. But cookie from non-wheat cereals like rice, jowar, maize or millet is uncommon. Recently, millets are gaining importance because they can offer several nutraceuticals, and also being rich in protein, minerals and vitamins. Its protein has a beneficial influence on the metabolism of cholesterol. Cereal or millet cookie is made from a fine flour of millet with leavening and shortenings. There exists, however considerable potential for large scale manufacture and marketing of shelf-stable product utilizing underutilized grains like Kodo millet as the demand for ready-to-eat convenience food products has been steadily increasing, consequent to industrialization and convenience in using. The product is made from kodo millet flour and can be consumed during tea time or in between the meal.

## **PREPARATION OF KODO MILLET COOKIES**

Kodo millet cookies manufacturing process involves three steps includes

- 1) Mixing
- 2) Shaping or forming
- 3) Baking

## **1 Mixing**

Mixing is a process designed to blend different ingredients into a uniform and homogenous mixture. The major ingredients are flour, fat and sugar. All measured ingredients are put together for dough formation. Prepared dough is fed into mixers where mixing is done and dough is prepared for moulding/cutting.

## **2 Shaping and Forming**

The forming process is specific for each cookie type. There are three processes by which shaping or forming of cookies is achieved-

- 1) Sheeting and cutting
- 2) Rotary moulding
- 3) Extrusion

### **1) Sheeting and cutting method:**

This method of forming is used for the production of crackers, semisweet cookies and selected soft doughs.

### **2) Rotary moulding:**

The rotary moulding process offers advantages over sheeting and cutting that there is no scrap to recycle and very less labour requirement. This process is used for dry and crumbly doughs only.

### **3) Extrusion method:**

In this method of dough forming, the dough is extruded through a row of dies which is cut by a wire or blade mounted on a frame that moves through the dough just below the die nozzle outlet.

### **3. Baking**

This is the area where we pass these moulded/ formed wet cookie into baking oven.

The cookies are baked on desired temperatures (160°C - 220°C).

Various type of heating are available now-a-days as per the convenience and cost.

Different types of oven are available for baking products.

### **4 Cooling**

The hot product obtained from baking must be cooled to room temperature prior to packaging for several reasons-

- Being warm, reduced firmness of the baked product so as to withstand packaging process
- Packaging material shrinkage due to contact to hot product
- Hot packed product may continue release some steam causing condensation inside the packaging.

Cooling can be achieved either by placing the baked product at ambient conditions or by forced air cooling.

## **2. MODEL KODO MILLET COOKIES 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 Kodo millet growing states in India are Madhya Pradesh, Karnataka, Maharashtra, Chhattisgarh and Tamil Nadu.

### **2.2 INSTALLED CAPACITY OF THE KODO MILLET COOKIES PROCESSING UNIT**

The maximum installed capacity of the Kodo millet cookies manufacturing unit in the present model project is proposed as 150 tons/annum or 500 kg/day Kodo millet cookies. The unit is assumed to operate 300 days/annum @ 8-10 hrs. /day the 1<sup>st</sup> year is assumed to be construction/expansion period of the project; and in the 2<sup>nd</sup> year 55 percent capacity, 3<sup>rd</sup> year 65 percent capacity, 4<sup>th</sup> year 75 percent capacity, 5<sup>th</sup> year 90 percent capacity & 6<sup>th</sup> year onwards 100 percent capacity utilization is assumed in this model project.

### **2.3 RAW MATERIAL REQUIREMENTS FOR THE UNIT**

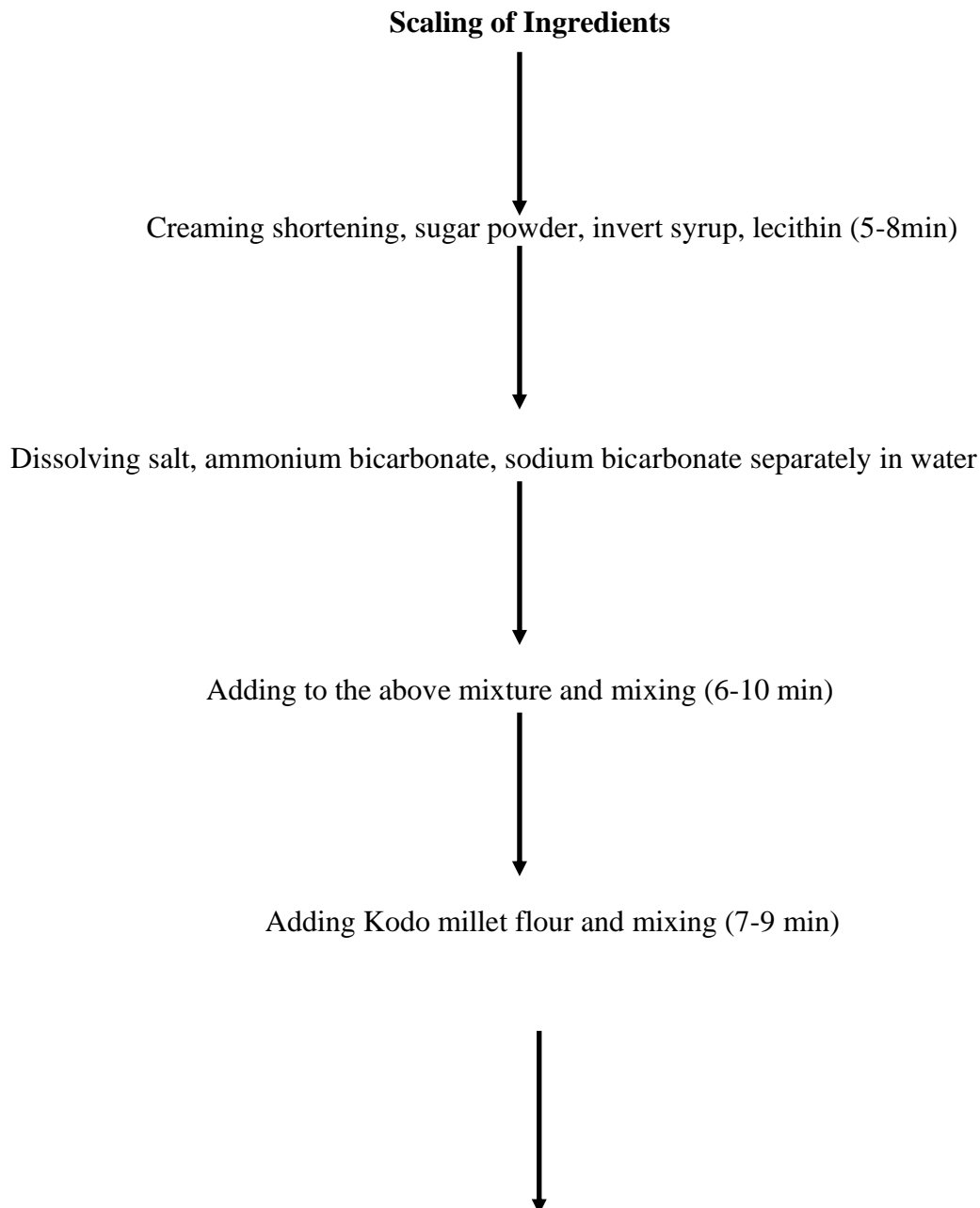
A sustainable grain processing unit must ensure maximum capacity utilization and thus requires an operation of minimum 280-300 days per year to get reasonable profit. Therefore, ensuring uninterrupted raw materials supply requires maintenance of adequate raw material inventory. The processor must have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



the unit requires 154.82 kg/day, 182.97 kg/day, 211.12 kg/day, 253.35 Kg/day & 281.5 kg/day kodo millet grain at 55, 65, 75, 90 & 100 percent capacity utilization, respectively.

## 2.4 MANUFACTURING PROCESS OF THE KODO MILLET COOKIES

**Flow chart for Kodo millet cookies:**



Sheeting dough (3.5 mm thickness)



Cutting into circular shape



Baking (9-11 min at 205 ° C)



Cooling and packing

## **2.5 MARKET DEMAND AND SUPPLY FOR KODO MILLET COOKIES**

Madhya Pradesh is one amongst the states in India with the poorest level of nutrition: 60% of the children are underweight compared to 43% at national level. Kodo millets provide good sources of phosphorus and iron and higher protein content than rice. Because of this high nutritional value and their capacity to even thrive on poor quality soils under water-limited conditions, small millets have great potential to help alleviate nutrition insufficiencies in the State. Minor millets have largely been replaced by rice in most parts of India.

Millet crops have recently received a lot of national and international attention as traditional gluten-free super foods. This renewed perception further enhances the potential for these cereals to be reasonable economic investment for smallholder farmers in India, while improving local livelihoods, nutrition and resilience.

Local farmers have the opportunity to take advantage of this momentum before distant suppliers take actions to meet the growing demand.

## 2.6 MARKETING STRATEGY FOR KODO MILLET COOKIES

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 Kodo millet products.

## 2.7 DETAILED PROJECT ASSUMPTIONS

This model DPR for Kodo millet cookies 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 grain processing unit by adding new dehydration 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. Kodo millet cost considered @ Rs.20/-per kg.
  2. 1 kg kodo millet will produce 90% 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 Kodo millet cookies 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	20	
Average sale prices per Kg	180	Rs/kg
Pulp extraction	90	
<b>KODO MILLET COOKIES</b>	1 kg Kodo millet cookies from 0.563 Kg Kodo millet flour	

## 2.8 FIXED CAPITAL INVESTMENT

### 2.8.1 MACHINERY AND EQUIPMENT

Sr No.	Equipment	Capacity	Quantity	Price (Rs. In Lacs)
1	Planetary mixer	1	50 Kg/Batch	1.2
2	Cookie wire cut machine	1	Suitable	0.8
3	Rotary oven	1	100 Kg/Batch	1.5
4	wrapping machine	1	Suitable	2.25
5	Weighing balance	1	Suitable	0.06
6	Accessories	1	Suitable	0.5
			<b>Total</b>	<b>6.31</b>

### 2.8.2 OTHER COSTS:-

#### Utilities and Fittings:-

Utilities and Fittings
------------------------

1. Water	Rs. 0.8Lacs total
2. Power	

### Other Fixed Assests:

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 19.49 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	1.19	1.40	1.91
Work in progress	15 days	2.37	2.80	3.82
Packing material	15 days	0.90	1.06	1.45
Finished goods' stock	15 days	3.85	4.55	6.20

Receivables	30 days	7.69	9.09	12.40
Working expenses	30 days	0.81	0.96	1.31
Total current assets		16.81	19.87	27.09
Trade creditors		0.00	0.00	0.00
Working capital gap		16.81	19.87	27.09
Margin money (25%)		4.20	4.97	6.77
Bank finance		12.61	14.90	20.32

## 2.10 TOTAL PROJECT COST AND MEANS OF FINANCES

### Project Cost and Means of Finance

Particulars	Amount in Lakhs
i. Land and building (20 x 32 x 12 ft - LxBxH)	5.18
ii. Plant and machinery	6.31
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	4.85
Total project cost (i to vii)	20.14
Means Of finance	
i. Subsidy	9.87
ii. Promoters Contribution	4.83
iii. Term Loan (@10%)	5.44

## 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

Expenditure, Revenue and Profitability Analysis							
		150	MT				
	80.4						
	Particulars	1st Year	2nd Year	3rd Year	4 th Year	5th year	6th year
A	Total Installed Capacity (MT)	80.4 MT Kodo millet flour/Annum	82.5	97.5	112.5	135	150
	Capacity utilization (%)	Under Const.	55%	65%	75%	90%	100%
B	<b>Expenditure (Rs. in Lakh)</b>	0					
	Kodo millet flour (Av. Price @ Rs. 30/Kg )	0.00	11.96	14.13	16.30	19.57	21.74
	Invert syrup @ Rs. 25/kg	0.00	0.90	1.06	1.22	1.47	1.63
	Sugar @ Rs. 35/kg	0.00	5.16	6.10	7.04	8.45	9.38
	Fat @ Rs. 110/kg	0.00	7.45	8.81	10.16	12.20	13.55
	Essence @ Rs. 1000/Kg	0.00	0.80	0.94	1.09	1.30	1.45
	Other materials	0.00	2.59	3.06	3.54	4.24	4.72
	Packaging materials (Rs 12 per Kg)	0.00	9.90	11.70	13.50	16.20	18.00
	Utilities (Electricity, Fuel)	0.00	0.62	0.73	0.84	1.01	1.12
	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
	<b>Total Expenditure</b>	<b>2.96</b>	<b>49.96</b>	<b>57.22</b>	<b>64.48</b>	<b>75.22</b>	<b>82.38</b>
C	<b>Total Sales Revenue (Rs. in Lakh)</b>	<b>0.00</b>	<b>99.00</b>	<b>117.00</b>	<b>135.00</b>	<b>162.00</b>	<b>180.00</b>
	Sale of Kodo millet cookies (Av. Sale Price @ Rs.120/kg)	0.00	99.00	117.00	135.00	162.00	180.00
D	<b>PBDIT (Total exp.-Total sales rev.) (Rs. in Lakh)/Cash Inflows</b>	<b>-2.96</b>	<b>49.04</b>	<b>59.78</b>	<b>70.52</b>	<b>86.78</b>	<b>97.62</b>
	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	0.63	0.57	0.51	0.46	0.41	0.37
	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%	0.57	0.55	0.52	0.50	0.47	0.44
	Interest on working capital @ 12%	0.00	1.75	1.75	1.75	1.75	1.75
E	Profit after depreciation and Interest (Rs. in Lakh)	<b>-4.54</b>	<b>47.58</b>	<b>58.42</b>	<b>69.27</b>	<b>85.62</b>	<b>96.55</b>

F	Tax (assumed 30%) (Rs. in Lakh)	0.00	14.27	17.53	20.78	25.69	28.97
G	Profit after depreciation, Interest & Tax (Rs. in Lakh)	-4.54	33.30	40.90	48.49	59.93	67.59
H	Surplus available for repayment (PBDIT- Interest on working capital-Tax) (Rs. in Lakh)	0.57	0.55	0.52	0.50	0.47	0.44
I	Coverage available (Rs. in Lakh)	0.57	0.55	0.52	0.50	0.47	0.44
J	Total Debt Outgo (Rs. in Lakh)	0.19	0.21	0.23	0.25	0.28	0.31
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)	-3.53	34.22	41.73	49.24	60.62	68.21
M	Payback Period	2.5 Years					
	(on Rs. 19.49 Lakhs initial investment)						

## 2.13 REPAYMENT SCHEDULE

Year	Beginning	PMT	Interest	Principal	Ending Balance
1	5,43,771.35	75,431.52	56,552.22	18,879.30	5,24,892.05
2	5,24,892.05	75,431.52	54,588.77	20,842.74	5,04,049.31
3	5,04,049.31	75,431.52	52,421.13	23,010.39	4,81,038.92
4	4,81,038.92	75,431.52	50,028.05	25,403.47	4,55,635.45
5	4,55,635.45	75,431.52	47,386.09	28,045.43	4,27,590.02
6	4,27,590.02	75,431.52	44,469.36	30,962.16	3,96,627.86
7	3,96,627.86	75,431.52	41,249.30	34,182.22	3,62,445.65
8	3,62,445.65	75,431.52	37,694.35	37,737.17	3,24,708.48
9	3,24,708.48	75,431.52	33,769.68	41,661.84	2,83,046.64
10	2,83,046.64	75,431.52	29,436.85	45,994.67	2,37,051.97
11	2,37,051.97	75,431.52	24,653.41	50,778.11	1,86,273.86
12	1,86,273.86	75,431.52	19,372.48	56,059.04	1,30,214.83

13	1,30,214.83	75,431.52	13,542.34	61,889.18	68,325.65
14	68,325.65	75,431.52	7,105.87	68,325.65	0.00
		10,56,041.24	5,12,269.89	5,43,771.35	(5,43,771.35)

## 2.14 ASSET'S DEPRECIATION

Assets' Depreciation (Down Value Method)	Amounts in Lakhs							
Particulars	1st Year	2nd year	3 rd 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	6.31	5.68	5.11	4.60	4.14	3.73	3.35	3.02
Depreciation	0.63	0.57	0.51	0.46	0.41	0.37	0.34	0.30
Depreciated value	5.68	5.11	4.60	4.14	3.73	3.35	3.02	2.72
Other Fixed Assets	0.80	0.68	0.58	0.49	0.42	0.35	0.30	0.26
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	12.29	11.28	10.36	9.53	8.78	8.09	7.46	6.89
Depreciation	1.01	0.92	0.83	0.76	0.69	0.63	0.57	0.52
Depreciated value	11.28	10.36	9.53	8.78	8.09	7.46	6.89	6.37

## 2.15 FINANCIAL ASSESSMENT OF THE PROJECT

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

Particulars	1st Year	2nd year	3 rd year	4th year	5th year	6th year	7th year	8th year	
Capital cost (Rs. in Lakh)	20.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Recurring cost (Rs. in Lakh)	2.96	49.96	57.22	64.48	75.22	82.38	82.38	82.38	
Total cost (Rs. in Lakh)	23.10	49.96	57.22	64.48	75.22	82.38	82.38	82.38	517.11
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)								6.37	
Total benefits (Rs. in Lakh)	0.00	99.00	117.00	135.00	162.00	180.00	180.00	186.37	1059.37
Benefit-Cost Ratio (BCR): (Highly Profitable project)	<b>2.049</b>								
Net Present Worth (NPW):	542.26								

## 2.16 BREAK EVEN ANALYSIS

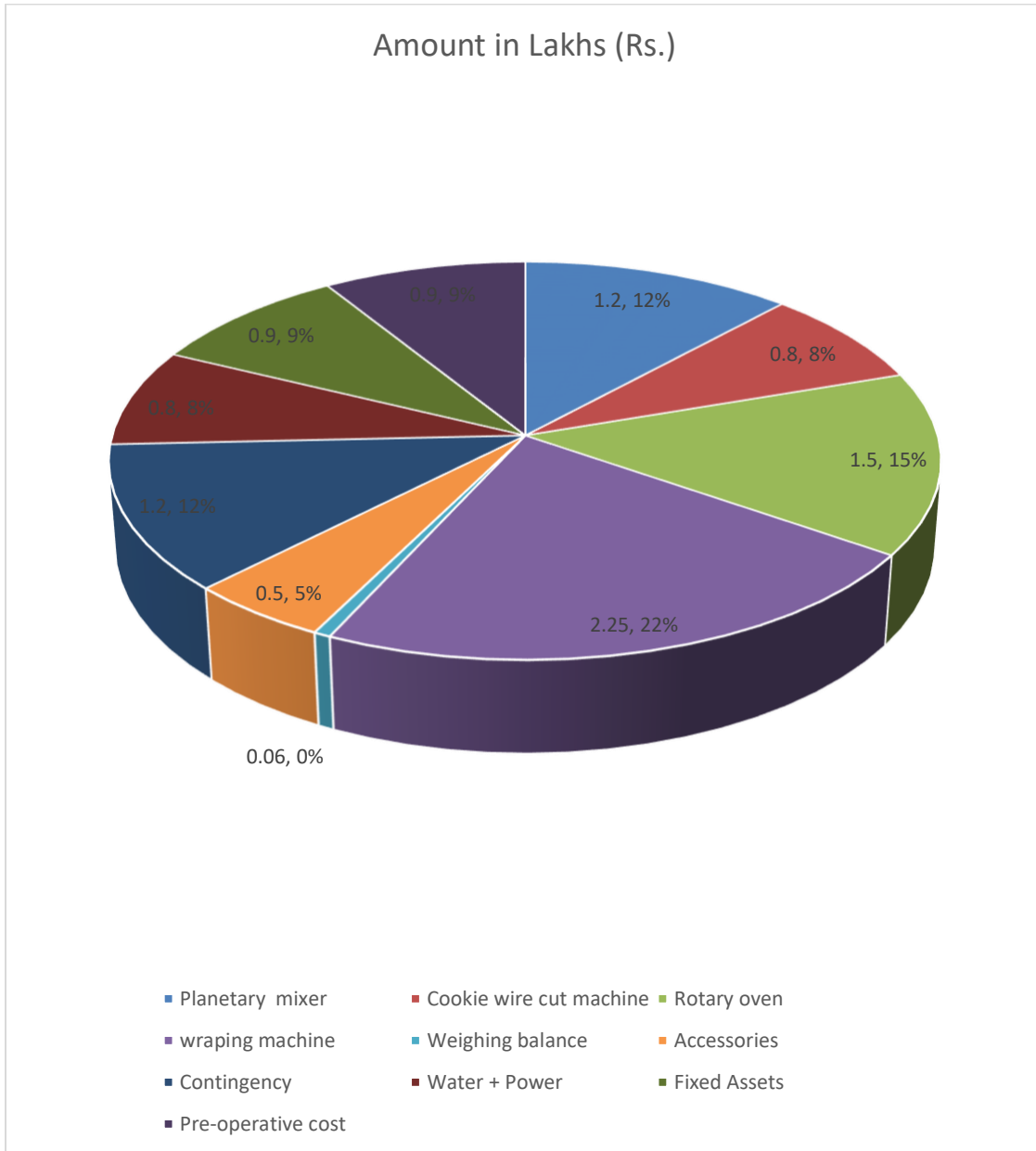
Break even analysis indicates costs-volume profit relations in the short run. This is the level at which, the firm is in no loss no profit situation.

### Break-Even Analysis

Sr. No.	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
<b>A</b>	<b>Fixed Cost (Rs. in Lakh)</b>								
	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	0.63	0.57	0.51	0.46	0.41	0.37	0.34	0.30
	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	0.57	0.55	0.52	0.50	0.47	0.44	0.41	0.38
	Insurance	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	<b>Total Fixed Cost (Rs. in Lakh)</b>	<b>9.16</b>	<b>9.05</b>	<b>8.94</b>	<b>8.84</b>	<b>8.75</b>	<b>8.65</b>	<b>8.57</b>	<b>8.48</b>
<b>B</b>	<b>Sales Revenue (Rs. in Lakh)</b>	<b>0</b>	<b>99</b>	<b>117</b>	<b>135</b>	<b>162</b>	<b>180</b>	<b>180</b>	<b>180</b>
<b>C</b>	<b>Variable Cost (Rs. in Lakh)</b>								
	Kodo millet flour (Av. Price @ Rs.30/Kg)	0.00	11.96	14.13	16.30	19.57	21.74	21.74	21.74
	Invert syrup @ 25 per kg	0.00	0.90	1.06	1.22	1.47	1.63	1.63	1.63
	Sugar @ 35 per kg	0.00	5.16	6.10	7.04	8.45	9.38	9.38	9.38
	Fat @ 110 per kg	0.00	7.45	8.81	10.16	12.20	13.55	13.55	13.55
	Esence @ 1000 per kg	0.00	0.80	0.94	1.09	1.30	1.45	1.45	1.45
	Other ingredients	0.00	2.59	3.06	3.54	4.24	4.72	4.72	4.72
	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	0.62	0.73	0.84	1.01	1.12	1.12	1.12
	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	1.75	1.75	1.75	1.75	1.75	1.75	1.75

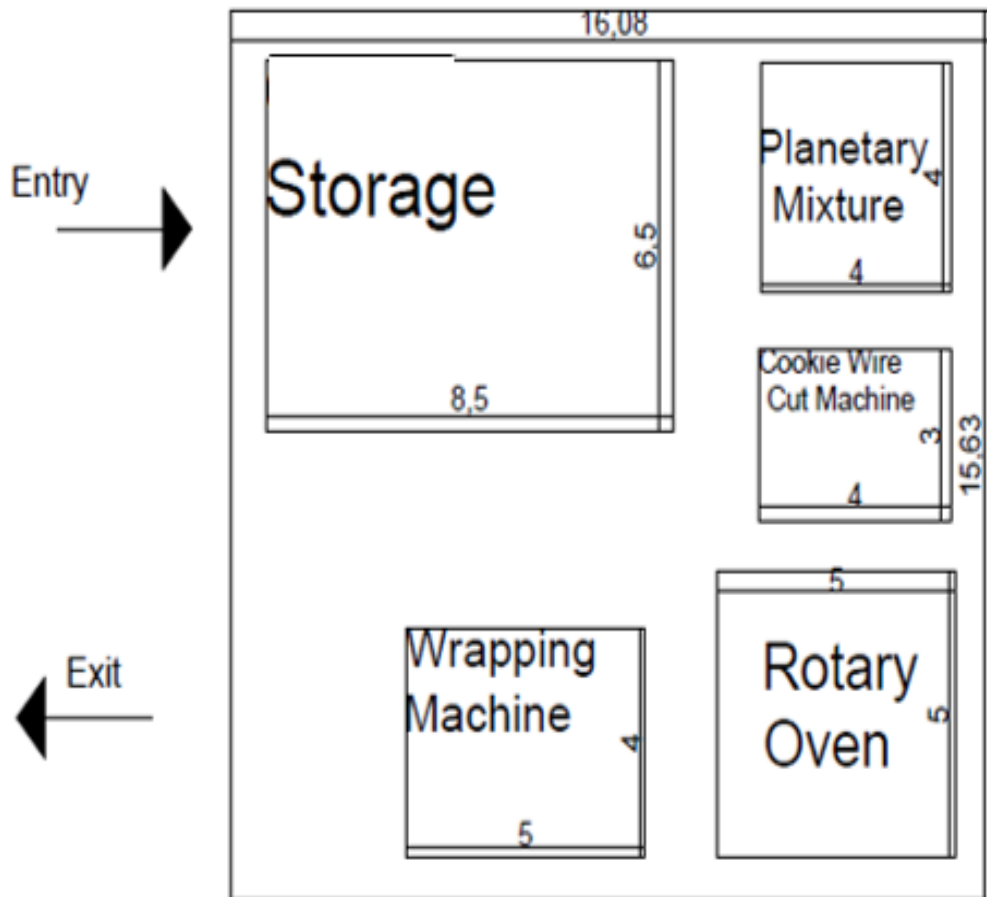
	<b>Total Variable Cost (Rs. in Lakh)</b>	<b>0.50</b>	<b>49.61</b>	<b>56.87</b>	<b>64.12</b>	<b>74.86</b>	<b>82.02</b>	<b>82.02</b>	<b>82.02</b>
D	Break Even Point (BEP)								
	as % of sale	-	12.00	10.00	8.00	8.00	7.00	7.00	6.00
	Break Even Point (BEP) in terms of sales value (Rs. in Lakhs)	-	11.88	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 KODO MILLET COOKIES 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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