Model Detailed Project Report

PUFFED/ FLAKED RICE

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

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1 EXECUTIVE SUMMARY

India is the world's largest producer across a range of commodities due to its favorable agro climatic conditions and rich natural resource base. Puffed rice is "ideally suited for consumption as breakfast cereal and snack food. Due to low Fat, Very Low Sodium, No cholesterol, High in Manganese, Niacin, Riboflavin and No Sugar Dieticians are referring Puffed Rice for Ideal Break Fast. When you have unexpected guests drop by and need to whip up a quick snack Puffed Rice Upma is the best way.

Rice has shaped the culture, diets and economic of thousands of millions of peoples. For more than half of the humanity “rice is life”. Considering its importance position, the United Nation designated year 2004 as the “International Year of rice”.

India produces annually 89 million tones of rice (second largest producer of rice in the world), but, only 10 percent of it is converted to different value added products such as puffed rice, popped rice or flaked rice. Puffed rice has got a highest demand both in national and international market. Quality factors such as uniform puffing, contamination free, good colour, crispness etc. are the major concern for export of puffed rice. However, the production of puffed rice in India is only limited to village levels. The puffing method traditionally followed in India is sand-roasting. The whole process of puffing is very tedious, time consuming and involves a large amount of skilled labour working in hot conditions.

The Puffed Rice Market to grow at a substantial Compound Annual Growth Rate during the forecast period 2017-2022. With the increase in demand for muri, farmers are growing more rice to meet the demands.

Puffing of food is done by using high temperature, pressure, or extrusion. In puffing process expansion of seed is carried out and at that period the vapor pressure escapes through the micropores of the grain structure due to high pressure or thermal gradient. There are different methods of puffing viz. dry heat, sand and salt treated, hot air popping, gun puffing, popping in hot oil, and microwave heating. A wide range of cereals and millets used for puffing such as rice, wheat, corn, sorghum, and ragi.

TABLE 1 PROJECT AT GLANCE

1	**Name of the proposed project**	**Puffed Rice Unit**
2	Name of the entrepreneur/FPO/SHG/ Cooperative	
3	Nature of proposed project	
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	1 Ton/day (60, 70 & 80% capacity utilization in the 2nd, 3rd and 4th years' onwards respectively)
11	Raw materials	Rice
12	Major product outputs	Puffed Rice
13	Total project cost :	Rs. 21.52 Lakhs
	· Land development, building & civil : construction	Rs. 3.50 Lakhs
	· Machinery and equipment's :	Rs.12.47 Lakhs
	· Utilities (Power & water facilities) :	Rs.0.5 Lakhs
	· Miscellaneous fixed assets :	Rs.0.5 Lakhs
	· Pre-operative expenses :	Rs.0.90 Lakhs
	· Contingencies :	Rs.1.50 Lakhs
	· Working capital margin :	Rs.2.15 Lakhs
14	Working capital requirement	
	· 2nd year	Rs.4.47 Lakhs
	· 3rd year	Rs.5.93 Lakhs
	· 4th year	Rs.6.90 Lakhs
15	Means of Finance	
	· Subsidy grant by MoFPI (max 10 lakhs) : :	Rs. 10.00 Lakhs
	· Promoter's contribution (min 20%)	Rs. 4.30 Lakhs
	· Term loan (45%) :	Rs. 7.21 Lakhs
16	Debt-equity ratio	1.95
17	Profit after Depreciation, Interest & Tax	
	· 2nd year	Rs.10.32 Lakhs
	· 3nd year	Rs.8.13 Lakhs
	· 4nd year	Rs.9.76 Lakhs
18	Average DSCR	Rs.5.32 Lakhs
19	Benefit-Cost Ratio	1.11
20	Term loan repayment	7 Years with 1year grace period
21	Payback period for investment	2 Years 10 Months

2 OBJECTIVE OF THE PROJECT

The Prime Objective of the Report is to present a Viable Bankable Model of **"Puffed/ Flaked Rice Manufacturing Unit"** through adoption of appropriate technology, utilization of resources, quality production and suitable market strategy.

Some important objectives behind setup of "Puffed/ Flaked Rice Processing Unit" are:

- ✓ The prime objective is to setup this unit is to produce & make available quality product in most hygienic conditions with good packaging, untouched & with very less human interference during entire operations till market.
- ✓ To produce & market safe, quality-assured products with highest nutrient value than existing one.
- ✓ Improve customer's nutrition by allowing them to consume quality processed product.
- ✓ Empowering the lifestyle of promoter by adopting proper techniques in production and marketing of final product.
- ✓ Proper utilization of land, water, labour & other resources for better plant economics.
- ✓ Employment generation for youth and women in surrounding areas.

3 PROJECT PROFILE

TABLE 2
PROJECT DESCRIPTION

PARTICULARS	DESCRIPTION
Project Name	**"SET UP OF PUFFED/ FLAKED RICE MANUFACTURING UNIT"**
Project Location	Tamilnadu, India.
Project Area	5000 Sqft.
Project Proposed Economic Activities	✓ Setup of Puffed/Flaked Rice Manufacturing Unit with optimum capacity
Project Capacity/Annum	**Puffed/ Flacked Rice Manufacturing Unit** ✓ 1000 kg/Day Capacity

4 GENERAL OVERVIEW OF RICE PRODUCTION, CLUSTERS, PHM AND VALUE ADDITION IN INDIA

4.1 INTRODUCTION

Rice is the world's most important food cereal crop and a main food source for more than a third of the world's population. More than 90% of the world's rice is cultivated and consumed in Asia where 60% of the world's people live. Rice provide about 35 to 60% of the calories consumed by 3 billion Asians. Rice is grown on about 148 million hectares annually, or on 11% of the world's cultivated land. Rice is the only major cereal crop that is consumed almost exclusively by humans. Earth's rice production was 553 million tons in 1996. China, the largest producer, produced 187 million tons followed by India (122 million tons), Indonesia (50million tons), Bangladesh (27 million tons), Vietnam (24million tons), Thailand (21million tons) and Myanmar (20 million tons) . But only about 4% of the world's rice production is traded internationally. Thailand is world's leading rice exporter, selling about 4–6 million tons yearly. The United States is the second largest exporter, even though it ranks 11th in production. It produces 6 million tons yearly and market about 40% of it. Vietnam, Pakistan and Myanmar each market about a million tons yearly. India market about 4 million tons in 1995 while decline in 1996 but market only about 2 million tons. Iran, Iraq and Saudi Arabia are the main foreign buyers, taking about 0.9, 0.7, and 0.5 million tons annually. African countries, where demand for rice is increasing at a rate of about2%yearly, buy around 3million tons or about 25% of the total world imports each year. The importance of rice in the diet varies among countries. It provides over 70% of the daily calorie intake in countries such as Bangladesh, Cambodia, Laos, and Myanmar but drops to about 40% in countries such as China and India whose northern areas consume more wheat. Rice is also an important staple in Latin America, Africa and Middle East. The number of rice consumption is increasing at the rate of 1.5% annually where as it production at present increase only at the rate of 1.0% annually. According to the United Nation (UN) estimation, the world population will have increased from 6.7 billion at present to about 8 billion by 2025, therefore its production must increase from 440 million tons at present to 475 million tons by 2020. Food Agricultural Organization(FAO) estimates that by 2050 the world rice requirement will be 524 million tones which required annual increased of 2 million tons from the present level of production. To meet with challenge of producing more rice from the existing land resources, therefore upland rice varieties with a highly yield potential are required, to achieve this there is need to know how photoperiod regulate flowering in rice which is the key success to a high potential yields.

4.2 ORIGIN, DISTRIBUTIN AND PRODUCTION OF RICE

Rice cultivation probably dates back to the antiquity and has probably been the staple food and the first cultivated crop in Asia. In India, rice has been cultivated since ancient times. This supported by archaeological evidences and by the numerous references made to rice in ancient Hindu scriptures and literature. Carbonised paddy grains were found in the excavation at Hasthinapur (Uttar Pradesh) at a site dated between 1000-750 B.C. This is the oldest rice specimen yet known in the world. From the study of Sanskrit and of other different languages in South Eastern Asia, many investigators have come to the conclusion that rice was known in India before the present era.

De candolle (1886) and Watt (1892) thought that South India was the place where cultivated rice originated. Vavilov (1926) suggested that India and Burma should be regarded as the centre of origin of cultivated rice.

Rice is the world's leading food crop, cultivated over an area of about 155 million hectares with a production of about 596 million tonnes (paddy). In terms of area and production it is second to wheat. It provides about 22 per cent of the world's supply of calories and 17% of the proteins. Maximum area under rice is in Asia. Among the rice growing countries, India has the largest area (44.8 million hectares) followed by China and Indonesia. In respect of production, India ranks second with 131 million tonnes of paddy next to China (200 million tonnes of paddy). In regard to average yield per hectare, Egypt ranks first followed by USA. Average rice yield of India is only 2929 kg per hectare. The leading countries producing rice crop are Japan, Brazil, China, India, Indonesia, Bangladesh, Vietnam, Thailand, Myanmar and Philippines. In India, rice is grown in almost all the states. Andhra Pradesh, Bihar, Uttar Pradesh, Madhya Pradesh and West Bengal lead in the area. West Bengal and Uttar Pradesh have the highest rice production. The average yield per hectare is highest in Punjab (3346 kg/ha).

Rice farming is the largest single use of land for food. Rice production totaled 600 million tonnes. 90% rice is produced in Asia alone. Only 6-7% of production is exported from area of production. Rice field covers 11% of arable land. It is the most important economic activity of earth. Rice eaters and growers form the bulk of the worlds' poor. Single most important activity of rural people in the world. Rice is grown in 250 million Asian farms. Rice farming is 10,000 years old. Once basis of social order and occupied major place in religions and customs. Rice is used pay debts, wages, and rent. Staple food for largest number of humanity in the world. It is single largest source of energy for poor. Rice is synonym with food throughout Asia.

In India, rice is grown under widely varying conditions of altitude and climate. Rice cultivation in India extends from 8 to 350 N latitude and from sea level to as high as 3000 metres. Rice crop needs a hot and humid climate. It is best suited to regions which have high humidity, prolonged sunshine and an assured supply of water. The average temperature required throughout the life period of the crop ranges from 21 to 370 C. At the time of tillering the crop requires a higher temperature than for growth. Temperature requirement for blooming is in the range of 26.5 to 29.50 C. At the time of ripening, the temperature should be between 20-250 C. Photo-periodically, rice is a short-day plant. However, there are varieties which are non-sensitive to photoperiodic conditions.

In India, rice is grown under so diverse soil conditions that it can be said that there is hardly any type of soil in which it cannot be grown, including alkaline and acidic soils. Soils having good water retention capacity with good amount of clay and organic matter are ideal for rice cultivation. Clay or clay loams are most suited for rice cultivation, such soils are capable of holding water for long and sustain crop. Rice being a semi-aquatic crop grows best under submerged conditions. A major part of rice crop in India is grown under 'lowland' conditions. Rice plant is able to tolerate a wide range of soil reaction, but, it does have a preference for acidic soils. It grows well in soils having a pH range between 5.5 and 6.5. It can be grown on alkali soils also, after treating them with gypsum or pyrite.

4.3 VARITIES

There are many varieties of rice available which varies in size, colour and texture. There is white , brown , red and black rice that has different nutritional benefits are used in it's own way based on the region where it is available. Each type of rice comes with its own unique qualities, features,

texture, smell, flavor, and uses. From the aromatic jasmine rice to the nutty brown rice, every type of rice is simply unique, to say the least.

White Rice

One of the main health benefits of this Indian rice is the energy it provides. White rice is the easiest food to digest at any time of the day, which is why it is recommended for children and adults. The other good aspect of white rice is that it helps in relieving digestive disorders such as diarrhoea, dysentery, colitis and even morning sickness.

Brown Rice

The best Indian rice to consume is brown rice. This type of rice has endless benefits which will keep you fit and active. It has less starch, less calories and much more. Brown rice is also an excellent source of soluble fiber. The oil present in this rice is good to reduce bad cholesterol.

Red Rice

Not many are fond of red rice. However, if you want to stay healthy and fit, red rice is your answer. Consuming this Indian rice helps to keep your iron count normal. It also regulates blood sugar and insulin. Besides, red rice contains vitamin B6, which is important to balance the formation of serotonin and red blood cells. It also helps in the production of DNA cells.

Black Rice

Black rice is good for health. It is helpful for patients who are suffering from Alzheimer's and diabetes. The anti-inflammatory properties and antioxidants present in black rice is higher than in any other type of Indian rice.

Basmati Rice

One cup of basmati rice contains about 20 percent more fibre compared to most of the other Indian types of rice. It is also said that basmati rice has a low to medium glycaemic index. It means that the energy released is slower and comes at a steadier rate leading to a more balanced level of energy.

Jasmine Rice

One of the best health benefits of this Indian type of rice is that it helps to lessen muscle pain in the body due to the presence of high amino acids.

4.4 HEALTH HENEFITS AND NUTRITIONAL IMPORTANCE

India has a wealth of medicinal plants, most of which have been traditionally used in Ayurveda, Unani systems of medicines and by tribal healers for generations. In ancient Indian literature it is clearly mentioned that every plant on this earth is useful for human beings, animals and for other plants. In Ayurveda the medicinal values of rice have been described: rice is considered to be acrid, oleaginous, tonic, aphrodisiac, fattening, diuretic and useful in biliousness. In Chhattisgarh, rice is

widely cultivated and the region is known as "the rice bowl of India". Rice is believed by some to have medicinal properties. Although, this is not scientifically proven effective, it has been used in many countries for medicinal purpose. Rice water is prescribed by the Pharmacopoeia of India as an ointment to counteract inflamed surface. In Indian state Chhattisgarh, Rice is considered as medicinal plant. Insects attacking on rice are also used in Traditional Healing. The Traditional Healers use different parts of medicinal rice in treatment of both common as well as complicated diseases. Medicinal rice variety "Laicha" was so named because of its unique property to prevent "Laicha" disease (skin infection). During the survey it was observed that the younger generation is less aware about these medicinal rice varieties than the older generations, so there is a strong need for documentation of this valuable information about the medicinal values of traditional rice varieties in the region. The poplar medicinal rice Alcha, Laicha, Baissour, Maharaji, Jhilli, KanthiBanko, Udan Pakheru, Ramkeli, ShyamLal, Tenduphool etc. are still under cultivation and in use in Traditional Healing.

Health benefits of rice can be found in more than forty thousand varieties of this cereal available in the world. The two main categories include whole grain rice and white rice. Whole grain rice is not processed much, therefore it is high in nutritional value, whereas white rice is processed so that the bran or outer covering is removed and it has less nutritional value. Rice can also be defined by the length of each grain. Indian or Chinese cuisines specialize in long grained rice, whereas western countries prefer short or medium sized grains. According to Rice-Trade, rice is extremely nutritious.

Great Energy Source:

As rice is rich in carbohydrates, it acts as fuel for the body and aids in normal functioning of the brain.

Cholesterol Free:

Eating rice is extremely beneficial for health, just for the fact that it does not contain harmful fats, cholesterol or sodium. It forms an integral part of balanced diet.

Rich in Vitamins:

Rice is an excellent source of vitamins and minerals like niacin, vitamin D, calcium, fiber, iron, thiamine and riboflavin.

Resistant Starch:
Rice abounds in resistant starch, which reaches the bowel

High Blood Pressure:

As rice is low in sodium, it is considered best food for those suffering from high blood pressure and hypertension.

Cancer Prevention:

Whole grain rice like brown rice is rich in insoluble fiber that can possibly protect against many types of cancers. Many scientists believe that such insoluble fibers are vital for protecting the body against cancerous cells.

Dysentery:

The husk part of rice is considered as an effective medicine to treat dysentery. A three month old rice plant's husks is said to contain diuretic properties. Chinese people believe that rice considerably increases appetite cures stomach ailments and indigestion problems.

Skin Care:

Medical experts say that powdered rice can be applied to cure some forms of skin ailments. In Indian subcontinent, rice water is duly prescribed by ayurvedic practitioners as in undigested form. It aids the growth of useful bacteria for normal bowel movements. An effective ointment to cool off inflamed skin surfaces.

Alzheimer's disease:

Brown rice is said to contain high levels of neurotransmitter nutrients that can prevent Alzheimer's disease to a considerable extent.

Heart Disease:

Rice bran oil is said to have antioxidant properties that promotes cardiovascular strength by reducing cholesterol levels in the body.

TABLE 3
NUTRITIONAL COMPOSITION OF RICE (100 GM EDIBLE PORTION)

Sr.No	Nutrient	Amount	% Daily Value (DV)
1	Calories	130	
2	Carbohydrate	28.7 grams (g)	10%
3	Protein	2.36 g	5%
4	Fat	0.19 g	0%

4.5 CULTIVATION, BEARING AND POST-HARVEST MANAGEMENTS

The rice plant approximately grows up to 2 to 6 ft tall depends on the variety and soil fertility. Rice plant has a 50–100 cm (20–39 in) long and 2–2.5 cm (0.79–0.98 in) broad leaves. The edible rice grain is 5–12 mm (0.20–0.47 in) long and 2–3 mm (0.079–0.118 in) thick.

FIGURE 1
RICE CROP

In India, rice grains are mainly used in South India. Rice can be used for the culinary purpose. There are many rice cultivation methods are available in the worldwide but In India and most Asian countries, the traditional and popular hand methods are used for cultivating and harvesting of the rice crop.

In India, The farmers of some rural areas, they have used the buffalos for land preparation, plantation and harvesting of rice farming. Rice farming can be done in Rabi and Kharif seasons. If you have a proper land, field management, and excellent irrigation facility then you can get the profit in short time of period in rice farming.

Climate Requirement for Rice Farming

Rice farming requires 20°C to 40°C temperature throughout the life period of the crop. It can accept maximum 42°C temperature. Generally, Rice requires hot and humid climatic conditions for its well grow. Rice cultivation is convenient for the area which has an abundant water supply, prolonged sunshine, and high humid land is available.

Soil Requirement for Rice Farming

Rice farming can be done on a different variety of soil like as silts, loams, gravels, acidic and alkaline soils. The deep fertile clayey (rich in organic matter) and loamy soils are considered as an ideal soil or growing rice crop. In rice, farming Propagation is done through rice seeds.

Various Rice Cultivation Methods

Broadcasting method

It is the very old and traditional method for rice farming. In broadcasting, method seeds are cultivated by hand.

The rice cultivation process is suitable for the soil which is not well fertile and lands are dry. The broadcasting method requires less labor and inputs. In this method, you will get the less rice crop yield compare to the other cultivation methods.

Drilling method

In this drilling method sowing of seeds and land, Ploughing can be taken by only two persons. This rice sowing method is generally confined to peninsular of The India.

Transplantation method

This transplantation method is suitable for regions where soil has good fertility and abundant rainfall/irrigation. In this method first of all paddy seeds are cultivated in a nursery. After five weeks you can get the rice seedlings and it is ready for the transplanted in the main field. In this rice cultivation method, you require more labor and inputs. This is the best yield method for rice farming.

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FIGURE 2
CULTIVATION OF RICE

Post-Harvest Management: -

The harvesting is done for the early or medium rice varieties after 26 to 30 days of flowering and for high varieties of rice, it takes 36 to 40 days of flowering. Generally, harvesting of the crop is done when the moisture of rice grain is 20 to 25 %.

Harvesting is the process of obtaining plant parts or component of plant-parts that has reached its physiological maturity or at the stage of growth ideal for separating it from the stock plant. The act of harvesting can be picking, pulling, plucking, slashing, cutting, stripping and shaking the economic part of the plant that is of interest to the harvester. Time to harvest a crop is often determined by changes that takes place in the economic part of the crop and, in some cases, the entire plant. This change can be in the form of visual appearance, smell, colour, size, and the moisture content.

- Stockpiling harvested stalk paddy in bund.

- Drying of harvested stalk.
- Threshing of the dried stalk paddy.
- Gathering up of the threshed paddy in sacks.
- Transport to the village on shoulder or head.
- Cleaning of the paddy (Winnowing).
- Placing winnowed paddy in sacks.
- Storing the winnowed paddy in the house.

4.6 PROCESSING AND VALUE ADDITION IN INDIA

Rice is a staple food for more than half of the world population. The world rice (paddy, unmilled) production in 2015 was estimated at 749.1 million ton by FAO. India accounts for more than 21% of world production, ranking second only to China.

In India, rice is produced in states like West Bengal, Uttar Pradesh, Andhra Pradesh, Punjab, Bihar, Orissa, Chhattisgarh, Assam, Tamil Nadu and Haryana. The country is now self- sufficient in rice production and is also one of the leading exporters of rice in the world market. India's export of rice stood at 23.89 lakh MT in 1997-98. The corresponding value of foreign exchange earned was to the tune of Rs 3,371 crore in 1997-98. Indian Basmati rice has been a favorite among international rice buyers.

Value addition also enhances the profitability of rice production. A wide range of product development like processed and canned, ready-to-eat products, vitamin, iron or calcium enriched flaked or puffed rice, flavoured rice, starch extraction from broken rice and so on are nowadays getting popular. Value-added products from organic rice and therapeutic value medicinal rice varieties have good niche in domestic and export markets.

Rice processing

Rising food prices, infrastructure constraints in supply chain, reduction in available agricultural land, high dependency on monsoon, production technology and techniques, poor management and distribution of food commodities, efficiency and transparency of the system, and several other factors are influencing the food security scenario of the country.

India needs to invest heavily in the agriculture sector which employs almost 50% of the country's workforce and contributes 13.7% of the GDP, including the allied sectors. If losses can be prevented by proper post-harvest management system, more grains will be available to feed more people. Due to improved technologies and activities adopted in India, the post- harvest losses of major food grains have been reduced. In rice, post-harvest losses of 11% were reported in 2004 by State of Indian Farmer-Post Harvest Management-A Millennium Study, whereas in 2010, they have been reported as 5.2 % by CIPHET (ICAR), Ludhiana, 2010.

Problem in high moisture paddy

Paddy is cultivated as double cropping system in many places. One of the crop harvests coincides with the monsoon season. After harvest since there are no efficient farm level mechanical dryers

available, farmers dry the paddy in floor using solar energy but facing difficulties in the monsoon season as the floor is wet and there is continuous rain. If high moisture raw paddy is not dried to moisture level of at least 16% within two days, it leads to germination, heat development, and microbial growth followed by discoloration, musty odour development resulting in more breakage in milling. Development of farm gate suitable dryers solves the problem and reduces the loss.

Parboiling and milling

Rice milling is the oldest and the largest agro processing industry of the country. At present, it has a turnover of more than 25,500 crore per annum. It processes about 85 million ton of paddy per year and provides staple food grain and other valuable products required by over 60% of the population. Paddy grain is milled either in raw condition or after par-boiling, mostly by single hullers of which over 82,000 are registered in the country. Apart from that, there are also a large number of unregistered single hulling units in the country. A good number (60%) of these are linked with par-boiling units and sun-drying yards. Most of the tiny hullers of about 250-300 kg/hr capacities are employed for custom milling of paddy. Apart from that, double hulling units number over 2,600 units, under run disc shellers-cum- cone polishers numbering 5,000 units and rubber roll shellers-cum-friction polishers numbering over 10,000 units are also present in the country. Further, over the years, there has been a steady growth of improved rice mills in the country. Most of these have capacities ranging from 2 ton /hr to 4 ton/ hr. At present, over 1,30,000 rice mills are available in India including modern rice mills.

Parboiling

Parboiling is a hydrothermal treatment in which paddy is soaked in water and steamed to get gelatinized rice. Due to parboiling, the rice gets harder and results in higher milling yield with lesser breakage and more oil content in bran. Besides it also contains more vitamins and minerals in polished rice. Different methods of parboiling are in vogue which include household parboiling, single steaming, double steaming, hot water soaking and steaming. The disadvantage in single steaming is longer soaking time which causes off smell in rice. In conventional rice mills, usually follow single or double steaming method whereas modern rice mills adopt hot soaking method. In modern rice mills, after parboiling, the paddy is dried in mechanical driers.

Milling

Rice milling is the process of removing the husk and part of the bran from paddy in order to produce edible rice. Unlike other food grains, rice is mostly cooked and consumed in whole form. Milling technology is therefore geared to obtain maximum out-turn of milled rice and to reduce breakage to the minimum. Rice milling systems range from the home-scale to the large, complex modern rice-processing installations. They include hand-pounding pestle and mortar, huller, emery sheller-cum-huller mills, emery sheller-cum-cone polisher mills and the modern rubber-roll sheller-cum-vertical emery polishers.

In modern rice mills, the husk is removed first in rubber roll sheller followed by polishing in abrasive emery polishers or friction metal polishers. Polishing is done in two to three stages. Raw paddy milling in steel huller mill results in low milling recovery of around 50 – 54 % with more broken. The recovery of whole rice in a traditional rice mill using steel hullers is around 62-67%. Against it, the

recovery percentage of whole rice in modern rice mills using rubber roll shellers and emery polishers is around 68 -70% in case of milling of parboiled paddy. Further the quality of rice bran obtained in modern rice mill is better with higher oil content.

Modern rice mill

The concept of modern rice milling is essentially to remove the husk separately from paddy and then bran to produce polished rice. The unit-operations are cleaning, destoning, Dehusking, husk separation, paddy-brown rice separation, polishing in stages, grading, silky / humidified polishing, sorting, weighing and bagging. The ultimate cause of rice breakage during milling is the defects in grain. Maintaining good grain quality by proper harvesting, drying and storage practices is therefore of greatest importance for reducing rice breakage. But the type of mill, the moisture content and the grain size and shape are also important.

Value addition of rice

Normally the farmers after harvest sell their product to traders without any further processing. Even a mere primary processing like cleaning and grading will give higher price to the farmers. Further value addition like preparation of brown rice, puffed rice, flaked rice, ready-to-eat foods and extruded foods will increase the income.

Brown rice

It is highly nutritious, however, due to drudgery in preparation by hand pounding it is not popular even though it is traditionally used. Nowadays suitable machineries are available. Brown rice from traditional and organically grown paddy has more commercial value. For getting brown rice, it has to be milled in rubber roll sheller to remove husk followed by unshelled paddy separation.

Puffed rice

Normally puffed rice is prepared by immediate immersing the sand roasted paddy in water, water drained, tempered, dried and milled. The polished rice is treated with solution of salt, sugar, soda salt and puffed in sand medium. From the puffed rice, ready-to-eat products like snack foods can be prepared.

Flaked rice

It is another form of nutritious and quick cooking product from rice. In the production of flaked rice, more losses occur due to more powdering. Soaked paddy is roasted and flaked in edge runner or roller flakers. Technologies are available for preparation of ready-to-cook lemon bath, curd bath, and so on and it has more export potential.

Other products

The flour from rice or broken can be used for various products like murrukku, puttu, noodles, idiyappam and so on. Rice sevai with different tastes will add the value. Rice flour can be used for

preparation of extruded rice. As it is an extruded product with same rice shape, it can be used as ready-to-eat form with different flavours. Another important advantage is fortification with minerals and vitamins. Traditionally value-added products are available. But it is labor-intensive and the products have lesser shelf life. Development of automatic or semi-automatic machineries with hygienic way of preparation, ready-to-serve and with more shelf life is required for commercial exploitation.

5 MODEL PUFFED/ FLAKED RICE PROCESSING UNDER FME SCHEME

5.1 LOCATION OF 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 ideal locations for establishment of exclusive Puffed/ Flaked Rice processing unit are in the production clusters of Rice growing states/Areas such as Bihar, Tripura, West Bengal, Uttar Pradesh, Punjab, Haryana and Uttarakhand where adequate quantities of surplus raw materials can be available for processing.

5.2 INSTALLED CAPACITY OF PUFFED/ FLAKED RICE PROCESSING PLANT

The maximum installed capacity of the manufacturing unit in the present model project is proposed as 1000 kg/day Puffed/ Flaked Rice. The unit is assumed to operate 300 days/annum @ 8-10 hrs/day. The 1st year is assumed to be construction/expansion period of the project; and in the 2nd year 60 percent capacity, 3rd year 70 percent capacity and 4th year onwards 80 percent capacity utilization is assumed in this model project.

5.3 RAW MATERIAL REQURIMENT FOR THE UNIT

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. 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.

5.4 MANUFACTURING PROCESS

Puffed Rice

Puffed rice is very popular in India as a low cost ready-to-eat breakfast cereal as well as snack because of its crispness and lightness. It is also a favourite food product made in different forms like puffed rice balls, bars and fatty pastes, chocolate (or) boiled sugar confectioneries in many countries. Puffing of rice grains results from the sudden expansion of water vapour (steam) in the interstices of starch granules during high-temperature-short-time (HTST) heating of the grains. The particle is fixed in its expanded state by the dehydration resulting from the rapid diffusion of the water vapour out of it. Puffed product should be maintained around 3 percent moisture in order to achieve the desired crispness.

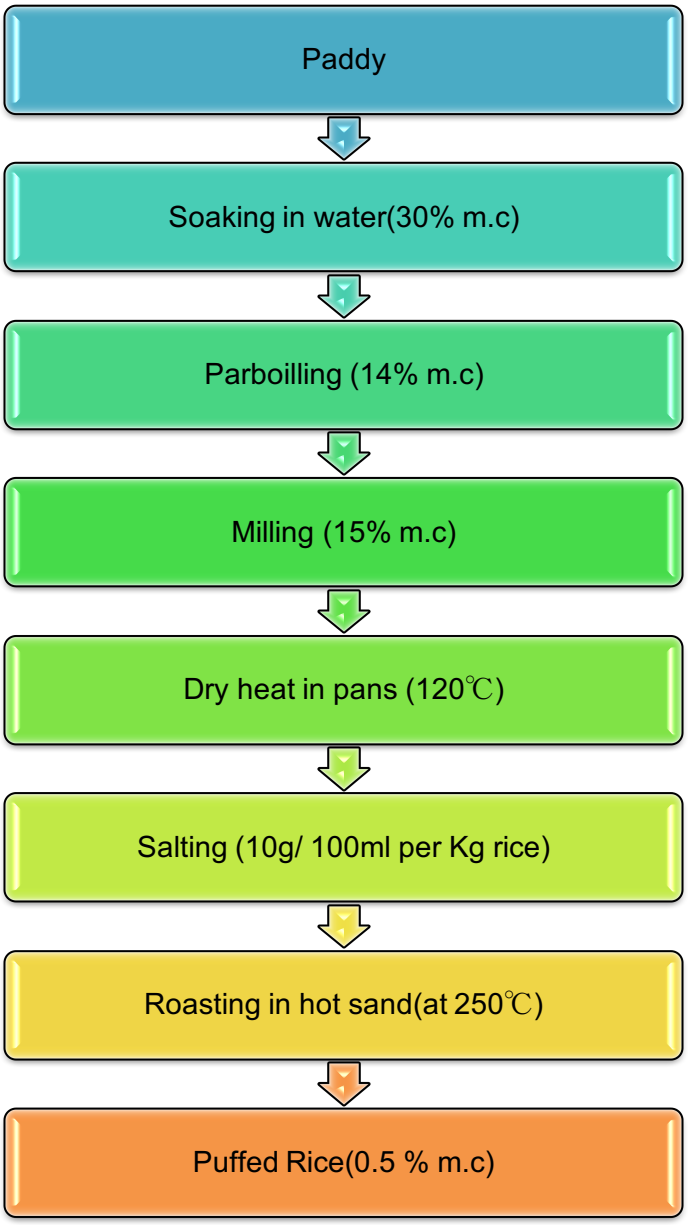
Puffing processes may be broadly classified into two groups:

1) atmospheric pressure processes which rely upon the sudden application of heat to obtain the necessary rapid vaporization of water, and

2) pressure drop processes which consists of suddenly transferring superheated particles into a space at lower pressure.

The pressure drop may be achieved by releasing the seal on a yes el containing a product, which has been equilibrated with high temperature steam or it may be secured by transferring the hot material from the atmosphere into an evacuated chamber.

FIGURE 3 PUFFED RICE PRCOESS FLOWCHART



Soaking

At cottage level, soaking is done in metal drums or cement tanks for about 10–12 h. After soaking conditioned for 2–3 h within the soaking tank. The moisture content of soaked paddy reaches 25–33%, depending on climatic condition.

Parboiling

It involves steeping the soaked paddy in hot water and steaming at steam pressure of 1.5 kg/ cm2 for 10 minutes.Then drying is done to reduce the moisture content to around 14%.This process allows the vitamins and minerals present in the hulls and bran coat to be carried into the endosperm.

Milling

The parboiled paddy is passed through de-husker and polisher for the removal of husk and bran layers, respectively. The obtained parboiled rice having the moisture level of 14–15% was tempered to achieve the moisture content.

Dry heating

The rice is now preheated under slow heat for 35 minutes in order to attain approximate grain temperature of 110°C.

Salting

Salt conditioning of parboiled rice is usually done to increase the smoothness and uniformity of puffing. A salt solution of 10 percent concentration was sprayed at the rate of 100 millilitres per kilogram of milled rice and kept for 15 hours.

Roasting

The conditioned paddy is roasted in a paddy roaster maintained at the temperature of 270–280 °C for an exposure of parboiled paddy to a short time duration.

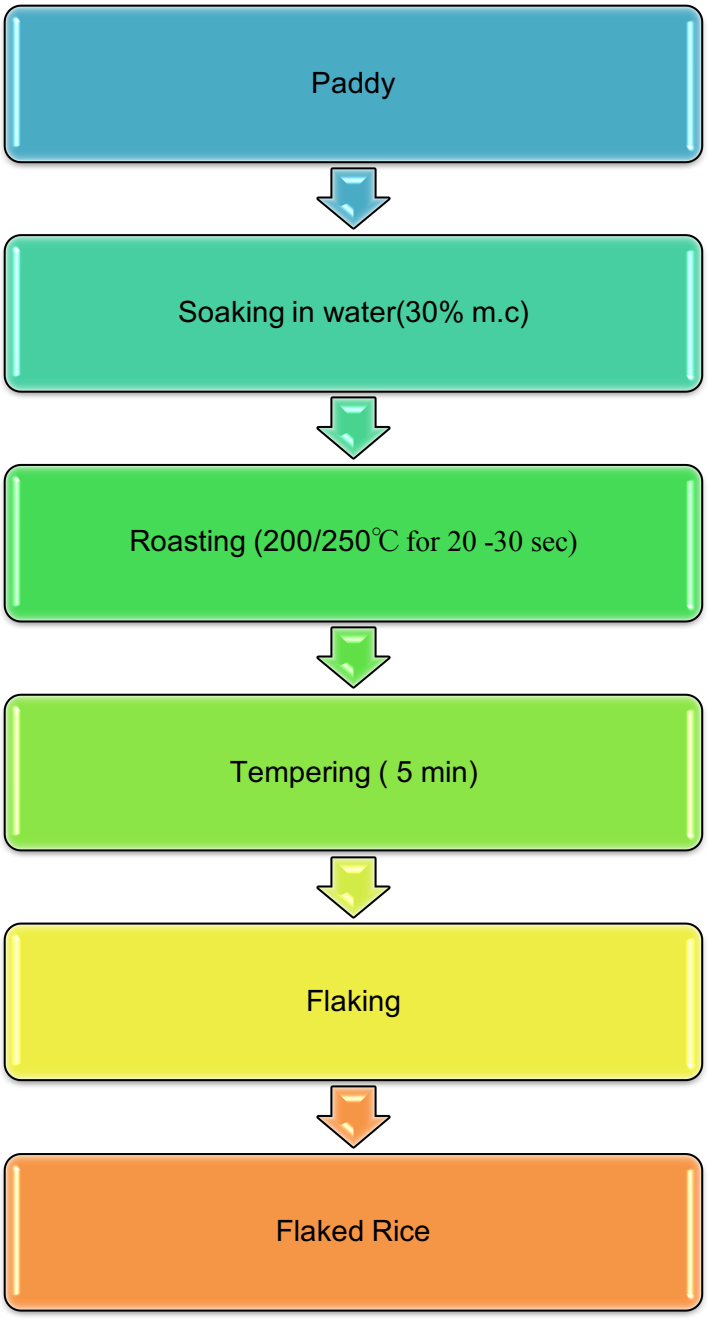
The obtained puffed rice is then cooled to room temperature.

Flaked Rice

Flaked rice is a major product in India. It is known by a number of names, including aval (Tamil), avalakki (Kannada), atukulu (Telugu), and poha (Hindi). It has played an important role in religious ceremonies for a very long time, and it is also one of the main breakfast items in the states of Maharashtra, Madhya Pradesh, Karnataka, Gujarat, and Rajasthan. Flaked rice is consumed raw or with milk. The common dishes made with it are onion poha and potato poha. The roasted, thick-flaked rice called chiwda or chura is used in namkins, which are a fried, crispy snack made with a mixture of cereals and pulses.

The processes involved in creating flaked rice are cold or hot soaking, roasting, flaking, sieving, and packing. There are a number upgrades for the flaked rice industry, including developing a method to achieve uniform moisture content of the soaked paddy and advancement of the temperature control systems of the roasters. Increased interaction with government departments and R&D institutions will further enhance the future of this rice product. In flaked rice production, generally freshly harvested paddy is preferred, as it gives more whiteness.

FIGURE 4 FLAKED RICE PRCOESS FLOWCHART



Soaking

At cottage level, soaking is done in metal drums or cement tanks for about 10–12 h. After soaking conditioned for 2–3 h within the soaking tank. The moisture content of soaked paddy reaches 25–33%, depending on climatic condition.

Roasting

The conditioned paddy is roasted in a paddy roaster maintained at the temperature of 200–250 °C for an exposure of parboiled paddy to a short time duration.

Tempering

The roasted paddy is moistened and conditioned to obtain different types of flakes, such as thick (~1 mm), medium (~0.6 mm), thin (0.55–0.3 mm), and very thin (<0.3mm).

Flaking

Roasted paddy is collected in bamboo baskets and fed into an edge runner in1-2kg batches. It is then flaked for 15–60 sec, depending on the quality of flaked rice. Thin flaked rice is obtained. Edge runners are batch type flaking machines with the capacity to flake 50, 100, and 140 kg/hr of paddy. In edge runners, the paddy is pressed in between the body of the edge runner and the flaking roller. Different types of flakes can be produced and the end products can be categorized according to the thickness of the flakes. The flaked rice is sieved in a sieve shaker in order to separate small, broken, powdered material and lumps. The shelf life of the thick type of flaked rice is less than the medium and thin types as it contains more moisture and undergoes less polish than the other grades.

TABLE 4 DIFFERENT TYPES OF FLAKES BASED ON THICKNESS

Sr.No	Type of flakes	Thickness (mm)
1	Thick	~1
2	Medium	~0.6
3	Thin	0.55–0.3
4	Very thin	<0.3

5.5 MAEKRT DEMAND AND SUPPLY FOR PUFFED / FLAKED RICE

The snack food is one of the most important areas of the food industry. Designing snack foods today can be a complex process to meet changing consumers taste and expectations and elusive search for something unique that also appeals to a wide variety of people. Most snack manufacturers use some form of existing technology as the basis for creating snack products and incorporate variations that increase the resulting snacks' health image. Therefore, puffing and popping using advance technologies are processes, which can accomplish all these targets. As the simplest, inexpensive and quickest traditional method of dry heat application for preparation of weaning food formulations and ready-to-eat snacks products, popping and puffing have been practiced since hundreds of years. Explosion puffing by sudden release and expansion of water vapour is a relatively well known and widely used process. Puffed grain being a pre-cooked ready-to-eat material can be used in snack foods,specialty foods and as a base for development of supplementary foods. Examples ofthe use of the puffing process are the manufacture of expanded rice. Convenient snack foods like popcorn, popped and puffed rice, popped sorghum, popped wheat roasted and puffed soybean and other legumes are very popular not only in Indian sub- continent, but also worldwide. The production

level of this rice product is not known exactly, but it has been indicated that about 10% of total rice production is utilized for flaked rice, expanded rice and popped rice. In states where it is consumed as breakfast, there is more production and larger industries exist. In Karnataka, the flaked rice production centers are situated at Hubli, Bhadravathi, Davengare, Udipi, and Belgam. Gujrat, Navasari, Ahmedabad, Umreth, and Bavala are the locations of other major production centers, and Madhya Pradesh and Orissa are major producers as well. In other states, production is only at a cottage level. Rice products being gluten free can be a suitable breakfast food item especially for the patients' undergoing the hardship of celiac disease. Puffed rice possesses adequate amounts of nutrient, dietary fiber and phyto-chemicals, which have been linked to minimize disease risk. The bran, which is rich source of oil (19–23%) also contains natural antioxidant. The γ-oryzanol as natural antioxidant lowers the total cholesterol and low-density lipoprotein cholesterol level on consumption and thus reduces the risk of coronary heart diseases. The incidences of life style disorders in present days are accelerating mainly due to sedentary lifestyle with the dependence on unhealthy food combinations with or without the junk foods. So, there is a need to move towards the traditional whole grain based foods. As pre cooked product with unique flavor the puffed rice is becoming an important readyto-eat food item. Thus, the present investigation is planned to characterize thechanges in the properties at different stages of puffed rice manufacturing.

5.6 MARKETING STRATEGY FOR RICE PRODUCTS

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

5.7 DETAIL PROJECT ASSUMPTIONS

This model DPR for Puffed/ Flaked Rice 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 Rice processing unit by adding Puffed/ Flaked Rice manufacturing 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. Rice cost considered @ Rs.40/-per kg.
2. 1 kg Rice will produce 80% recovery.
3. 1 Batch size is approximately 100 kg.
4. No. of hours per day are approximately 8-10 hours.
5. Batch yield is 95%

TABLE 5
PROJECT SUMMARY

Detailed Project Assumptions		
Sr.No	**Parameter**	**Value**
1	Capacity of the processing unit	1200 Kg/Day Rice
2	Utilization of capacity	1st year implementation, 60% in 2nd year, 70% in 3rd year and 80% in 4th year onwards.
3	Working days per year	300 days
4	Working hours per day	8 hrs.
5	Interest on term and working capital loan	12%
6	Repayment period	Seven years with one year grace period is considered.
7	Average prices of raw material	Rs. 30/Kg.
8	Recovery rate	80%
9	Selling Price	Rs.50/Kg

TABLE 6
FIXED CAPITAL INVESTMENT

Sr. No.	**Particulars**	**Size/ Dimensions / Specification**	**Quantity (No)**	**Unit Cost (Rs)**	**Amount (Rs)**	**Amount (Lakh)**
A	**Capital Investment**		**1 Plot**		3,50,000	3.50
	Capital Investment				**3,50,000**	**3.50**
B	**Machinery & Equipment's**					
1	Puffed Rice Making Machine	1500 Kg	1	400000	4,00,000	4.00
2	Soaking Vessels	100 kg/hr	1	150000	1,50,000	1.50
3	Digital Weighing Machine	up to 100 kg	4	4,300	17,200	0.17
4	Packaging Machinery	2000 pack/ hr	1	575000	5,75,000	5.75
5	Plastic Trays & Utensils				1,00,000.	1.00
6	Miscellaneous				5,000	0.05
	Machinery & Equipment's				**12,47,200**	**12.47**
C	**Other Costs**					
C1	**Utilities & Fittings**					
1	Water					
2	Power				50,000	0.50

	Total				**50,000**	**0.50**
C2	**Other Fixed Assets**					
1	Furniture & Fixtures				50,000	0.50
2	Electrical Fittings					
3	Plumbing Work					
	Total				**50,000**	**0.50**
C3	**Pre-operative Expenses**					
1	Legal Expenses, Start -up Expenses, Establishment Cost, Consultancy fees, Trials and others				90,000	0.90
	Total				**90,000**	**0.90**
C4	**Contingency**				**1,50,000**	**1.50**
	Total				**1,50,000**	**1.50**
C	**Total Cost (C1+C2+C3+C4)**				**3,40,000**	**3.40**
II	**Total Cost (I+F+G)**				**19,37,200**	**19.37**

TABLE 7

WORKING CAPITAL REQUIRMENTS

Sr. No.	Description	Quantity	Unit Rate/ Kg	Total Cost (Rs) /Day	Total Cost (Rs) / Month	Total Cost (Rs) / Year
1	Rice	1200	30	36,000	9.00	90.00
2	Packaging Material (1 kg)	1,000	2.5	2,500	0.63	6.25
3	Labour - Cleaning, Stem Removing	6	300/day	1,800	0.45	4.50
4	Supervisor / Manager	1	500/ day	500.00	0.15	1.50
5	Electricity			500	0.13	1.25
6	Transportation			500	0.13	1.25
7	Miscellaneous			1000.00	0.25	2.50
	Total working Cost			**42,800.00**	**10.73**	**107.25**
	Margin for Working Capital 20%				2.15	

TABLE 8 TOTAL PROJECT COST

Sr. No.	Particulars	Amount In Lakhs
i	Land Development & Building Structure	3.50
ii	Plant & Machinery	12.47
iii	Other Fixed Assets	1.90
iv	Working Capital Margin	2.15
v	Contingency	1.50
vi	Total Project Cost	21.52

TABLE 9 MEANS OF FINANCE

Sr. No.	Particulars	Amount In Lakhs
i	Subsidy	10.00
ii	Promoters Contribution	4.30
iii	Term Loan	7.21
	Total Means of Finance (1 to 3)	21.52

TABLE 10 EXPENDITURE, REVENUE AND PROFITABILITY

PARTICULARS	YEAR					
	1st yr	2nd yr	3rd yr	4th yr	5th yr	6th yr
A. INCOME						
Sales of Puffed / Flaked Rice	-	68.18	89.51	104.32	126.43	141.89
Total	**-**	**68.18**	**89.51**	**104.32**	**126.43**	**141.89**
B.EXPENSES						
Raw Material	-	45.00	59.67	69.53	84.24	94.50
Consumables	#REF!	-	-	-	-	-
Packing cost	-	3.13	4.14	4.83	5.85	6.56
Transportation cost	#REF!	0.63	0.83	0.97	1.17	1.31
Direct employee cost	#REF!	3.00	3.98	4.64	5.62	6.30
Depreciation	-	2.56	2.21	1.91	1.65	1.43
Office Rent						
Plant Electricity Cost	#REF!	0.63	0.83	0.97	1.17	1.31
Miscellaneous	#REF!	1.25	1.66	1.93	2.34	2.63
Office Expenses	-	0.66	0.73	0.80	0.88	0.97
Telephonic Expences	-	0.06	0.60	0.66	0.73	0.80
Indirect Employee	-	0.50	0.50	0.50	0.50	0.50

Repair & Maintenance	-	0.50	1.50	1.65	1.82	2.00
Audit, Accounts & Compliance	-	0.44	0.44	0.48	0.53	0.59
Insurance		0.5	2	2	2	3
Total Cost	**-**	**58.85**	**79.08**	**91.05**	**108.91**	**121.55**
Add :- Opening Stock		-	6.37	8.40	9.79	11.86
Less :- Closing Stock	-	6.37	8.40	9.79	11.86	13.31
Cost of Sales	**-**	**52.47**	**77.06**	**89.67**	**106.84**	**120.10**
GROSS PROFIT	**-**	**15.70**	**12.46**	**14.65**	**19.60**	**21.78**
	#DIV/0!	23.03%	13.92%	14.05%	15.50%	15.35%
FINANCE EXPENSES						
Interest on Term Loan	0.87	0.80	0.67	0.55	0.43	0.30
Interest On CC		0.16	0.16	0.16	0.16	0.16
Total Interest	**0.87**	**0.96**	**0.84**	**0.71**	**0.59**	**0.47**
PROFIT BEFORE TAX	**-0.87**	**14.74**	**11.62**	**13.94**	**19.01**	**21.32**
INCOME TAX (30%)	-0.26	4.42	3.49	4.18	5.70	6.39
PROFIT AFTER TAX	**-0.61**	**10.32**	**8.13**	**9.76**	**13.30**	**14.92**

TABLE 11 REPAYMENT SCHEDULE

Year	Outstanding loan at start of yr.	Disburse- ment	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	-0.00	7.21	7.21	1.54	0.87	0	0.87	7.21	0.67
2	7.21		7.21	4.05	0.80	1.03	1.83	6.18	2.22
3	6.18		6.18	5.62	0.67	1.03	1.71	5.15	3.92
4	5.15		5.15	7.78	0.55	1.03	1.58	4.12	6.20
5	4.12		4.12	10.41	0.43	1.03	1.46	3.09	8.95
6				12.42	0.30	1.03	1.33		11.08

	3.09		3.09					2.06	
7	2.06		2.06	13.41	0.18	1.03	1.21	1.03	12.20
8	1.03		1.03	16.09	0.06	1.03	1.09	-	15.00

TABLE 12 ASSETS DEPRECIATION

PARTICULARS	YEAR					
	1st yr	**2nd yr**	**3rd yr**	**4th yr**	**5th yr**	**6th yr**
Building Structure						
Opening Bal.		3.50	3.15	2.84	2.55	2.30
Additions	3.50					
Less :- Depreciation @ 10%		0.35	0.32	0.28	0.26	0.23
Closing Bal.	3.50	3.15	2.84	2.55	2.30	2.07
PARTICULARS	YEAR					
	1st yr	**2nd yr**	**3rd yr**	**4th yr**	**5th yr**	**6th yr**
Plant Machinery						
Opening Bal.		12.47	10.60	9.01	7.66	6.51
Additions	12.47					
Less :- Depreciation @ 15%		1.87	1.59	1.35	1.15	0.98
Closing Bal.	12.47	10.60	9.01	7.66	6.51	5.53
PARTICULARS	YEAR					
	1st yr	**2nd yr**	**3rd yr**	**4th yr**	**5th yr**	**6th yr**
Other Required Material & Accessories						
Opening Bal.		3.40	3.06	2.75	2.48	2.23
Additions	3.40					
Less :- Depreciation @ 10%		0.34	0.31	0.28	0.25	0.22
Closing Bal.	3.40	3.06	2.75	2.48	2.23	2.01
TOTAL DEPRECIATION	-					
PARTICULARS	YEAR					
	1st yr	**2nd yr**	**3rd yr**	**4th yr**	**5th yr**	**6th yr**

Building Structure	-	0.35	0.32	0.28	0.26	0.23
Plant Machinery	-	1.87	1.59	1.35	1.15	0.98
Other Required Material & Accessories	-	0.34	0.31	0.28	0.25	0.22
TOTAL DEPRECIATION	-	2.56	2.21	1.91	1.65	1.43

TABLE 13 FINANCIAL ASSESSMENT OF PROJECT

	YEAR							
	1st yr	**2nd yr**	**3rd yr**	**4th yr**	**5th yr**	**6th yr**	**7th yr**	**8th yr**
Cost	19.37	58.85	79.08	91.05	108.91	121.55	122.56	123.09
Benefit	-	68.18	89.51	104.32	126.43	141.89	143.31	144.74
Discounting Rate	0.91	0.83	0.75	0.68	0.62	0.56	0.51	0.47
P.V Cost	17.61	48.63	59.42	62.19	67.62	68.61	62.89	57.42
P.V Benefit	-	56.34	67.25	71.25	78.51	80.09	73.54	67.52

Total P.V Cost	444.40
Total P.V Benefit	494.50
Benefit Cost Ratio	**1.11**

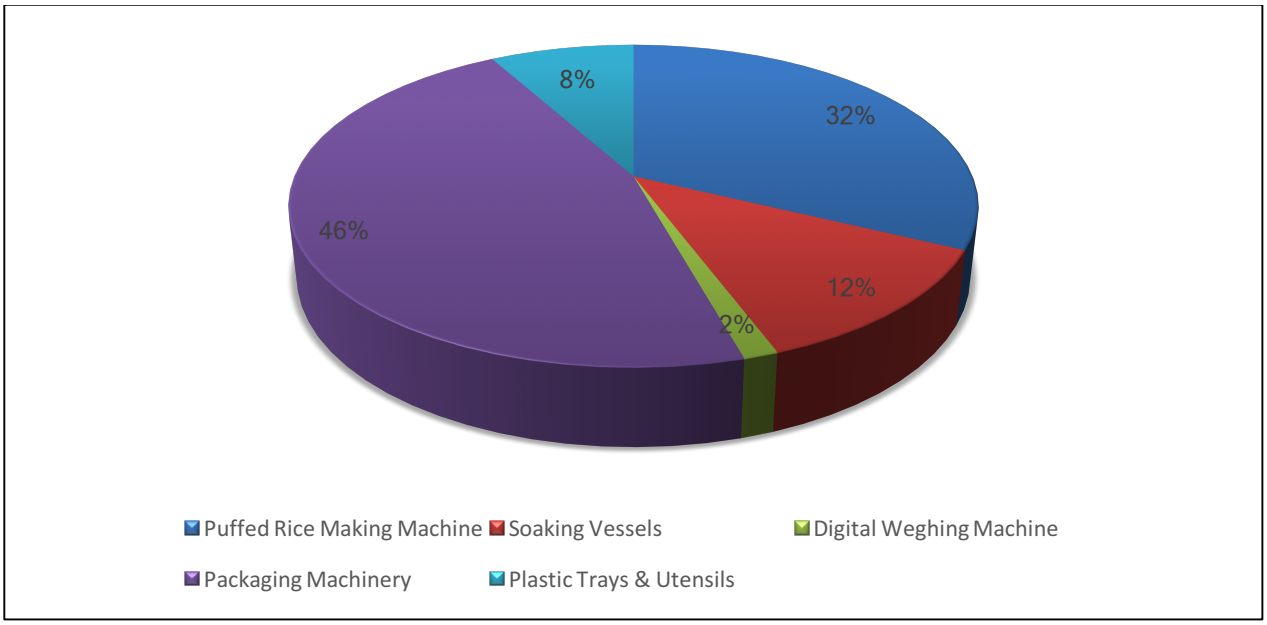
TABLE 14 BREAK EVEN ANALYSIS

PARTICULARS	**Year**					
	1st yr	**2nd yr**	**3rd yr**	**4th yr**	**5th yr**	**6th yr**
Annual Production in Kg	-	1,35,000	1,75,500	2,02,500	2,43,000	2,70,000
Revenue	-	68.18	89.51	104.32	126.43	141.89
Selling Cost Per Kg		50.50	51.01	51.52	52.03	52.55
	-					
Office & General Expenses	-	1.16	1.77	1.94	2.14	2.35
Depreciation		2.56	2.21	1.91	1.65	1.43
	-					
Total Fixed Cost	-	3.72	3.98	3.85	3.79	3.78
Total Fixed Cost Per Kg		2.76	2.27	1.90	1.56	1.40
	-					
Total Variable Cost	-	51.75	68.62	79.95	96.88	108.68
Variable Cost Per Kg		38.33	39.10	39.48	39.87	40.25
	-					
Contribution	-	16.43	20.89	24.36	29.56	33.21
Contribution per Unit		12.17	11.91	12.03	12.16	12.30
Contribution in %	-	24%	23%	23%	23%	23%
	-					
Break Even Point kg		0	0	0	0	0
Break Even Point Rs	-	2.96	3.21	3.09	3.02	3.01

Break Even In %	-	22.65	19.04	15.81	12.82	11.38
Margin Of Safety	-	65.21	86.30	101.23	123.41	138.87

FIGURE 5

PIA CHART FOR BETTER UNDERSTANDING OF EXPENCES OF EACH HEAD

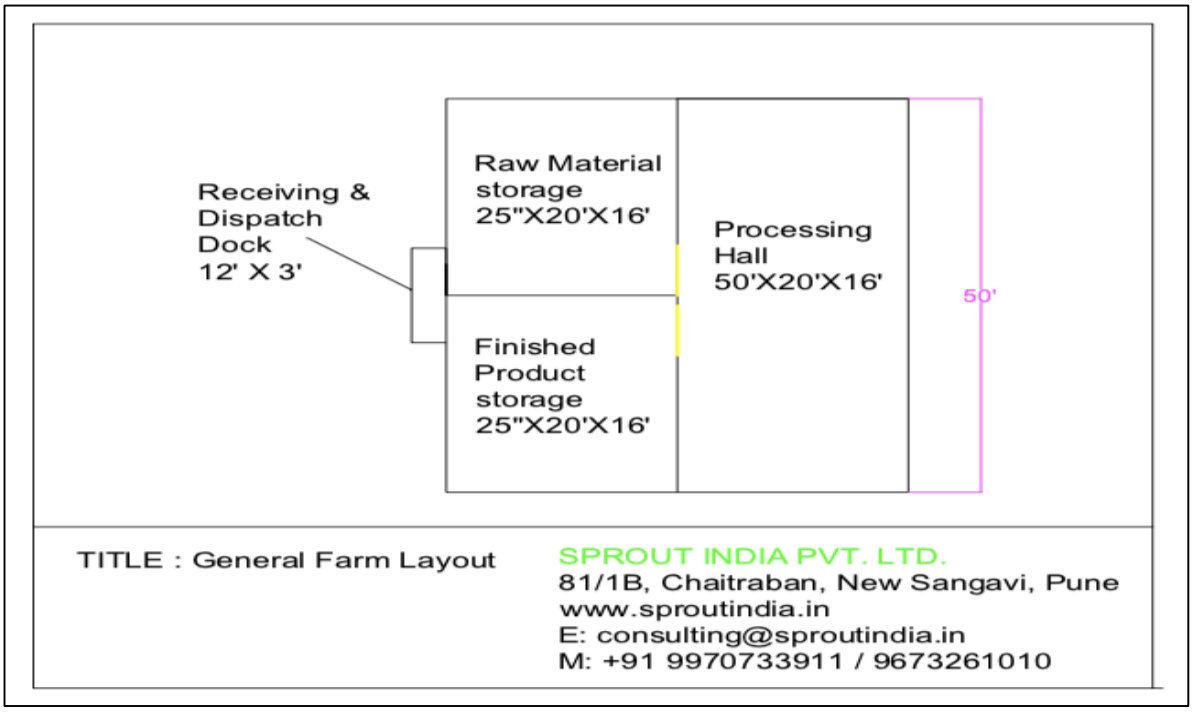


5.8 MACHINERY SAPPLIERS

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

1. Rising Industries Sukantapally, Kolkata, West Bengal.
2. Rajputana Engineering Sector 64, Noida, Gautam Budh Nagar, Uttar Pradesh.
3. Proveg Engineering & Food Processing Private Limited , Pune , Maharashtra, Pune.

FIGURE 6
PLANT LAYOUT



6 LIMITATIONS OF MODEL DPR AND GUIDELINES FOR ENTREPRENEURS

6.1 6.1 LIMITATIONS OF MODEL 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.

6.2 6.2 GUIDELINES FOR ENTEPRENURES

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.

- **END OF THE REPORT -**