MINISTRY OF FOOD PROCESSING INDUSTRIES
GOVERNMENT OF INDIA

PMFME
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NIFTEM
THANJAVUR

PM Formalisation of
Micro Food Processing Enterprises Scheme

DETAILED PROJECT REPORT
FOR
PINEAPPLE CANDY

AATMANIRBHAR BHARAT

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Project at a Glance

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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	Pineapple Fruit
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13	Total project cost (Lakhs)	30.10
	Land development, building & civil construction	4
	Machinery and equipment	16.17
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	Second Year	18.40
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	Subsidy grant by MoFPI (max 10 lakhs)	9.93
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	2nd year	83.74

	3rd year	96.71
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18	Average DSCR	2.16
	Benefit Cost Ratio	3.036930356
	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 PINEAPPLE PRODUCTION, CLUSTERS, POST-HARVEST MANAGEMENT AND VALUE ADDITION IN INDIA

1.1 INTRODUCTION

The pineapple (*Ananas comosus*) is a tropical plant with an edible fruit and the most economically significant plant in the family *Bromeliaceae.* The pineapple is indigenous to South America, where it has been cultivated for many centuries. The introduction of the pineapple to Europe in the 17th century made it a significant cultural icon of luxury. Since the 1820s, pineapple has been commercially grown in greenhouses and many tropical plantations. Further, it is the third most important tropical fruit in world production. In the 20th century, Hawaii was a dominant producer of pineapples, especially for the US; however, by 2016, Costa Rica, Brazil, and the Philippines accounted for nearly one-third of the world's production of pineapples.

Pineapples grow as a small shrub; the individual flowers of the unpollinated plant fuse to form a multiple fruit. The plant is normally propagated from the offset produced at the top of the fruit, or from a side shoot, and typically mature within a year.

The important pineapple going countries of the world are the Hawaiian Islands, Philippines, Malaysia, Thailand, Brazil, Ghana, Kenya, Mexico, Taiwan, South Africa, Australia, Puerto Rico and India. India produces more than 8% of total world production of pineapple. The major pineapple producing states in India are Assam, West Bengal, Karnataka, Meghalaya, Manipur, Arunachal Pradesh, Kerala and Bihar.

1.2 ORIGIN, DISTRIBUTION AND PRODUCTION OF PINEAPPLE

The pineapple (*Ananas comosus:* *Bromeliaceae*) is one of the most popular tropical fruits. The name pineapple in English (or piña in Spanish) comes from the similarity of the fruit to a pinecone. Ananas comes from anana, the Tupi word for the fruit, meaning "excellent fruit". Comosus means tufted and refers to the stem of the fruit. Pineapple is an important tropical fruit showing an increasing demand worldwide, over the years. World trade on fresh pineapple has shown 100 % increase during the last one decade. Even though India is the fifth largest producer of pineapple in the world, its share in the world market is only 0.1 %. The different Asian countries and the countries around the Indian ocean is importing about two lakh tons of pineapple in an year, mostly coming from distant countries. This market can be exploited by Kerala if an earnest effort is made in the right direction.

Native to southern Brazil and Paraguay (perhaps especially the Parana-Paraguay River) area where wild relatives occur, the pineapple was apparently domesticated by the Indians and carried by them up through South and Central America to Mexico and the West Indies long before the arrival of Europeans. Christopher Columbus and his shipmates saw the pineapple for the first time on the island of Guadeloupe in 1493 and then again in Panama in 1502. Caribbean Indians placed pineapples or pineapple crowns outside the entrances to their dwellings as symbols of friendship and hospitality. Europeans adopted the motif and the fruit was represented in carvings over doorways in Spain, England, and later in New England for many years. The plant has become naturalized in Costa Rica, Guatemala, Honduras and Trinidad but the fruits of wild plants are hardly edible.

Spaniards introduced the pineapple into the Philippines and may have taken it to Hawaii and Guam early in the 16th Century. The first sizeable plantation 5 acres (2 ha)—was established in Oahu in 1885. Portuguese traders are said to have taken seeds to India from the Moluccas in 1548, and they also introduced the pineapple to the east and west coasts of Africa. The plant was growing in China in 1594 and in South Africa about 1655. It reached Europe in 1650 and fruits were being produced in Holland in 1686 but trials in England were not

success ful until 1712. Greenhouse culture flourished in England and France in the late 1700's. Captain Cook planted pineapples on the Society Islands, Friendly Islands and elsewhere in the South Pacific in 1777. Lutheran missionaries in Brisbane, Australia, imported plants from India in 1838. A commercial industry took form in 1924 and a modern canning plant was erected about 1946. The first plantings in Israel were made in 1938 when 200 plants were brought from South Africa. In 1939, 1350 plants were imported from the East Indies and Australia. but the climate is not a favorable one for this crop.

Over the past 100 years, the pineapple has become one of the leading commercial fruit crops of the tropics. In 1952-53, world production was close to 1,500,000 tons and reportedly nearly doubled during the next decade. Major producing areas are Hawaii, Brazil, Malaysia, Taiwan, Mexico, the Philippines, South Africa and Puerto Rico. By 1968, the total crop had risen to 3,600,000 tons, of which only 100,000 tons were shipped fresh (mainly from Mexico, Brazil and Puerto Rico) and925.000 tons were processed. In the period 1961-66, imports of fresh pineapples into Europe rose by 70%. Soon many new markets were opening. In 1973, the total crop was estimated at 4,000,000 tons with 2.2 million tons processed. The increased worldwide demand for canned fruit has greatly stimulated plantings in Africa and Latin America. For years, Hawaii supplied 70% of the world's canned pineapple and 85% of canned pineapple juice, but labor costs have shifted a large segment of the industry from Hawaii to the Philippines. Because production costs in Hawaii (which are 50% labor) have increased 25% or more, Dole has transferred 75% of its operation to the Philippines, where, in 1983, it employed 10,000 laborers on about 25,000, mostly rented, acres (10,117 ha).

Pineapples were first canned in Malaya by a retired sailor in 1888 and exporting from Singapore soon followed. By 1900, shipments reached a half million cases. The industry alternately grew and declined, and then ceased entirely for 3 1/2 years during World War II. The Malaysian Pineapple Industry Board was established in 1959. Thereafter there has been steady progress. The pineapple, was a very minor crop in Thailand until 1966 when the first large cannery was built. Others followed. Since then processing and exporting have risen rapidly. In 1977-78 many farmers switched from sugarcane to pineapple. Of the annual production of 1 1/2 million tons, 1/8 is canned as fruit or Juice.

South Africa produces 2.7 million cartons of canned pineapple yearly and exports 2.4 million. In addition, 31,000 tons of fresh pineapple are sold on the domestic market and 500,000 cartons exported yearly. As in many areas, pineapple culture existed on a small scale on the Ivory Coast until post WW II when cultural efforts were stepped up. By 1950, annual production amounted to 1800 tons. By 1972, it had risen to 200,000 tons for shipment, fresh or canned, to western Europe. Cameroun's annual production is about 6,000 tons.

In the Azores, pineapples have been grown in green-houses for many years for export mainly to Portugal and Madeira. They are of luxury quality, carefully tended and blemish free, graded for uniform size and well-padded in each box for shipment.

The ten leading exporters of fresh pineapples were (in descending order): Taiwan (39,621 tons), Puerto Rico, Hawaii, Ivory Coast, Brazil, Guinea, Mexico, South Africa, Philippines and Martinique (5,000 tons). The ten leading exporters of processed pineapples were (in descending order): Hawaii, Philippines, Taiwan, South Africa, Malaysia (Singapore), Ivory Coast, Australia, Ryukyu, Mexico, Thailand (10,500,000 tons).

For 250 years, pineapples have been grown in the Bahama Islands. At one time plantings on Eleuthera, Cat Island and Long Island totaled about 12,000 acres. The pineapple was a pioneer crop along the east coast of Florida and or, the Keys. In 1860 fields were established on Plantation Key and Merritt's Island. And in 1876 planting material from the Keys was set out all along the central Florida east coast. Shipping to the North began in 1879. In 1910 there were 5000 to 10,000 acres stretching as far north as Ft. Pierce. There were more than a dozen families raising pineapples on Elliott's Key where an average crop was 50,000 to 75,000 dozen fruits, mostly sent by schooner to New York. When the industry was flourishing, Florida shipped to New York, Philadelphia and Baltimore one million crates of pineapples a year from the sandy ridge along the Indian River. It was believed in those days that the pineapple benefitted by closeness to salt water.

Wood-lath sheds roofed with palmetto fronds, Spanish moss or tobacco cloth were constructed to provide shade which promoted vigorous plant growth and high fruit quality.

Wood-burning ovens were scattered through the sheds for frost protection in winter. Small, open boxcars operating on steam or horsepower ran on wooden rails the length of the shed to transport loads of fruit to the packing station. In open fields, plants were sheltered by palmetto fronds from mid-December to mid-March. 'Smooth Cayenne' had to be grown in sheds. It was not successful in the open. One early planter on Eden Island moved his farm to the mainland because bears ate the ripe fruits. With the coming of the railroad in 1894, pineapple growing expanded. The 1908-09 crop was 1,110,547 crates. Then Cuban competition for U.S. markets caused prices to fall and many Florida growers gave up. The ridge pineapple fields begain to fail as the humus was exhausted by cultivation. Fertilization was steadily raising the pH too high for the pineapple. World War I brought on a shortage of fertilizer, then several freezes in 1917 and 1918 devastated the industry.

In the early 1930's, the United Fruit Company supplied slips for a new field at White City but the pressure of coastal development soon reduced this to a small patch. Shortly after World War II, a plantation of 'Natal Queen' and 'Eleuthera' was established in North Miami but, after a few years, the operation was shifted inland to Sebring, in Highlands County, Central Florida, where it still produces on a small scale.

1.3 VARIETIES

There are different varieties of pineapple growing worldwide. Varieties of Pineapple growing worldwide are described below.

'Smooth Cayenne:

'Cayenne', 'Cayena Lisa' in Spanish (often known in India, Sri Lanka, Malaysia and Thailand as 'Sarawak' or 'Kew') was selected and cultivated by Indians in Venezuela long ago and introduced from Cayenne (French Guyana) in 1820. From there it reached the Royal Botanical Gardens, Kew, England, where it was improved and distributed to Jamaica and Queensland, Australia. Because of the plants near freedom from spines except for the needle at the leaftip and the size-4 to 10 lbs (1.8 4.5 kg)-cylindrical form, shallow eyes, pineapple rind, yellow flesh, low fiber, juiciness and rich mildly acid flavor, it has become of greatest

importance worldwide even though it is subject to disease and does not ship well. Mainly, it is prized for canning, having sufficient fiber for firm slices and cubes as well as excellent flavor.

It was the introduction of this cultivar into the Philippines from Hawaii in 1912 that upgraded the Philippine industry from the casual growing of the semi-wild type which was often seedy. There are several clones of 'Smooth Cayenne' in Hawaii which have been selected for resistance to mealybug wilt. It is the leading cultivar in Taiwan. In 1975, the Queensland Department of Primary Industries, after 20 years of breeding and testing, released a dual purpose cultivar named the 'Queensland Cayenne'. South Africas Pineapple Research Station, East London, after 20 years of selecting and testing of 'Smooth Cayenne' clones, has chosen 4 as superior especially for the canning industry.

Hilo:

It is a variant of 'Smooth Cayenne' selected in Hawaii in 1960. The plant is more compact, the fruit is smaller, more cylindrical; produces no slips but numerous suckers It may be the same as the 'Cayenne Lisse' strain grown in Martinique and on the Ivory Coast, the fruit of which weighs from 1-1 1/2 kg and has a very small crown.

St. Michael:

It is another strain of 'Smooth Cayenne' is the famous product of the Azores. The fruit weighs (2.25-2.75 kg), has a very small crown, a small core, is sweet with low acidity, and some regard it as insipid when fully ripe.

Giant Kew:

well-known in India, bears a large fruit averaging 6 lbs (2.75 kg), often up to 10 lbs (4.5 kg) and occasional up to 22 lbs (10 kg). The core is large and its extraction results in too large a hole in canned slices.

Charlotte Rothschild:

Second to 'Giant Kew' in size in India, tapers toward the crown, is orange-yellow when ripe, aromatic, very juicy. The crop comes in early. 'Baron Rothschild', a Cayenne strain, grown in Guinea, has a smaller fruit 1 3/4 to 5 lbs (0.8-2 kg) in weight, marketed fresh.

Perolera:

Also called 'Tachirense', 'Capachera', 'Motilona', and 'Lebrija') is a 'Smooth Cayenne' type ranking second to 'Red Spanish' in importance in Venezuela. It has long been grown in Colombia. The plant is entirely smooth with no spine at the leaftip. The fruit is yellow, large-7 to 9 1bs (3-4 kg) and cylindrical.

Bumanguesa:

The variety is of Venezuela and Colombia, is probably a mutation of 'Perolera'. The fruit is red or purple externally, cylindrical with square ends, shallow eyes, deep-yellow flesh, very slender core but has slips around the crown and too many basal slips to suit modern commercial requirements.

Monte Lirio:

This variety is of Mexico and Central America, also has smooth leaves with no terminal spine. The fruit is rounded, white-fleshed, with good aroma and flavor. Costa Rica exports fresh to Europe.

1.4 HEALTH BENEFITS AND NUTRITIONAL INFORMATION

Nutritional value:

Food Value Per l00 g of Edible Portion of Pineapple:

Moisture	81.3-91.2 g
Ether Extract	0.03 0.29 g
Crude Fiber	0.3-0.6 g
Nitrogen	0.038-0.098 g
Ash	0.21-0.49 g
Calcium	6.2 37.2 mg
Phosphorus	6.6-11.9 mg
Iron	0.27-1.05 mg
Carotene	0.003 0.055 mg
Thiamine	0.048 0.138 mg
Riboflavin	0.011-0.04 mg
Niacin	0.13-0.267 mg
Ascorbic Acid	27.0-165.2 mg

Pineapples also contain trace amounts of vitamins A and K, phosphorus, zinc and calcium.

They are especially rich in vitamin C and manganese, providing 131% and 76% of the daily recommendations, respectively.

Vitamin C is essential for growth and development, a healthy immune system and aiding the absorption of iron from the diet. Meanwhile, manganese is a naturally occurring mineral that aids growth, maintains a healthy metabolism and has antioxidant properties

CONSTITUENTS AND HEALTH BENEFITS OF PINEAPPLES

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

Health benefits:

1. Treats Cold and Cough:

If you are suffering from a bad cold, then you need to make it a point to eat pineapple. This is because this healthy fruit contains bromelain which is an enzyme that has inflammatory properties that can fight infections and kill bacteria. Eating it regularly can prevent you from a cough and cold.

2. Strengthen Bones:

Pineapple is rich in manganese that helps in strengthening your bones. All you need to do is to add this fruit to your everyday diet and this will help you maintain a strong body and keep your bones strong and healthy. Manganese maintains good bone strength and when it is combined with zinc, copper and calcium this substance can be super healthy. Thus, pineapple has all the components and this is why this fruit can aid in stronger bones.

3. Good for Teeth:

Eating pineapple is said to strengthen your gums and keep your health strong. Your teeth and bones are made up of calcium and pineapple do have good content of it. It also does have manganese that also helps in strengthening bones and teeth.

4. Prevents Cancer:

A pineapple a day can keep cancer away and this is true in the case of this healthy fruit. The best thing about this fruit is that it slows down cell damage and makes you look younger. This fruit has loads of antioxidants in it that can protect you from a wide range of diseases and fights some dangerous organisms that are may affect you.

5. Aids in Digestion:

Gulping down all of those tasty dishes can sometimes make you feel heavy and lead to indigestion. Pineapple has a rich source of bromelain, dietary fibre and vitamin C that helps in good digestion.

6. Good for your Eyes:

Regular consumption of pineapple can reduce your risk of macular degeneration which is diseases that affects the eye as you get older. However, this healthy fruit has a high source of vitamin C and several antioxidants that can aid in good vision.

7. Reduce Symptoms of Arthritis:

Arthritis involves severe pain in the joints which is primarily caused due to inflammation. Pineapple contains bromelain which is said to have major anti-inflammatory property. This will ease joint pain and prevent you from arthritis.

8. Prevents Hypertension:

If you are suffering from hypertension, then make it a point to start eating pineapples regularly as this fruit has high amounts of potassium and lower amounts of sodium that can maintain blood pressure and make you feel relaxed most often.

9. Reduces Risk of Blood Clots:

Bromelain being the major substance in pineapples will reduce your risks of blood clots. Thus, you need to make this healthy fruit your good time pass snack. It can benefit your health in many possible ways and so make it a point to consume this fruit very often.

10. Contain Antioxidants:

Pineapples are rich in nutrients and antioxidants that have the ability to prevent you from diseases that your body is prone to. Your body is prone to a lot of diseases as you age and as a result, this can cause chronic inflammation and weaken your immune system. Pineapple has antioxidants that can boost your immune system and protect you from many diseases.

11. Prevents Nausea:

Pineapple contains digestive enzymes that can reduce nausea. This is because of its bromelain enzyme that will take away nausea, morning sickness and can be very beneficial especially for pregnant women.

12. Natural Energizer:

Pineapple contains valine and leucine which are two substances that are very important for the growth and repair of muscle tissue. The best thing about this fruit is that it will keep you hydrated the entire day and provide all the energy you would need to run yourself.

13. Stress Buster:

Pineapple has serotonin which is a natural stress buster that keeps your hormones and nerves relaxed.

Pineapple Benefits for Skin

Pineapple is good for your overall health and similarly, it is also good for your skin and hair too. If you are suffering from acne, skin rashes or skin damage, then you need to consume this healthy fruit which will rejuvenate your skin and make it look clean and fresh. Here are some health benefits of consuming pineapple for the skin.

14. Treats Acne:

Pineapple juice has loads of vitamin C and antioxidants that can treat acne, sun damage and uneven skin toning. Bromelain is a content that can fight against inflammation and swelling in your joints

15. Anti-Ageing Properties:

The older you get your skin begins to lose its glow and you will begin to develop wrinkles. However, pineapple can make you look younger and delay cells from dying. It's rich source of antioxidants and vitamin C is said to boost your immunity and keep you energetic.

1.5 CULTIVATION, BEARING & POST HARVEST MANAGEMENT:-

The pineapple is an herbaceous perennial, which grows to 1.0 to 1.5 m (3.3 to 4.9 ft) tall, Although sometimes it can be taller. In appearance, the plant has a short, stocky stem with tough, waxy leaves. When creating its fruit, it usually produces up to 200 flowers, although some large-fruited cultivars can exceed this. Once it flowers, the individual fruits of the flowers join together to create a multiple fruit. After the first fruit is produced, side shoots (called 'suckers' by commercial growers) are produced in the leaf axils of the main stem. These may be removed for propagation, or left to produce additional fruits on the original plant. Commercially, suckers that appear around the base are cultivated. It has 30 or more long, narrow, fleshy, trough-shaped leaves with sharp spines along the margins that are 30 to 100 cm (1.0 to 3.3 ft) long, surrounding a thick stem. In the first year of growth, the axis lengthens and thickens, bearing numerous leaves in close spirals. After 12 to 20 months, the stem grows into a spike-like inflorescence up to 15 cm (6 in) long with over 100 spirally arranged, trimerous flowers, each subtended by a bract.

The ovaries develop into berries, which coalesce into a large, compact, multiple fruit. The fruit of a pineapple is usually arranged in two interlocking helices. Typically there are eight in one direction and 13 in the other, each being a Fibonacci number.

Cultivation and Bearing:-

The pineapple is a tropical or near tropical plant limited (except in greenhouses) to low elevations between 30°N and 25°S. A temperature range of 65°-95°F (18.33-45°C) is most favorable, though the plant can tolerate cool nights for short periods. Prolonged cold retards growth, delays maturity and causes the fruit to be more acid. Altitude has an important effect on the flavor of the fruit. In Hawaii, the 'Smooth Cayenne' is cultivated from sea level up to 2,000 ft (600 m). At higher elevations the fruit is too acid. In Kenya, pineapples grown at 4500 ft (1371 m) are too sweet for canning; between 4500 and 5700 ft (1371-1738 m) the flavor is most suitable for canning; above 5700 ft (1738 m) the flavor is undesirably acid. Pineapples are grown from sea level to 7545 ft (2300 m) in Ecuador but those in the highlands are not as sweet as those of Guayaquil.

Ideally, rainfall would be about 45 in (1,143 mm), half in the spring and half in the fall; though the pineapple is drought tolerant and will produce fruit under yearly precipitation rates ranging from 25 to 150 in (650-3,800 mm), depending on cultivar and location and degree of atmospheric humidity. The latter should range between 70 and 80 degrees.

The best soil for pineapple culture is a well-drained, sandy loam with a high content of organic matter and it should be friable for a depth of at least 2 ft (60 cm), and pH should be within a range of 4.5 to 6.5. Soils that are not sufficiently acid are treated with sulfur to achieve the desired level. If excess manganese prevents response to sulfur or iron, as in Hawaii, the plants require regular spraying with very weak sulfate or iron. The plant cannot stand waterlogging and if there is an impervious subsoil, drainage must be improved. Pure sand, red loam, clay loam and gravelly soils usually need organic

enrichment. Filter presscake from sugar mills, worked into clay soils in Puerto Rico, greatly enhances plant vigor, fruit yield, number of slips and suckers.

It is difficult to judge when the pineapple is ready to be harvested. The grower must depend a great deal on experience. Size and color change alone are not fully reliable indicators. Conversion of starch into sugars takes place rapidly in just a few days before full maturity. In general, for the fresh fruit market, the summer crop is harvested when the eye shows a light pale green color. At this season, sugar content and volatile flavors develop early and steadily over several weeks. The winter crop is about 30 days slower to mature, and the fruits are picked when there is a slight yellowing around the base. Even then, winter fruit tends to be more acid and have a lower sugar level than summer fruit, and the harvest period is short. Fruits for canning are allowed to attain a more advanced stage. But overripe fruits are deficient in flavor and highly perishable.

Maturity studies conducted with 'Giant Kew' in India showed that highest quality is attained when the fruit is harvested at a specific gravity of 0.98-1.02, total soluble solids of 13.8-17%, or total soluble solids/acid ratio of 20.83-27.24 with development of external yellow color. Some people judge ripeness and quality by snapping a finger against the side of the fruit. A good, ripe fruit has a dull, solid sound; immaturity and poor quality are indicated by a hollow thud.

In manual harvesting, one man cuts off or breaks off the fruits (depending on the cultivar) and tosses them to a truck or passes them to 2 other workers with baskets who convey them to boxes in which they are arranged with the stems upward for the removal of bracts and application of a 3% solution of benzoic acid on the cut stem of all fruits not intended for immediate processing. The harvested fruits must be protected from rain and dew. If moist, they must be dried before packing. All defective fruits are sorted out for use in processing.

If the work is semi-mechanized, the harvesters decrown and trim the fruits and place them on a 30-ft conveyor boom which extends across the rows and carries the fruits to a bin on a forklift which loads it onto a truck or trailer. Some conveyors take the fruits directly into the canning factory from the field. In most regions of the world, pineapples are commonly

marketed with crowns intact, but there is a growing practice of removing the crowns for planting. For the fresh fruit market, a short section of stem is customarily left on to protect the base of the fruit from bruising during shipment.

Total mechanical harvesting is achieved by 2 hydraulically operated conveyors with fingers on the top conveyor to snap off the fruit, the lower conveyor carrying it away to the decrowners. After the fruit has been conveyed away, the workers go through the field to collect the crowns (where they have been left on the tops of the plants) and place them on the conveyors for a trip to the bins which are then fork lifted and the crowns dumped into a planting machine.

Post-harvest management:-

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

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

- Use clean, smooth harvesting bins;
- Make sure packing line equipment is cleaned regularly. This reduces dirt and wax buildup which can cause fruit abrasion;
- Reduce packing line abrasion by using foam, rubber and smooth belts to Cushion fruit;
- Remove old and rotten fruit regularly from the packing shed and surrounds;
- Treat harvested fruit with a registered fungicide within 24hrs of harvest;

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

1.6 PROCESSING & VALUE ADDITION:-

Any step in the production process that improves the product for the customer and results in a higher net worth, is known as value addition. Typical value-added products include jams, jellies, preserves, fruit sauces and spreads, pickles, preserved vegetables, tapenades, hot chili sauces, extra virgin olive oils, herb-flavored olive oils and vinegars, and salsas. Typically fruits and vegetables have a low price when they are in the raw state, but can be processed into a range of dried foods, jams, juice, pickles and etc, which have a considerably higher value. The high added value means that the amount of food that must be processed to earn a reasonable income is relatively small. Hence, the size and type of equipment required to operate at this scale can kept to levels that are affordable to most aspiring entrepreneurs. In many countries, vegetables and fruits are among the most accessible raw materials for processing.

Pineapple is one of the popular fruits and is liked by majority of the people irrespective of their age group. As is the case with most of the fruits and vegetables, their availability is

limited during off-seasons. Many techniques have been developed to make available seasonal fruits as well as vegetables even during off-season. The pineapple does not lend itself well to freezing, as it tends to develop off flavours and lose texture or crispiness. This fruit is highly perishable and seasonal. Hence processing is necessary. Processed pineapple is popular and is exported by many countries. Brazil is considered the main pineapple producing country in the world since 2005. During processing, nutritional quality of pineapple can be affected but there are recent researches carried out which use new technologies to retain the nutritional quality of the pineapple fruit.

2. MODEL PINEAPPLE CANDY 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.

India produces more than 8% of total world production of pineapple. The major pineapple producing states in India are Assam, West Bengal, Karnataka, Meghalaya, Manipur, Arunachal Pradesh, Kerala and Bihar.

2.2 INSTALLED CAPACITY OF THE PINEAPPLE CANDY PROCESSING UNIT

The maximum installed capacity of the Pineapple candy manufacturing unit in the present model project is proposed as150 tonns/annum or 500 kg/day Pineapple candy. The unit is assumed to operate 300 days/annum @ 8-10 hrs/day. The 1styear is assumed to be construction/expansion period of the project; and in the 2nd year 70 percent capacity, 3rd year

80 percent capacity and 4th year onwards 90 percent capacity utilization is assumed in this model project.

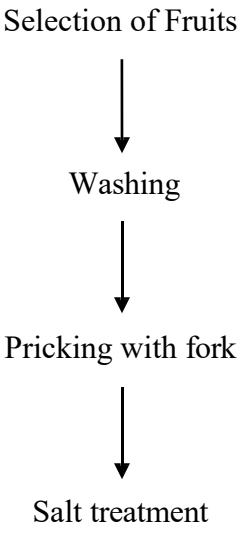
2.3 RAW MATERIAL REQUIREMENTS FOR THE UNIT

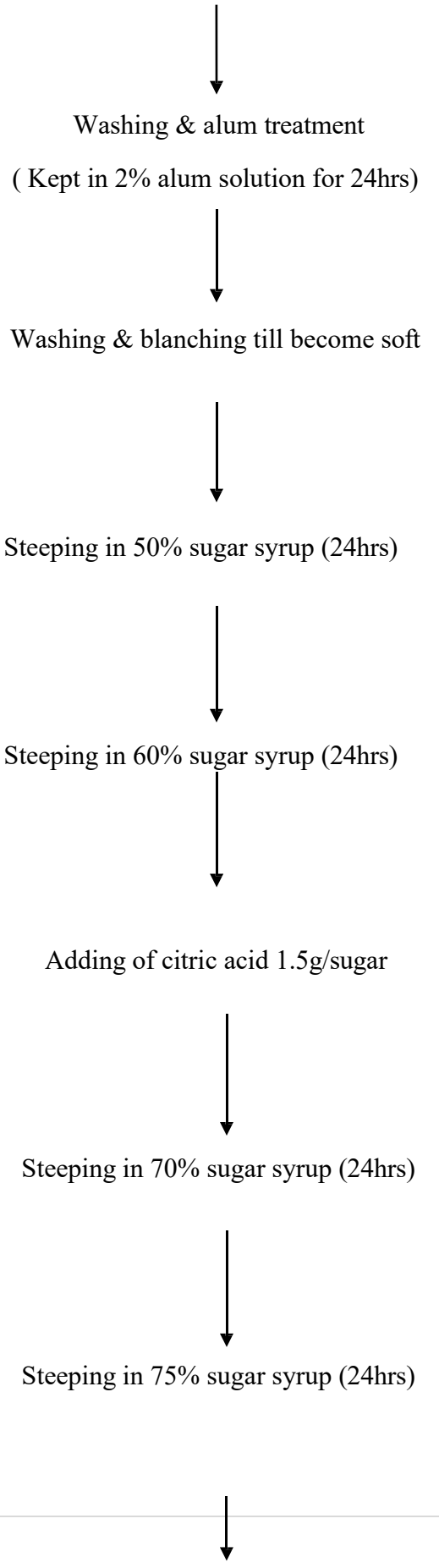
A sustainable food processing unit must ensure maximum capacity utilization and thus requires an operation of minimum 280-300 days per year to get reasonable profit. Therefore, ensuring uninterrupted raw materials supply requires maintenance of adequate raw material inventory. The processor must have linkage with producer organizations preferably FPCs through legal contract to get adequate quantity and quality of raw materials which otherwise get spoiled. In the Pineapple candy manufacturing project, the unit requires 350 kg/day, 400 kg/day and 450 kg/day Pineapple fruit at 70, 80 and 90 percent capacity utilization, respectively. The Mature Pineapple must be plucked from plant; and then stored below 6°C temperature.

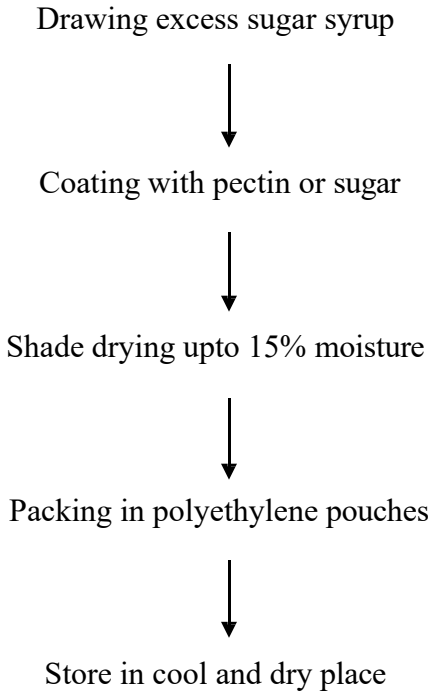
2.4 MANUFACTURING PROCESS OF THE PINEAPPLE CANDY

The typical Procedure for manufacturing of Pineapple candy is as below:

Flow chart for Pineapple Candy:




Washing & alum treatment
(Kept in 2% alum solution for 24hrs)
Washing & blanching till become soft
Steeping in 50% sugar syrup (24hrs)
Steeping in 60% sugar syrup (24hrs)
Adding of citric acid 1.5g/sugar
Steeping in 70% sugar syrup (24hrs)
Steeping in 75% sugar syrup (24hrs)



2.5 MARKET DEMAND AND SUPPLY FOR PINEAPPLE CANDY

Pineapple (*Ananas comosus, family Bromeliaceae*) is a tropical fruit grown in the tropical and sub-tropical regions. It's grown on large scale in India and now India is the second largest producer of fruits after Brazil. The Pineapple producing countries are Philippines, Thailand, China, Brazil, India, Mexico and South Africa. India is the fourth largest producer of pineapple in the world contributing almost 9 per cent to the world production of fresh pineapple. Pineapple is largely consumed around the world as canned pineapple slices, chunk and dice, pineapple juice, fruit salads, sugar syrup, alcohol, citric acid, pineapple chips and pineapple puree. It mainly contains water, carbohydrates, sugars, vitamins A, C and carotene and refreshing sugar-acid balance and a very rich source of vitamin C and organic acids. Pineapple is one of the most important fruit crops of north eastern India especially in Arunachal Pradesh of India. Thailand, Philippines, Brazil and China are the main pineapple producers in the world supplying nearly 50% of the total output. Other important producers

include India, Nigeria, Kenya, Indonesia, Mexico, Costa Rica and these countries provide most of the remaining fruit. Green pineapple is also used for making pickles. After extraction of its juice, the left over is used as livestock feed and also the tender leaves are used for the same purpose. Various food items like squash, syrup, and jelly are produced from pineapple. Vinegar, alcohol, citric acid, calcium citrate etc. are also produced from pineapple. Pineapple is also recommended as medical diet for certain diseased persons. The U.S. National Library of Medicine lists bromelain as a proteolytic digestive enzyme. When taken with meals, bromelain aids in the digestion of proteins, working to break proteins down into amino acids. Pineapple contains 81.2 to 86.2% moisture, and 13-19% total solids, of which sucrose, glucose and fructose are the main components. Carbohydrates represent up to 85% of total solids whereas fiber makes up for 2-3%. Of the organic acids, citric acid is the most abundant in it. The pulp has very low ash content, nitrogenous compounds and lipids (0.1%). From 25-30% of nitrogenous compounds are true proteins. Out of this proportion, Ca. 80% has proteolytic activity due to a protease known as Bromelain. Fresh pineapple contains minerals as Calcium, Chlorine, Phosphorus and Sodium.

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

2.6 MARKETING STRATEGY FOR PINEAPPLE CANDY

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

2.7 DETAILED PROJECT ASSUMPTIONS

This model DPR for Pineapple candy 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 fruit processing unit by adding new product 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. Pineapple cost considered @ Rs.58/-per kg.
    2. 1 kg Pineapple will produce 45% 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%

Detailed Project Assumptions		
Parameter	Assumption	
Capacity of the Pineapple Candy Unit	150	MT/annum
Utilization of capacity	1st Year Implementation, 70% in second, 80% in third and 90% in fourth year 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	58	
Average sale prices per Kg	200	Rs/kg
Pulp extraction	45	
PINEAPPLE CANDY	0.88 Kg Pineapple from 1 kg Pineapple candy	

2.8 FIXED CAPITAL INVESTMENT

2.8.1 MACHINERY AND EQUIPMENT

Sr No.	Equipment	Capacity	Quantity	Price (Rs. In Lacs)
1	Cold store sq. meter	1	1500 Kg	6
2	Fruit washing trough	1	500 liter	2.5
3	Fruit Cutter	1	Manual	0.3
4	Core removal	4	Manual	0.06
5	Blanching kettle Gas operated	1	300 Liter	1.5
6	Sugar syrup tank	4	500 liter	2.4
7	Dryer	1	120 kg /batch	2.2
8	Induction sealer	1	Suitable	0.3
9	Shrink tunnel	1	Suitable	0.35
10	Weighing balance	1	Suitable	0.06
11	Accessories	1	Suitable	0.5
			Total	16.17

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 30.10 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		Year 2 (55%)	Year 3(65%)	Year 4 (70%)
Raw material stock	7 days	2.17	2.56	3.49
Work in progress	15 days	4.34	5.13	6.99

Packing material	15 days	0.45	0.53	0.73
Finished goods' stock	15 days	5.55	6.56	8.95
Receivables	30 days	11.11	13.13	17.90
Working expenses	30 days	0.91	1.08	1.47
Total current assets		24.53	28.99	39.53
Trade creditors		0.00	0.00	0.00
Working capital gap		24.53	28.99	39.53
Margin money (25%)		6.13	7.25	9.88
Bank finance		18.40	21.74	29.65

2.10 TOTAL PROJECT COST AND MEANS OF FINANCES

Particulars	Amount in Lakhs
i. Land and building (20 x 32 x 12 ft -L x B x H)	4
ii. Plant and machinery	16.17
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	6.13
Total project cost (i to vii)	30.10
Means of finance	
i. Subsidy	9.93
ii. Promoters Contribution	6.02
iii. Term Loan (@10%)	14.15

2.11 MANPOWER REQUIREMENTS

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

2.12 EXPENDITURE, REVENUE AND PROFITABILITY ANALYSIS

	Particulars	**1st Year**	**2nd Year**	**3rd Year**	**4 th Year**	**5th year**	**6th year**
A	Total Installed Capacity (MT)	132 MT Pineapple/Annum	82.5	97.5	112.5	135	150
	Capacity utilization (%)	Under Const.	55%	65%	75%	90%	100%
B	**Expenditure (Rs. in Lakh)**	0					
	Pineapple (Av. Price @ Rs. 58/Kg)	0.00	18.95	22.39	25.84	31.01	34.45
	Sugar @ Rs. 35/kg	0.00	5.72	6.76	7.80	9.36	10.40
	Other materials (Rs. 100/kg)	0.00	0.83	0.98	1.13	1.35	1.50
	Packaging materials (Rs 6 per Kg)	0.00	4.95	11.70	13.50	16.20	18.00
	Utilities (Electricity, Fuel)	0.00	1.17	1.39	1.60	1.92	2.13
	Salaries (1st yr only manager's salary)	2.16	7.28	7.28	7.28	7.28	7.28
	Repair & maintenance	0.00	0.70	0.80	0.90	0.90	0.90
	Insurance	0.30	0.30	0.30	0.30	0.30	0.30
	Miscellaneous expenses	0.50	2.30	2.30	2.30	2.30	2.30
	Total Expenditure	**2.96**	**42.20**	**53.90**	**60.65**	**70.62**	**77.27**
C	**Total Sales Revenue (Rs. in Lakh)**	**0.00**	**165.00**	**195.00**	**225.00**	**225.00**	**225.00**
	Sale of Pineapple Candy (Av. Sale Price @ Rs.200/kg)	0.00	165.00	195.00	225.00	225.00	225.00
D	**PBDIT (Total exp.-Total sales rev.) (Rs. in Lakh)/Cash Inflows**	**-2.96**	**122.80**	**141.10**	**164.35**	**154.38**	**147.73**
	Depreciation on civil works @ 5% per annum	0.20	0.19	0.18	0.17	0.16	0.15
	Depreciation on machinery @ 10% per annum	1.62	1.46	1.31	1.18	1.06	0.95
	Depreciation on other fixed assets @ 15% per annum	0.12	0.10	0.09	0.07	0.06	0.05
	Interest on term loan @ 12%	1.47	1.42	1.36	1.30	1.23	1.16

	Interest on working capital @ 12%	0.00	2.21	2.21	2.21	2.21	2.21
E	Profit after depreciation and Interest (Rs. in Lakh)	**-6.37**	**119.63**	**138.16**	**161.63**	**151.86**	**145.41**
F	Tax (assumed 30%) (Rs. in Lakh)	**0.00**	**35.89**	**41.45**	**48.49**	**45.56**	**43.62**
G	Profit after depreciation, Interest & Tax (Rs. in Lakh)	**-6.37**	**83.74**	**96.71**	**113.14**	**106.30**	**101.79**
H	Surplus available for repayment (PBDIT-Interest on working capital-Tax) (Rs. in Lakh)	1.47	1.42	1.36	1.30	1.23	1.16
I	Coverage available (Rs. in Lakh)	1.47	1.42	1.36	1.30	1.23	1.16
J	Total Debt Outgo (Rs. in Lakh)	0.49	0.54	0.60	0.66	0.73	0.81
K	Debt Service Coverage Ratio (DSCR)	3.00	2.62	2.28	1.97	1.69	1.44
	Average DSCR	2.16					
L	Cash accruals (PBDIT- Interest-Tax) (Rs. in Lakh)	-4.43	85.49	98.29	114.56	107.59	102.95
M	Payback Period	2.5 Years					
	(on Rs. 30.10 Lakhs initial investment)						

2.13 REPAYMENT SCHEDULE

Year	Beginning	PMT	Interest	Principal	Ending Balance
1	1,414,798.15	196,259.64	147,139.01	49,120.64	1,365,677.52
2	1,365,677.52	196,259.64	142,030.46	54,229.18	1,311,448.34
3	1,311,448.34	196,259.64	136,390.63	59,869.02	1,251,579.32
4	1,251,579.32	196,259.64	130,164.25	66,095.39	1,185,483.92
5	1,185,483.9	196,259.64	123,290.33	72,969.32	1,112,514.61
6	1,112,514.61	196,259.64	115,701.52	80,558.12	1,031,956.48
7	1,031,956.48	196,259.64	107,323.47	88,936.17	943,020.32
8	943,020.32	196,259.64	98,074.11	98,185.53	844,834.79
9	844,834.79	196,259.64	87,862.82	108,396.83	736,437.96
10	736,437.96	196,259.64	76,589.55	119,670.10	616,767.86
11	616,767.86	196,259.64	64,143.86	132,115.79	484,652.08
12	484,652.08	196,259.64	50,403.82	145,855.83	338,796.25

13	338,796.25	196,259.64	35,234.81	161,024.83	177,771.42
14	177,771.42	196,259.64	18,488.23	177,771.42	(0.00)
		2,747,635.01	1,332,836.86	1,414,798.15	(1,414,798.15)

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	4.00	3.80	3.61	3.43	3.26	3.10	2.94	2.79
Depreciation	0.20	0.19	0.18	0.17	0.16	0.15	0.15	0.14
Depreciated value	3.80	3.61	3.43	3.26	3.10	2.94	2.79	2.65
Plant & Machinery	16.17	14.55	13.10	11.79	10.61	9.55	8.59	7.73
Depreciation	1.62	1.46	1.31	1.18	1.06	0.95	0.86	0.77
Depreciated value	14.55	13.10	11.79	10.61	9.55	8.59	7.73	6.96
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	20.97	19.03	17.29	15.71	14.28	13.00	11.84	10.78
Depreciation	1.94	1.75	1.58	1.42	1.29	1.16	1.05	0.95
Depreciated value	19.03	17.29	15.71	14.28	13.00	11.84	10.78	9.83

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)	30.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Recurring cost (Rs. in Lakh)	2.96	42.20	53.90	60.65	70.62	77.27	77.27	77.27	
Total cost (Rs. in Lakh)	33.06	42.20	53.90	60.65	70.62	77.27	77.27	77.27	492.22
Benefit (Rs. in Lakh)	0.00	165.00	195.00	225.00	225.00	225.00	225.00	225.00	
Total Depreciated value of all assets (Rs. in Lakh)								9.83	
Total benefits (Rs. in Lakh)	0.00	165.00	195.00	225.00	225.00	225.00	225.00	234.83	1494.83
Benefit-Cost Ratio (BCR): (Highly Profitable project)	**3.037**								
Net Present Worth (NPW):	1002.61								

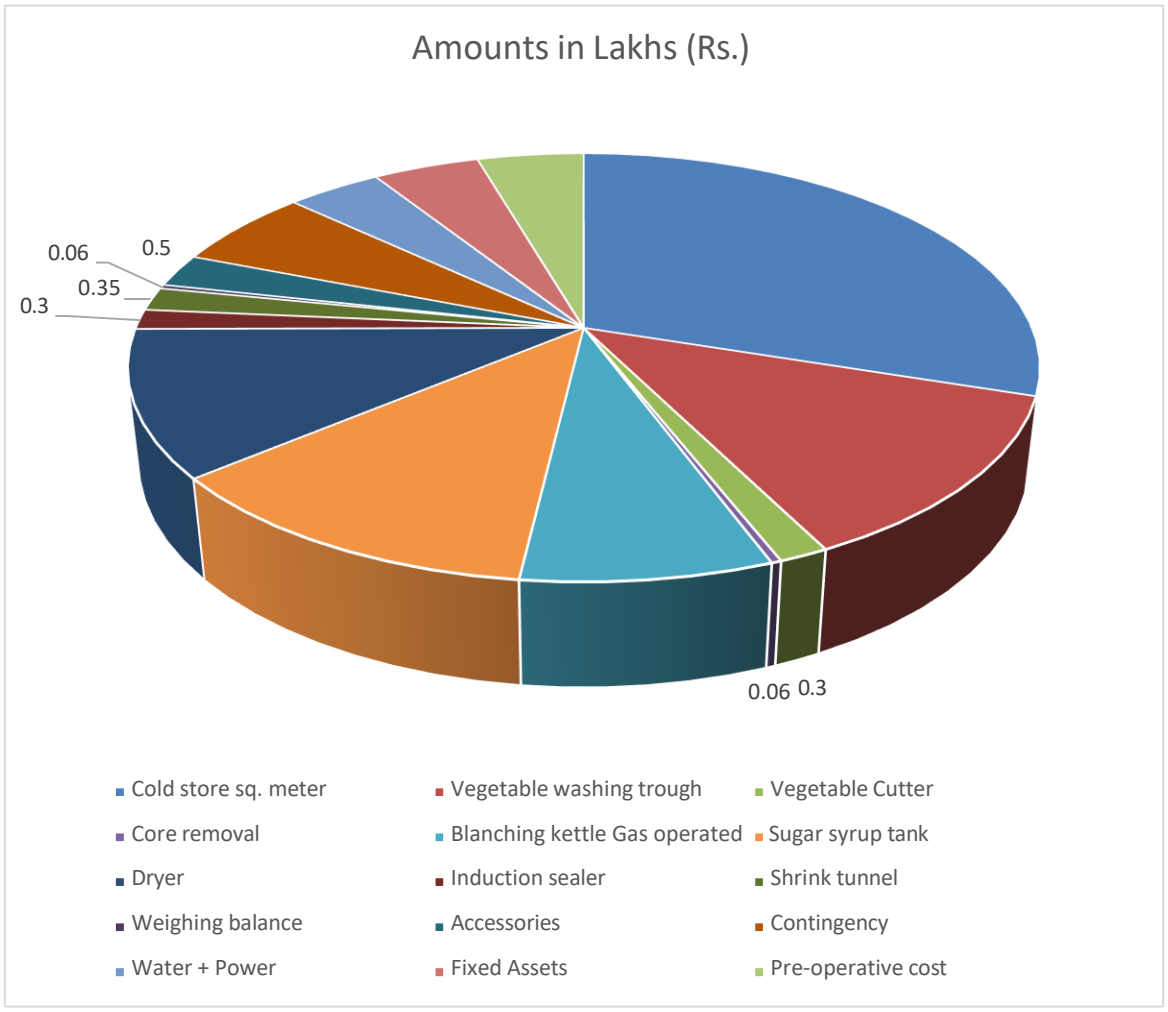
2.16 BREAK EVEN ANALYSIS

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

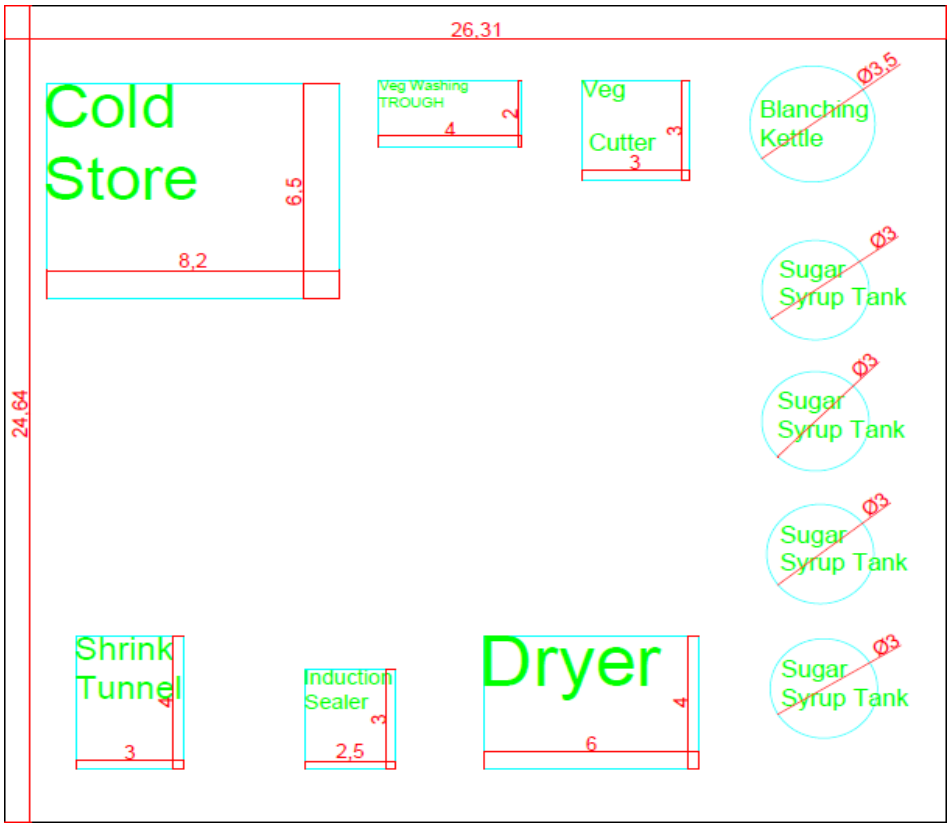
Particulars	**1st Year**	**2nd year**	**3 rd year**	**4th year**	**5th year**	**6th year**	**7th year**	**8th year**
Capacity utilization (%)	Under Const.	55%	65%	75%	90%	100%	100%	100%
Production MT/Annum		82.5	97.5	112.5	135	150	150	150
Fixed Cost (Rs. in Lakh)								
Permanent staff salaries	7.284	7.284	7.284	7.284	7.284	7.284	7.284	7.284
Depreciation on building @ 5% per annum	0.20	0.19	0.18	0.17	0.16	0.15	0.15	0.14
Depreciation on machinery @ 10% per annum	1.62	1.46	1.31	1.18	1.06	0.95	0.86	0.77
Depreciation on other fixed assets @ 15% per annum	0.12	0.10	0.09	0.07	0.06	0.05	0.05	0.04
Interest on term loan	1.47	1.42	1.36	1.30	1.23	1.16	1.07	0.98
Insurance	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total Fixed Cost (Rs. in Lakh)	**10.99**	**10.7**	**10.52**	**10.3**	**10.10**	**9.90**	**9.70**	**9.51**
Sales Revenue (Rs. in Lakh)	**0**	**165**	**195**	**225**	**225**	**225**	**225**	**225**
Variable Cost (Rs. in Lakh)								
Pineapple fruit(Av. Price @ Rs.58/Kg)	0.00	18.95	22.39	25.84	31.01	34.45	34.45	34.45
Sugar @ 35 per kg	0.00	5.72	6.76	7.80	9.36	10.40	10.40	10.40
Other ingredients @100/Kg	0.00	0.83	0.98	1.13	1.35	1.50	1.50	1.50
Packaging materials	0.00	4.95	5.85	6.75	8.10	9.00	9.00	9.00

Casual staff salaries	0.00	5.78	5.78	5.78	5.78	5.78	5.78	5.78
Utilities (Electricity, Fuel)	0.00	1.17	1.39	1.60	1.92	2.13	2.13	2.13
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	2.21	2.21	2.21	2.21	2.21	2.21	2.21
Total Variable Cost (Rs. in Lakh)	**0.50**	**42.31**	**48.15**	**54.00**	**62.63**	**68.37**	**68.37**	**68.37**
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)	-	19.80	19.50	18.00	18.00	15.75	15.75	13.50

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



2.18 TYPICAL PINEAPPLE CANDY MANUFACTURING UNIT LAYOUT



2.19 MACHINERY SUPPLIERS

There are many machinery suppliers available within India for fruits-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.

Contact Us

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