



# **PM Formalisation of Micro Food Processing Enterprises Scheme**

## **DETAILED PROJECT REPORT FOR PROCESSING OF SEA BUCKTHORNS BEVERAGES**



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## CHAPTER 1: THE PROJECT AT A GLANCE

|                                                                                                 |                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Name of the proposed project                                                                 | : Sea buckthorn Beverage Processing Unit                                                                                                                 |
| 2. Name of the entrepreneur/ FPO/ SHG/ Cooperative                                              | :                                                                                                                                                        |
| 3. Nature of proposed project :                                                                 | : Proprietorship/Company/Partnership                                                                                                                     |
| 4. Registered office                                                                            | :                                                                                                                                                        |
| 5. Project site/location                                                                        | :                                                                                                                                                        |
| 6. Names of Partners (if partnership)                                                           | :                                                                                                                                                        |
| 7. No. of share holders (if company/FPC)                                                        | :                                                                                                                                                        |
| 8. Technical advisor                                                                            | :                                                                                                                                                        |
| 9. Marketing advisor/partners                                                                   | :                                                                                                                                                        |
| 10. Proposed project capacity                                                                   | : 120 MT/ annum (60,70%, 80% & 90% capacity utilization in the 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> & 5 <sup>th</sup> years respectively) |
| 11. Raw materials                                                                               | : Sea buckthorn berries                                                                                                                                  |
| 12. Major product output                                                                        | : Sea buckthorn Beverage                                                                                                                                 |
| 13. Total Project Cost                                                                          | : Rs. 32.01 Lakhs                                                                                                                                        |
| • Land development, building & civil construction(only for expansion of existing built-up area) | : <i>Rs 2.00 Lakhs</i>                                                                                                                                   |
| • Machinery and equipments                                                                      | : <i>Rs 20.00 Lakhs</i>                                                                                                                                  |
| • Utilities (Power & water facilities)                                                          | : <i>Rs 2.00 Lakhs</i>                                                                                                                                   |
| • Miscellaneous fixed assets                                                                    | : <i>Rs 2.00 Lakhs</i>                                                                                                                                   |
| • Pre-operative expenses                                                                        | : <i>Rs 0.25 Lakhs</i>                                                                                                                                   |
| • Contingencies                                                                                 | : <i>Rs 2.00 Lakhs</i>                                                                                                                                   |
| • Working capital margin                                                                        | : <i>Rs 3.76 Lakhs</i>                                                                                                                                   |
| 14. Working capital requirement                                                                 |                                                                                                                                                          |
| • 2 nd year                                                                                     | : <i>Rs 15.03 Lakhs</i>                                                                                                                                  |
| • 3 rd year                                                                                     | : <i>Rs 18.41 Lakhs</i>                                                                                                                                  |
| • 4 th year                                                                                     | : <i>Rs 20.96 Lakhs</i>                                                                                                                                  |
| 15. Means of Finance                                                                            |                                                                                                                                                          |
| • Subsidy grant by MoFPI (max 10 lakhs)                                                         | : <i>Rs 10.00 Lakhs</i>                                                                                                                                  |
| • Promoter's contribution (min 20%)                                                             | : <i>Rs 7.10 Lakhs</i>                                                                                                                                   |
| • Term loan (42%)                                                                               | : <i>Rs 15.00 Lakhs</i>                                                                                                                                  |
| 16. Debt-equity ratio                                                                           | : 2.11:1                                                                                                                                                 |
| 17. Profit after Depreciation, Interest & Tax                                                   |                                                                                                                                                          |
| • 2 nd year                                                                                     | : <i>Rs 6.04 Lakhs</i>                                                                                                                                   |
| • 3 rd year                                                                                     | : <i>Rs 15.98 Lakhs</i>                                                                                                                                  |
| • 4 th year                                                                                     | : <i>Rs 20.00 Lakhs</i>                                                                                                                                  |
| 18. Average DSCR                                                                                | : 4.18                                                                                                                                                   |
| 19. Benefit-Cost Ratio                                                                          | : 1.28                                                                                                                                                   |
| 20. Term loan repayment                                                                         | : 5 years with 1 year grace period                                                                                                                       |
| 21. Payback period for investment                                                               | : 4 years                                                                                                                                                |

## CHAPTER 2

### **General Overview of Production, Post Harvest Management and Value Addition of Sea buckthorn in India**

#### **2.1. Introduction**

Sea buckthorn (*Hippophae* spp.L.) is an ecologically and economically important plant of trans-Himalayan region that belongs to the family Elaeagnaceae. Sea buckthorn is commonly known as ‘Cold desert gold’ because of its multifarious uses. Potential of Sea buckthorn in India has been recognized by several R&D organizations. However, Sea buckthorn industry is still in its nascent stages. In India, the total area under Sea buckthorn is 13,000 ha. And approximately 600 tons of berries are harvested annually.

The species is a wind pollinated dioecious shrub. It has silvery deciduous leaves and colourful red, orange or yellow berries that remain on the shrub throughout the winter. The plant is hardy and it can withstand extreme temperatures from 43°C to 40°C and it is considered to be drought tolerant. The shrub develops extensive root system having ability to fix atmospheric nitrogen. It is therefore an ideal plant for soil erosion control, land reclamation, wildlife habitat enhancement and farm stand protection in temperate region. Sea buckthorn grows naturally without much of human interference.

The fruits are rich in phytochemicals which exhibit excellent radical scavenging properties. The fruit has excellent nutritional qualities as well as unique taste, colour and flavour. The medicinal value of Sea buckthorn was recorded as early as the 8th century in the Tibetan medicinal classic ‘rGyud Bzi’.

Sea buckthorn fruit is highly perishable and the lack of storage facilities and processing machinery leads to minimum utilization of the fruit. Converting the fruit into value added products will help in increasing the popularization of the fruit in domestic and international markets.

Currently, the demand for Sea buckthorn far exceeds the supply capacity of the region. Large scale cultivation of Sea buckthorn has the potential to be a key means of sustainable development for trans-Himalayan areas. The primary processing of converting the fruit into juice, seeds and hull is done in the fruit production areas. These products are then marketed to firms outside the region who add further value to each of these materials.

The potential for value added products provides an extremely viable opportunity for sustainable promotion of rural as well as urban livelihoods. Processing of Sea buckthorn

berries into value added products such as ready to drink beverages at small scale/ village level and selling to the markets directly/ tying up with big aggregators will help both the farmers and the consumers.

Therefore, processing of Sea buckthorn berries into value added products such as RTS beverages can ensure nutritional and food security, improved profitability and also offers huge scope for entrepreneurship development at micro, small or medium scale levels using effective government schemes such as PM-Formalization of Micro Food Processing Enterprises Scheme of MoFPI, Government of India.

## **2.2. Origin and distribution of Sea buckthorn**

The genus *Hippophae* is distributed between 27° -69° N latitude and 7°W-122° E longitude in the world. It occurs as a native plant in China and is distributed throughout the major temperate zones of the world including France, Russia, Mongolia, India, Great Britain, Denmark, Netherlands, Germany, Poland, Finland and Norway. Total acreage of Sea buckthorn is reported about 3.0 million hectares worldwide (both wild and cultivated cover). Approximately 90% of world's Sea buckthorn is found in China, Mongolia, Russia, Northern Europe and Canada. China is the largest producer of Sea buckthorn.

In India, it grows at high altitudes (2000-4300 m) areas of Himachal Pradesh, Jammu and Kashmir, Uttarakhand, Sikkim and Arunachal Pradesh. The trans-Himalayan region of India is rich in diversity of wild edible plant species. Wild edible plants are very important for the well being of the populations in the region, not only as sources of supplemental food, nutritionally balanced diets, medicine, fodder and fuel, but also for developed methods of resource management, which may be fundamental to the conservation of some of the world's important habitats. Sea buckthorn berry collection has become an important activity in the Trans-Himalayan region since 2001.

## **2.3. Production of Sea buckthorn in India**

Sea buckthorn industry in India is still in its nascent stages. Total area under Sea buckthorn is 13,000 ha. Approximately 600 tons of berries are harvested annually.

Sea buckthorn grows naturally in five Himalayan States (Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh). Ladakh remains the major site for

natural Sea buckthorn resource with over 70% of the total area under Sea buckthorn in the country. Using satellite data, it is estimated that area under pure Sea buckthorn in Ladakh is 7184 ha while the area under mixed Sea buckthorn is 2083 ha. Despite the vast area under natural forest, the mean annual berry harvest is less than 5% of the total available Sea buckthorn resource in the region. There is no production data available.

| Particulars     | Ladakh | Himachal | Uttrakhand | Sikkim |
|-----------------|--------|----------|------------|--------|
| Total Area (Ha) | 9,267  | 1000     | 2000       | 800    |
| Area (%)        | 70.9   | 7.6      | 15.4       | 6.1    |

## 2.4. Composition and Nutritional value of Sea buckthorn

The fruit of sea buckthorn is rich in nutrients and medicinal compounds such as vitamins, carotene, flavonoids, essential oil, carbohydrates, organic acids, amino acids, and minerals. Protein level of Sea buckthorn is fairly high for a fruit and this explains the cloudy or opalescent juice. Vitamin C content has been reported as high as 600 mg/100 g of fruit. Vitamin E content is 160 mg/100 g of fruit.

**Table 1: Nutritive value of Sea buckthorn fruit per 100 g of edible portions**

| Nutrients     | Per 100g |
|---------------|----------|
| Carbohydrates | 5g       |
| Protein       | 1g       |
| Fat           | 2 g      |
| Moisture      | 91g      |
| Crude fibre   | 0.5g     |
| Vitamin C     | 909 mg   |
| Vitamin A     | 1500µg   |
| Vitamin E     | 3mg      |
| Sodium        | 6mg      |
| Potassium     | 420mg    |

*Source: Directorate of Arecanut and Spices Development, Ministry of Agriculture and Farmers Welfare and USDA Food composition data base.*

## 2.5. Health benefits of Sea buckthorn

1. In Ladakh region, local traditional doctors often prescribe preparations from Sea buckthorn for treatment of common problems like indigestion, throat infection, gynaecological problem, ulcer, gastritis, bronchitis, acidity, diarrhoea, hypertension, blood disorder, fever, tumor, gallstone, cough, cold, food poisoning etc.
2. Sea buckthorn is known for its medicinal properties for treatment of oral mucositis, vaginal mucositis, cervical erosion, duodenal ulcers, skin ulcers, cancer, sluggish digestion, stomach malfunctioning, neoplasia, thrombosis, hepatic injury, tendon and ligament injuries etc.
3. Clinical trials on patients with ischemic heart disease have shown that total flavonoids of Sea buckthorn reduce cholesterol level and improve cardiac function.
4. The oil absorbs ultraviolet light and promotes healthy skin and this unique property of Sea buckthorn oil is being recognized and sought by the cosmetic industry.

## 4.1. Sea buckthorn Varieties in India

Three varieties of Sea buckthorn are seen in India, namely *Hippophae rhamnoides*, *H. salicifolia* and *H. tibetana*. These species have different morphology i.e. size and shape of plants as well as fruits.

Among the three species, *H. rhamnoides* is a shrub or small tree form (2-5 m), *H. salicifolia* is a small or large tree (4-9 m), whereas *H. tibetana* is a under shrub (0.2-0.6 m). Fruit size varies from 8 to 27 g/100 fruits in *H. rhamnoides*, 30-35 g in *H. salicifolia* and 15-21 g in *H. tibetana*. Colour of the fruit varies from red to reddish orange in *H. rhamnoides*, yellow in *H. salicifolia* and orange with green strips in *H. tibetana*.

**Table 2: Distribution of the Sea buckthorn fruit varieties**

| Species                      | Ladakh   | Himachal | Uttarakhand | Sikkim  |
|------------------------------|----------|----------|-------------|---------|
| <i>Hippophae rhamnoides</i>  | Present  | Present  | Not seen    | Present |
| <i>Hippophae salicifolia</i> | Not seen | Present  | Present     | Present |
| <i>Hippophae tibetana</i>    | Present  | Present  | Present     | Present |

## **4.2. Cultivation and Harvesting of Sea buckthorn**

### **2.7.1 Climatic and soil requirements**

Sea buckthorn is a temperate crop and therefore its cultivation can be done only in temperate region. It can withstand wide range of temperatures from -43 to 40°C. This unique feature enables the species to adapt very well in harsh climatic conditions. The shrubs reach 0.5-6 m tall, rarely up to 10 m in height, and typically occur in dry, sandy areas, on hills and hillsides, in valleys and river-beds. The dense and thorny bushes of sea buckthorn are salt tolerant and demand full sunlight for growth.

### **2.7.2. Land preparation**

Plant spacing of 4 m × 2 m resulted in highest canopy volume generation followed by spacing of 3.5 m × 2.0 m and 4.0 m × 1.5. When plant to plant spacing is decreased below 1.5 m, the overlapping in plant canopies occurs and medium to heavy pruning has to be taken.

Significantly higher canopy volume was obtained in the pit size of 2.0'×2.0'×2.0'. Significantly lower values were recorded in the pit size of 1'×1'×1'. Larger pit size may result in more accumulation of snow water, better proliferation of roots and better nutrient supply. It is added that pit is not required to be filled up to the top, 20 cm kept, as such, while planting to accumulate more of snow during winter so that more of water saturate the soil profile. This practice is preferred by farmers going for new plantations.

### **2.7.3. Planting & propagation**

Sea buckthorn can also be propagated by seed. However, the method is not preferred for propagation of Sea buckthorn for commercial cultivation (being a dioecious species). Successful cultivation of the high yielding genotypes requires efficient vegetative propagation system. Methods have been standardized for propagation of a pencil thick (7.5±1.7 mm diameter) hardwood stem cuttings with high rooting success. Use of silverblack plastic mulching film was found to increase rooting success by 10%. Suppression of weed emergence by the plastic mulch resulted in 75.8% time saving in manual weeding by farm workers. In view of the availability of lesser number of a pencil thick stem cuttings per plant, an improved method of propagation of Sea buckthorn was developed using the previous season's growth for the stem cuttings (2.9±0.8 mm thickness). Overall, using a less than half the pencil thick hardwood cuttings resulted in much higher rooting success than those

reported for conventional method of propagation. Seven-fold more number of cuttings can be taken from each shrub as compared to that of pencil thick hardwood cuttings. Using the developed propagation methods, a large scale propagation of elite selections are being carried out at experimental farm at DIHAR. Every year 15,000-20,000 rooted plants are being raised at DIHAR, Leh.

#### **2.7.4. Manuring**

Sea buckthorn requires 50 kg N/ha for initial establishment. Application of Farm Yard Manure / Vermicompost results in significantly higher canopy volume. A dose of around 20-40 kg FYM/basin increased the canopy volume per tree to a greater extent.

#### **2.7.5. Weed management**

Using black polythene sheet or *Artemisia* as mulch in basins of sea buckthorn plants significantly suppresses the weed density and biomass and it can economically replace 3 hand weedings required to check the growth of weeds.

#### **2.7.6. Plant management**

Pruning beyond an intensity of 25% should be avoided as it affects the yield.

In general, agrotechniques of sea buckthorn have been standardized by ICAR, for spacing (4 m x 2 m), pit size (2'x2'x2'), pruning intensity (10-25%), weed control by black polymulch or *artimisia*, early nitrogen supply (50 kg/ha) and use of FYM in plant basin (20kg/plant).

#### **2.7.7. Harvesting**

The fruit maturity in sea buckthorn is generally judged on the basis of their colour which may vary from pale yellow, yellow, deep orange and reddish orange with a total soluble solid content reaching up to 12°Brix or more and seed coat becoming very hard and brown in colour. The sea buckthorn plant bears foliage from April to November, flowers in June and July for a week and bears fruits from mid August to April that are harvested during September to November end although the plant remain laden with fruits till February and dry on the branch itself.

The harvesting of sea buckthorn berries is the most important and difficult task because of the small size, stickiness of the soft fruits and thorny nature of the bushes. Two methods have

been found effective where the branches of are beaten on the tree and fruits are collected on the ground while in another method the fruits are harvested after breaking off the branches from the mother plant followed by shedding of the berries to collect them on the ground.

The yield of berries range between 2-3 kg/ tree. A natural Sea buckthorn habitat can yield upto 750-1,500 kg/ha of berries, shelter belt planting upto 4 to 5 tonnes per hectare while orchard planting has been reported to yield upto 10 tonnes per hectare. A wild plant of sea buckthorn bears 1-2 kg fruits per year; while, exotic high yielding varieties are known to produce about 10-15 kg fruit per plant. However, the yield of berries is also known to vary with the type of species, cultivation and agro climatic conditions.

## **2.8 Post Harvest Operations, Processing and Storage of Sea buckthorn**

### **2.8.1 Post harvest operations for Sea buckthorn**

#### **a. Berry inspection & cleaning**

Berry inspection and cleaning is an important step to remove damaged berries, twigs, leaves and other debris collected during harvesting. The first step in cleaning is done by rolling the berry on a wet surface (L×W: 7'6" × 3') placed at an angle of 40-50°. The leaves and damaged berries stick to the wet surface and are removed manually. Twigs and other debris that does not stick to the wet surface are removed by hand. The berry is then washed in water and the remaining leaves and damaged berries that float on the surface are removed with a sieve. Water is drained from the berry before juice extraction.

#### **b. Storage & transporting**

Sea buckthorn berries when overripe carry a strong musky odour with rancid taste, detectable even in the field. Washing may reduce or change the odour. To avoid this problem, berries must be harvested at the correct stage, quickly transported to the processing plant, and be cooled immediately to temperatures around 4° to 6°C to retard growth of microorganisms. If the berries are to be stored more than a few days, they should be frozen, preferably by individual quick freezing techniques. The berries are thawed and processed to products as required on demand. Juice extracted by pressing or centrifugal techniques must be stored under refrigeration and requires pasteurization and freezing for long term storage. Alternatively fruit may be processed into pasteurized or sterilized finished products and stored in that form at room temperature. The shelf life even of sterilized product is limited but improved in refrigerated storage.

### **c. Juice extraction**

Juice extraction from berry is done with a pulper. When cleaned berries are fed into the pulper, pulp ( $73.82 \pm 3.33\%$ ) and cake ( $24.14 \pm 2.96\%$ ) containing unbroken seeds are obtained. The extracted juice is collected in food grade 50 kg capacity drums and potassium metabisulphate is added as preservative. The pulp is the main marketable component and currently fetches Rs 110- 120 per kg. Occasionally, the pulp is passed through filtration unit to get cake and a clear aqueous solution (pH 2.7; TSS 10.6°B). The cake is packed in 50 litre capacity drum for sale. However, the clear aqueous solution remains unused. The cake containing unbroken seed is sun dried and seed is separated by rubbing the dried residue with hands to get clean seed and the hull. Both seed and the hull are source of valuable oil and are sold either separately or along with the pulp. If the cleaned seed and hull are sold separately, it fetches Rs 250-300 and Rs 20-30 per kg, respectively. The seed of Sea buckthorn is in great demand since 2011 as it contains omega rich oil, which is generally extracted by supercritical CO<sub>2</sub> extraction method.

### **d. Drying**

A combination of open sun drying and electric drying is practiced in India. Open sun drying is a tedious method and generally takes more than a month to get the finished product. Besides, it requires large area for drying and need protection from rain and wind. On an average,  $33.25 \pm 3.12$  kg of whole dried berry is obtained when 100 kg of cleaned berry is put to get dried in the sun. A kilogram of dried berry fetches Rs 200-300.

## **2.8.2 Processing of Sea buckthorn Beverage**

Sea buckthorn Beverage is a product made by blending the fruit juice with sugar syrup to meet the specifications for the category and then subjecting it to sufficient heat treatment such as pasteurization or sterilization before or after packing. RTS or fruit beverage should contain at least 10 per cent fruit juice and 10 per cent total soluble solids besides about 0.3 per cent acid. It is not diluted before serving; hence it is known as ready-to-serve (RTS).

The unit operations in the production of Sea buckthorn beverage are explained below.

### **2.1.1. Berry inspection & cleaning**

This is an important step to remove damaged berries, twigs, leaves and other debris collected during harvesting. The first step in cleaning is done by rolling the berry on a wet surface

(L×W: 7'6" × 3') placed at an angle of 40-50°. The leaves and damaged berries stick to the wet surface and are removed manually. Twigs and other debris that does not stick to the wet surface are removed by hand. Since the harvesting methods are crude, there is a lot of debris involved, resulting in a process loss of about 13±3 %.

### **2.1.2. Washing**

The berries are then washed in water and the remaining leaves and damaged berries that float on the surface are removed with a sieve. Manual washing or mechanical washing by spray or bubble washer may be done. The washed berries are drained well off the water before they go to extraction.

### **2.1.3. Juice extraction**

Juice extraction from berry is done with a pulper. Cleaned berries are fed into the pulper to obtain pulp. The unbroken seeds and hull are separated as a cake. The yield of pulp is around 74 ± 3% and the cake with seeds is around: 24 ± 3 %

### **2.1.4. Clarification**

If rested, raw juice separates into 3 layers, due to different density fractions which is undesirable. The top layer is thick, creamy and orange; it contains Sea buckthorn oil. The middle layer contains the liquid fraction from the pulp and the lower fraction consists of the sediment.

To prevent this undesirable natural separation, the juice is separated in a cream separator. This process separates the juice into two fractions: fat rich “cream” and opalescent juice. The cream contains sea buckthorn oil and makes up 3 to 4% of the total juice mass, while the opalescent juice is processed into the beverage. The sediment fraction accumulates at the bottom of the juice fraction

If the pulp oil is left in the juice, it will cause an oil layer to be formed on the juice surface. This will create an unsightly and undesirable oil ring on the package surface after the juice is removed. Centrifugal reduction of the juice oil content below about 0.1% will eliminate the floating oil problem. As the oil is removed by the disk stack centrifuge, the coarse sediment will be sedimented to the bottom of the bowl and can be removed automatically by the dislodging mechanisms present in the centrifuge.

### **2.1.5. Filtration**

Filtration is done to remove any remaining sediment portion from the clarified juice. This step makes the juice impurity free and highly suited for further processing. Vibratory filter can be used to avoid sludge formation.

### **2.1.6. Syrup preparation & Blending**

The required amount of sugar and water (based on the calculations with raw juice parameters and desired final product parameters) are mixed in a vat to prepare the syrup. The mix is gently heated to dissolve the sugar completely. Once the sugar is dissolved, the fruit juice is added and blended well. The other permitted additives such as acidity regulator, stabilizer, permitted colours and natural flavouring substances are then added according to the permitted levels. All these are blended well together to ensure a homogenous beverage.

### **2.1.7. Bottling, exhausting & capping**

The prepared beverage is filled into clean and sterile bottles. The filled bottles are exhausted and capped. Exhausting is done to remove the air in the headspace of the bottles.

### **2.1.8. Pasteurization**

The capped bottles are pasteurized at 95°C for 3 minutes in Pasteurization tunnel or batch pasteurizers. This High Temperature Short Time (HTST) combination is preferred because the fruit juice is delicate and has heat sensitive components.

Alternatively, pasteurization of the beverage can be done by UHT (Ultra High Temperature) processing also, at 115-118°C for 3 seconds. Plate or Tubular heat exchangers are used. Here the beverages are pasteurized first, cooled and then packed aseptically in Tetra pack containers or plastic bottles.

UHT processed beverages can also be packed in bag in box type of packaging for bulk handling. The advantages are longer shelf life and less loss of nutrients.

### **2.1.9. Cooling, Labelling & Storage**

After pasteurization is complete, the bottles should be cooled down to room temperature and then labelling is done. Then the bottles are stored/ transported.

## **CHAPTER 3**

### **MODEL SEA BUCKTHORN BEVERAGE PROCESSING UNIT UNDER PM-FME SCHEME**

#### **3.1 Introduction**

The Central Sector scheme for Formalization of Micro Enterprises in Food Processing sector under Ministry of Food Processing Industries, Government of India is an important scheme that offers for formalization and mainstreaming the unorganized home based or micro food processing units. The scheme is useful for expansion of the existing units in terms of capacity and technology through installation of new machineries and additional civil infrastructures. Further, the scheme promotes establishment of new micro units on the principle of ODOP (One District One Product).

Establishment or expansion of Sea buckthorn Beverage Processing Unit is an attractive option in potential Sea buckthorn growing states in India as Sea buckthorn Beverage has a lot of market and export potential. A model generalized DPR is therefore, prepared for expansion of existing unformalized Sea buckthorn Beverage Processing Unit. A detailed account of the model DPR prepared on the basis of certain generalized assumptions is discussed in the subsequent sections. An entrepreneur can use this model DPR template and modify according to his/her need in terms of capacity, location, raw materials availability etc.

#### **3.2 Form of the Business Enterprise**

The entrepreneur concerned must specify about the form of his/her business organization i.e. whether Sole Proprietorship, Cooperative, FPO/FPC, SHG Federation, Partnership Firm or Company and accordingly attach all the required documents. The documents may be registration certificate, share holding pattern, loan approval certificate etc as specified in the FME scheme guidelines.

#### **3.3 Background of the Promoters/ Owners and Required Documents**

The detailed bio-data of promoter/promoters inter-alia name, fathers name, age, qualification, business experience, training obtained, contact number, email, office address, permanent address, share holding pattern, definite sources of meeting the commitment of promoters contribution, details of others business along with certified balance sheet and profit loss

account for the last 3- 4 years, tax registration, PAN Number, income tax return etc for 3-4 years and other requirements as specified in the FME guidelines must be provided with the DPR.

### **3.4 Background of the Proposed Project**

The entrepreneur must specify whether it is a new project or expansion of the existing project. If new project is proposed then the reason to go in to the project and if expansion of the existing project, the must specify what kind of expansion is proposed in terms of capacity, product, machines, civil infrastructure etc.

### **3.5 Location of the Proposed Project and Land**

The entrepreneur must provide description of the proposed location, site of the project, distance from the targeted local and distant markets; and the reasons/advantages thereof i.e. in terms of raw materials availability, market accessibility, logistics support, basic infrastructure availability etc. The entrepreneur must mention whether project is proposed in self owned land or rented/allotted land in any industrial park or private location. Accordingly, he/she must provide ownership document, allotment letter/ lease deed.

Land clearance certificate must be from village authority/ municipality or any other concerned authority. The ideal locations for establishment of exclusive Sea buckthorn Beverage Processing Units are in the production clusters of the major Sea buckthorn growing states and UTs such as Ladakh, Himachal Pradesh, Uttaranchal and Sikkim where adequate quantities of Sea buckthorn fruits will be available for processing. Since the tree has the potential to be grown in mid to higher altitude areas, prospective cultivable areas along with processing centres can be identified and promoted.

### **3.6 Installed Capacity**

The maximum installed capacity of the Sea buckthorn Beverage Processing Unit in the present model project is proposed as 120 tonnes/ annum. The unit is assumed to operate 300 days/annum @ 8-10 hrs/day. The 1<sup>st</sup> year is assumed to be construction/expansion period of the project; and in the 2<sup>nd</sup> year 60 percent capacity, 3<sup>rd</sup> year 70 percent capacity and 4<sup>th</sup> year

80 percent and 5<sup>th</sup> year onwards 90 percent capacity utilization is assumed in this model project.

### **3.7 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 deteriorated. In the current model Sea buckthorn Beverage processing project, the unit requires 0.043 Tonnes/ day, 0.050 Tonnes/ day, 0.057 Tonnes/ day and 0.064 Tonnes/ day of Sea buckthorn fruits at 60, 70, 80 and 90 percent capacity utilization, respectively.

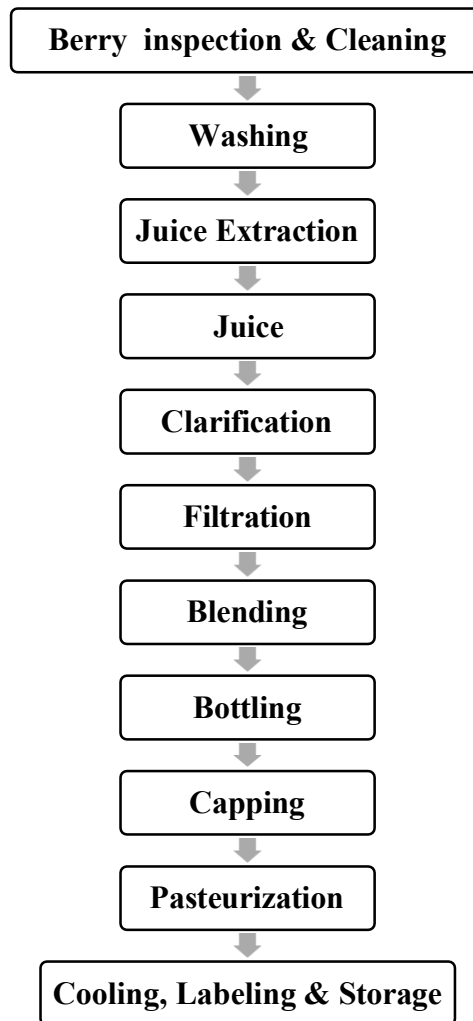
### **3.8 Product Profile of the Unit**

In the present model Sea buckthorn Beverage processing unit, the targeted product output is taken as Sea buckthorn Beverage.

Greater utilization of under-utilized or wild edible plants that are of local or regional importance will effectively increase nutritional security. By improving the linkage between production and utilization, the biodiversity of traditional crops can be safe guarded. There is also developing preference for unique and niche culinary products with increasing urban spending power. The food industry and consumers are showing increased interest in the use of unconventional ingredients in food products. Beverages are a product with high acceptance. Commercialization of such product will not only help in providing nutrition to the consumers but will also add to the economic benefits of the local inhabitants of that area.

Therefore, value addition of Sea buckthorn berries into Beverage has great potential in terms of maintaining the export quality standards, nutritive quality of the product, minimizing post-harvest losses, enhancing the non seasonal availability through increased shelf life and the ability increase the revenue potential for the Sea buckthorn cultivating farmers. There is also scope to bring more barren area under cultivation of the crop, given the crop's adaptability and endurance.

### 3.9 Manufacturing Process of Sea buckthorn Beverage



### 3.10 Technology Accessibility

IIFPT and its liaison offices at Guwahati and Bhatinda have all the technical knowhow on Sea buckthorn Beverage processing. These technologies are available through training, incubation and consultancy. The entrepreneur can first avail training or consultancy and then undergo business incubation before venturing into the business. Other than IIFPT, NIFTEM, CFTRI and other institutes also have the technical knowledge and training facilities.

### 3.11 Market Demand and Supply

The Fruit Beverages, Squashes & Cocktail market is expected to register a CAGR of 3.5% till 2023. The global retail sales are set to reach 1.53 billion USD by 2023. This implies that the

processed products of fruit & vegetable business will remain a growth industry for a long time. In recent years, there has been a tremendous shift of consumer preferences from aerated drinks to packaged fruit juices which is a Rs.1500 crore size market in India. Packaged fruit juices market is growing by and large and is forecasted to grow at more than 15% CAGR in the coming years. Fruit drinks with less than 30% fruit juice hold 50-60% of the market. Consumers nowadays have inclination towards health proposition and they are thinking and selecting options which are good for their health.

Greater utilization of under-utilized or wild edible plants that are of local or regional importance will effectively increase nutritional security. By improving the linkage between production and utilization, the biodiversity of traditional crops can be safe guarded.

Also the potential health benefits of such nutritious and niche products will impact the market in a positive way. Increasing health consciousness and the inclusion of organic ingredients is driving the market. Hence there is a huge potential to manufacture such value added products.

### **3.12 Marketing Strategy**

Generally, domestic households, restaurants, and other eateries are the major consumers of these items. The increasing urbanization offers huge market for unique fruit beverages packaged attractively and merchandised in organized urban platforms such as departmental stores, malls, super markets. Direct marketing kiosks can also be utilised in urban market areas.

The producer may also enter into agreements for supplying to big players or retailers in their brand name as private labels. The producer may enter into agreements for supplying to larger manufacturers who have their own brand or have a large market volume. It is safe and more sustainable to manufacture in bulk for established branded players.

The producer may also enter into agreements with local retail chains, quick service restaurants, etc, as well as e-commerce channels as the liking for such is on a rise and the local demand for products like Sea buckthorn Beverage will hence be boosted.

Export market is a major avenue for niche valuable products such as Sea buckthorn Beverage, provided good hygienic production and compliant attractive packaging are done. Further there are several e-commerce companies that sell good quality produce, which can be utilized.

### 3.13 Detailed Project Assumptions

This model DPR for Sea buckthorn Beverage Processing 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 Table 3.

This DPR assumes expansion of existing unit by adding new Sea buckthorn Beverage processing line. Therefore, land and civil infrastructures are assumed as already available with the entrepreneur.

| <b>Table 3: Detailed Project Assumptions</b>                     |                                                      |                |
|------------------------------------------------------------------|------------------------------------------------------|----------------|
| Parameter                                                        | Value                                                |                |
| Assumed Capacity of the Sea buckthorn Beverage processing unit : | 120 MT/ annum                                        |                |
| Utilization of capacity :                                        | Year 1                                               | Implementation |
|                                                                  | Year 2                                               | 60%            |
|                                                                  | Year 3                                               | 70%            |
|                                                                  | Year 4                                               | 80%            |
|                                                                  | Year 5 onwards                                       | 90%            |
| Working days per year :                                          | 300 days                                             |                |
| Working hours per day :                                          | 8-10 hours                                           |                |
| Interest on term loan :                                          | 12.00%                                               |                |
| Interest on working capital loan :                               | 12.00%                                               |                |
| Repayment period :                                               | Five years with one year grace period is considered. |                |
| Average price of raw material :                                  | Rs. 65 / kg                                          |                |
| Average sale price of product :                                  | Rs. 130 / kg                                         |                |

### 3.14 Fixed Capital Investment

#### 3.14. A. Land & Building

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

| Table 4: Land and Civil Infrastructures |                                                                                                                                        |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| i. Land 1000 Sq ft                      | Assumed land already developed and has 6000 sq ft built in area. So additional 1000 sq ft can be built in @ Rs. 200/sq ft Rs. 2,00,000 |
| ii. Built-up processing area 6000 sq ft |                                                                                                                                        |
| iii. Storage area 1000 sq ft            |                                                                                                                                        |
| Total                                   | Rs. 2,00,000                                                                                                                           |

#### 3.14. B. Machinery & Equipment: Rs. 20.00 Lakhs

| Table 5: Machineries & Equipments |                             |                |                   |                   |     |                       |
|-----------------------------------|-----------------------------|----------------|-------------------|-------------------|-----|-----------------------|
| S. No                             | Description                 | Power required | Area reqd (Sq.ft) | Unit Price, (Rs.) | Qty | Amount (Rs. in Lakhs) |
| 1.                                | Weighing scale              | 0.5 HP         | 50                | 100000            | 1   | 1.00                  |
| 2.                                | Cleaning machine            | 2 HP           | 100               | 100000            | 1   | 1.00                  |
| 3.                                | Washer                      | 5 HP           | 100               | 200000            | 1   | 2.00                  |
| 4.                                | Pulper                      | 5 HP           | 100               | 300000            | 1   | 3.00                  |
| 5.                                | Clarifier                   | 5 HP           | 100               | 300000            | 1   | 3.00                  |
| 6.                                | Blending Tank               | 2 HP           | 50                | 200000            | 1   | 2.00                  |
| 7.                                | Bottle Filler & Capping m/c | 2 HP           | 100               | 300000            | 1   | 3.00                  |
| 8.                                | Pasteurizer                 | 5 HP           | 50                | 300000            | 1   | 3.00                  |
| 9.                                | Boiler                      | 5 HP           | 100               | 200000            | 1   | 2.00                  |
|                                   | <b>Total</b>                |                |                   |                   |     | <b>20.00</b>          |

### 3.14. C. Utilities and Fittings

| Table 6: Utilities and Fittings |                |
|---------------------------------|----------------|
| Power                           | Rs. 1.20 Lakhs |
| Water                           | Rs. 0.80 Lakhs |
| Total                           | Rs. 2.00 Lakhs |

### 3.14. D. Other Fixed Assets

| Table 7: Other Fixed Assets                      |                |
|--------------------------------------------------|----------------|
| Furniture and fixtures                           | Rs. 2.00 lakhs |
| Utensils, trays, thermometer, refractometer, etc |                |
| Total                                            | Rs. 2.00 Lakhs |

### 3.14. E. Pre-operative Expenses

| Table 8: Pre-operative Expenses                                                              |               |
|----------------------------------------------------------------------------------------------|---------------|
| Legal expenses, start-up expenses, establishment cost, consultancy fee, trial runs, & others | Rs. 25,000.00 |
| Total Pre-operative Expenses                                                                 | Rs. 25,000.00 |

### 3.14. F. Total Fixed Capital Investment

Total Fixed Capital Investment = (Land & Building + Machinery & Equipment+ Utilities and Fittings + Other Fixed Assets + Pre-operative Expenses)

= Rs. (2.00+20.00+2.00+2.00+0.25) = **Rs. 26.25 Lakhs**

### 3.15. Working Capital Requirement

| <b>Table 9: Working Capital Requirement (Rs. in lakhs)</b> |               |                                 |                                 |                                 |
|------------------------------------------------------------|---------------|---------------------------------|---------------------------------|---------------------------------|
| <b>Particulars</b>                                         | <b>Period</b> | <b>year 2<br/>(70% - 70 MT)</b> | <b>year 3<br/>(80% - 80 MT)</b> | <b>year 4<br/>(90% - 90 MT)</b> |
| Raw material stock                                         | 7 days        | 0.32                            | 0.38                            | 0.43                            |
| Packing material                                           | 15 days       | 1.80                            | 2.10                            | 2.40                            |
| Work in progress                                           | 15 days       | 2.94                            | 3.48                            | 3.93                            |
| Finished goods' stock                                      | 15 days       | 2.82                            | 3.46                            | 3.91                            |
| Receivables                                                | 30 days       | 7.15                            | 8.99                            | 10.29                           |
| Total current assets                                       |               | 15.03                           | 18.41                           | 20.96                           |
| Trade creditors                                            |               | 0.00                            | 0.00                            | 0.00                            |
| Working capital gap                                        |               | 15.03                           | 18.41                           | 20.96                           |
| Margin money (25%)                                         |               | 3.76                            | 4.60                            | 5.24                            |
| Bank finance                                               |               | 11.27                           | 13.81                           | 15.72                           |

### 3.16. Total Project Cost and Means of Finance

| <b>Table 10: Total Project Cost and Means of Finance (Rs. In lakhs)</b> |               |
|-------------------------------------------------------------------------|---------------|
| <b>Particulars</b>                                                      | <b>Amount</b> |
| i. Land and building                                                    | 2.00          |
| ii. Machinery and equipments                                            | 20.00         |
| iii. Utilities & Fittings                                               | 2.00          |
| iv. Miscellaneous Fixed assets                                          | 2.00          |
| v. Pre-operative expenses                                               | 0.25          |
| vi. Contingencies                                                       | 2.00          |
| vii. Working capital margin                                             | 3.76          |
| <b>Total project cost (i to vii) (Rounded off)</b>                      | <b>32.10</b>  |
| <b>Means of finance</b>                                                 |               |
| i. Subsidy                                                              | 10.00         |
| ii. Promoter's contribution                                             | 7.10          |
| iii. Term loan                                                          | 15.00         |

### 3.17. Manpower Requirement

| Table 11: Manpower Requirement    |                |                       |                               |
|-----------------------------------|----------------|-----------------------|-------------------------------|
| Particulars                       | No. of persons | Monthly Wage<br>(Rs.) | Total Monthly Salary<br>(Rs.) |
| i. Manager<br>(can be the owner ) | 1              | 20000                 | 20000                         |
| ii. Skilled worker                | 2              | 10000                 | 20000                         |
| iii. Semi skilled                 | 3              | 7500                  | 22500                         |
| iv. Helper                        | 3              | 5000                  | 15000                         |
| v. Salesman                       | 1              | 7500                  | 7500                          |
| Total                             | 10             |                       | 85000                         |

Note: Only the manager and two skilled workers are permanent staffs (Salary Rs. 40000/ month). Others are causal staffs.

### 3.18. Expenditure, Revenue and Profitability Analysis

| Table 12: Expenditure, Revenue and Profitability Analysis |                                                                    |                                    |                      |                      |                      |                      |                      |                      |                      |
|-----------------------------------------------------------|--------------------------------------------------------------------|------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|                                                           | Particulars                                                        | 1 <sup>st</sup> year               | 2 <sup>nd</sup> year | 3 <sup>rd</sup> year | 4 <sup>th</sup> year | 5 <sup>th</sup> year | 6 <sup>th</sup> year | 7 <sup>th</sup> year | 8 <sup>th</sup> year |
| A                                                         | <b>Total Installed Capacity</b>                                    | 120 MT/Year Sea buckthorn Beverage |                      |                      |                      |                      |                      |                      |                      |
|                                                           | Capacity utilization (%)                                           | Under const. (0%)                  | 72 MT (60%)          | 84 MT (70%)          | 96 MT (80%)          | 108 MT (90%)         | 108 MT (90%)         | 108 MT (90%)         | 108 MT (90%)         |
| B                                                         | <b>Expenditure (Rs. in Lakh)</b>                                   |                                    |                      |                      |                      |                      |                      |                      |                      |
|                                                           | Raw materials*                                                     | 0.00                               | 15.49                | 18.07                | 20.65                | 23.23                | 23.23                | 23.23                | 23.23                |
|                                                           | Packaging materials @ Rs. 60/ kg                                   | 0.00                               | 43.20                | 50.40                | 57.60                | 64.80                | 64.80                | 64.80                | 64.80                |
|                                                           | Utilities (Electricity, Fuel)                                      | 0.00                               | 3.95                 | 4.37                 | 4.79                 | 5.22                 | 5.22                 | 5.22                 | 5.22                 |
|                                                           | Salaries (1st yr only manager's salary)                            | 2.40                               | 7.14                 | 7.91                 | 8.67                 | 9.44                 | 9.44                 | 9.44                 | 9.44                 |
|                                                           | Repair & maintenance                                               | 0.00                               | 0.69                 | 0.69                 | 0.69                 | 0.69                 | 0.69                 | 0.69                 | 0.69                 |
|                                                           | Insurance                                                          | 0.30                               | 0.30                 | 0.30                 | 0.30                 | 0.30                 | 0.30                 | 0.30                 | 0.30                 |
|                                                           | Miscellaneous expenses                                             | 0.50                               | 0.50                 | 0.50                 | 0.50                 | 0.50                 | 0.50                 | 0.50                 | 0.50                 |
|                                                           | <b>Total Expenditure</b>                                           | 3.20                               | 71.27                | 82.24                | 93.20                | 104.18               | 104.18               | 104.18               | 104.18               |
| C                                                         | <b>Total Sales Revenue (Rs. in Lakh)</b>                           |                                    |                      |                      |                      |                      |                      |                      |                      |
|                                                           | Sale of Sea buckthorn Beverage @ Rs. 130/ kg                       | 0.00                               | 85.80                | 107.90               | 123.50               | 139.10               | 140.40               | 140.40               | 140.40               |
| D                                                         | <b>PBDIT (Total Sales Revenue-Total Expenditure) (Rs. in Lakh)</b> | -3.20                              | 14.53                | 25.66                | 30.30                | 34.92                | 36.22                | 36.22                | 36.22                |
|                                                           | Depreciation on civil works @ 5% per annum                         | 0.10                               | 0.10                 | 0.09                 | 0.09                 | 0.08                 | 0.08                 | 0.07                 | 0.07                 |

|   |                                                                                        |         |       |       |       |       |       |       |       |
|---|----------------------------------------------------------------------------------------|---------|-------|-------|-------|-------|-------|-------|-------|
|   | Depreciation on machinery @ 10% p.a                                                    | 2.02    | 1.82  | 1.64  | 1.47  | 1.32  | 1.19  | 1.07  | 0.97  |
|   | Depreciation on other fixed assets@ 15% p.a                                            | 0.91    | 0.77  | 0.65  | 0.56  | 0.47  | 0.40  | 0.34  | 0.29  |
|   | Interest on term loan @ 12% p.a                                                        | 1.79    | 1.79  | 1.55  | 1.20  | 0.82  | 0.57  | 0.00  | 0.00  |
|   | Interest on working capital @ 10% p.a                                                  | 0.00    | 1.35  | 1.66  | 1.89  | 2.12  | 2.13  | 2.13  | 2.13  |
| E | <b>Profit after Depreciation and Interest</b><br>(Rs. in Lakh)                         | -8.02   | 8.70  | 20.07 | 25.09 | 30.11 | 31.85 | 32.61 | 32.76 |
| F | Tax (assumed 15%) (Rs. in Lakh)                                                        | 0.00    | 2.66  | 4.09  | 5.09  | 6.15  | 6.39  | 6.52  | 6.59  |
| G | <b>Profit after depreciation, Interest &amp; Tax</b> (Rs. in Lakh)                     | -8.02   | 6.04  | 15.98 | 20.00 | 23.96 | 25.46 | 26.09 | 26.17 |
| H | Surplus available for repayment (PBDIT-Interest on Working Capital -Tax) (Rs. in Lakh) | -3.20   | 10.52 | 19.91 | 23.32 | 26.65 | 27.70 | 27.57 | 27.50 |
| I | Coverage available (Rs. in Lakh)                                                       | -3.20   | 10.52 | 19.91 | 23.32 | 26.65 | 27.70 | 27.57 | 27.50 |
| J | Total Debt Outgo (Rs. in Lakh)                                                         | 1.79    | 4.79  | 4.55  | 4.20  | 3.82  | 3.57  | 0.00  | 0.00  |
| K | <b>Debt Service Coverage Ratio (DSCR)</b>                                              | -1.79   | 2.20  | 4.38  | 5.55  | 6.98  | 7.76  |       |       |
|   | <b>Average DSCR</b>                                                                    | 4.18    |       |       |       |       |       |       |       |
| L | <b>Cash accruals (PBDIT- Interest-Tax)</b><br>(Rs. in Lakh)                            | -4.99   | 10.08 | 20.02 | 24.01 | 27.95 | 29.26 | 29.70 | 29.63 |
| M | <b>Payback Period</b> (on Rs. 32.10 Lakhs initial investment)                          | 4 years |       |       |       |       |       |       |       |

\* Raw materials: Sea buckthorn juice: 1 litre; Sugar: 1.4 kg; Water: 7.6 kg; Product yield: 10 litres with 15% TSS

Cost: Sea buckthorn: Rs 65 /kg (Juice yield: 44% with 10% TSS); Sugar: Rs.40/ kg; Water: Rs 5/ litre; Other additives (0.005%): Rs.100/ kg.

### 3.19. Repayment Schedule

| Table 13: Repayment Schedule (Rs. in Lakh) |                                  |              |                        |                       |                  |                        |             |                                |              |
|--------------------------------------------|----------------------------------|--------------|------------------------|-----------------------|------------------|------------------------|-------------|--------------------------------|--------------|
| Year                                       | Outstanding loan at start of yr. | Disbursement | Total outstanding Loan | Surplus for repayment | Interest payment | Repayment of principal | Total outgo | o/s Loan at the end of the yr. | Balance left |
| 1                                          | 0.00                             | 15.00        | 15.00                  | -3.20                 | 1.79             | 0.00                   | 1.79        | 15.00                          | -4.99        |
| 2                                          | 15.00                            |              | 15.00                  | 10.52                 | 1.79             | 3.00                   | 4.79        | 12.00                          | 5.73         |
| 3                                          | 12.00                            |              | 12.00                  | 19.91                 | 1.55             | 3.00                   | 4.55        | 9.00                           | 15.36        |
| 4                                          | 9.00                             |              | 9.00                   | 23.32                 | 1.20             | 3.00                   | 4.20        | 6.00                           | 19.12        |
| 5                                          | 6.00                             |              | 6.00                   | 26.65                 | 0.82             | 3.00                   | 3.82        | 3.00                           | 22.83        |
| 6                                          | 3.00                             |              | 3.00                   | 27.70                 | 0.57             | 3.00                   | 3.57        | 0.00                           | 24.13        |

### 3.20. Assets' Depreciation

| Table 14: Assets' Depreciation (Written Down Value Method) (Rs. in Lakh) |          |          |          |          |          |          |          |          |
|--------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Particulars                                                              | 1st Year | 2nd Year | 3rd Year | 4th Year | 5th Year | 6th Year | 7th Year | 8th Year |
| Civil works                                                              | 2.02     | 1.92     | 1.82     | 1.73     | 1.64     | 1.56     | 1.48     | 1.41     |
| Depreciation                                                             | 0.10     | 0.10     | 0.09     | 0.09     | 0.08     | 0.08     | 0.07     | 0.07     |
| Depreciated value                                                        | 1.92     | 1.82     | 1.73     | 1.64     | 1.56     | 1.48     | 1.41     | 1.34     |
|                                                                          |          |          |          |          |          |          |          |          |
| Plant & Machinery                                                        | 20.19    | 18.17    | 16.35    | 14.71    | 13.24    | 11.92    | 10.73    | 9.66     |
| Depreciation                                                             | 2.02     | 1.82     | 1.64     | 1.47     | 1.32     | 1.19     | 1.07     | 0.97     |
| Depreciated value                                                        | 18.17    | 16.35    | 14.71    | 13.24    | 11.92    | 10.73    | 9.66     | 8.69     |
|                                                                          |          |          |          |          |          |          |          |          |
| Other Fixed Assets                                                       | 6.04     | 5.13     | 4.36     | 3.71     | 3.15     | 2.68     | 2.28     | 1.94     |
| Depreciation                                                             | 0.91     | 0.77     | 0.65     | 0.56     | 0.47     | 0.40     | 0.34     | 0.29     |
| Depreciated value                                                        | 5.13     | 4.36     | 3.71     | 3.15     | 2.68     | 2.28     | 1.94     | 1.65     |
|                                                                          |          |          |          |          |          |          |          |          |
| All Assets                                                               | 28.25    | 25.22    | 22.53    | 20.15    | 18.03    | 16.16    | 14.49    | 13.01    |
| Depreciation                                                             | 3.03     | 2.69     | 2.38     | 2.12     | 1.87     | 1.67     | 1.48     | 1.33     |
| Depreciated value                                                        | 25.22    | 22.53    | 20.15    | 18.03    | 16.16    | 14.49    | 13.01    | 11.68    |

### 3.21. Financial Assessment of the Project

| Table 15: Benefit Cost Ratio (BCR) and Net Present Worth (NPW) |                                                                                                      |          |          |          |          |          |          |          |          |        |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|--------|
| S. No                                                          | Particulars                                                                                          | 1st year | 2nd year | 3rd year | 4th year | 5th year | 6th year | 7th year | 8th year |        |
| i                                                              | Capital cost (Rs. in Lakh)                                                                           | 28.25    | 0        | 0        | 0        | 0        | 0        | 0        | 0        |        |
| ii                                                             | Recurring cost (Rs. in Lakh)                                                                         | 3.20     | 71.27    | 82.24    | 93.20    | 104.18   | 104.18   | 104.18   | 104.18   |        |
| iii                                                            | Total cost (Rs. in Lakh)                                                                             | 31.45    | 71.27    | 82.24    | 93.20    | 104.18   | 104.18   | 104.18   | 104.18   | 694.88 |
| iv                                                             | Benefit (Rs. in Lakh)                                                                                | 0.00     | 85.80    | 107.90   | 123.50   | 139.10   | 140.40   | 140.40   | 140.40   |        |
| v                                                              | Total Depreciated value of all assets (Rs. in Lakh)                                                  |          |          |          |          |          |          |          | 11.68    |        |
| vi                                                             | Total benefits (Rs. in Lakh)                                                                         | 0.00     | 85.80    | 107.90   | 123.50   | 139.10   | 140.40   | 140.40   | 152.08   | 889.18 |
|                                                                | <b>Benefit-Cost Ratio (BCR): 1.28 (Profitable Project)</b><br><b>Net Present Worth (NPW): 194.30</b> |          |          |          |          |          |          |          |          |        |

### 3.22. Break Even Analysis of the Project

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

| Table 16: Break-Even Analysis |                                              |                      |                      |                      |                      |                      |                      |                      |                      |
|-------------------------------|----------------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| S.No                          | Particulars                                  | 1 <sup>st</sup> year | 2 <sup>nd</sup> year | 3 <sup>rd</sup> year | 4 <sup>th</sup> year | 5 <sup>th</sup> year | 6 <sup>th</sup> year | 7 <sup>th</sup> year | 8 <sup>th</sup> year |
|                               | Capacity utilization                         | Under const<br>(0%)  | 72 MT<br>(60%)       | 84 MT<br>(70%)       | 96 MT<br>(80%)       | 108 MT<br>(90%)      | 108 MT<br>(90%)      | 108 MT<br>(90%)      | 108 MT<br>(90%)      |
| A                             | <b>Fixed Cost (Rs. in Lakh)</b>              |                      |                      |                      |                      |                      |                      |                      |                      |
|                               | Permanent staff salaries                     | 2.55                 | 2.55                 | 2.55                 | 2.55                 | 2.55                 | 2.55                 | 2.55                 | 2.55                 |
|                               | Depreciation on building @ 5% p.a            | 0.10                 | 0.10                 | 0.09                 | 0.09                 | 0.08                 | 0.08                 | 0.07                 | 0.07                 |
|                               | Depreciation on machinery @ 10% p.a          | 2.02                 | 1.82                 | 1.64                 | 1.47                 | 1.32                 | 1.19                 | 1.07                 | 0.97                 |
|                               | Depreciation on other fixed assets @ 15% p.a | 0.91                 | 0.77                 | 0.65                 | 0.56                 | 0.47                 | 0.40                 | 0.34                 | 0.29                 |
|                               | Interest on term loan 12% p.a                | 1.79                 | 1.79                 | 1.55                 | 1.20                 | 0.82                 | 0.57                 | 0.00                 | 0.00                 |
|                               | Insurance                                    | 0.30                 | 0.30                 | 0.30                 | 0.30                 | 0.30                 | 0.30                 | 0.30                 | 0.30                 |
|                               | <b>Total Fixed Cost (Rs. in Lakh)</b>        | 7.67                 | 7.33                 | 6.78                 | 6.17                 | 5.54                 | 5.09                 | 4.33                 | 4.18                 |
| B                             | <b>Sales Revenue (Rs. in Lakh)</b>           | 0.00                 | 85.80                | 107.90               | 123.50               | 139.10               | 140.40               | 140.40               | 140.40               |
| C                             | <b>Variable Cost (Rs. in Lakh)</b>           |                      |                      |                      |                      |                      |                      |                      |                      |
|                               | Raw materials*                               | 0.00                 | 15.49                | 18.07                | 20.65                | 23.23                | 23.23                | 23.23                | 23.23                |
|                               | Packaging materials @ Rs.60/ Unit            | 0.00                 | 43.20                | 50.40                | 57.60                | 64.80                | 64.80                | 64.80                | 64.80                |
|                               | Casual staff salaries                        | 0.00                 | 4.59                 | 4.59                 | 4.59                 | 4.59                 | 4.59                 | 4.59                 | 4.59                 |
|                               | Utilities (Electricity, Fuel)                | 0.00                 | 3.95                 | 4.37                 | 4.79                 | 5.22                 | 5.22                 | 5.22                 | 5.22                 |

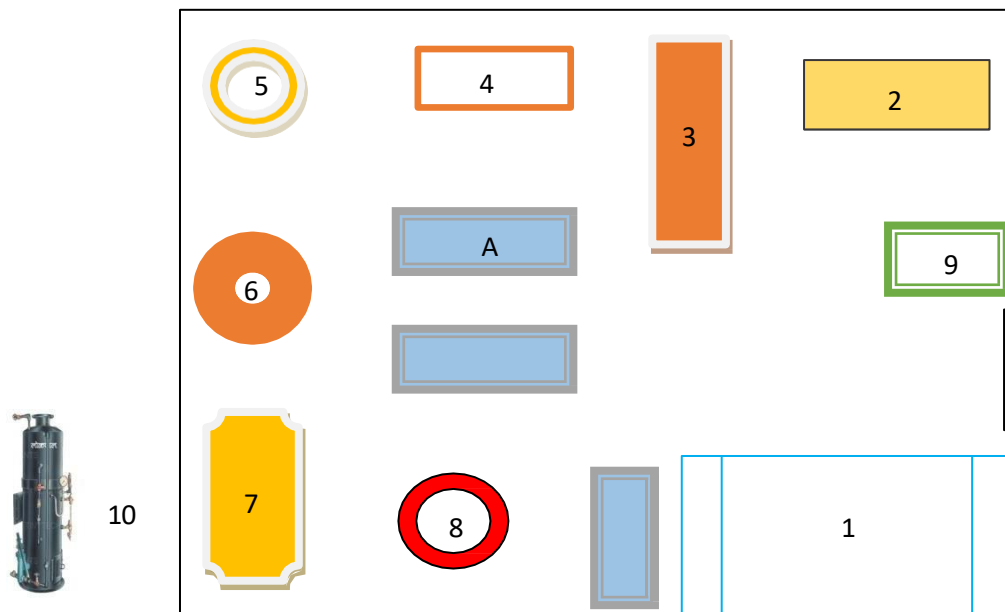
|   |                                                                      |      |        |        |        |        |        |        |        |
|---|----------------------------------------------------------------------|------|--------|--------|--------|--------|--------|--------|--------|
|   | Repair & maintenance                                                 | 0.00 | 0.69   | 0.69   | 0.69   | 0.69   | 0.69   | 0.69   | 0.69   |
|   | Miscellaneous expenses                                               | 0.50 | 0.50   | 0.50   | 0.50   | 0.50   | 0.50   | 0.50   | 0.50   |
|   | Interest on working capital                                          | 0.00 | 1.35   | 1.66   | 1.89   | 2.12   | 2.13   | 2.13   | 2.13   |
|   | Total Variable Cost (Rs. in Lakh)                                    | 0.50 | 69.77  | 80.28  | 90.71  | 101.15 | 101.16 | 101.16 | 101.16 |
| D | <b>Break Even Point (BEP) as % of sale</b>                           | 0.00 | 45.73% | 24.55% | 18.82% | 14.60% | 12.97% | 11.03% | 10.65% |
|   | <b>Break Even Point (BEP) in terms of sales value (Rs. in lakhs)</b> |      | 39.23  | 26.49  | 23.24  | 20.31  | 18.21  | 15.49  | 14.96  |

\* Raw materials:

\* Raw materials: Sea buckthorn juice: 1 litre; Sugar: 1.4 kg; Water: 7.6 kg; Product yield: 10 litres with 15% TSS

Cost: Sea buckthorn: Rs 65 /kg (Juice yield: 44% with 10% TSS); Sugar: Rs.40/ kg; Water: Rs 5/ litre; Other additives (0.005%): Rs.100/ kg.

### 3.23 Plant Layout



- |                    |                                       |
|--------------------|---------------------------------------|
| 1 Storage          | 6 Syrup & Juice Blending Tank         |
| 2 Cleaning machine | 7 Beverage bottling & capping machine |
| 3 Washing          | 8 Bottle Pasteurizer                  |
| 4 Pulping          | 9 Weighing scale                      |
| 5 Clarifier        | 10 Boiler                             |

### 3.24. Machinery Suppliers

The entrepreneur must provide tentative supplier list and quotations with respect to his project. However, there are many machinery suppliers available within India for Sea buckthorn Beverage processing machineries and equipments. Some of the suppliers are:

1. Gardners Corporation

158 Golf Links New Delhi 110003 India

Tel: +91 11 2334 4287/2336 3640; Fax: +91 11 2371 7179

2. Bajaj Machine Private Limited

7/20 - 7/27, Jai Lakshmi Industrial Estate, Side-IV Sahibabad Industrial Area

Ghaziabad - 201301 U.P India

Tel: +91 120 22775119/22775137; Fax: +91 120 22775137

Website: [www.indiamart.com/bajajmachine](http://www.indiamart.com/bajajmachine)

3. Delhi Industries

4 Paharganj Lane, New Delhi 110055 India

Tel: +91 11 2529720, 27525200, 27536888

Fax: +91 11 25791291

4. Geeta Food Engineering

Plot No C-7/1 TTC Area Pawana MIDC, Thane Belapur Road

Behind Davita Chemicals Ltd, Navi Mumbai 400 705 India

Tel: +91 22 2782 6626/2766 2098; Fax: +91 22 2782 6337

5. Repute Engineers Private Limited

12/23, D-1 Block, MIDC, Chinchwad, Pune-411019,

Maharashtra, India

6. Bruckner Process Technologies

No. 364, 2nd Floor, Anna Salai, Royapettah,

Chennai-600006, Tamil Nadu, India

7. Acufil Machines

S. F. No. 120/2, Kalapatty Post Office

Coimbatore - 641 035 Tamil Nadu, India

Tel: +91 422 2666108/2669909

Fax: +91 422 2666255

Email: [acufilmachines@yahoo.co.in](mailto:acufilmachines@yahoo.co.in), [acufilmachines@hotmail.com](mailto:acufilmachines@hotmail.com)

8. Autopack Machines Pvt Ltd

101-C Poonam Cambers A Wing, 1st Floor Dr Annie Besant Road,

Worli Mumbai 400018 India

Tel: +91 22 2493 4406/2497 4800/2492 4806; Fax: +91 22 2496 4926

E-mail: [autopack@bom3.vsml.net.in](mailto:autopack@bom3.vsml.net.in)

Website: [www.autopackmachines.com](http://www.autopackmachines.com)

## **CHAPTER 4**

### **LIMITATIONS OF THE MODEL DPR AND GUIDELINES FOR ENTREPRENEURS**

#### **4.1. Limitations of the Model DPR**

- i. This model DPR has provided only the basic standard components and methodology to be adopted by an entrepreneur while submitting a proposal under the Formalization of Micro Food Processing Enterprises Scheme of MoFPI.
- ii. This is a model DPR made to provide general methodological structure not for specific entrepreneur/crops/location. Therefore, information on the entrepreneur, forms and structure (proprietorship/partnership/cooperative/ FPC/ joint stock company) of business, background of proposed project, location, raw material base/contract sourcing, entrepreneur's own SWOT analysis, market research, rationale of the project for specific location, community advantage/benefit, employment generation etc are not given in detail.
- iii. The present DPR is based on certain assumptions on cost, prices, interest, capacity utilization, output recovery rate and so on. However, these assumptions in reality may vary across places, markets and situations; thus the resultant calculations will also change accordingly.
- iv. This particular DPR is made on three components of means of finance i.e. grant, owner's contribution and loan/debt as followed in many central sector schemes.

#### **4.2. Guidelines for the Entrepreneurs**

- i. The success of any prospective food processing project depends on how closer the assumptions made in the initial stage are with the reality of the targeted market/place/situation. Therefore, the entrepreneurs must do its homework as realistic as possible on the assumed parameters.
- ii. This model DPR must be made more comprehensive by the entrepreneur by including information on the entrepreneur, forms and structure (proprietorship/partnership/cooperative/ FPC/joint stock company) of entrepreneur's business, project location, raw material base/contract sourcing, entrepreneurs own SWOT analysis, detailed market research, comprehensive product mix based on demand, rationale of the project for specific location, community advantage/benefit from the project, employment generation,

production/availability of the raw materials/crops in the targeted area/clusters and many more relevant aspects for acceptance and approval of the competent authority.

iii. The entrepreneur must be efficient in managing the strategic, financial, operational, material and marketing aspects of a business. In spite of the assumed parameter being closely realistic, a project may become unsustainable if the entrepreneur does not possess the required efficiency in managing different aspects of the business and respond effectively in changing situations.

iv. The machineries should be purchased after thorough market research and satisfactory demonstration.

v. The entrepreneur must ensure uninterrupted quality raw materials' supply and maintain optimum inventory levels for smooth operations management.

vi. The entrepreneur must possess a strategic look to steer the business in upward trajectory.

vii. The entrepreneur must maintain optimum (not more or less) inventory, current assets. Selecting optimum source of finance, not too high debt-equity ratio, proper capital budgeting and judicious utilization of surplus profit for expansion is must.

viii. The entrepreneur must explore prospective markets through extensive research, find innovative marketing strategy, and maintain quality, adjust product mix to demand.

ix. The entrepreneur must provide required documents on land, financial transaction, balance sheet, further project analysis as required by the competent authority for approval.

x. The entrepreneur must be hopeful and remain positive in attitude.



## Contact Us

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