

Banana



1. Introduction :

Banana (*Musa sp.*) is a large perennial herb with leaf sheaths that form trunk like pseudostem. Banana has its origin in tropical region of South East Asia. Banana is a nutritious gold mine. They are high in vitamin B6, which helps fight infection and is essential for the synthesis of heme, the iron containing part of hemoglobin. They are also rich in potassium and are a great source of fibre. In recent years, considering the adverse impact of indiscriminate use of chemicals, new trend for organic production of banana is increasing in the country. A new name, i.e. "Green Foods" for this has been coined.

This refers to organically grown crops which are not exposed to any chemicals right from source of planting material to the final post harvest handling and processing. It is based on recycling of natural organic matter. In this system nutritional requirement are met through use of enriched composts, cakes, promotion of green manure, inter and cover crops, mulching etc, while pests and diseases are kept below threshold level through integrated crop management.

2. International scenario :

Bananas are the fifth largest agricultural commodity in world trade after cereals, sugar, coffee and cocoa. India, Ecuador, Brazil and China alone produce half of total bananas of the world. The advantage of this fruit is its availability round the year. The present scenario of area, production and productivity of banana is given in Table 1.

Table 1: Area, Production and productivity of banana

| | Area (ha) | Production('000 t) | Average Productivity (t/ha) |
|-------|-----------|--------------------|-----------------------------|
| World | 4544702 | 69280 | 15.20 |
| India | 529700 | 16225 | 30.63 |

Source : FAOSTAT

The major banana exporting countries are Ecuador, Colombia, Costa Rica and Philippines and the major importing countries are USA, Belgium, Germany and United Kingdom. According to FAO estimates, India occupies the highest area under banana in the world. It may be noted that 11 percent of the total global area under banana belongs to India. India ranks first in banana production, contributing about 23% in world pool of banana production.

3. National Scenario :

The major banana producing states of India are Tamilnadu, Maharashtra, Karnataka, Gujarat, Andhra Pradesh, Assam and Madhya Pradesh. Although separate data on organic banana is not available, the area, production and productivity of banana is presented in Table 2.

Table 2. Statewise Area, Production and Productivity of Banana in India (2006-07)

| Sr. No. | Name of the State | Area (' 000 ha) | Production ('000 t) | Productivity (t/ha) |
|---------|-------------------|-----------------|---------------------|---------------------|
| 1 | Assam | 43.30 | 598.90 | 13.83 |
| 2 | Andhra Pradesh | 72.40 | 2173.30 | 30.02 |
| 3 | Bihar | 29.00 | 1125.10 | 38.80 |
| 4 | Gujarat | 53.40 | 2912.60 | 54.54 |
| 5 | Kerala | 59.10 | 463.77 | 7.85 |
| 6 | Karnataka | 58.13 | 1441.07 | 24.79 |
| 7 | Maharashtra | 73.40 | 4621.90 | 62.97 |
| 8 | Madhya pradesh | 14.90 | 773.00 | 51.88 |
| 9 | Orissa | 22.20 | 284.80 | 12.83 |
| 10 | Tamil nadu | 102.22 | 5019.45 | 49.10 |
| 11 | West Bengal | 31.70 | 802.10 | 25.30 |
| 12 | Others | 40.40 | 641.80 | 15.89 |
| 13 | Total | 600.15 | 20857.79 | 34.75 |

Source - National Horticulture Board Database

The productivity per hectare in India is more than twice that of the world. The state of Maharashtra is the largest producer of banana in the country with 27% of total Indian production and it has the highest productivity, 420% higher than that of the world average and 225% higher than that of the country's average. Even though nearly 23% of total world output is produced in India, the export is negligible when compared to other countries. The exports

of Indian Banana is mainly to UAE, Saudi Arabia and other Gulf countries. The export of fresh banana from India during the last three years is given in Table 3.

Table 3. Export of Fresh Banana from India

| Sr. No. | Year | Quantity (t) | Value(Rs. in crore) |
|---------|---------|--------------|---------------------|
| 1 | 2004-05 | 12817 | 13.42 |
| 2 | 2005-06 | 11475 | 16.06 |
| 3 | 2006-07 | 14411 | 22.36 |

Source : APEDA

India has the potential to emerge as a major exporter of organically grown bananas by promotion of biofertilizers, biopesticides and recycling of wastes of eco-friendly inputs and setting up of a national certification scheme and accreditation agency to certify organic products in the country.

4.Organic Farming :

Organic farming is a crop production method respecting the rules of the nature. It maximises the use of onfarm resources and minimises the use of off-farm resources. It is a farming system that seeks to avoid the use of chemical fertilisers and pesticides. In organic farming, entire system i.e. plant, animal, soil, water and micro-organisms are to be protected. The guidelines for organic farming is enclosed in Annexure I.

5.Organic Production :

5.1 Climate and Soil

This tropical crop is grown throughout the year under humid weather condition. The optimum temperature suitable for banana ranges between 25-30 0 C. The plant prefers a soil pH of 5.5-7.5. Almost all the agricultural soils are suitable, provided they are deep well drained. Black loams and sandy loam soils of uplands are most suited.

5.2 Land preparation

The land is prepared by ploughing twice and harrowing thrice. Levelling is done by tractor after harrowing. Ridges and furrows are made and the pits (30 cm x 30 cm x 30 cm) are dug and filled up with well decomposed FYM/compost. The pits are irrigated to allow the soil to settle.

5.3 Varieties

The varieties grown in Maharashtra under organic cultivation are Dwarf Cavendish, Grand Naine, Sreemanthi and Basrai.

5.4 Planting material

The banana is propagated by suckers and rhizomes. However, tissue cultured plantlets are also being used on a large scale nowadays. These tissue cultured plantlets enable early harvesting in 11-12 months after planting.

5.5 Planting and infilling

The time of planting of banana depends solely on climatic conditions and availability of water. In areas of heavy and continuous rains, planting of banana should be done after rains i.e. September - October and in those areas where rains are not so heavy planting can be done in June-July. In irrigated areas the planting is done in February - March and in hilly areas in April. The planting material is treated with a solution of 250 g of ghee, 0.500 g of honey and 15 kg of cowdung. The spacing adopted by organic banana cultivators in Maharashtra are 1.5 m x 1.5 m and 1.5 m x 1.8 m. However for tissue cultured banana, a spacing of 1.5 m x 1.8 m accommodating a plant population of 4400 plants/ha is considered for working out the cost of this model scheme.

5.6 Intercropping

Onion, soyabean and cowpea can be grown as intercrop in Banana by planting on raised bed which will give additional income. Growing intercrops like cowpea and soyabean also helps in suppressing weed growth. In preparation of model scheme, the income and expenditure for intercropping is not considered.

5.7 Manuring

15 t of FYM/compost is applied at the time of land preparation. After plantation, the manuring is done by applying 5 kg FYM, 2 Kg Bhumilab, 20 g trichoderma and 30-50 ml humus per plant in first year and FYM @ 10 kg, Bhumilab @ 2.5 - 3 kg per plant during subsequent two years. The spraying of Gomutra (Cow urine) and Jeevamrut is also taken up. The jeevamrut is prepared by adding 10 kg cowdung, 5 l of cow urine, 2 kg black jaggery, 2 kg ground pulses powder, handful of bund soil in 200 l of water, the solution is kept for 2 to 7 days in shade for fermentation. During the fermentation, the solution is stirred on daily. Biofertilizers like Azatobacter(20 g/plant), Phosphate Solubilizing bacteria (PSB) (20 g/plant) and EM solution at the rate of 1 l per acre. The EM (Effective Microorganisms) solution is prepared by adding 1 l EM, 2 kg black jaggery, 50 g salt mixed in a drum of suitable size.

5.8 Irrigation

The plants need to be irrigated immediately after planting. About 30-40 weekly irrigations are required. When summer temperature crosses 37.5 °C, irrigation on every 3rd day is essential. Inadequate irrigation to banana leads to delayed flowering, irregular bunch size, delayed maturity, reduced fingers and poor keeping quality of the fruits. The drip system of irrigation is being followed in most of the organic banana cultivation in Maharashtra. In this model scheme, the cost of installation of drip is not considered.

5.9 Interculture operations

5.9.1 Propping

Propping or supporting the bearing plants can be done by suitable propping material like bamboo or wooden poles.

5.9.2 Mulching

Mulching is desirable immediately after planting. Mulching controls weed growth, conserves moisture, hastens growth and improves yield.

5.9.3 Desuckering

All varieties of banana throw suckers from 2-3 months after planting. All these suckers should not be allowed to grow as they will compete with the mother plants for water and nutrients thereby reducing the yield of main crop. Desuckering with sickle at 15-20 days interval right from the beginning till flowering is essential. Wrapping the bunches is essential to have blemish / bruise free fruits with uniform size and quality. For this, black coloured polythene may be used for covering the fruits

5.9.4 Other operations

Weeding is done 3-4 times in a year. Trashing is done by removing dried leaves. Earthing up of the soil is required to be carried out two times annually

5.10 Plant Protection

The major pests and diseases observed in banana crop are rhizome weevil, nematodes, bunchy top, leaf spot, etc. In the case of organic farming, dasparni arka and neem cake are used to control pests and diseases. The dasparni arka, which means mixture of leaves of ten kinds of plants (das=ten, parna=leaf, arka=concentrated form of solution) is prepared by adding 25 kg

neem leaves and 2 kg leaves each of custard apple, nirgudi, kaner, cotton, papaya, castor, karanj, gudwel, drumstick in 200 l of water, 5 to 10 l of gomutra & 2 kg of green chillies, the solution is kept for 15-20 days for fermentation. The stock solution is prepared by filtration through muslin cloth. The spraying is done by diluting the arka further by adding 100 l of water to 2.5 l of the arka.

5.11 Harvesting

The crop gets ready for harvest after 11-12 months of planting. First ratoon crop is ready after 8-10 months from harvesting the main crop and second ratoon after 8 months of harvesting of the first ratoon crop. Thus over the period of 27-30 months, it is possible to harvest three crops i.e. one main crop and two ratoon crops.

5.12 Yield

With the conservative estimate, it is expected that at least 80% of the plants would produce bunches of banana. Accordingly, the yield/ha is estimated as under :-

| Year | I | II | III |
|--|-------|-------|-------|
| No. of plants/ha bearing bunches of fruits (80% of plant population) | 3520 | 3520 | 3520 |
| Weight/bunch (kg) | 18.00 | 22.00 | 20.00 |
| Yield (t/ha) | 63.36 | 77.44 | 70.40 |

6.0 Linkages :

The marketing of the banana is done in APMC market located in taluka/district level or through direct purchase by vendors. However, marketing of organic banana with distinct demarcation from non-organic banana is not there so far. National Research Centre for Banana, Tiruchirapalli, Tamilnadu is undertaking problem oriented research on banana.

7.0 Financial Aspects :

7.1 Sale price

Although the farmers realise a sale price ranging between Rs. 2500 to Rs. 4500 per tonne of organic banana, a conservative estimate of Rs. 3000 per tonne is considered in this model.

7.2 Unit Cost

The unit cost for raising tissue culture banana plants is Rs.173600/ha. The breakup of the cost estimates are presented in **Annexure II**.

7.3 Margin

The percentage of margin / down payment to investment cost prescribed is 5, 10 and 15% for small, medium and large farmers respectively. The rest of the investment cost will be provided as bank loan. Margin considered in the present model is 10%.

7.4 Bank Loan

Bank loan of 85 - 95 % shall be available from the financing institution. Bank loan considered in the model is 90%.

7.5 Rate of Interest

The rate of interest to be charged to the ultimate borrower would be guided by RBI guidelines issued from time to time. However, the ultimate lending rate has been considered as 12 % for working out the bankability of the model scheme.

7.6 Security

Banks are guided by RBI guidelines issued from time to time in this regard

7.7 Financial Analysis The results of financial analysis are indicated below :

- NPW at 15% DF : Rs.227930
- BCR at 15% DF : 1.90 : 1
- IRR : > 50%

Details are given in **Annexure III, IV & V**.

7.8 Repayment

The bank loan with interest is repayable within three years for tissue cultured plantation as shown in **Annexure-VI**.

8.0 Conclusion :

In view of the above, it can be concluded that organic cultivation of banana is a technically feasible, financially viable and bankable activity.