

PROJECT REPORT

Of

BANANA CULTIVATION

PURPOSE OF THE DOCUMENT

This particular pre-feasibility is regarding **Banana Cultivation**.

The objective of the pre-feasibility report is primarily to facilitate potential entrepreneurs in project identification for investment and in order to serve his objective; the document covers various aspects of the project concept development, start-up, marketing, finance and management.

[We can modify the project capacity and project cost as per your requirement. We can also prepare project report on any subject as per your requirement.]



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BRIEF ABOUT CULTIVATION OF BANANA



Intro

Banana (*Musa* sp.) is the second most important fruit crop in India next to mango. Its year round availability, affordability, varietal range, taste, nutritive and medicinal value makes it the favourite fruit among all classes of people. It has also good export potential. Banana evolved in the humid tropical regions of S.E.Asia with India as one of its centres of origin. Modern edible varieties have evolved from the two species – *Musa acuminata* and *Musa balbisiana* and their natural hybrids, originally found in the rain forests of S.E.Asia. During the seventh century AD its cultivation spread to Egypt and Africa. At present banana is being cultivated throughout the warm tropical regions of the world between 30° N and 30° S of the equator.

Banana is a very popular fruit due to its low price and high nutritive value. It is consumed in fresh or cooked form both as ripe and raw fruit.

Banana is a rich source of carbohydrate and is rich in vitamins particularly vitamin B. It is also a good source of potassium, phosphorus, calcium and magnesium. The fruit is easy to digest, free from fat and cholesterol. Banana powder is used as the first baby food. It helps in reducing risk of heart diseases when used regularly and is recommended for patients suffering from high blood pressure, arthritis, ulcer, gastroenteritis and kidney disorders.

Processed products, such as chips, banana puree, jam, jelly, juice, wine and halwa can be made from the fruit. The tender stem, which bears the inflorescence is extracted by removing the leaf sheaths of the harvested pseudostem and used as vegetable. Plantains or cooking bananas are rich in starch and have a chemical composition similar to that of potato.

Banana fibre is used to make items like bags, pots and wall hangers. Rope and good quality paper can be prepared from banana waste. Banana leaves are used as healthy and hygienic eating plates.

CULTIVATION

Climate

Banana is basically a tropical crop, grows well in temperature range of 13°C – 38°C with RH regime of 75-85%. In India this crop is being cultivated in climate ranging from humid tropical to dry mild subtropics through selection of appropriate varieties like Grandnaine. Chilling injury occurs at temperatures below 12°C. The normal growth of the banana begins at 18°C, reaches optimum at 27°C, then declines and comes to a halt at 38°C. Higher temperature causes sun scorching. High velocity wind which exceeds 80 km phrs damages the crop.

Soil

Soil for banana should have good drainage, adequate fertility and moisture. Deep, rich loamy soil with pH between 6-7.5 are most preferred for banana cultivation. Ill drained, poorly aerated and nutritionally deficient soils are not suitable for banana. Saline solid, calcareous soil are not suitable for Banana cultivation. Avoided soil of low laying areas, very sandy & heavy black cotton with ill drainage.

A soil that is not too acidic & not too alkaline, rich in organic material with high nitrogen content, adequate phosphorus level and plenty of potash are good for banana.

Varieties

In India banana is grown under diverse conditions and production systems. Selection of varieties, therefore is based on a large number of varieties catering to various kinds of needs and situations. However, around 20 cultivars viz. Dwarf Cavendish, Robusta, Monthan, Poovan, Nendran, Red banana, Nyali, Safed Velchi, Basarai, Ardhapuri, Rasthali, Karpurvalli, Karthali and Grandnaine etc..

Grandnaine is gaining popularity and may soon be the most preferred variety due to its tolerance to biotic stresses and good quality bunches. Bunches have well spaced hands with straight orientation of figures, bigger in size. Fruit develops attractive uniform yellow colour with better self life & quality than other cultivars.

Land Preparation

Prior to planting banana, grow the green manuring crop like daincha, cowpea etc. and bury it in the soil. The land can be ploughed 2-4 times and leveled. Use ratovator or harrow to break the clod and bring the soil to a fine tilt. During soil preparation basal dose of FYM is added and thoroughly mixed into the soil.

A pit size of 45cm x 45cm x 45cm is normally required. The pits are to be refilled with topsoil mixed with 10 kg of FYM (well decomposed), 250 gm of Neem cake and 20 gm of conbofuron. Prepared pits are left to solar radiation helps in killing the harmful insects, is effective against soil borne diseases and aids aeration. In saline alkali soil where PH is above 8 Pit mixture is to be modified to incorporate organic matter.

Addition of organic matter helps in reducing salinity while addition of purlite improves, porosity and aeration. Alternative to planting in pits is planting in furrows. Depnding on soil strata one can choose appropriate method as well as spacing and depth at which plant is required to be planted.

Planting Material

Sword suckers weighing approximately 500-1000 gm are commonly used as propagating material. Suckers generally may be infected with some pathogens and nematodes. Similarly due to the variation in age and size of sucker the crop is not uniform, harvesting is prolonged and management becomes difficult.

Therefore, in-vitro clonal propagation i.e. Tissue culture plants are recommended for planting. They are healthy, disease free, uniform and authentic. Properly hardened secondary seedlings are only recommended for planting

Advantages of Tissue Culture Planting Material

- True to the type of mother plant under well management.
- Pest and disease free seedlings.

- Uniform growth, increases yield.
- Early maturity of crop - maximum land use is possible in low land holding country like India.
- Round the year planting possible as seedlings are made available throughout the year.
- Two successive ratoons are possible in a short duration which minimizes cost of cultivation.
- No staggered harvesting.
- 95% - 98% plants bear bunches.

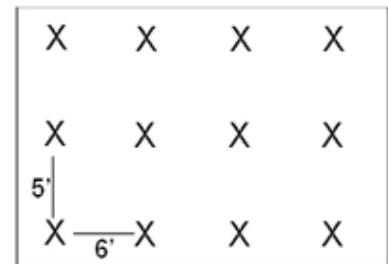
New varieties can be introduced and multiplied in a short duration.

Planting Time

Planting of tissue culture Banana can be done throughout the year except when the temperature is too low or too high. Facility of drip irrigation system is important. There are two important seasons in Maharashtra, India ; Mrig Baug (Kharif) Month of planting June - July.

Kande Baug (Rabi) Month of planting October - November. Crop Geometry

Traditionally banana growers plant the crop at 1.5m x 1.5m with high density, however plant growth and yields are poor because of competition for sunlight. Various trials are conducted at Jain Irrigation System R&D farm with Grandnaine as cultivar. And then suitable spacing of 1.82m x 1.52m is being recommended, it accommodates 1452 plants per acre (3630 plants per hectare) keeping row direction North-South with wide spacing 1.82m between the rows. The region like north India, coastal belt and where humidity is very high and temp falls down upto 5-7°C, the planting distance should not be less than 2.1m x 1.5m.



Planting Method

Polybags is separated from the plant without disturbing the root ball of the plant and then plants are planted in the pits keeping the pseudo-stem 2cm below the ground level. Soil around the plant is gently pressed. Deep planting should be avoided.

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Water Management

Banana, a water loving plant, requires a large quantity of water for maximum productivity. But Banana roots are poor withdrawal of water. Therefore under Indian condition banana production should be supported by an efficient irrigation system like drip irrigation. Water requirement of banana has been worked out to be 2000mm per Annum. Application of drip irrigation and mulching technology has reported improved water use efficiency. There is saving of 56% of water and increasing yield by 23-32% under drip. Irrigate the plants immediately after planting. Apply sufficient water and maintain field capacity. Excess irrigation will lead to root zone congestion due to removal of air from soil pores, thereby affecting plant establishment and growth. And hence drip method is must for proper water management in Banana.

Fertigation

Banana requires high amount of nutrients, which are often supplied only in part by the soil. Nutrient requirement has been worked out on all India basis is to be 20 kg FYM, 200gm N; 60-70gm P; 300gm K/plant. Banana requires heavy nutrition. Banana crop requires 7-8 Kg N, 0.7-1.5 Kg P and 17-20 Kg K per metric tonne yield. Banana responds well to application of nutrients. Traditionally farmers use more of urea and less of phosphorous and potash. In order to avoid loss of nutrients from conventional fertilizers i.e. loss of N through leaching, volatilization, evaporation and loss of P and K by fixation in the soil, application of water soluble

or liquid fertilizers through drip irrigation (fertigation) is encouraged. A 25-30% increase in yield is observed using fertigation. Moreover, it saves labour and time and the distribution of nutrients is uniform.

Interculture Operations

The Root system of banana is superficial and easily damaged by cultivation, use of intercrop which is not desirable. However short durational crops (45-60 days) like mung, cowpea, daincha are to be considered as green manuring crops. Crops from cucurbitaceous family should be avoided as these carry viruses.

Weeding

Spraying of Glyphosate (Round up) before planting at the rate of 2 lit/ha is carried out to keep the plantation weed free. One or two manual weedings are necessary.

Micronutrient Foliar Spray

Combined foliar application of ZnSo₄ (0.5%), FeSo₄ (0.2%), CuSo₄ (0.2%) and H₃Bo₃ (0.1%) can be adopted to improve morphological, physiological and yield attributes of banana. The micronutrient spray solution is prepared by dissolving the following in 100 lit. of water.

Zinc sulphate - 500 gm - For every 10 litre of mixture 5-10ml of sticker solution such as Teepol should be added before spraying.

Ferrom sulphate - 200 gm - For every 10 litre of mixture 5-10ml of sticker solution such as Teepol should be added before spraying.

Copper - 200 gm - For every 10 litre of mixture 5-10ml of sticker solution such as Teepol should be added before spraying.

Removal of male buds

(Denavelling) Removal of male buds helps fruit development and increases bunch weight. Male buds are removed from the last 1-2 small hands with a clean cut keeping a single finger in the last hand.

Bunch Spray

Spray of monocrotophos (0.2%) after emergence of all hands takes care of the thrips. Thrips attack discolors the fruit skin and makes it unattractive.

Bunch Covering

Covering bunch using dried leaves of the plant is economical and prevents the bunch from direct exposure to sunlight. Bunch cover enhances quality of fruit. But in rainy season this practice should be avoided.

Sleeving of bunch is done to protect fruits against dust, spray residue, insect and birds. For this blue plastic sleeves are preferred. This also increases temperature around developing bunch and helps in early maturity.

Dehandling of false hands of bunch

In a bunch there are some incomplete hands which are not fit for quality produce. These hands should be removed soon after bloom. This helps in improving the weight of other hands. Sometimes the hand just above the false hand is also removed.

Propping

Due to heavy weight of bunch the plant goes out of balance and the bearing plant may lodge and production and quality are adversely affected. Therefore they should be propped with the help of two bamboos forming a triangle by placing them against the stems on the leaning side. This also helps in uniform development of bunch.

Harvesting

Banana should be harvested at the physiological maturity stage for better post harvest quality. The fruit is climacteric and can reach consumption stage after ripening operation

Maturity indices

These are established on the basis of fruit shape, angularity, grade or diameter of the median figure of the second hand, starch content and number of days that have elapsed after flowering. Market preferences can also affect the decision for harvesting a slight or full mature fruit.

Removal of bunch

Bunch should be harvested when figures of second hand from top are 3/4 rounded with the help of sharp sickle 30cm above the first hand. Harvest may be delayed upto 100-110 days after opening of the first hand. Harvested bunch should generally be collected in well padded tray or basket and brought to the collection site. Bunches should be kept out of light after harvest, since this hastens ripening and softening. For local consumption, hands are often left on stalks and sold to retailers. For export, hands are cut into units of 4-16 fingers, graded for both length and girth, and carefully placed in polylined boxes to hold different weight depending on export requirements.

Post harvest operations

At collection site injured and over mature fruits are discarded and for local market bunches should be delivered through lorries or wagons. However, for more sophisticated and export market where the quality is predominant, bunches should be deheaded, fruits are cleared in running water or dilute sodium hypochlorite solution to remove the latex and treated with thiobendasole; air dried and graded on the basis of size of fingers as already stated, packed in ventilated CFB boxes of 14.5 kg capacity or as per requirement with polythene lining and pre-cooled at 13-15°C temperature and at 80-90% RH. Such material should than be sent under cool chain at 13°C for marketing

Yield

The planted crop gets ready for harvest within 11-12 months of planting. First ratoon crop would be ready by 8-10 month from the harvesting of the main crop and second ratoon by 8-9 months after the second crop.

Thus over a period to 28-30 months, it is possible to harvest three crops i.e. one main crop and two ratoon crops. Under drip irrigation combined with Fertigation yield of Banana as high as 100 T/ha can be obtained with the help of tissue culture technique, even similar yield in the ratoon crops can be achieved if the crop is managed well.

PROJECT AT GLANCE

Name of Beneficiary : XXXXX

Proposed Project : Banana Cultivation

Project Site : XXXXXX
XXXXXX

Area of Land : 7.50 Acre

Total Cost of Project : 11.36 Lacs

Financial Assistance Requi Term Loan : 6.00 Lacs

COST OF PROJECT

(in Lacs)			
PARTICULARS	Area in Acre)	Cost/Acre	Amount
Land			Owned
Land Development Work incl. Fencing, leveling etc	7.50	0.275	2.06
Plantation Cost	7.50	-	2.29
Plastic Mulching	7.50	0.128	0.96
Drip Irrigation	7.50	0.250	1.88
Tube Well & Pump Set	-	-	2.30
Farming Equipments	7.50	0.050	0.38
Labour Quarter/Store Room	7.50	0.200	1.50
TOTAL			11.36

MEANS OF FINANCE

PARTICULARS	AMOUNT
Own Capital	5.36
Term Loan from Bank	6.00
TOTAL	11.36

CAPITAL SUBSIDY

Land Area 7.5 Acre
Max cost as per Norms 150000 /Acre
Total Cost 1125000
Eligible Subsidy 450000
4.50 Lacs

CALCULATION OF PLANTATION COST

Area of Land	3.034 Hectare
Area of Land (in Acre)	7.50 Acre
Density per Acre	1235
No. of Banana Plants	9259
Cost per Plant	17.50
Total Cost of Plant	162,029.00
Cost of Fertilizer & Manure @10000/ Acre	74,970.00
Less : Mortality 5%	8,101.00

Total Plantation Cost	228,898.00
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CALCULATION OF SALE OF PLANT

<i>Year</i>	<i>No. of Plant</i>	<i>Yield per Plant (Kg)</i>	<i>Production</i>	<i>Rate/per</i>	<i>Amount</i>
1	8796	25.00	219,896	12.00	26.39
2	8796	25.00	219,896	13.20	29.03
3	8796	25.00	219,896	14.50	31.88
4	8796	25.00	219,896	16.00	35.18
5	8796	25.00	219,896	17.60	38.70
6	8796	25.00	219,896	19.40	42.66
7	8796	25.00	219,896	21.30	46.84

PROJECTED BALANCE SHEET

PARTICULARS		1	2	3	4	5
	<i>Const. Period</i>					
LIABILITIES						
Share Capital	5.36	5.36	5.36	5.36	5.36	5.36
Net Profit	-	4.42	8.22	12.62	18.35	25.81
Term Loan	6.00	5.40	4.20	-	-	-
Capital Subsidy	-	4.50	4.50	4.50	4.50	4.50
Expenses Payable	-	0.48	0.53	0.58	0.64	0.70
TOTAL	11.36	20.16	22.81	23.06	28.85	36.37
ASSETS						
FIXED ASSETS/PLANT	9.07	9.07	9.07	9.07	9.07	9.07
Less Depreciation	-	1.13	2.12	2.98	3.73	4.38
	9.07	7.94	6.95	6.09	5.34	4.69
Plant Capital Cost	2.29	1.14	2.52	1.26	2.77	1.38
Capital Subsidy		4.50	4.50	-	-	-
CURRENT ASSETS	-	-	-	-	-	-
Advances & Receivables	-	2.40	2.64	2.90	3.19	3.51
Cash & Bank Balance	-	4.18	6.20	12.80	17.55	26.79
TOTAL	11.36	20.16	22.81	23.06	28.85	36.37
	-	-	-	-	-	-

PROJECTED PROFITABILITY STATEMENT

<u>PARTICULARS</u>	1	2	3	4	5	6
<u>INCOME</u>						
Sales	26.39	29.03	31.88	35.18	38.70	42.66
TOTAL	26.39	29.03	31.88	35.18	38.70	42.66
<u>EXPENDITURE</u>						
Fertilizer & Pesticides etc	3.96	4.35	4.78	5.28	5.81	6.40
Power & Fuel Expenss	0.98	1.03	1.09	1.14	1.20	1.26
Water & Irrigation Exp.	1.32	1.45	1.59	1.76	1.94	2.13
Salary & Wages	10.16	10.67	11.21	11.77	12.35	12.97
Insurance of Crop	0.10	0.10	0.10	0.10	0.10	0.10
Repair & Maintainance	-	0.30	0.32	0.33	0.35	0.36
Admin. & Selling Exp.	2.64	2.90	3.19	3.52	3.87	4.27
Intt. On Term Loan	0.52	0.78	0.70	0.55	-	-
Depreciation	1.13	0.99	0.86	0.75	0.65	0.57
Plant Cost W/off	1.14	1.14	1.26	1.26	1.38	1.38
Cost of Project (B)	21.96	23.73	25.09	26.45	27.65	29.45
GROSS PROFIT [A-B]	4.42	5.30	6.79	8.74	11.05	13.21
NET PROFIT BEFORE TAX	4.42	5.30	6.79	8.74	11.05	13.21
LESS : TAXES	-	-	-			
NET PROFIT AFTER TAX	4.42	5.30	6.79	8.74	11.05	13.21

CASH FUND FLOW STATEMENT

PARTICULARS	Const.	1	2	3	4	5
<u>SOURCES OF FUND</u>						
Share Capital	5.36	-	-	-	-	-
Fund From operators	-	4.42	5.30	6.79	8.74	11.05
Capital Subsidy	-	4.50	-	-	-	-
Incr. in Term Loan from Bank	6.00	-	-	-	-	-
Depreciation	-	1.13	0.99	0.86	0.75	0.65
Plant Cost W/off	-	1.14	1.14	1.26	1.26	1.38
Incr. in Expenses Payable	-	0.48	0.05	0.05	0.06	0.06
TOTAL	11.36	11.68	7.48	8.96	10.80	13.16
<u>APPLICATION OF FUND</u>						
Incr. in Fixed Assets/Plant	9.07	-	-	-	-	-
Incr in Investment (Subsidy)	-	4.50	-	(4.50)	-	-
Incr. in Plantation Cost	2.29	-	2.52	-	2.77	-
Incr. in Advances & Rece.	-	2.40	0.24	0.26	0.29	0.32
Rep. Loan of Bank Loan	-	0.60	1.20	4.20	-	-
Drawings	-	-	1.50	2.40	3.00	3.60
TOTAL	11.36	7.50	5.46	2.36	6.06	3.92
Opening Balance	-	-	4.18	6.20	12.80	17.55
Surplus	-	4.18	2.02	6.60	4.74	9.24
Closing Balance	-	4.18	6.20	12.80	17.55	26.79

DETAIL OF SALARY WAGES

Particular	Nos.	Salary Per Month	Total	Annual Salary
Supervisor	1	10000.00	10000.00	120,000.00
Helpers/Labours	15	4000.00	60000.00	720,000.00
Accountant/Other	1	7000.00	7000.00	84,000.00
				<hr/>
				924,000.00
		Add Fringe benefit @ 10%		<hr/>
				92,400.00
Total Salary				1,016,400.00
In Lacs				10.16

DETAIL OF POWER CONSUMPTION

Total Power Load Required		5 HP
No of Days		300
No of Hours		8
Total Power Expense		8952 KWH
Power Supply from DG Set	100%	8952

COST OF POWER

Cost of power from DG Set (@10/- per Unit)		0.90
Add : Lubricants		0.09
Total Annual Power Expense		0.98

TERM LOAN REPAYMENT SCHEDULE

Year	Particulars	Op. Balance	Interest	Total	Instalment	Total Repayment	Closing Balance
1	Amount Borrowed	6.00	0.52	6.52	-	0.52	6.00
2	Balance Carried down	6.00	0.78	6.78	0.60	1.38	5.40
3	Balance Carried down	5.40	0.70	6.10	1.20	1.90	4.20
4	Balance Carried down	4.20	0.55	4.75	4.20	4.75	-

DSCR CALCULATION

	<u>1</u>	<u>2</u>	<u>3</u>
Net Profit after Tax	4.42	5.30	6.79
Add Depreciation	1.13	0.99	0.86
CASH ACCURALS	5.56	6.29	7.65
Add Interest	0.52	0.78	0.70
Total Fund	6.08	7.07	8.35
REPAYMENT			
Instalment of Loan	0.60	1.20	4.20
Interest On Loan	0.52	0.78	0.70
Total Payment Obligation (B)	1.12	1.98	4.90
D.S.C.R.	5.43	3.57	1.70
D.S.C.R. (AVG)		2.69	

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