PROJECT REPORT

Of

BANANA RIPENING

PURPOSE OF THE DOCUMENT

This particular pre-feasibility is regarding Banana Ripening.

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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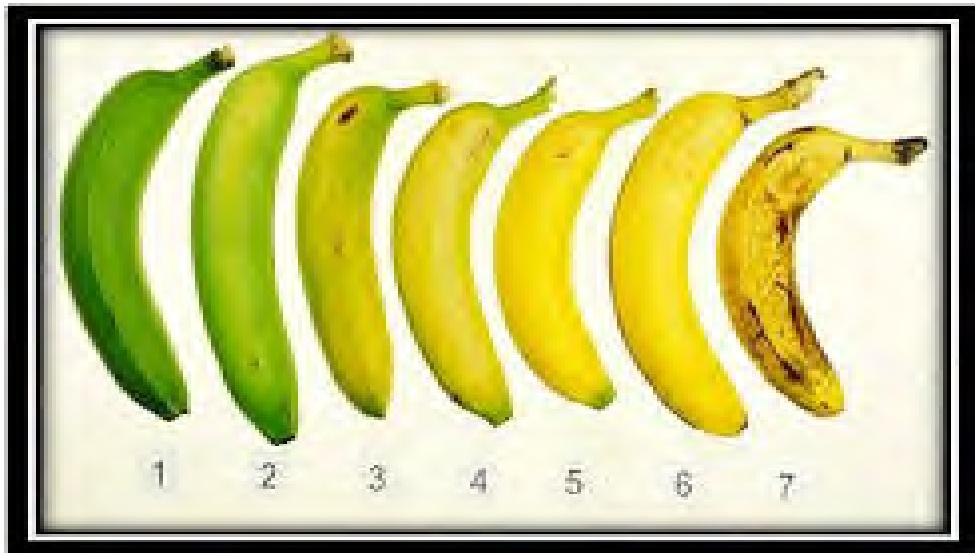

What is Fruit Ripening?

- Ripening is a process in fruits that causes them to become edible. The fruit becomes sweeter, less green and softer

- Ripening is associated with change in composition i.e. conversion of starch to sugar

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What is Fruit Ripening?

- However, all fruits do not ripen in the same manner
- On the basis of their ripening behaviour, fruits are classified as:

-Climacteric Fruits

-Non-Climacteric Fruits

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Climacteric Fruits

- are defined as fruits that enter ‘climacteric phase’ after harvest i.e. they continue to ripen off the tree / plant
- most ripened climacteric fruits are too soft and delicate to withstand rigours of transport and repeated handling
- these are harvested hard and green, but fully mature
- ripening is done near the consumption areas

(we will return to how this is done later…)

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Climacteric Fruits

Examples:

Mango	Banana	Papaya
Guava	Sapota	Kiwi
Fig	Apple	Passion fruit
Apricot	Plum	Pear

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Non-Climacteric Fruits

These fruits, once harvested, do not ripen further

Examples:

Orange	Mousambi	Kinnow
Grapefruit	Grapes	Pomegranate
Litchi	Watermelon	Cherry
Raspberry	Blackberry	Strawberry

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Ripening of Climacteric Fruits

Now, we return to ripening of Climacteric Fruits

- We have seen that these fruits need to be ripened, post harvest, preferably near consumption areas
- Traditionally, this has been done with the help of chemicals such as Calcium Carbide

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Conventional Ripening Method

- Calcium Carbide used is industrial grade, used in welding applications.
- This is known to contain traces of arsenic and phosphorus .….these are toxic and may be hazardous to health.
- Calcium Carbide reacts with moisture in the air to produce acetylene gas. Acetylene gas acts as a ripening agent ….but is believed to affect the nervous system by reducing supply of oxygen to the brain

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Conventional Ripening Method

- Use of Calcium Carbide is banned under Rule 44-AA of PoFA (Prevention of Food Adulteration) Rules, 1955.
- Almost all ripening (more than 99%) in India is done with Calcium Carbide.

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Ripening with Ethylene

- The only scientific and safe ripening method accepted worldwide is the use of **Ethylene**
- Ethylene is a natural plant hormone that the fruit itself emits as it ripens
- Exposure of unripe fruit to a miniscule dose of ethylene is sufficient to stimulate the natural ripening process until the fruit itself starts producing ethylene in large quantities

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Ripening with Ethylene

- The process is essentially same for all climacteric fruits
- The conditions - ethylene concentration, temperature and humidity, vary from fruit to fruit

As an example, let us look at ripening process for **bananas**

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Ripening of Bananas with Ethylene

- For optimum quality, flavor, color and texture it is essential that bananas are harvested green, but fully mature, with little or no angularity

- The quality of the ripe bananas depends on maturity at harvest, the care and speed in handling, avoidance of chilling injuries, and ripening under optimum conditions

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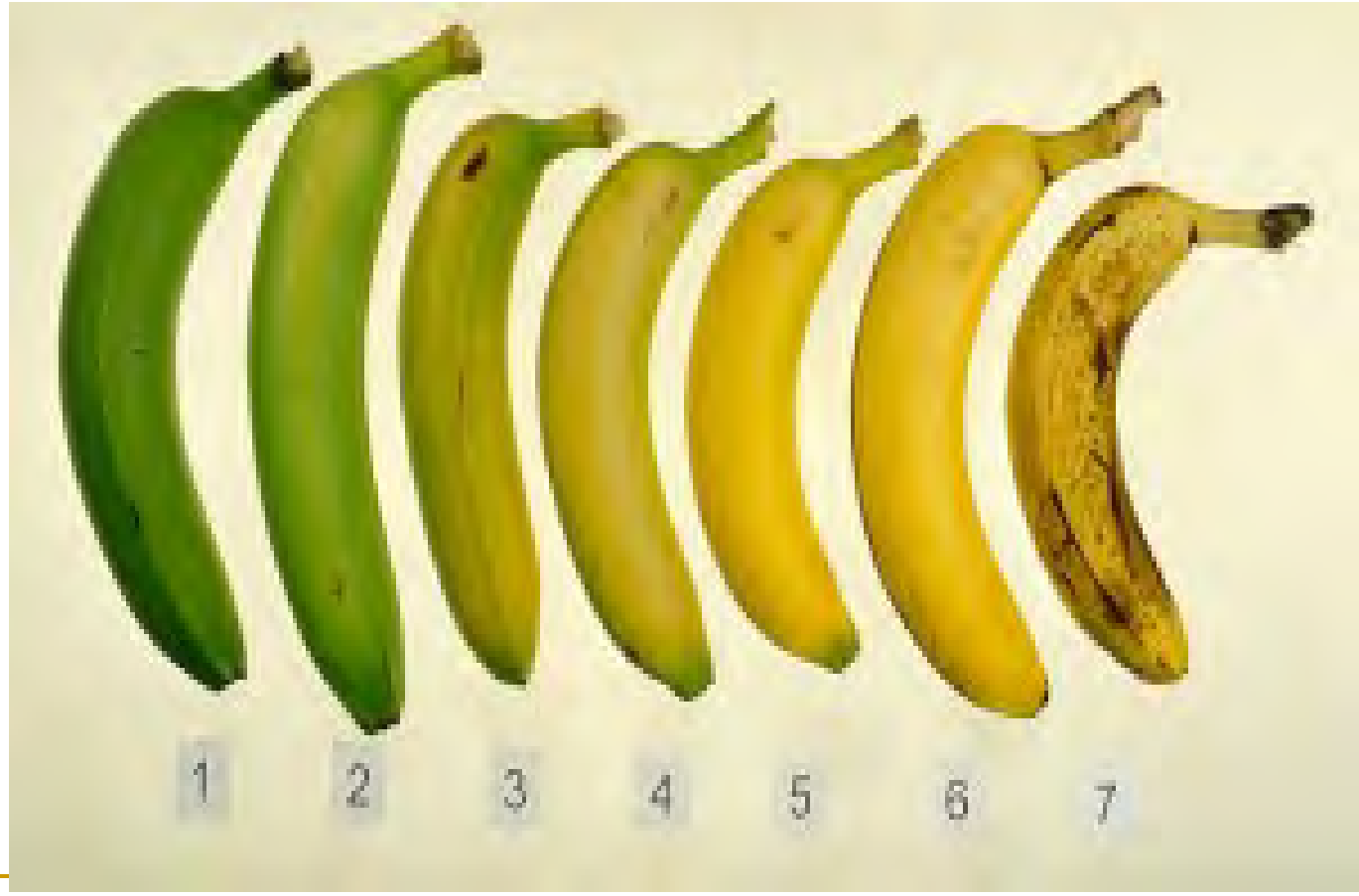
Banana Color Chart



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Banana Color Chart

1. evenly green; common color after harvesting
2. light green; color of bananas treated by gas
3. more green than yellow; ready for wholesale supply
4. more yellow than green; recommended for retail outlets
5. ideal color for sale
6. fully ripe bananas ready for consumption
7. over ripe fungus effected banana

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Ripening of Bananas with Ethylene

- Bananas are received at the ripening plant at color stage 1 (refer color chart above)
- The product is pre-cooled to the pulp temperature of 18ºC
- After stabilization of temperature, ethylene is introduced at a concentration of 100 – 150 ppm
- Most convenient and safe method of introducing ethylene is through ethylene generators
- Cylinders containing 5% mixture of ethylene gas with nitrogen may also be used

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Ripening of Bananas with Ethylene

- After 24 hours, the chambers are vented. During this period the fruit starts producing ethylene by itself at the rate of 2 - 4 µl / kg·hr
- Ripening associated changes include an increase in rate of respiration from 20 to 60 - 80 ml CO2 / kg·hr and a similar 3 to 4 fold increase in heat production
- The product breathes in oxygen and gives off carbon dioxide
- Excess ethylene and carbon dioxide must be removed for faster and uniform ripening

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Ripening of Bananas with Ethylene

- The refrigeration system must be capable of removing the heat of respiration and maintain the temperature and relative humidity at desired levels

- The venting system must be capable of removing excess carbon dioxide in order to maintain concentration level of below 10,000 ppm

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Ripening Cycle

- Bananas are ripened to color stage 3 or 4 depending on mode of retailing for dispatch to market
- Depending on cultivar and market requirements, ripening cycle maybe spread from 4 to 8 days

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Common Myths about Fruit Ripening

- There are many wide spread myths about fruit ripening
- Media loves to propagate them with addition of ‘sensational’ findings
- Certain TV channels regularly broadcast programs that warn you never to touch a fruit let alone eat it

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Most Common Myths about Fruit Ripening

- Farmers harvest the fruit pre-maturely to realize “ahead of season” high price, or
- Farmers are afraid of glut in the market and want to sell the produce as early as possible, or
- Unscrupulous traders want to book profits as early as possible without waiting for the fruit to ripen naturally

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Most Common Myths about Fruit Ripening

- Whilst there are obvious questions about use of harmful chemicals to ripen the fruits
- The fact that climacteric fruits necessarily need to be ripened post harvest is completely ignored
- Post harvest ripening of climacteric fruits need not necessarily be called “**artificial ripening**”

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Ripening Chambers in India

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Indian Perspective

- Presently in India, green bananas are transported in bulk in trucks or railway wagons.
- There is no packing except nominal cushion provided by banana leaves.
- There is no temperature or humidity control.
- During transport, bananas inevitably get bruised and damaged. These blemishes are not easily visible at the green stage but show up in the ripe bananas.
- More damage /bruises are inflicted in subsequent handling in the distribution chain all the way up to the consumer.

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Indian Perspective

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Indian Perspective

- All this damage can be easily avoided if the bananas are packed in corrugated fiber boxes (CFB) at the plantation itself.
- However, this is not possible in short and medium term as banana is a low value fruit and the market will not bear the cost of box cartons.
- Western countries have shifted to the use of box cartons some 20 years ago and eventually this will happen in India as well in due course.

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CFB Boxes

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CFB Boxes

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Indian Perspective

Crates

- In the mean time, ethylene ripening plants are taking a step in the direction of reducing damage to the fruit by use of plastic crates.
- Bananas are being unloaded in crates and remain in crates during the ripening process in the plant.
- After ripening, the crates are sent out to the market, thus reducing manual touching /handling significantly

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Indian Perspective

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Indian Perspective

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VISION 2020

- India is the largest producer of bananas in the World with annual production estimated at 26 million MT
- This means, daily production and consumption of more than 70,000 MT
- If use of calcium carbide has to be completely eliminated, we require 3,500 ripening plants in the country with an average capacity of 20 MT per day

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VISION 2020

- The Government of India on its part is doing it's utmost to make it happen
- Ministry of Agriculture, through National Horticulture Board (NHB) and National Horticulture Mission (NHM) is offering attractive incentive packages to encourage the industry
- Generous capital investment subsidy is available for all new projects adopting modern and energy efficient technologies

PROJECT AT GLANCE

Name of the Benificiary	:	**XXXXXX**
Constitution	:	XXXXXX
Name of Main Promotor	:	**XXXXX**
Proposed Project	:	Banana Ripening
Project Site	:	XXXXX
Land Area	:	5000 Sq.Ft.
Total Cost of Project	:	48.01 Lacs
Financial Assistance Required	Term Loan :	20.00 Lacs
	Working Capital :	4.00 Lacs

Finance Indicator	Const Stage	**I**	**II**	**III**	**IV**	**V**	**VI**
Gross Receipts	135.84	163.10	186.86	212.64	240.54	270.70	-
Cash Accruals	11.51	12.30	14.47	16.78	19.24	21.82	-
Net Profit	2.53	5.12	8.99	12.73	16.44	20.15	-
D.S.C.R.	3.03	2.54	3.19	3.98	4.92	2.10	-
Avg. D.S.C.R.				**3.29**			

INVESTMENT REQUIRED

PARTICULARS	**AMOUNT**
Land	Leased
Building	12.15
Plant & Equipments	27.39
Plastic Crates	4.38
Contingencies	1.10
Margin for Working Capital	3.00
TOTAL	**48.01**

MEANS OF FINANCE

PARTICULARS	**AMOUNT**
Capital	22.25
Venture Capital (SFAC)	5.76
Term Loan from Bank	20.00
TOTAL	**48.01**

Capital Subisdy of Rs. 14.50 Lacs **5.79**

CALCULATION OF COST OF PRODUCTION

No of Chamber	2	
Capacity per Chamber	15	MT
Total Capacity	30	MT
No of Days for each cycle	4	
Total Cycle in a Year	45	
Total Production	1,350	MT
Cost of Raw Banana per MT	15,000	MT
Total Cost in a Year	202.50	MT

Particulars	1	2	3	4	5	6
Capacity Utilisation	50%	55%	60%	65%	70%	75%
Opening Stock	-	28	31	34	37	39
Purchases	675	743	810	878	945	1,013
Closing Stock	28	31	34	37	39	42
Net Consumed	647	740	807	875	942	1,010
Price per MT	15000	15,750	16,540	17,370	18,240	19,150
Purchase in Lacs	97.03	116.50	133.51	151.93	171.86	193.36

CALCULATION OF SALE OF PRODUCT

Year	*Capacity Utilisation*	*Total Production*	*Rate per Ton*	*Amount*
2016-17	50%	647	21,000.00	135.84
2017-18	55%	740	22,050.00	163.10
2018-19	60%	807	23,150.00	186.86
2019-20	65%	875	24,310.00	212.64
2020-21	70%	942	25,530.00	240.54
2021-22	75%	1,010	26,810.00	270.70

PROJECTED BALANCE SHEET

PARTICULARS	*Const. Period*	*1*	*2*	*3*	*4*	*5*	*6*
LIABILITIES							
Capital	22.25	22.25	22.25	22.25	22.25	22.25	22.25
Net Profit	-	0.78	3.59	9.28	17.73	28.93	42.56
General Reserve	-	14.50	14.50	14.50	14.50	14.50	14.50
Venture Capital (SFAC)	5.76	5.76	5.76	5.76	5.76	5.76	-
Term Loan	20.00	18.80	16.40	14.00	11.60	9.20	-
Working Capital	-	4.00	4.00	4.00	4.00	4.00	4.00
Expenses Payable	-	0.60	0.66	0.73	0.80	0.88	0.97
TOTAL	**48.01**	**66.69**	**67.16**	**70.52**	**76.64**	**85.52**	**84.28**
ASSETS							
FIXED ASSETS/PLANT	45.01	45.01	45.01	50.01	50.01	50.01	56.01
Less Depriciation	-	6.63	11.87	16.13	19.63	22.57	25.06
	45.01	38.39	33.14	33.89	30.38	27.44	30.95
Capital Subsidy	-	14.50	14.50	14.50	14.50	14.50	-
CURRENT ASSETS							
Stock of Banana	-	4.22	4.87	5.58	6.35	7.18	8.08
Advances & Receivables	-	7.84	9.41	10.78	12.27	13.88	15.62
Cash & Bank Balance	3.00	1.75	5.24	5.77	13.15	22.52	29.63
TOTAL	**48.01**	**66.69**	**67.16**	**70.52**	**76.64**	**85.52**	**84.28**
	-	-	-	-	-	-	-

PROJECTED PROFITABILITY STATEMENT

PARTICULARS	*1*	*2*	*3*	*4*	*5*	*6*
INCOME						
Sales	135.84	163.10	186.86	212.64	240.54	270.70
TOTAL	**135.84**	**163.10**	**186.86**	**212.64**	**240.54**	**270.70**
EXPENDITURE						
Cost of Material	97.03	116.50	133.51	151.93	171.86	193.36
Transportation Cost	6.79	8.16	9.34	10.63	12.03	13.53
Power & Fuel Expenss	7.10	7.81	8.60	9.46	10.40	11.44
Packing Expense	2.50	2.75	3.03	3.33	3.66	4.03
Consumables	0.27	0.33	0.37	0.43	0.48	0.54
Factory Rent	0.12	0.12	0.12	0.13	0.13	0.13
Salary & Wages	5.41	5.95	6.55	7.20	7.92	8.72
Insurance	0.15	0.15	0.15	0.15	0.15	0.15
Repair & Maintainance	-	3.00	3.60	4.32	5.18	6.22
Admin. & Selling Exp.	4.08	4.89	5.61	6.38	7.22	8.12
Intt on Working Capital	0.63	0.63	0.63	0.63	0.63	0.63
Intt. On Term Loan	2.60	2.44	2.13	1.82	1.51	1.20
Depreciation	6.63	5.25	4.25	3.51	2.94	2.49
Cost of Project (B)	**133.31**	**157.98**	**177.88**	**199.91**	**224.10**	**250.55**
GROSS PROFIT [A-B]	**2.53**	**5.12**	**8.99**	**12.73**	**16.44**	**20.15**
NET PROFIT BEFORE TAX	2.53	5.12	8.99	12.73	16.44	20.15
LESS : TAXES	0.25	0.51	0.90	1.27	1.64	2.01
NET PROFIT AFTER TAX	2.28	4.61	8.09	11.45	14.80	18.13

CASH FUND FLOW STATEMENT

PARTICULARS	*Const.*	*1*	*2*	*3*	*4*	*5*	*6*
SOURCES OF FUND							
Incr. in Capital	22.25	-	-	-	-	-	-
Fund From operators	-	2.53	5.12	8.99	12.73	16.44	20.15
Incr. in Subsidy	-	14.50					
Incr. in Term Loan from	20.00	-	-	-	-	-	-
Incr. in Venture Capital	5.76	-	-	-	-	-	-
Depreciation	-	6.63	5.25	4.25	3.51	2.94	2.49
Incr. in Working Capital	-	4.00	-	-	-	-	-
Incr. in Expenses Payable	-	0.60	0.06	0.07	0.07	0.08	0.09
Adjustment of Subsidy	-	-	-	-	-	-	14.50
TOTAL	48.01	28.26	10.43	13.30	16.31	19.46	37.23
APPLICATION OF FUND							
Incr. in Fixed Assets/Plant	45.01	-	-	5.00	-	-	6.00
Incr. in Subsidy	-	14.50	-	-	-	-	-
Incr. in Stock		4.22	0.65	0.71	0.77	0.83	0.90
Incr. in Advances & Rece.	-	7.84	1.57	1.37	1.49	1.61	1.74
Rep. Loan of Bank Loan	-	1.20	2.40	2.40	2.40	2.40	9.20
Rep. of Venture Capital	-	-	-	-	-	-	5.76
Drawings	-	1.50	1.80	2.40	3.00	3.60	4.50
Taxation	-	0.25	0.51	0.90	1.27	1.64	2.01
TOTAL	45.01	29.51	6.94	12.78	8.93	10.08	30.11
Opening Balance	-	3.00	1.75	5.24	5.77	13.15	22.52
Surplus	3.00	(1.25)	3.49	0.52	7.38	9.37	7.11
Closing Balance	3.00	1.75	5.24	5.77	13.15	22.52	29.63

DETAIL OF SALARY WAGES

Particular	Nos.	Salary Per Month	Total	Annual Salary
Manager	1	10000.00	10000.00	120,000
Marketing	1	6000.00	6000.00	72,000
Helpers/Labours	5	3000.00	15000.00	180,000
Accountant/Other	2	5000.00	10000.00	120,000
				492,000
		Add Fringe benefit @ 10%		49,200
Total Salary				541,200
In Lacs				5.41

DETAIL OF POWER CONSUMPTION

Total Power Load Required		15	HP
No of Days		210	
No of Hours		24	
Total Power Expense		56398	KWH
Power Supply from DG Set	100%	56398	

COST OF POWER

Cost of power from DG Set (@10/- per Unit)	5.64
Add : Fixed Cost	0.90
Add : Lubricants	0.56
Total Annual Power Expense	**7.10**

TERM LOAN REPAYMENT SCHEDULE Intt rate @12.5%

Year	*Particulars*	*Op. Balance*	*Interest*	*Total*	*Instalment*	*Total Repayment*	*Closing Balance*
1	Amount Borrowed	20.00	0.65	20.65	-	0.65	20.00
2	Balance Carried down	20.00	2.60	22.60	1.20	3.80	18.80
3	Balance Carried down	18.80	2.44	21.24	2.40	4.84	16.40
4	Balance Carried down	16.40	2.13	18.53	2.40	4.53	14.00
5	Balance Carried down	14.00	1.82	15.82	2.40	4.22	11.60
6	Balance Carried down	11.60	1.51	13.11	2.40	3.91	9.20
7	Balance Carried down	9.20	1.20	10.40	9.20	10.40	-

Mortorium Period	9 Months
Repayment Period	66 Months
Door to Door	75 Months (6 Yrs 3 Month)
Intallment	66 intallment of Rs. 0.25 Lacs each (Rs. 16.50 Lacs) adjustment of subsidy in Last year Rs. 5.50 Lacs

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