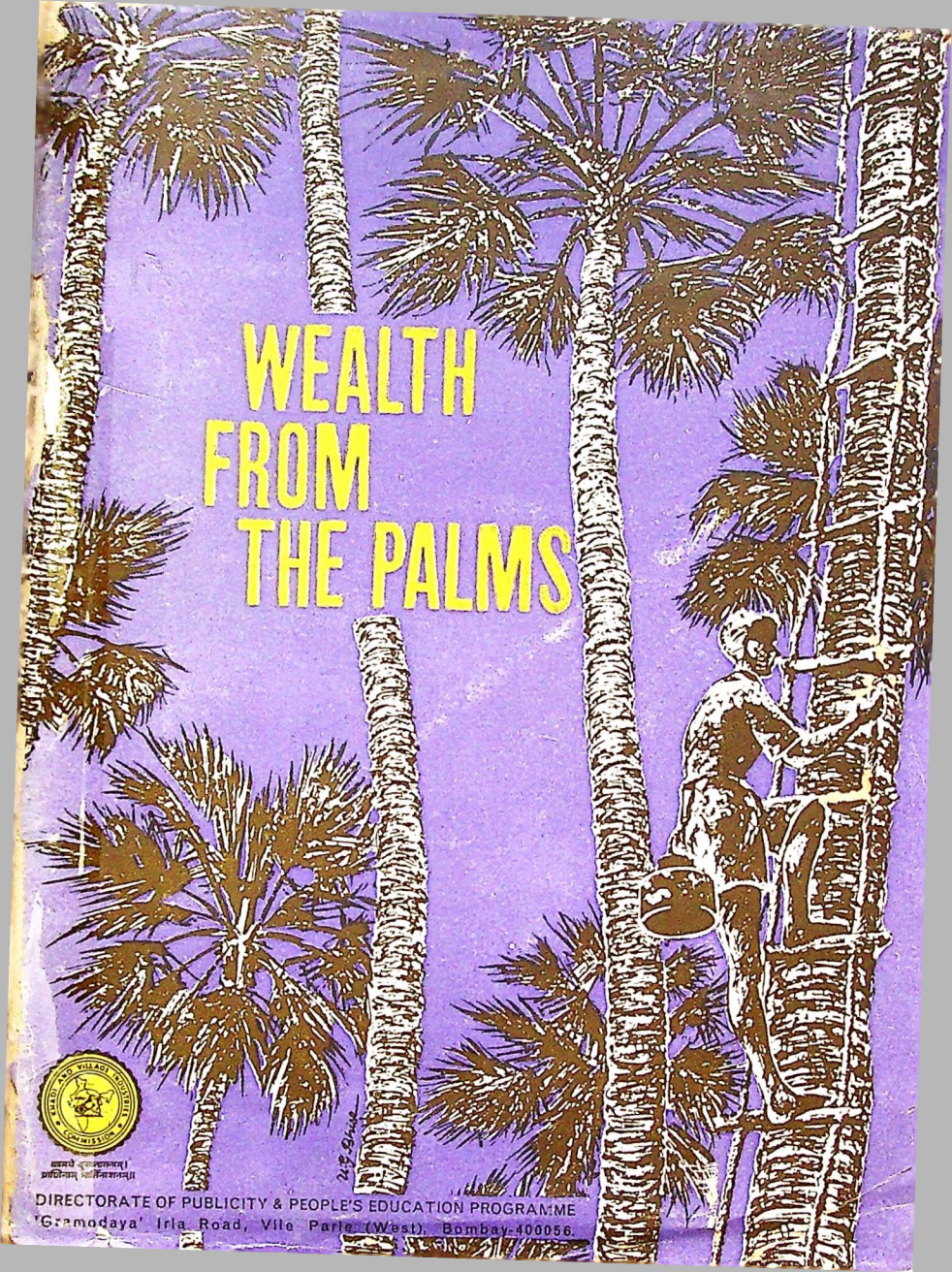

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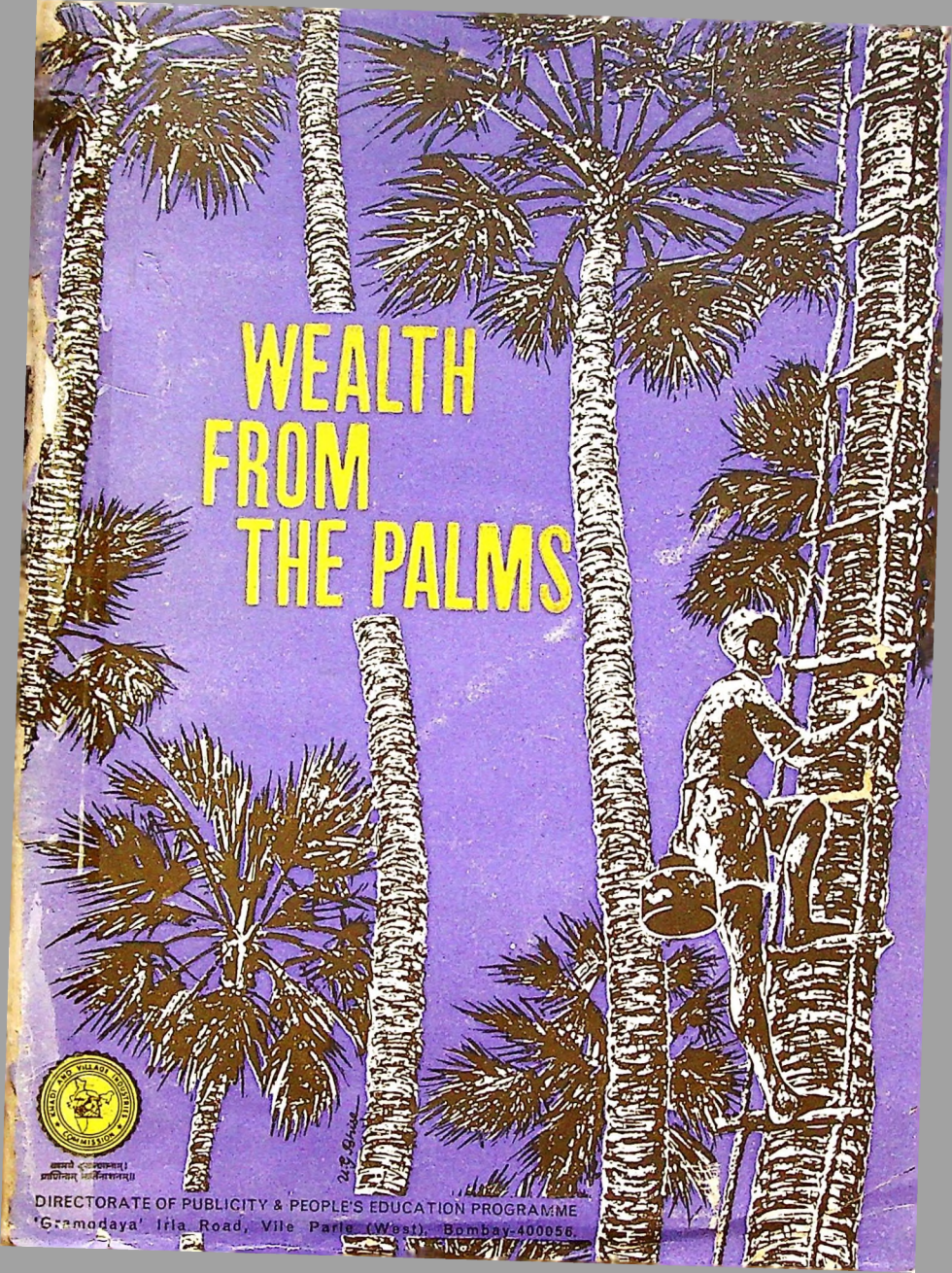

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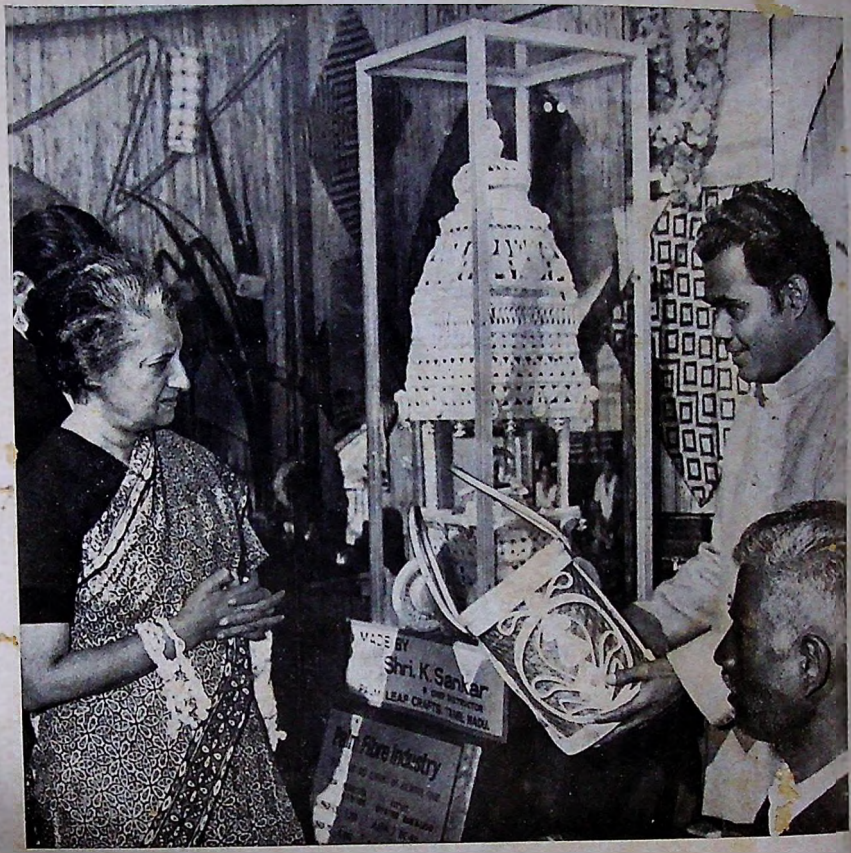
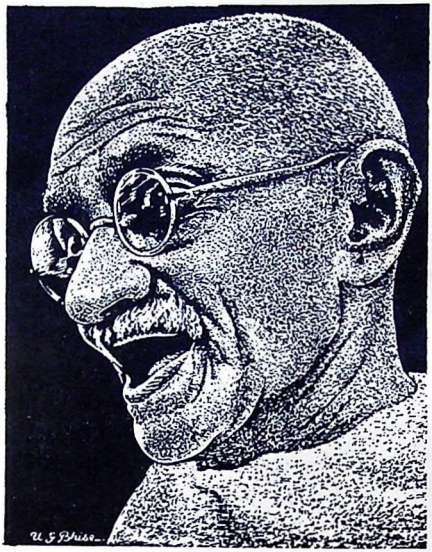


Smt. Indira Gandhi, Prime Minister, appreciating the artistic and utility value of Palm Leaf Products.



"Neera can be converted into jaggery, sweet as honey itself. This jaggery is superior to cane jaggery. Cane jaggery is sweet, but palm jaggery is sweet and delicious ; it can be produced worth crores of rupees. Palm gur gives mineral salts too. Where there are palm trees, this jaggery can be easily produced. This is the way of banishing poverty from our land. This also is an antidote to poverty."

— MAHATMA GANDHI

Tapping of Palmyra Palm

FOREWORD

Sugar yielding palms are known for their economic potentialities. We have in India, four varieties of such palms namely palmyrah Palm, Date Palm, Coconut Palm and Sago Palm. Eversince organised efforts to tap the resources of these palms were initiated in 1947 by the National Government, much have been achieved in terms of organisational progress, technical developments and employment potentialities. The booklet "Wealth From Palms", is a short resume of the various developments achieved under the Palm Gur Industry so far. It also brings to the readers some of the potential characteristics of the various Palm products and their value to the society. The development schemes mentioned in the booklet could find use for the implementing agencies in formulating their programmes.

Bombay
18-2-1975

N. Gopinathan
DIRECTOR
(PALM GUR)

WEALTH FROM THE PALMS

Don't you remember how much did you love eating a piece of jaggery when you were a naughty child? Or don't you drink neera to quench your thirst? The sweetness and nutritive values in these have a fascinating story behind them. It is not merely fun crunching a piece of jaggery or bibulously drinking a cup of neera, but it is good for your health too. So better know the sweet tale of *tad gud*, i. e., palm gur.

EXPERIMENTS WITH NATURE

We are all children of nature. But how many of us realise this fact? Nature is kind and helpful to us provided we do not go against some of its fundamental laws. Gandhiji had great faith in this fact and did many experiments with nature, like truth, with great success. His secretary, Shri Pyarelal, narrated an incident where palm gur came to the rescue of the village children and that was Gandhiji's last experiment performed in Sevagram.

"Dr. G. L. Batra, a retired deputy director of public health, Bengal, coming to Sevagram to stay with Gandhiji, found that nearly 60 per cent of the children of the village suffered from Keratomalacia — a deficiency disease due to lack of vitamin A. He mentioned it to Gandhiji. A pharmaceutical firm had sent Gandhiji a canister of red palm oil as a substitute for cod liver oil. He placed

it, with skim milk from a small dairy that he had started in the Ashram, at Dr. Batra's disposal. Dr. Batra collected all the children in the village and began to give six ounces of skim milk with palm gur and a tea spoon of red palm oil to each child. In a few weeks' time there was not a case of keratomalacia left in the village". (From "Gandhiji's Last Experiment: Sevagram Ashram", by Pyarelal, published in the Illustrated Weekly of India, December 2, 1962).

KALPA VRIKSHA — THE PALM TREE.

This wish-fulfilling tree is as useful as it is miraculous. She is the mother of a versatile industry, that is, the palm gur and palm product industry.

Palm gur is a sweet food obtained by boiling the unfermented juice of sugar yielding palms like date, palmyra, coconut and sago. These are known since time immemorial as potential sources for supplying sweetening agents like gur, sugar and a host of subsidiary products for our day to day use. That's why palm, especially coconut palm tree, is known as the Kalpa Vriksha, the wish-fulfilling tree.

The palm belt in the world roughly extends from 44° south latitude to 45° north latitude, abundantly spreading in tropical countries like Congo, Burma, Ceylon, India, Indochina, Indonesia and Malaya. India undoubtedly is one of the most Palm-rich countries of the belt.

With its rich natural palm wealth India can today boast of 19 crores of palm trees. Nearly 5 crores of these are available for tapping. There are again four major varities of palm trees:

(1) *PALMYRA PALM (Borassus flabellifer).*

It is known for its gur and sugar yielding potential. These are mainly prepared from the sweet sap of this palm in the states of Tamil Nadu, Andhra Pradesh. Kerala, West Bengal and Mysore. (Season for extraction: December to February for male trees and February to March for female trees. Total season — Six to Seven months).

(2) *DATE PALM* (*Phoenix sylvestries*)

Though found in all parts of the country, gur and sugar are prepared from time immemorial in Bengal out of this palm. Uulike other palms, the trunk below the crown of this palm is tapped for extraction of juices. (Season: Winter, October-March. Total season — six months).

(3) *COCONUT PALM* (*Cocos nucifera*)

The gur and sugar prepared out of the sap of this palm is highly nutritive. As this palm is abundantly cultivated on the coast line, the industry is mainly concentrated in Kerala, Mysore and Tamil Nadu States. (This palm is tapped all round the years as a new spathe is put forth every month).

(4) SAGO PALM (*Caryota urens*)

It is grown mostly in the Western strip of India and the sap is used in Kerala for gur production (operated throughout the year).

In India palm gur industry dates back to about 4000 years and practiced as an essential village industry. The use of palms for extracting sugar, however, was known since the 17th century, but then it was just a cottage industry. With the installation of the first palm sugar manufacturing factory in 1837 at Dhoba, near Burdwan in Bengal by Mr. Blake, opened a new chapter in industrialising it in the modern sense. For nearly a century thereafter the industry had a staggering growth. In spite of suggestions from the Indian sugar committee in 1920 to exploit palm for sugar manufacture, the industry could not make much headway for lack of official encouragement and scientific approach. This resulted in steady decline of a potential industry.

Gandhiji initiated revitalising this industry even during our independence struggle by including it in the purview of the All India Village Industries Association at Wardha. After independence the industry was brought under the Union Ministry of Food and Agriculture, and encouraged under the Grow More Food Programme. At present the industry is progressing with the organised efforts of the Khadi and Village Industries Commission.

INTERESTING VILLAGE INDUSTRY

The palm gur industry in itself is an interesting and rewarding activity. It has its glamour and problems both of which make it quite exacting. Yet another advantage of the industry is that it keeps the whole family, even women and children, engaged throughout the year.

There are many problems too in manufacturing, preserving and storing palm gur. Experiments are, however, being carried on to overcome these problems and youngmen are trained in making a scientific approach to the industry.

Basic operation of the industry begins with the tapping which is known in India for ages. The methods and instruments used for tapping differ according to the place and variety of palm. In date palm for example three methods are prevalent. They are Surti, Karnataki and Bengali.

Tapping is an art as well as a science. The tapper has to climb twice a day and with the traditional method of climbing, one is able to tap as many as 30 date palm trees per day depending upon the method and individual experience.

Improved methods such as aerial rope ways (for palmyra and coconut) and bamboo ways (for date palms), are devised to increase the efficiency of a tapper from 30 to 50 palms.

AERIAL ROPE-WAYS

In this method, palmyra palms are connected by tying thick ropes. One rope is tied to the trunk of the tree and another in parallel just below the crown portion. A bamboo with notches is then tied vertically to the trunks of the first and last trees which are connected with aerial rope ways. The tapper can climb the first tree using the bamboo notches as steps, complete the operation on that tree and move to the second one with the rope-way instead of coming down and climb all again.

BAMBOO—WAYS

In place of ropes, bamboos are used in tapping date palms.

Generally the distance between each palm tree is 15 to 20 feet and this could be easily connected either by ropes or bamboos according to the covenience. Yet another advantage is that both bamboos and ropes are locally available. Ropes can be even prepared by palm fibre in the off-season leisure hours of the villagers.

In tapping also, considerable improvements have been made, especially in date palms. The method known as "dainik chhedan" is an improvement over the traditional Bengal method where two intermittent rest days to each tree were given. In the new method, the tapping portion of date palm — the crown base — is sliced into three parts and the tender portion is exposed. Every day one portion is tapped giving rest to the other two. By adopting this method, the tapper could save 2/3 of tree rent (e.g. 30 trees instead of 90) as he gives rest to the tapped portion rather than the entire tree itself. Further improvements are planned and new methods are experimented upon to improve tapping techniques. They are hygienic collection of neera, vacuum tapping etc.,

Tapping the infloresence in case of palmyra, coconut and sago palms and the crown base in case of date palm, a sweet juice trickles down into the pots attached for collection. This is the popular drink neera.

EDIBLE AND SUBSIDIARY PRODUCTS

Edible products of palm are neera, jaggery, palm sugar, palm candy and palmolates. There are also many subsidiary products of palms (some are made out of the by-products). These are sufficient enough to keep the tapper families employed round the year. Manufacturing of the subsidiary products will keep these families busy during the four to six months of the off season period. These are preparing palm fibre, palm leaf naar and various other articles from them. Thus the palms have great potential in giving a substantial footing to the tapper families to make a living.

PALMYRA PALM

Palmyra palm is yielding edible and non-edible products throughout the year.

January to June	Neera
June to August	Tender fruits
August to October	Fruits
October to December	Edible roots

Uses of the different parts of Palmyra Palm

Part of the Palm	Uses
1. Root	Basket making
2. Bottom of the Trunk	Cattle feeding
3. Timber	House construction, cot making, walking stick
4. Spathe Cower. (Kolanji.)	Brush making
5. Petiole of the young tree (Karukka mattai)	Fencing of gardens
6. *Petiole*	
a) Frond	Fibre extraction
b) Karukku	Rope for bundling
c) Agani	Cot weaving, basket making
d) Purani	Basket making
e) Tender leaf	Roofing, packing
f) Matured leaf	Fancy leaf articles
7. Eark	Brush making, Basket making, Sinnow making etc.

Potentiality of a Single Palmyra Palm

Name of the raw material	Quantity available	Finished product		Value realisable
1. Neera	150 Litres	Gur	24 Kgs.	40-00
2. Fibre	1 Kg.	Basket	2 Nos.	6-00
3. Eark	2.5 Kgs.	Brush	12 Nos.	7-20
4. Leaf	8 Nos.	Mats	6 Nos.	4-80
5. Naar	16 Nos.	Basket	1 No.	3-00
			Total Rs.	61-00

Potentiality of Single Date Palm

Name of the material	Quantity available	Finished product	Value of finished product
1. Neera	120 Litres	Gur 15 Kgs.	37-50
2. Leaf	15 Kgs.	Rope 130 Ft.	7-50
3. Petiole	20 Nos.	.....	1-00
		Total Rs.	46-00

Date Palms yield Neera and also non-edible products as leaves. The leaves can be used as such for thatching or for the extraction of fibre.

NEERA — THE NECTAR

Neera the delicious drink extracted from the sap of palm, is fast becoming popular in rural and urban areas of India. Refreshing as it is, the drink has agreeable flavour, high nutritive value and medicinal properties. It is wholesome, cool and good for improvement of general health, specially as a supplement to those who have iron and vitamin deficiency. The popularity of the drink is due to its several advantages. It builds the body, keeps our system cool, improves appetite and digestion. It can be consumed in fairly large quantity without causing any harm to the system. As a good tonic to the asthamatic, anaemic and leprosy patients, neera has acted miraculously. It has also cured digestive troubles.

Besides drinking fresh neera it can also be used for preparing gur, syrup, rab, sugar. candy, confectionery, icecream and various sweets. Since palm gur industry was included in the programme of the All India Village Industries Association, founded by Mahatma Gandhi at Wardha in 1934, the drink neera, got a boost. It was later scientifically analysed by many scientific workers including Dr. Kamal Sohonie (who was both qualified and experienced in the field). The nutrition surveys, scientific analysis and experimental tests carried out by her team in 1959 brought in new light regarding its nutritional and food values :

Figures below show how nutritive neera is. Eight ounces of Neera contain:

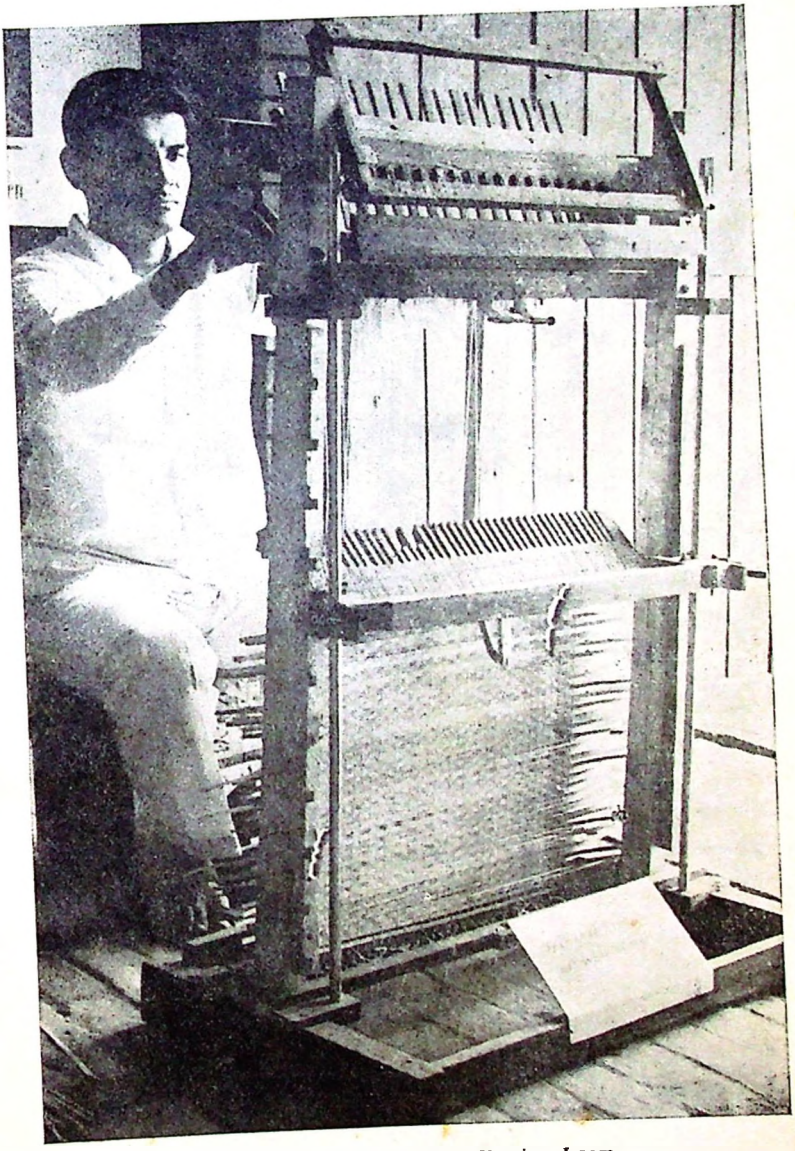
1.	Ph	7.2
2.	Total Sugar/gm.	28.8
3.	Calcium/mgms.	35.4
4.	Iron/mgms.	5.5
5.	Phosphorous/mgms.	32.4
6.	Thiamine/mg.	83.3
7.	Ribofiavin/mg.	83.3
8.	Ascorbic acid/mgms.	12.2
9.	Nicotinic acid/mg.	674.1
10.	Protein/mgms.	49.7
11.	Calories	113.3

Chemical analysis of 100 cc. of neera has shown the following result:

1.	Specific gravity	1.07
2.	Ph	6.1 to 6.9
3.	Nitrogen	0.056 gm.
4.	Protein	0.35
5.	Reducing Sugars	0.96
6.	Ash (Minerals)	0.54
7.	Calcium	Traces
8.	Phosphorous	0.14
9.	Iron	0.04
10.	Titrable	8.75 cc. of N/10 alkali
11.	Vitamin C	13.25 mgms.

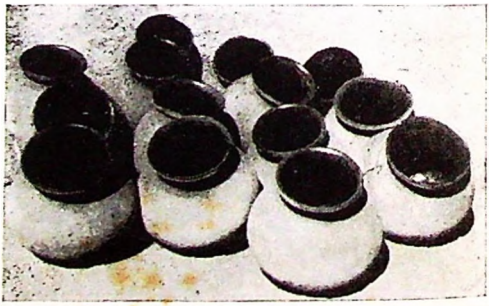
In addition neera contains 3.9 international units of vitamin B-1 per 100 cc. and probably other members of vitamin B complex in negligible quantities.

In what high esteem Gandhiji held this industry is known from his speech made 30 years back in Bihar at the village industry exhibition. Said Gandhiji "This is the way to banish poverty from our land. This also is an antidote to poverty."



Palm Leaf Mat Weaving Loom

Aerial Rope ways



Lacquered Pots for Hygienic Collection of Neera

PALM GUR

Also known as jaggery, it is prepared by boiling sweet juice of palm. It is generally prepared and consumed in the states of Madras, Andhra Pradesh, Bengal and Mysore.

The method of preparing improved variety of gur is quite interesting. Limed juice is collected, slightly heated, clarified by adding superphosphate of phosphoric acid, strained to eliminate the added lime and other impurities. The clear juice is then further boiled upto nearly 116°C to 118°C and moulded in different shapes. And lo! The sweet palm gur is ready for consumption. It has thus all the properties of fresh palm juice, delicious taste and pleasing colour.

COMPOSITION OF PALM GUR

Kind of Gur	Moisture. %	Sucrose %	Reducing Sugars %	Fats %	Proteins %	Total Minerals %	Calcium as CaO %	Phosphorus as P_2O_5 %
Palmyra Gur	8.61	76.86	1.66	0.19	1.04	3.15	0.861	0.052
Date Palm Gur	9.16	72.01	1.48	0.26	1.46	2.60	0.363	0.52
Coconut Palm Gur	10.32	71.89	3.70	0.15	0.96	5.04	1.638	0.062
Sago Palm Gur	9.16	84.31	0.53	0.11	2.28	3.66	1.352	1.372

The nutritive values of palm gur are given below based on an analysis (out of 100 gms.) of the Nutritional Research Laboratories, Indian Council of Medical Research.

1. Thiamine (Vit. B) 21 mgm.
2. Ribofiavin (Vit. B) 432 mgm.
3. Nicotinic Acid
   (Antipallagra Vitamin) 5.24 mgm.
4. Ascorbic Acid (Vit C.) 11 mgm.

Like Neera, jaggery has also some rare medicinal values as testified by Dr. Naidoo of Nagadcoil, Tamil Nadu. Accordingly palm gur solution proved excellent food for typhoid both at early and advanced stages.

The rate of sale of palm gur in India is equal to that of cane and gur and in some cases the former fetches higher rate.

PALM SUGAR

Manufacture of palm sugar is also a traditional industry of our villages. The vitamin values of palm sugar are:

1. Thiamine Microgram (100 gm.) 160
2. Riboflavin Microgram (100 gm.) 429
3. Nicotinic acid Microgram (100 gm.) 1.98

The words of Prof. Gundu Rao, Director, National Sugar Institute, Kanpur at the Palm Sugar Symposium are apt in the light of present day acute sugar scarcity situation. He said:

> "The brown sugar should be preferred to white sugar and gur to brown sugar. Unfortunately, we go the other way and try to purify. It is surprising that we go on paying through our nose for refining and getting eliminated the extra bit of nutrition that the sugar may have and ultimately come back to pay again for adding to our diet, some of these nutritional things. This is a wrong way."

About eight per cent of palm sugar can be recovered from Neera on weight basis. Improved methods like the 'film evaporators' are still in experimental stages.

Unlike the cane sugar industry, the problem of disposal of molasses is overcome in palm sugar industry by utilising molasses by converting them into various edible products like the golden syrup, confactionery syrup, madhu prash, etc. It is also used in preparation of palmolates, fruit preservation and cattle feed. Further experiment are successfully completed for producing vinegar out of molasses and to decolourize molasses for utilization in various other products.

PALM CANDY

This sweet candy is produced directly from neera. The high medicinal and nutritive values of neera are 'moulded' into sugar candies. This traditional industry is practised specially in Tamil Nadu and Bengal with good income.

The improved method of candy preparation out of palm juice is simple. The clarified juice is boiled to 107°C to 108°C and poured into insulated crystallisers to promote crystal growth and the candy is made available within 30 days. This method is used in Ayurvedic medicines and has high curative values.

There is one more method wherein candy is obtained within ten days from boiling palm sugar. Today many improvements have been done in crystallisers, insulation methods, boiling and in hangers used in crystallisers to get good quality candy.

The period of crystallisation has also been shortened considerably by adopting improved techniques.

Here are the results of nutritional analysis of different types of candies done by Nutritional Research Laboratories, Indian Council of Medical Research:

NUTRITIONAL ANALYSIS OF PALM CANDIES

	Palmyra Neera	Palmyra sugar	Date Palm	Date Palm sugar
1. Moisture %	0.7	0.06	0.8	0.03
2. Protein %	0.2	0.06	0.2	0.08
3. Fat % (Ether Extraction)	0.04	0.07	0.30	0.05
4. Minerals	0.3	0.06	0.5	0.1
5. Carbohydrates	98.76	99.76	98.42	99.74
6. Calcium (Ca) mg%	58.7	18.9	55.6	32.6
7. Phosphorous (P) mg %	5.4	1.9	6.2	1.4
8. Iron (FC) mg %	1.4	5.2	20.2	11.6
9. Caloric Value for 100 gms.	396	400	395	400
10. Riboflavin mg/100 gm.	8.2	nil	18.4	nil

On separation of candy, the residue (the mother liquor) can be reboiled for making sugar. It can also be boiled and variously flavoured and bottled for consumption. This sharbat (Squash) is a pleasant, nutritious beverage that can be consumed after diluting with water.

PALMOLATES

These are indigenous sweets and confections prepared from palm sugar or gur. A variety of confectionery articles and Indian sweets are prepared today to popularize the use of palm sugar and gur. Also prepared are bakery products like biscuits, nankhatai, cakes, etc. They are quite popular among the consumers.

MADHU PRASH

Aerated beverages are consumed in large quantities in India. It was heartening to note that these could be prepared from palm sugar or palm molasses. These delicious drinks are known as *Madhu Prash*. They not only quench our thirst but also add to the nutritional values. *Madhu Prash* can also be prepared out of fruit pulps from papaya, guava and chikoo. They are then more delicious, nutritious and palatable. All over India *Madhu Prash* has become popular today.

Analysis of Madhu Prash has shown the following food values:

1.	Total solids	12.984 %
2.	Proteins	0.186 %
3.	Total sugar	9.632 %
4.	Ash	0.560 %
5.	Calcium (Ca)	0.073 % nw/vol.
6.	Phosphorous (P)	0.0037 gms.
7.	Iron (FC)	1.05 mgm.
8.	Vitamin B	6.0 mgm.
9.	Vitamin B2	
10.	Vitamin C	0.34 mgm.
11.	Niacin	75.5 mgm.

WEALTH OUT OF WASTE

Subsidiary Products

Our village industries, though not sophisticated, have such a potent that even from waste we can produce untility articles. Every part of palmyra is useful in one way or the other.

The by-products of village industries are capable enough to keep the artisans employed during the off-season period. Palm Industry is no exception to this and many subsidiary industries have been developed to utilize their by-products.

PALM FIBRE

Extracting fibre from the palmyra trees is an ancient industry of India. This has today great export potential.

The process of fibre extraction is done by a wooden hammer to separate the fibres. It is then passed through the comb closely fixed on a board to separate and remove additional fibre hairs. The fibre is then dried. sorted and bundled and is ready for export or other uses.

A variety of articles like brushes, foot rugs and mats are prepared out of this fibre. This industry keeps the tapper occupied when he is free from tapping and fetches him about Rs. 3 to Rs. 4 per day. Fibre can be extracted even from young trees.

COST STRUCTURE OF PROCESSED FIBRE

Raw material	43%
Wages	45%
Sundry expenses	7½%
Transport	3½%
Govt., cess	½%
Total	100%

(From Madras State Palm Gur Federation)

PALM LEAF AND EARK

A variety of fancy and utility articles can be made from palmyra leaf and its mid-rib called 'eark', Especially in South India, women and

children are busy making such articles. There is no limit to this creative genius of the village artisans and articles like fans, bags, garlands, mats, wall mats and many decorative materials are made.

DATE PALM FIBRE

Yet there is another subsidiary industry in which fibre is extracted from leaves through carding machines. This fibre is then dried, coloured and used in weaving door mats, foot rugs and cot tapes. They are also directly twisted for rope making which has many uses in a village. Even the middle rib of the date palm leaf and its base are used for making 'Chicks'. This fetches an earning of Rs. 2 and Re. 1 per day to male and female members respectively. A small scale fibre industry could be started with an investment of Rs. 3,000.

NAAR

The word Naar originated from Tamil language. Outer and inner skins of petiole are known as purani and agarni respectively. Naar peeled with the help of a sharp knife, the fibrous portion is sliced and is used for weaving cots and chairs, in place of cane. Naar is also used for making baskets of different shapes, mats, etc., Even the waste fibrous material is coloured and used for door mat, drops and other decorative purposes. This is a household industry in Madras and an artisan can earn Rs. 2 to Rs. 3 per day.

BRIGHT FUTURE

Thus, in India if all the five crore tappable palms are used for manufacturing neera, gur, sugar and other subsidiary products, the potential industry, which is still not fully developed, can help more families stand to gain much from the natural hidden wealth.

There is also a ready market for palm products throughout India and abroad. New vistas could be explored with intensive research programme, experiments and hard work. The dream of 'gramrajya", cherished by the Father of the Nation could thus be fulfilled.

REVIVAL

It was Mahatma Gandhi who believed in the upliftment of industries as the potential centres for the nation's welfare, and who reviewed,

among others, the palm gur industry as a cottage industry with his guidance and inspiration, the All India Khadi and Village Industries Association, Wardha opened a separate Palm Gur Department through which the provincial ministries were approached for starting work in different states. The Ministry of Agriculture then opened the Palm Gur Section in 1974 for its development with official status and aid. Later on the programme was enlarged by the erstwhile All India Khadi and Village Industries Board in 1954-55 and continues under the aegis of the Khadi and Village Industries Commission since 1957—58.

The industry was put on a scientific footing by starting a Research and Training Institute, the first of its kind, in Moodbidri (South Kanara, Mysore State) in 1948 and later shifted to Cuddalore (South Arcot, Tamil Nadu) where it worked as a training cum recruit centre till 1954. Later in 1955 it was renamed as Bharatiya Tad Gud shilpa Bhavan and was located at Dahanu, Thana, Maharashtra.

To put this conventional industry on modern line research work is being conducted at the Central Research Laboratory for palm gur industry under the auspices of the Bhavan. Apart from this, fundamental research is also carried out in other laboratories on different aspects of the industry.

Also attached to the laboratory is a reference library and a technical show room. These serve both the research workers and act as an informotion bureau to the palm gur workers all over the country. The scientific investigations conducted at the library have helped improve the yield of neera by planned pruning of leaves finding out alternative techniques for preserving neera with silica get instead of lime and evaluation of simple technique for preserving gur and sugar.

There is also a techno-Industrial museum of palm products wherein are displayed a range of samples of many palm products from all over India, the different types of tapping tools, past and present models of furnaces and a wide variety of charts, flow diagram, etc. This store house of information is a monument to the industry. It is an inspira-

tion to the palm gur workers and an interesting and educative centre for the public.

DEVELOPMENT PROGRAMME

The development programmes of the industry are implemented at the central level by the palm gur section and its allied branches under the Khadi and Village Industries Commission and at the state level by the State Khadi and Village Industries Board.

In 1972-73 there were 3,558 Cooperative Societies with a membership of 4.17 lakhs. Of these 1198 Cooperative Societies and 49 Institutions were reported to be working. As many as 168 lakh palm trees were tapped. The total production of Palm Gur, Palm Sugar, Candy, Neera and edible and non-edible products was worth Rs. 632.31 lakhs. The total sales amounted to Rs. 738.10 lakhs. During the period 2.92 lakh persons were provided employment.

Undoubtedly palm gur and its allied industries will change the life of our village folk for better. The industry has a heritage, a great potential and bright future and the days are not far ahead when the dream of Gandhiji to make the gramarajya into a Rama Rajya is fulfilled.

COST STRUCTURE OF PALM GUR

Kind of Palm	Tree Rent %	Fuel %	Chemicals %	Depreciation %	Overheads %	Total %	Earnings %
Date	**	6.00	2	7	6.5	43	57
Palmyra	15.5	11	3	7	4	29	71
Sago	32	6	1	5	8	52	48
Coconut	44	10	3	9	9	75	25

As worked out in the study conducted by the Ec, R while conducting Palm Gur price fixation enquiry.

Technological Improvements Introduced in Palm Gur Industry

Sr. No.	Subject	Research undertaken	Object	Results obtained	Remarks
1	2	3	4	5	6
1.	Palm Agronomy	a) Transplantation of young plants aged 4 to 6 years was tried in the case of date palm.	Regular plantations can be made by transplanting the scattered palms and thus reduce the area of operation of the tapper.	Successful. 98% survived when watered regularly with addition of phosphates and Nitrogen.	It has served as a useful demonstration to Co-operative societies.
		b) Pruning of the foilage.	To find out whether systematic pruning can enchance the yield of neera.	In the case of Date Palm a removal of 30% leaves at the rate of 10% in a phased manner, the yield of Neera increased by about 35%. In the case of Palmyra the increase in yield with a 20% removal of Leaves at start was about 70%.	These findings have been propogated through artisans training course.
		c) Effect of manures on the quality & quantity of Neera.	To increase the quality and quantity of Neera.	An increase of about 1% in the yield of Gur is observed in	

Sr. No.	Subject	Research undertaken	Object	Results obtained	Remarks
1	2	3	4	5	6
				the case of Neera from the treated palms.	
2.	Climbing	a) Aerial rope ways. Two ropes were tied parallel to each other from tree to tree (Palmyra) so that the tapper can cover the distance quickly by walking on one rope and balancing himself on the other.	To increase the efficiency of the tapper & reduce exhaustion and difficulty.	Tapping capacity increased by 50%.	-do-
3.	Tapping	a) The trees were subject to four methods of tapping. 1. Original Bengali method. 2. Dainik Paddhati. 3. Half Bangali method. 4. Surti Method.	To improve the technique of tapping.	While the original Bengali method is found to be the best in respect of the quality of juice and the Surti method is found to yield the maximum quality, the new method of daily tapping	These findings have been propogated through artisans training course.

Sr. No.	Subject	Research undertaken	Object	Results obtained	Remarks
1	2	3	4	5	6
				proved more advantageous in respect of yield and quality.	
		c) Effect of tapping on the yield and quality of nut in coconut.	To establish the popular belief that tapping is beneficial for nut yield of poor yielders.	Tapping for a period of 6 months is found to invigorate nut yield in poor yielders.	-do-
		d) Effect of tapping on disease and pests of coconut.	To contradict the popular belief that the incidence of pests is more when trees are tapped.	It could be proved to certain extent that tapping does not increase the incidence of disease.	-do-
		e) Improvements in implements & tools used for tapping.	To improve tapping efficiency.	High carbon steel with oil tampering improved the quality of tapping tools.	-do-
4.	Collection of juice	a) Treatment of pots 1. Wax Coating 2. Lacquering	To stop tree top formation.	Lacquering of pots was found to be good. The pots become non-porous and can be easily washed.	-do-

Sr. No.	Subject	Research undertaken	Object	Results obtained	Remarks
1	2	3	4	5	6
5.	Preservation of juice	a) Physical method- like partial heating, chilling etc.	Preservation after collection.	Heating, chilling preserves Neera for 72 hours. Frezing preserves the juice for a week.	
		b) Chemical method- various chemical preservatives were studied.	-do-	SO2 method evolved, preserves the Neera for 18 hrs. on tree tops.	-do-
		Neera catering using cooler, deep freezers and insulated boxes.	To avoid deteriorating of Neera after collection.	Flesh chilling process for immediate chilling was evolved. Chilled Neera preserves well for over 12 hrs. When kept under insulated condition.	The methods are in use for commercial Neera catering.
6.	Furnance & Pans.	a) Different type of furnance were tried i) Primitive furnace ii) Standard Bhatti iii) Salamat Bhatti iv) Kifayat Bhatti v) Mufeed Bhatti 2. Sahakari Bhatti	To economise fuel consumption.	i) Wastage of fuel and time. ii) 80 to 90% on the weight of the juice. iii) Fuel consumption was reduced to 60 to 70% on raw juice.	Already in use with Co-operative Society.

S. No.	Subject	Research undertaken	Object	Results obtained	Remarks
1	2	3	4	5	6
		vi) Coal furnace b) Solar heat utilisation.		iv) Fuel consumption is brought down to 35 to 60% on raw-juice and better quality gur. The circular pan now yielded place to thin N.S. or G.I. rectangular pan. v) 1. Fuel consumption was 30 to 35% on weight of raw juice. 2. This is for 400 to 500 Kgs. of Neera. The furnace consumes 27 to 30% fuel on the weight of juice. vi) The consumption of coal on raw Neera is 18 to 20% b) Still under study.	

S. No.	Subject	Research undertaken	Object	Results obtained	Remarks
1	2	3	4	5	6
7.	Clarification of juice for syrup & Gur making.	a) Double deliming process. b) Carbonation process.	To remove the lime from the Neera so that the final product will have a better quality.	a) The double deliming process of clarifying Neera using either superphosphate or phosphoric acid gave very high rise in purity for the clarified juice, low mud volume thus minimising sugar losses and also quick and efficient settling. The process has been standardised.	Widely used in gur sugar and candy boiling.
8.	Storage of Gur	a) For preservation humidity control method.	To prevent melting of gur.	Gur can be preserved well when R.H. is less than 60%.	
		b) Wax coating gur slabs were covered with tissue papers and then coated with wax.	To stop melting and to keep the original flavour, colour and texture.	Satisfactory process in the marketing of gur.	

S. No.	Subject	Research undertaken	Object	Results obtained	Remarks
1	2	3	4	5	6
9.	Sugar boiling	a) Open pan method. b) Vacuum boiling. c) Use of film evaporator for syrup making.	For making good quality sugar with better yield.	While open pan method is found to give very small crystals with a low yield vacum boiling ensures better crystals with higher yield. Work is still in progress for improving the efficiency of both methods.	A few units have already been put up in the field. They are yet to attain viability.
10.	Candy making	a) 'U' shaped crystallisers with parallel thread hangers were introduced.	a) To obtain higher recovery by giving more space for crystallisation and to eliminate 'Korandy' for crystallisation.	a) Higher recovery and better and regular shaped crystals were obtained.	The method is practised in the field.
11.	Confectionery and aerated beverage.	a) Using Palm Sugar and palm gur for making gur for making popular confectionery.	a) To diversify the use of Palm Gur and Palm Sugar.	a) By adopting simple purification method for sugar and changing the formula of the constituents, quality products could be obtained.	The method is adopted by Co-operatives.

S. No.	Subject	Research undertaken	Object	Results obtained	Remarks
1	2	3	4	5	6
				b) A standard quality of aerated beverage could be obtained using either inferior quality Palm Sugar or first quality Palm Molasses.	
12.	Brush making	Simple power operated machinery has been used.	For producing various designs of utility brushes.	Increased production efficiency & opened up channels for use of Palm fibers.	The method is adopted by Co-operatives.
13.	Palm leaf products.	Using Palm Fibre extracted from Date palm leaves treating palmyra leaves.	Utilisation of Date palm leaf. Improvement in the quality of palmyra leaf by chemical treatments.	Different types of mats could be produced from date Palm. The quality of palmyra leaf products could be improved by bleaching and other techniques.	The method is adopted by Co-operatives.

Neera Catering Scheme

Daily Sale: 1,500 Bottles (300 Litres of Neera)

I. Equipment (Non-recurring)

	Nos.	Rs. Ps.
1. Bottle at Rs. 0.55 per bottle	4,000	2,200-00
2. Chilling Unit or Freezer	1	18,000-00
3. Bottle Cooler (Ice type)	3	6,000-00
4. Bottle Washing Machine	1	3,000-00
5. Delivery Vehicle (Scooter with Insulator)	1	20,000-00
6. Crates	50	1,000-00
7. Neera Cans	8	1,600-00
8. Insulated Boxes	4	1,200-00
9. Push Cart	1	2,000-00
10. Neera Cabins	3	15,000-00
		70,000-00

II. Establishment

	Rs. Ps.
1. Manager 1 No. at Rs. 300/- p.m. for 12 months	3,600-00
2. Supervisor 1 No. at Rs. 200/- p.m. for 6 months	1,200-00
3. Accounts Clerk 1 No. at Rs. 200/- p.m. for 6 months	1,200-00
4. Processing expert 2 Nos. (150 x 6 x 2)	1,800-00
5. Driver 1 No. at Rs. 200/- p.m. for 6 months	1,200-00
6. Watchman 1 No. at Rs. 150 x 12	1,800-00
7. Salesman 4 Nos. (4 x 150 x 6)	3,600-00
8. Rent of Processing Centre (200 x 12)	2,400-00
9. Rent of Land for Neera Cabins	900-00
	17,700-00

III. Processing and Catering

	Rs. Ps.
1. Purchase of 50,000 liters of Neera at Rs. 0.25 per litre	12,500-00
2. Straw Pipe 500 Boxes at Rs. 2/- per box	1,000-00
3. Books and Forms	100-00
4. Local Taxes	200-00
5. Repair and Replacement	2,000-00
6. Electric Charges	1,000-00
7. Petrol at Rs. 65/- per day for 6 months	11,400-00
8. Ice and Miscellaneous	2,000-00
	30,200-00

IV. Working Capital : Rs. 12,000/-

Recovery

1. Neera Purchased	50,000 litres.	
2. Less wastage & sediment 10%	5,000	
3. Total Neera for sale (1 litre — 5 bottles) 45,000 x 5	2,25,000 bottles.	
4. Sale price at Rs. 0.30 per bottle of Neera	Rs. 67,500	

ABSTRACT

Receipt		*Expenditure*	Rs. Ps.
1. By sale Rs. 67,500-00		1. Establishment	17,700-00
		2. Processing and Catering	30,200-00
		3. Depreciation on equipment as per Appendix 'A'	10,353-00
		4. Interest on equipment at 6% on Rs. 70,000 for 1 year	4,200-00
		5. Interest on Working Capital of Rs. 12,000 for 6 months at 6%	360-00
		6. Anticipated Profit	4,687-00
	67,500-00		67,500-00

APPENDIX 'A'

Depreciation of Equipments (Non-Recurring)

Sr. No.	Particulars	Cost of equipment	Year of service	Depreciation Rs. Ps.
		Rs.		
1.	Bottle	2,200	3	733-00
2.	Chilling Unit or Freezer	18,000	10	1,800-00
3.	Bottle Cooler (Ice type)	6,000	6	1,000-00
4.	Bottle washing machine	3,000	6	500-00
5.	Deliver Vehicle	20,000	10	2,000-00
6.	Crates	1,000	5	200-00
7.	Neera Cans	1,600	5	320-00
8.	Insulated Boxes	1,200	4	300-00
9.	Push Cart	2,000	4	500-00
10.	Neera Cabins	15,000	5	3,000-00
		70,000		10,353-00

Neera Catering Scheme

Daily Sale — 3,000 Bottles

I. Equipmet (Non-recurring)	Nos.	Rs. Ps.
1. Bottle at 0.55 per bottle	8,000	4,400-00
2. Chilling Unit		
Pre-Chiller — 1 No. / Walk-in-Cooler — 1 No.	2	50,000-00
3. Bottle Cooler		
Electric Type	2	12,000-00
Ice Type	6	12,000-00
4. Bottle Washing Machine	2	6,000-00
5. Delivery Van (Jeep Van)	1	40,000-00
6. Crates	100	2,200-00
7. Neera Cans	20	4,000-00
8. Insulated Box	8	2,400-00
9. Neera Cabins		
Big — 2 Nos. (Rs. 10,000) / Small — 6 Nos. (Rs. 12,000)	8	22,000-00
		1,55,000-00

II. Establishment

	Rs. Ps.
1. Manager 1 No. at Rs. 400/- p.m. for 12 months	4,800-00
2. Supervisor 1 No. at Rs. 300/- p.m. for 6 months	1,800-00
3. Accounts Clerk 1 No. at Rs. 300/- p.m. for 6 months	1,800-00
4. Processing Experts 6 Nos. at Rs. 200/- p.m. for 6 months	7,200-00
5. Driver 1 No. at Rs. 300/- p.m. for 6 months	1,800-00
6. Watchman 1 No. at 150/- p.m. for 12 months	1,800-00
7. Rent of Processing Centre at Rs. 300/- p.m. for 12 months	3,600-00
8. Salesman 8 Nos. at Rs. 150/- p.m. for 6 months	7,200-00
9. Rent of Land for Neera Cabins	2,000-00
	32,000-00

III. Processing and Catering

	Rs. Ps.
1. Purchase of 10,000 litres of Neera at Rs. 0.25 per Litre	25,000-00
2. Straw Pipe 1000 boxes at Rs. 2/- per box	2,000-00
3. Books & Forms	200-00
4. Local Taxes	400-00
5. Repair and Replacement	5,000-00
6. Electric Charges	2,000-00
7. Petrol at Rs. 100/- per day for 6 months	18,000-00
8. Ice and Miscellaneous	5,000-00
	57,600-00

COMMUNITY HEALTH CELL
326, V Main, I Block
Koramangala
Bangalore-560034
India

IV. Working Capital : Rs. 20,000/-

V. Recovery

1.	Neera Purchased	:	1,00,000 Litres.
2.	Less Wastage & Sediment	:	10,000 Litres.
3.	Total Neera for sale 90,000 Litres. (1 Litre = 5 Bottles)	:	4,50,000 Bottles.
4.	Sale Price at 0.30 per bottle	:	Rs. 1,35,000-00

ABSTRACT

Receipt	*Expenditure*	Rs. Ps.
Rs. 1,35,000-00	1. Establishment	32,000-00
	2. Processing & Catering	57,600-00
	3. Depreciation on equipment as per Appendix 'A'	20,907-00
	4. Interest on equipment at 6% on Rs. 1,55,000 for 1 year.	9,300-00
	5. Interest at 6% on Working Capital of Rs. 20,000 for 6 months	600-00
	6. Anticipated Profit	14,593-00
1,35,000-00		1,35,000-00

APPENDIX 'A'

Sr. No.	Particulars	Cost of equipment	Year of service	Depreciation Rs. Ps.
1.	Bottle	4,400	3	1,467-00
2.	Chilling Unit	50,000	10	5,000-00
3.	Bottle Cooler			
	Electric Type	12,000	10	1,200-00
	Ice Type	12,000	6	2,000-00
4.	Bottle Washing Machine	6,000	6	1,000-00
5.	Delivery Van	40,000	10	4,000-00
6.	Crates	2,200	5	400-00
7.	Neera Cans	4,000	5	800-00
8.	Insulated Box	2,400	4	600-00
9.	Neera Cabins	22,000	5	4,400-00
		1,55,000		20,907-00

Palmyra Neera Candy Production Model Scheme

Season — 6 months

I. *Non-Recurring* (Equipment)	Qty.	Cost. Rs. Ps.
1. Pan	2 Nos.	400-00
2. Gratings	2 Nos.	80-00
3. Chimney	2 Nos.	100-00
4. Furnace	2 Nos.	400-00
5. Buckets	4 Nos.	100-00
6. Scrapper & Strainer	2 Nos.	20-00
7. Litter Measure	1 Set	50-00
8. Spring Balance	1 No.	50-00
9. Filter Cloth	4 Nos.	100-00
10. Thermometer 150°C	2 Nos.	100-00
11. Cans	2 Nos.	200-00
12. Candy Crystallizer at Rs. 40/- per Crystallizer	200 Nos.	8,000-00
13. Trays for Drying	10 Nos.	500-00
14. Sprayer	1 No.	400-00
		10,500-00

II. *Recurring*	Rs. Ps.
1. Cost of Neera 1,50,000 litres at Rs. 0.25 per litre	37,500-00
2. Feul at 40% on Neera 60 Tons at Rs. 70/- per ton	4,200-00
3. Superphosphate (at ½ Kg. per 100 Litres) for 1,50,000 Litres — 750 Kgs. of Super Phosphate at Re. 1/- per Kg.	750-00
4. B.T.B. Paper	20-00
5. Miscellaneous	500-00
	42,970-00

III. *Establishment*

	Rs. Ps.
1. Manager-cum-Accountant	2,400-00
2. Candy Boiler at Rs. 150 P.M. for 6 months	900-00
3. Asst. Candy Boiler at Rs. 125 P.M. for 6 months	750-00
4. Watchman at Rs. 100 for 12 months	1,200-00
5. Building Rent, Candy boiling shed etc., (200 x 12)	2,400-00
	7,650-00

IV. *Working Capital*: Rs. 10,000

V. *Recovery*

1. Total Neera	1,50,000	Litres
Less wastage 2% on Neera	3,000	Litres
	1,47,000	Litres

2. Recovery of Candy at 5% on Neera	7,350 Kg.
3. Molasses at 3% on Neera	4,410 Kg.
4. Cost of 7,350 Kg. of Candy at Rs. 7.50 per Kg.	Rs. 55,125
5. Cost of 4,410 Kg. of Molasses at Rs. 60 per Ton	264

VI.

ABSTRACT

Receipt		Expenditure	
Value of Candy :	Rs. 55,125-00	1. Recurring expenditure	42,970-00
Value of Molasses :	Rs. 264-00	2. Depreciation on equipment as per Appendix "A"	1,785-00
		3. Interest on Non-recurring amount of Rs. 10,500 at 6% per annum.	630-00
		4. Interest on working capital of Rs. 10,000 at 6% for 6 months	300-00
		5. Establishment and other expenditure	7,650-00
		6. Anticipated profit	2,050-00
	55,389-00		55,389-00

APPENDIX 'A'

Sr. No.	Particulars	Qty.	Cost	Year of Service	Depreciation
			Rs. Ps.		Rs. Ps.
1.	Pan	2 Nos.	400-00	2	200-00
2.	Grating	2 „	80-00	2	40-00
3.	Chimney	2 „	100-00	2	50-00
4.	Furnace	2 „	400-00	4	100-00
5.	Buckets	4 „	100-00	4	25-00
6.	Scrapper & Strainer	2 „	20-00	2	10-00
7.	Litter Measure	1 Set	50-00	5	10-00
8.	Spring Balance	1 No.	50-00	2	25-00
9.	Filter Cloth	4 Nos.	100-00	2	50-00
10.	Thermometer 150°C	2 „	100-00	4	25-00
11.	Cans	2 „	200-00	2	100-00
12.	Candy Crystallizer	200 „	8,000-00	8	1,000-00
13.	Trays for Drying	10 „	500-00	5	100-00
14.	Sprayer	1 „	400-00	8	50-00
			10,500-00		1,785-00

PALM FIBRE PROCESSING SCHEME (at Society level)

12 artisans will process 6,000 Kgs. of raw fibre per months. The recovery of finished fibre from 72 tons of raw fibre will be 57.5 tons per year.

I. Non-Recurring Expenses

	Rs. Ps.
1. Cleaning Combs 25 Nos. at Rs. 20 each	500-00
2. Cutting Knife 10 Nos. at Rs. 10/- each	100-00
3. Wooden Anvil 10 Nos. at Rs. 20/- each	200-00
4. Platform Balance 1	1,000-00
	1,800-00

II. Recurring

	Rs. Ps.
1. Cost of 72 tons of raw fibre at Rs. 1,500/- per ton	1,08,000-00
2. Transport charge at Rs. 15/- per ton	1,080-00
3. Processing charges at Rs. 22/- 100 Kgs. of finished fibre	12,650-00
4. Rent for workshed at Rs. 50/- p.m.	600-00
5. Rent for godown	600-00
6. Other miscellaneous expenses as stationery washing charges etc.,	500-00
	1,23,430-00

III. Establishment

	Rs. Ps.
1. Supervisor (1) at Rs. 250/- p.m.	3,000-00
2. Store Keeper Cum Clerk at Rs. 200/- p.m.	2,400-00
3. Watchman at Rs. 100/-	1,200-00
	6,600-00

IV. Depreciation on Equipment

Items	Year of Life	Depreciation
		Rs. Ps.
4	3 years	100-00
1, 2, 3,	10 years	270-00
		370-00

V. Working capital : Rs. 30,000/-

ABSTRACT

Receipt	Expenditure	Rs. Ps.
Sale price of 57.6 tons 2,350/per ton of processed fibre Rs. 1,35,125.	Depreciation on equipment	370-00
	Recurring Expenditure	1,23,430-00
	Establishment	6,600-00
	Interest on Working Capital of Rs. 30,000	1,800-00
	Anticipated Profit	2,925-00
1,35,125.00		1,35,125-00

The Society will purchase raw fibre from artisan clean it and sell it to the exporters. Only the first process is envisaged at the society level since the exporter will undertake the 2nd process according to his requirement.

MODEL SCHEME

BRUSH MAKING UNITS

Production : 650 Dozen of Floor Washing — II
Period : 1 Month

I. Equipments Non-Recurring	Rs. Ps.
1. Drilling Machine with 3/8 H.P. Motor 1 No.	1,000-00
2. Trimming Machine with 3/4 H.P. Motor 1 No.	700-00
3. Bench Saw Machine with Motor. 1 No.	1,800-00
4. Fret Work Machine with 3/8 H.J. Motor 1 No.	1,400-00
5. Shearing Machine 1 No.	450-00
6. Hammer Big. 2 Nos.	40-00
7. Hammer Small. 30 Nos.	60-00
8. Forks 30 Nos.	60-00
9. Filling Nails 40 Nos.	80-00
10. Chisel 4" 2 Nos.	20-00
11. Fibre Cones 3 Nos.	60-00
12. Horseshee Magnet 1 No.	10-00
13. Dyeing Vessel 1 No.	100-00
14. Working Table. 1 No.	500-00
15. Benches 4 Nos.	500-00
16. Stools 2 Nos.	50-00
17. Scissors - 2 Nos.	30-00
18. Folding Scale. - 1 No.	10-00
19. Installation charges	1,000-00
20. Other accessories	50-00
21. Table for erection of Machine	400-00
22. Racks 4 Nos.	500-00
23. Almirah	300-00
24. Carpenters Tool Set.	200-00
25. Wood Turning Lathe	800-00
	10,120-00

II. Recurring

(A) Establishment

1. Fibre Expert-cum-Manager 1 No. at Rs. 200/-	200-00
2. Carpenter - 2 Nos. at Rs. 150/-	300-00
3. Artisans 20 Nos. at Rs. 125/- P.M.	2,500-00
	3,000-00

(B) Raw Materials	Rs. Ps.
1. Fibre 326 Kgs. at Rs. 2 per Kg.	652-00
2. Planks	1,200-00
3. Pins	200-00
4. Polish & sand paper	50-00
5. Miscellaneous	98-00
	2,200-00
(C) Other Expenditure	
1. Building Rent	200-00
2. Electirc charges	100-00
3. Stationery	20-00
4. Miscellaneous	30-00
	350-00
Total A, B, & C.	5,550-00

III. Working Capital Loan

IV. Production

Floor Washing Brush — II at 1¼ Dozen per Artisan per day (26 days.)	650 Dozen (7800) Nos. at Rs. 0.80 per Brush	Rs. 6,240-00

ABSTRACT (Per Month)

Receipt	Rs. Ps.	Expenditure	Rs. Ps.
1. Sales	6,240-00	1. Recurring (A, B & C)	5,550-00
		2. Depreciation at 10% for one month on equipments (Rs. 10,120)	84-30
		3. Interest on equipment at 6% on Rs. 10,120/- for one month	50-60
		4. Interest on Working Capital of Rs. 10,000/- at 6%	50-00
		5. Anticipated Profit per month	505-10
	6,240-00		6,240-00

ABSTRACT (For one year)

Receipt		Expenditure	
	Rs. Ps.		Rs. Ps.
1. Sales	74,880-00	1. Recurring	66,600-00
		2. Depreciation at 10% for 12 Months one equipment	1,012-00
		3. Interest on equipment at 6%	607-20
		4. Interest on Working Capital at 6%	600-00
		5. Anticipated profit	6,060-80
	74,880-00		74,880-00

Model Scheme for Date Palm Gur Manufacture for a Tapper Family

1. No. of trees	200 trees in two groups
2. Yield of Neera	90 litres per tree per season
3. Season	6 Months

I. Non-Recurring	Rs. Ps.
1. Pan set	90-00
2. Furnace	90-00
3. Tapping Tooks	40-00
4. Work Shed	100-00
5. Moulds	60-00
6. Pots 150 Nos. at 60 paise per pot	90-00
7. Ropes for Rerial Rope ways	130-00
	600-00

II. Recurring.	Rs. Ps.
1. Tree rent for 200 trees @ Rs. 5/- per tree per season	1,000-00
2. Lime for preservation	60-00
3. Fuel 7,200 kgs. @ 40% on Neera of 18,000 litres at Rs. 80 per ton	576-00
4. Superphosphate	220-00
5. Filter cloth	29-00
6. Miscellaneous	65-00
	1,950-00
III. Working Capital	800-00

IV. Recovery	Rs.
1. Recovery of Neera from 200 trees at 90 liters per tree per season	18,000 litres
2. Wastage, sediment etc. 10% of 18,000 liters of Neera	1,800 litres
3. Neera for Gur making	16,200 litres
4. Gur at 10% on Neera 16,200 liters @ Rs. 2/- per kg.	1,620 kgs.
5. Cost of 1,620 kgs. of Gur	3,240

ABSTRACT

Receipts		Expenditure	Rs. Ps.
1. By sale of Gur	Rs. 3,240-00	1. Recurring	1,950-00
		2. Depreciation value on equipments	242-00
		3. Interest on working capital of Rs. 800/- @ 6% for 1 year	48-00
		4. Anticipated income for 6 months	1,000-00
Total	3,240-00		3,240-00

Depreciation of Non-Recurring Items (Equipments)

Sr. No.	Particulars	Cost of equipment	Year of service	Depreciation per year
		Rs. Ps.		Rs. Ps.
1.	Pan Set	90-00	3	30-00
2.	Furnace	90-00	3	30-00
3.	Tapping Tools	40-00	3	13-00
4.	Work Shed	100-00	2	50-00
5.	Moulds	60-00	2	30-00
6.	Pots	90-00	2	45-00
7.	Ropes	130-00	3	44-00
				242-00

Finance

1. Capital Expenditure Rs. 600/-
2. Working Capital Rs. 800/-

Model Scheme for Palmyra Gur Manufacture for a Tapper Family

1. No. of trees — 80 Trees
2. Yield of Neera 120 litres per tree per season

I. Non-Recurring

	Rs. Ps.
1. Pan set	90-00
2. Furnace	90-00
3. Tapping tools	40-00
4. Work Shed	100-00
5. Moulds	60-00
6. Pots 150 Nos. @ 40 paise per pot	90-00
7. Rope for Aerial Rope ways	130-00
	600-00

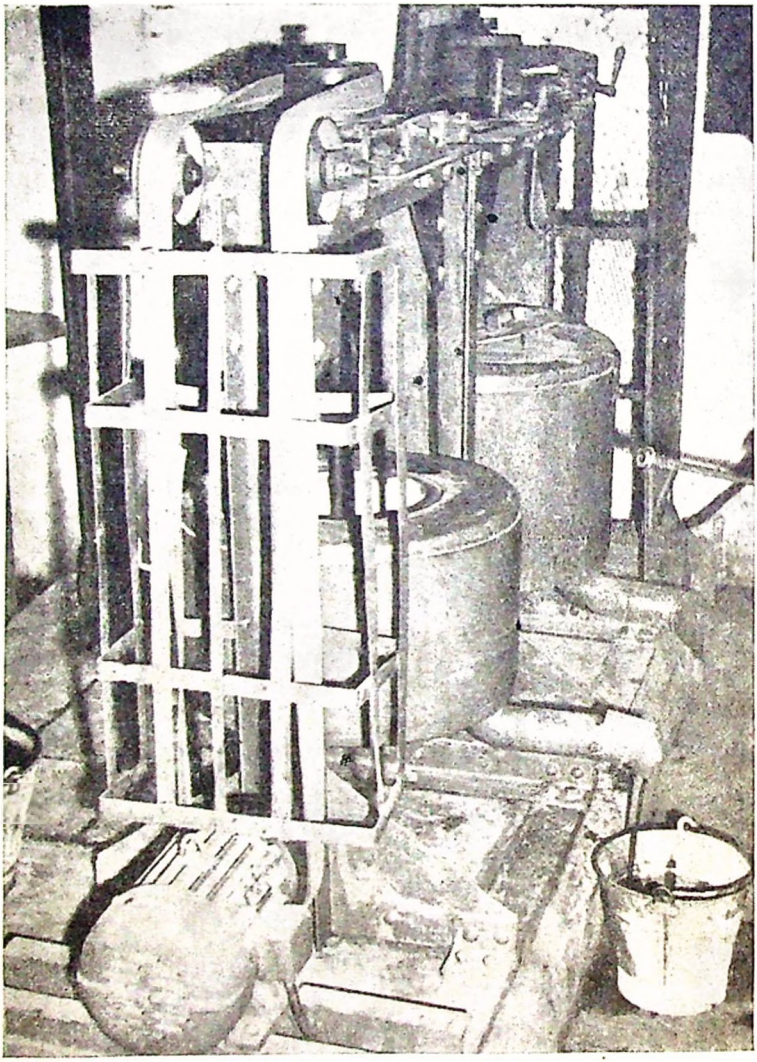
II. Recurring

	Rs. Ps.
1. Tree rent for 80 trees at Rs. 5/- per tree per season	400-00
2. Lime for preservation	30-00
3. Fuel 40% for 9,600 litres of Neera @ Rs. 80/- per ton	307-00
4. Superphosphate	100-00
5. Miscellaneous	50-00
6. Filter cloth	30-00
	917-00

III. Recovery

1. Recovery of Neera from 80 trees at 120 litres per tree per season	9,600 litres
2. Wastage, sediment etc. at 10% of 9,600 litres	960 litres
3. Neera for gur making	8,640 litres
4. Gur @ 12% on 8,640 litres	1,037 Kgs.
5. Cost of Gur at Rs. 2/- per kg.	Rs. 2,074

IV. Working Capital — Rs. 500-00



Palm Sugar by Centrifugal Machine

Model Scheme for Palmyra Gur Manufacture for a Tapper Family

1. No. of trees — 80 Trees
2. Yield of Neera 120 litres per tree per season

I. Non-Recurring

	Rs. Ps.
1. Pan set	90-00
2. Furnace	90-00
3. Tapping tools	40-00
4. Work Shed	100-00
5. Moulds	60-00
6. Pots 150 Nos. @ 40 paise per pot	90-00
7. Rope for Aerial Rope ways	130-00
	600-00

II. Recurring

	Rs. Ps.
1. Tree rent for 80 trees at Rs. 5/- per tree per season	400-00
2. Lime for preservation	30-00
3. Fuel 40% for 9,600 litres of Neera @ Rs. 80/- per ton	307-00
4. Superphosphate	100-00
5. Miscellaneous	50-00
6. Filter cloth	30-00
	917-00

III. Recovery

1. Recovery of Neera from 80 trees at 120 litres per tree per season	9,600 litres
2. Wastage, sediment etc. at 10% of 9,600 litres	960 litres
3. Neera for gur making	8,640 litres
4. Gur @ 12% on 8,640 litres	1,037 Kgs.
5. Cost of Gur at Rs. 2/- per kg.	Rs. 2,074

IV. Working Capital — Rs. 500-00

ABSTRACT

Receipts		Expenditure	Rs. Ps.
1. By sale of gur 1,037 kgs. Rs. 2074-00		1. Recurring	917.00
		2. Depreciation on equipments	242-00
		3. Interest on working capital of Rs. 500/- @ 6%	30-00
		4. Anticipated income for 6 months	885-00
Total Rs.	2,074-00		2,074-00

Depreciation of Non-Recovery Items (Equipments)

Sr. No.	Particulars	Cost of equipment	Service	Depreciation per year
		Rs. Ps.		Rs. Ps.
1.	Pan set	90.00	3	30-00
2.	Furnace	90-00	3	30-00
3.	Tapping tools	40-00	3	13-00
4.	Work Shed	100-00	2	50-00
5.	Moulds	60-00	2	30-00
6.	Pots	90-00	2	45-00
7.	Ropes	130-00	3	44-00
			Total	242-00

Scheme for the Extraction of Palmyra Palm Fibre by the Artisan and his Family

1. Period of Production of Fibre : 8 Months
2. An artisan & his wife can extract Fibre from 100 Full Pathals per day.

I. Non-Recurring Expenses		Rs. Ps.
1. Cutting knife	2 Nos.	20-00
2. Mallet	2 Nos.	40-00
3. Wooden Anvil	2 Nos.	60-00
4. Cleaning Combs	2 Nos.	50-00
5. Beam Balance	1 No.	59-00
		220-00

II. Recurring	Rs. Ps.
1. Cost of 24,000 Pathals for 8 months	720-00
2. Transport & other Miscellaneous	100-00
	820-00

III. Recovery	Rs. Ps.
1. Raw Fibre from 24,000 Pathals at the rate of 6 kg. of Kora Fibre from 100 Pathals	1,440 kg.
2. Value of 1,440 kg. of Kora fibre at Rs. 1.50 per kg.	2,160-00
IV. Working Capital	500-00

ABSTRACT

Receipt	Rs. Ps.	Expenditure	Rs. Ps.
Sales price Kora Fibre	2,160-00	1. Recurring	
		2. Depreciation on equipment as per Appendix 'A'	820-00
		3. Interest on working capital of Rs. 500/- at 6% for 1 year	44-00
		4. Anticipated income for 8 months	1,268-00
	2,160-00		2,160-00

APPENDIX 'A'

Depreciation of Equipments (Non-recurring)

Sr. No.	Particulars	Cost of equipment	Year of service	Depreciation
		Rs. Ps.		Rs. Ps.
1.	Cutting knife	20-00	5	4-00
2.	Mallet	40-00	5	8-00
3.	Wooden Anvil	60-00	5	12-00
4.	Cleaning comb	50-00	5	10-00
5.	Beam balance	50-00	5	10-00
				40-00

Finance

1. Capital Expenditure Rs. 220
2. Working capital Rs. 500

Scheme for Palmyra Palm Leaf Mat Weaving for an Artisan Family

1. Period 8 Months
2. An artisan & his wife make 6 sitting Mats of Size 20″ x 20″ per day

I. Non-Recurring		Rs. Ps.
1. Cutting knife	2 Nos.	20-00
2. Sizing Tool	2 Nos.	20-00
3. Alluminium Vessel	1 No.	50-00
4. Stove		50-00
5. G.I. Tray	1 No.	40-00
6. Needle & others		20-00
		200-00

II. Recurring	Rs. Ps.
1. 3840 Palmyra Leaves (16 leaves per day) for 240 days at 10 paise per Leaf	384-00
2. Colour at the rate of 3 paise per mat Total 1,440 Mats	43-00
3. Miscellaneous	25-00
	452-00

III. Working Capital

IV. Recovery

1,440 Mats at Re. 1/- per mat Rs. 1,440/-

ABSTRACT

Receipt		Expenditure	
	Rs. Ps.		Rs. Ps.
By sale of Mats	1,440-00	1. Recurring	452-00
		2. Depreciation on equipment.	45-00
		3. Interest on working capital of Rs. 300/- at 6% for 1 year	18-00
		4. Anticipated income in 8 months	925-00
	1,440-00		1,440-00

Depreciation of Equipments (Non-recurring)

Sr. No.	Particulars	Cost of equipment	Year of service	Depreciation
		Rs. Ps.		Rs. Ps.
1.	Cutting knife	20-00	4	5-00
2.	Sizing tool	20-00	4	5-00
3.	Alluminium Vessel	50-00	5	10-00
4.	Stove	50-00	5	10-00
5.	G.I. Tray	40-00	5	10-00
6.	Needle & others	20-00	4	5-00
				45-00

Finance

1. Capital Expenditure Rs. 200/-
2. Working Capital Rs. 300/-

Scheme for Palmyra Palm Candy Manufacture by a Tapper and his Family

1.	Season	6 months
2.	No. of Palmyra Palms	80
3.	Yield of Neera	120 liters per tree per season

I. Non-Recurring

		Rs. Ps.
1.	Pan set	90-00
2.	Furnace	90-00
3.	Tapping tools	40-00
4.	Work Shed	120-00
5.	Pots 150 Nos. at Rs. 0/40 paise per pot	60-00
6.	Rope of Aerial Rope ways	130-00
7.	Thermometer 1500	50-00
8.	Cans 2 Nos.	200-00
9.	Candy crystalliser at Rs. 50/- per crystallisers 20 nos.	100-00
10.	Tray for drying	80-00
11.	Syringe	70-00
	Total	1,900-00

II. Recurring

		Rs. Ps.
1.	Tree rent for 80 trees at Rs. 5/- per tree per season	400-00
2.	Lime for preservation	30-00
3.	Fuel at 60% for 9,600 liters of Neera	480-00
4.	Superphosphate	100-00
5.	Filter Cloth	30-00
6.	Miscellaneous	50-00
	Total	1,070-00

III. Recovery

1.	Recovery of Neera from 80 trees at 120 litres per tree per season	9,600 litres	
2.	Wastage, sediment etc., at 10% of 9,600 litres	960 litres	
3.	Neera for candy making	8,640 litres	
4.	Candy at 4.5% on 8,640 litres of Neera	396 kgs.	
5.	Cost of 389 kgs. of candy at Rs. 8/- per kg.	Rs.	3,112-00

IV. Working Capital Rs. 500-00

ABSTRACT

Receipt	Rs. Ps.	Expenditure	Rs. Ps.
1. By sale of candy	3,112-00	1. Recurring	1,070
		2. Depreciation value on equipments	468-00
		3. Interest on working capital of Rs. 500/- at 6% per 1 year	30-00
		4. Anticipated income for 6 months	1,541.00
	3,112-00		3,112-00

Sr. No.	Particulars	Cost of equipment	Year of service	Depreciation
		Rs. Ps.		Rs. Ps.
1.	Pan set	90-00	3	30-00
2.	Furnace	90-00	3	30-00
3.	Tapping tools	40-00	3	13-00
4.	Work shed	120-00	3	40-00
5.	Pots	60-00	2	30-00
6.	Ropes	130-00	3	44-00
7.	Themometer	50-00	5	10-00
8.	Cans	200-00	4	50-00
9.	Candy Crystalliser	1,000-00	5	200-00
10.	Trays	50-00	5	10-00
11.	Syringe	70-00	5	14-00
			Total	471-00

Finance

1. Capital Expenditure Rs. 1,900-00
2. Working Capital Rs. 500-00

Grand Total Rs. 2,400-00

(Sd/-)
DIRECTOR (PALM GUR)

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