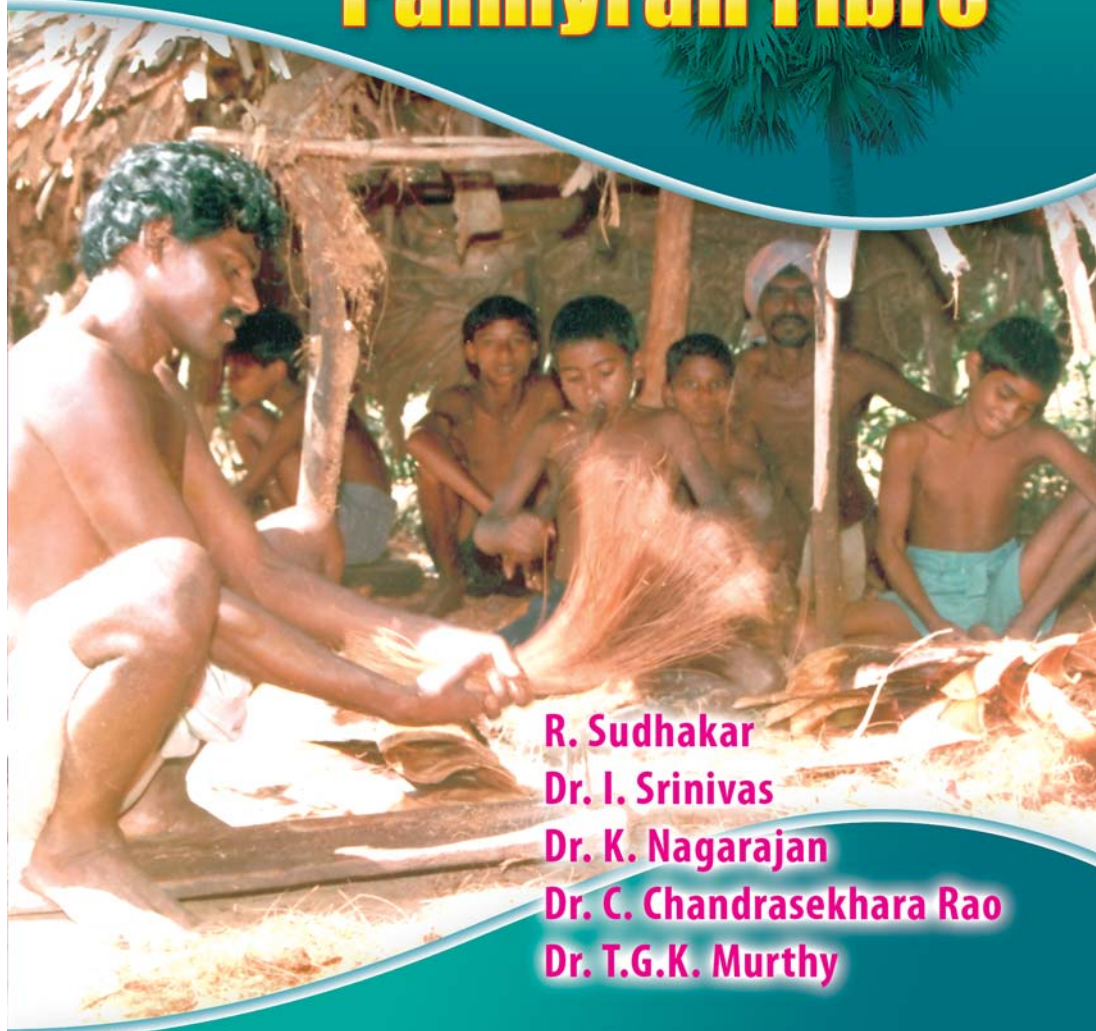


Bulletin - 27

Entrepreneurship in Palmyrah Fibre



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Entrepreneurship in Palmyrah Fibre

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Foreword



Palmyrah tree is considered as a *Kalpavruksha* in the Southern states of India. Manual extraction of fibre from petioles and leaf butts of palmyrah tree is tedious, low productive, involves drudgery and associated with health related problems. The Palmyrah Fibre Separator designed and developed by Krishi Vigyan Kendra of Central Tobacco Research Institute is user-friendly and cost-effective. It increases the fibre production 10 times besides considerably reducing the drudgery and improving the family income in rural and tribal areas. KVK-CTRI obtained patent (227533) for the Palmyrah Fibre Separator machine and bagged the NRDC Republic Day Award - 1998 and the Best Invention Award at All India Industrial Exhibition at Hyderabad in 1999. The KVK-CTRI popularised the Palmyrah Fibre Separator by conducting extensive training programmes and demonstrations. The machine revolutionized the palmyrah fibre industry in rural and tribal areas. I am happy to note that this machine crossed the state borders and is popular in Kerala and Tamil Nadu.

In order to further popularize the machine among the farmers and extension officials, all the relevant information on Palmyrah Fibre Separator machine is presented in the form of a bulletin. This bulletin contains the information on mechanization of palm fibre separation, advantages of palm fibre enterprise and also the training and marketing of the palm fibre.

I am sure the bulletin will be useful for young entrepreneurs and tribal people who would like use palm fibre separation as their livelihood. I compliment the Programme Co-ordinator, Subject Matter Specialists, Ch. Sudhakara Babu, programme assistant and the other staff of KVK for taking keen interest in preparation of this bulletin.

A handwritten signature in green ink, consisting of stylized initials and a long horizontal stroke.

Rajahmundry
28-3-2012

(**T.G.K. Murthy**)
Director, CTRI

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INTRODUCTION

In India, the palmyrah tree (*Borassus flabellifer*) is spread across Tamil Nadu, Andhra Pradesh, Bihar, Orissa and West Bengal states. About 50% of palmyrah trees are concentrated in the Tamil Nadu state where it is known as the 'Tree of the State'. Besides *neera*, the palmyrah yields tender endosperm, fruits, spongy haustorium and apocolon (tuber) which are edible. It also gives fibre, leaves and timber for house construction and domestic purposes. This is the only palm in which all of its parts from crown to root are useful and, thus, considered as the *Kalpavruksha* of rural India.



Extraction of fibre from the petiole and leaf butts is one of the important rural and tribal cottage industries in the coastal districts of Andhra Pradesh, Tamil Nadu and Kerala. Lakhs of families depend on palmyrah fibre extraction for their livelihood



Collection of petioles and leaf butts

security. Initially, the process of fibre separation from palmyrah leaf base was introduced by Britishers to India.

Subsequently, the activity has become the way of life for the rural communities due to socio-economic reasons. About 95% of the palmyrah fibre produced in India is exported to countries like Japan, Thailand, China, Germany, Korea, Indonesia, Hong Kong, Malaysia, Singapore, France, Czech Republic, Holland etc. India earns about ₹ 100 crores annually as foreign exchange through the export of palmyrah fibre. The fibre is extensively used for making high quality brushes, vacuum brushes, road cleaners, acoustic boards and different types of brooms. The fibre is acid resistant and hence preferred for cleaning purposes.

PALMYRAH FIBRE SEPARATION THROUGH MANUAL PROCESS

Traditionally fibre separation is a tedious and cumbersome process. People collect the palmyrah petioles and leaf butts



Manual extraction - beating

during early hours from the fields and later extract the fibre. In the manual extraction process, a scratch is made on the petiole with the help of a fork followed by beating with the help of an iron rod or wooden log, weighing about 1.5 to 2.0 kg.



Manual extraction process - combing

Each petiole requires a minimum of 100 strokes for softening and gives a meagre quantity of 30 g of fibre. The collected petioles and leaf butts are to be softened within 36 hours. The entire family including children and aged people are involved in this process. A family comprising 4 to 5 members can produce a maximum of 5 to 6 kg of fibre per day. Each person softens about 15 fronds in an hour. Then the waste is separated from the fibre after combing the softened frond through a nail mounted wooden plank. After separation fibre is stocked in the shade for one or two days by covering it with waste. Moisture content in the fibre is retained to get the desirable brown colour. Then the fibre dried for two to four days before it is sold. Depending upon the length

of the fibre, moisture content and quality the fibre fetches ₹ 10 to 15 per kg.



Combing and making bundles

After collecting the fibre from the villagers, the middle men clean it by secondary combing and then sun dry them for 2 to 3 days to get desirable dark brown colour and then the fibre bundles



Fibre bundles

weighing around 50 kg are prepared for sale at auction centres. These centres are situated at Kakinada, Eluru, Visakhapatnam in Andhra Pradesh and Tuticorn, Pollachi in Tamil Nadu states. The cost of fully dried fibre ranges from ₹ 1,200 to ₹ 1,400 per 50 kg of bundle whereas the cost of secondary grade fibre having 30 to 35 percent moisture ranges from ₹ 800 to ₹1,000 per 50 kg bundle.

Processing at Exporting Centres

The exporters procure the fibre through the auction centres and again clean the fibre and dry it before grading. Grading is done based on the length of the fibre. Later the fibre is cut into different sizes with the help of cutting machine. After grading, size of the fibre in a bundle ranges from 14" to 22". The graded fibre is made into bundles with the help of baling press and sent to Chennai from where the fibre is exported to different countries.



Processing of fibre bundles for export

Occupational hazards in manual process

Though the fibre provides good income to the middle men and exporters, the rural and tribal poor who are the main pillars of this industry, get only meagre income for their livelihood. Apart from this, the heavy drudgery involved in the manual extraction causes deformation at chest and shoulder level in young people while others may be affected by



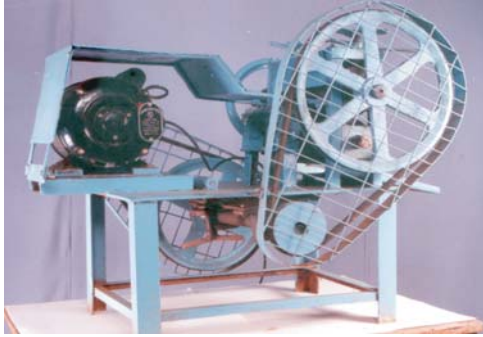
arthritis, respiratory disorders etc. Infact many of these people are advised by the doctors to stop this profession because of heavy drudgery involved. Children education is also neglected by parents involved in this industry to gain more income. Though the entire family works for more than 8 to 10 hrs per day the returns are meagre.

MECHANIZATION OF PALMYRAH FIBRE SEPARATION

Back ground

Krishi Vigyan Kendra of the Central Tobacco Research Institute, Rajahmundry working under the aegis of Indian Council of Agricultural Research, New Delhi has made an in depth survey

of this particular industry in the year 1996 and found the need to mechanize the fibre extraction to reduce the drudgery and to make the profession much more attractive by improving per day income and reducing



health problems. Partial mechanization was initiated in this field for the first time in the history of palmyrah fibre rural cottage industry by the CTRI - KVK in the year 1997.

About the Machine

A machine called PALMYRAH FIBRE SEPARATOR first of its kind was designed and developed by this KVK in the year 1997. The machine is operated by a single phase 1 HP heavy duty electric motor.

Processing Technique

Each frond is passed 3 to 4 times through the rollers in the machine according to its hardness. In this process, the fibre is separated because of compression and shear stress while passing through the rollers. The deformed frond is kept below the ground for retting by covering it with fibre waste so that combing will be very easy and it gives good quality and colour to the fibre. After retting, the fibre is separated from the frond by combing it on a nail mounted wooden plank. About 25 kg of fibre can be produced with the help of this machine within 8 hours by a single person. The motto of partial mechanization at producer level is



that it should not hamper the livelihood of the rural and tribal poor who are depending on this industry for a long time.

Several demonstrations were conducted in rural and tribal areas of East Godavari District of Andhra Pradesh in collaboration with District Rural Development Agency (DRDA), Kakinada, Integrated Tribal Development Agency (ITDA), Rampachodavaram and Kotaramachandrapuram, Shakthi Voluntary Organization, CRESA Voluntary Organization etc. to educate the rural and tribal poor. The ITDA, Rampachodavaram, Forest Range Office, Rampachodavaram and Shakthi Voluntary Organisation supplied the machines to 40 rural and tribal families with 50-75% subsidy. With the palmyrah fibre machine, fibre production per day increased 5 times i.e. 25 kg per day/person



Demonstrations

(8 hours). Accordingly per day income was raised from ₹ 50 to ₹ 250.

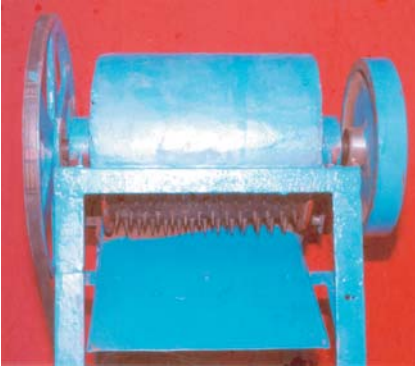
Awards

This machine is technically simple, low cost, maintenance free and safe. This innovative invention bagged the NRDC Republic Day Award in the year 1998, New Delhi under its invention promotion programme for its Novelty and Technical feasibility.

This machine has also bagged the Best invention Award at All India Industrial Exhibition, Hyderabad in the year 1999. Patent was obtained for this machine during 2009 (Patent No. 227533).

Need Based Modification

While conducting the demonstrations, the people expressed need of one more machine for combing the fibre. As per the desire of the people involved in this industry, a combing devise was also integrated by this KVK to make the process more efficient.



Combing machine

NEW PALMYRAH FIBRE SEPARATOR

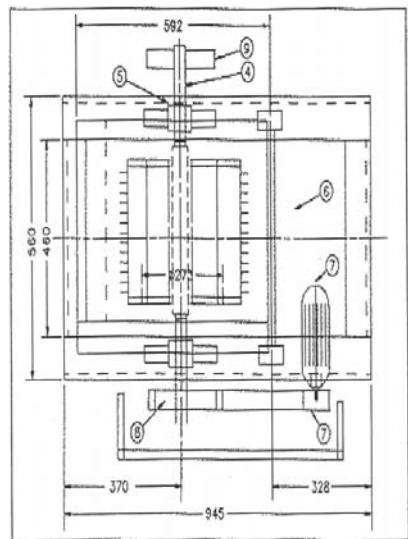
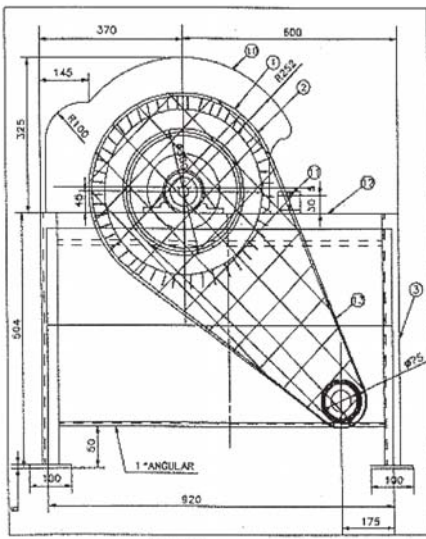
The enthusiasm of the rural and tribal people especially from tribal women towards further mechanization of this process resulted in integration of the extraction and combing methods in one machine. Finally a machine called NEW PALMYRAH FIBRE SEPARATOR was designed and developed in the year 1999.



New palmyrah fibre separator

Description of Palmyrah Fibre Separator Machine

The palmyrah fibre separator machine mainly consists of a hollow drum (1) on which nail mounted wooden strips (2) are embedded all around periphery. The drum is mounted on a rigid frame (3) and rotates on a shaft (4) supported by the ball bearings (5) at each end. The drive from the 1 HP single phase electric motor (6) pulley (7) is transmitted through a V-belt to a pulley (8) which rotates the said drum at 360 rpm. A counter weight (9) is also arranged on the other end of the said drum to balance the vibrating and centrifugal forces. A dome shaped cover (10) is provided on the said drum to prevent the spillage of the fibre waste during the operation and as a safety measure. A guiding rod (11) is also fixed on the adjustable feeding plate (12) which is in turn fixed on the said rigid frame to guide the fronds into the drum chamber. A guard (13) is also provided to cover the driving and driven pulleys as a precautionary measure.



Schematic diagram of the machine

Working process of palmyrah fibre separator

The palmyrah fibre separator machine uses the impact force with the said drum (1) and shear force cum combing action with the nails (2) mounted on it to separate the fibre from the fronds. Initially each frond is held firmly by the operator under the guiding



rod (11) and fed inch by inch into the drum chamber. As the drum rotates in downward direction towards the frond, the nail mounted wooden strips (2) separate the fibre from the frond within short time. The operator should be careful enough to protect his hands during the operation. The feeding plate (12) can be shifted forward to compensate the wear and tear of the nails after sometime. If the nails are totally worn out they can be replaced by the new ones. The drum chamber can be cleaned at the end of the operation by removing the dome cover (10).

Demonstration and Impact of the Machine

The rural and tribal people who are involved in this industry expressed full satisfaction with the performance of this machine. The Project Officer, ITDA, KR Puram of West Godavari district has introduced these machines among the tribal beneficiaries under the IFAD project of ITDA.

Under IFAD project, fifteen machines were supplied to fifteen women groups with 75% subsidy in Rajanagaram, Kadrikagudem, Ravvarigudem, Datlavarigudem, Seethappagudem, Gurrappagudem, Gadidhaboru, Itikalapudi tribal villages of West Godavari district in the year 2000. An impact study conducted during 2000-01 in these villages revealed that



women groups in the tribal areas well received these machines and produced 50 to 60 kg fibre per day sold directly at exporting/auction centres @ ₹20 to ₹23 per kg.

The women groups work 10 to 12 hrs per day and earn a net income of ₹ 500 to ₹ 900 per day. Further the ITDA has provided ₹25,000/- loan to each group towards capital investment.

The machine brought a revolutionary change in the lives of rural and tribal poor who depend on palmyrah fibre for their livelihood. The Indian Council of Agricultural Research (ICAR), New Delhi quoted this machine





as “Women friendly invention”

The forest range office (Vanarakshna Seva Samithi) Addateegala supplied 11 machines in tribal area of East Godavari district

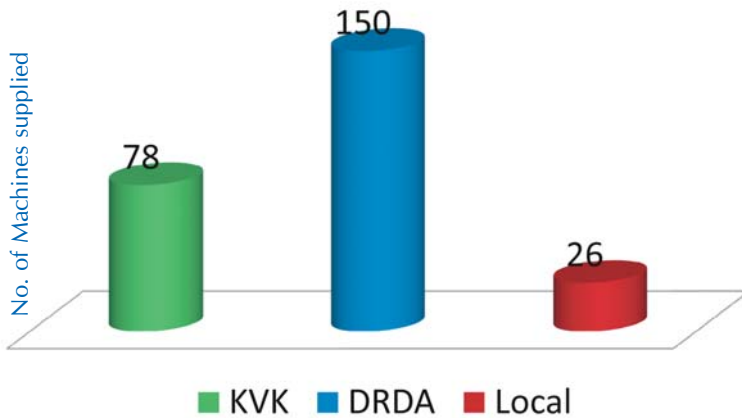
with 75% subsidy to 11 tribal families where the per day income of these families increased from ₹ 50 to ₹ 400. Similarly various voluntary organizations like Shakthi, supplied 14 machines to the tribal people in East and West Godavari districts of Andhra Pradesh. Further, five more machines were also supplied to Palakkad district of Kerala State.

Under Swarna Jayanthi Grama Swarojgar Yojana special project, the District Rural Development Agency (DRDA), Kakinada has fabricated the same and supplied 150 machines to



50 women groups in upland areas of East Godavari districts with 50% subsidy. A collaborative programme between KVK of CTRI and DRDA, East Godavari district, Kakinada was undertaken on “ Impact of Mechanization in the Field of Palmyrah Fibre Rural Cottage Industry in upland areas of East Godavari district”.

Particulars of Machines Supplied



The rural youth at various places were inspired with the performance of the machine and modified this machine by increasing the width of the drum by which the feeding inlet size is doubled so as to facilitate to process two or three fronds at a



Home stead units

time instead of one frond. They incorporated a 2 HP motor in place of 1 HP motor and the drum was mounted on brick walls instead of rigid frame, which reduces the cost of the machine. With the help of this machine they are producing 100 kg of fibre per day by working 2 persons at a time within 8 hours.

Advantages of machine over the manual process

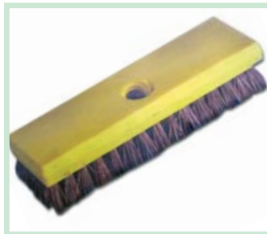
- ❖ Reduces the drudgery by eliminating the beating and combing actions involved in manual process.
- ❖ Increase in fibre production. A family can extract 50-60 kg of fibre/ day as against 5 – 6 kg fibre by manual process. Thus earning a net income of ₹500/ to ₹900/ per day.
- ❖ It is a user-friendly machine and cost-effective.
- ❖ It requires less maintenance cost, safe and easy to operate.
- ❖ Gives superior quality fibre with required strength, length, softness and colour.
- ❖ The waste material resulted during the mechanical separation can be used as an organic manure to agricultural fields.

Comparison between Manual & Mechanical Operations

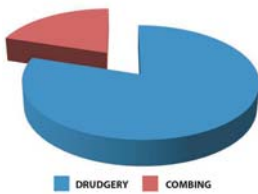
Particulars	Manual	Mechanical	
		Phase-I	Phase-II
No. of persons involved	3 to 5	2	2
Per day production of Fibre	4 to 6 kg	25 kg	60 kg
Per day Income	₹ 60-90	₹ 375	₹ 900
Maintenance cost per day	Nil	₹ 25	₹ 50
Drudgery involved	100%	20 %	Nil

PALMYRAH FIBRE USES

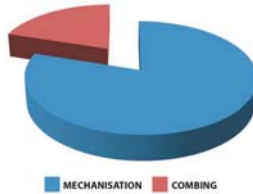
The palmyrah fibre is mainly used for making high quality brushes, vacuum road cleaners, acoustic boards, different types of brooms etc., in foreign countries. Because of acid resistance, palmyrah fibre is a preferred material for industrial equipment cleaning.



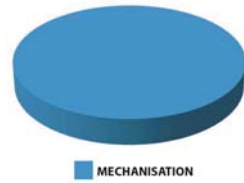
Advantages in Mechanisation



Manual Method



Mechanical Phase-I



Mechanical Phase-II

Horizontal Spread

The new palmyrah fibre separator machines were also supplied to other states like Kerala, Tamil Nadu and West Bengal. A total number of seven machines were supplied to West Bengal Khadi Village Industries Board, Bankura and necessary training programmes were organised in extraction of fibre and making of brushes.



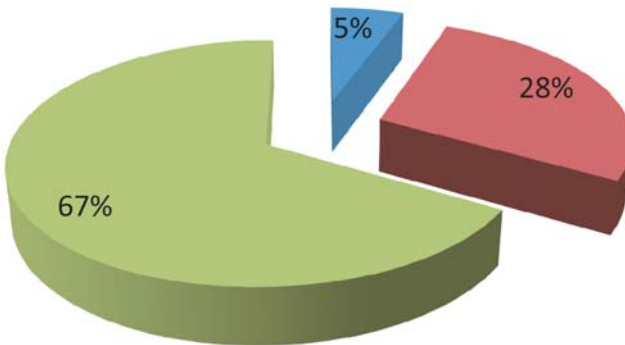
Similarly five machines were supplied to needy people in Tamil Nadu and five more machines were supplied to M/s Shelai and Shelai, Kerala along with a industrial crushing machine specially designed for them. This machine initially crushes the frond and makes the fibre extraction process easier with less wear and tear to the needles in the palm fibre machine.

Summary

Traditional palm fibre separation is very tedious and cumbersome process. The heavy drudgery causes ill affects on health of those involved in this process. The poor villagers who are the main pillars of this industry get a meagre income for their livelihood. In order to reduce the drudgery and to improve per day income and health aspects, mechanization was introduced by this KVK for the first time.

A total of 250 machines were in operation in East and West

Variation in Fibre Production per day of 8 hours shift



■ Traditional ■ Mechanical Phase - I ■ Mechanical Phase - II

Godavari district of Andhra Pradesh. The mechanization resulted in tenfold increase in per day income compared to traditional methods, beside eliminating the drudgery. New Palmyrah Fibre Separator designed and developed by the CTRI-KVK brought a revolutionary change in the lives of rural and tribal people who are depending on palmyrah fibre industry for their livelihood. This technology can be widely spread in the other states of the country where the palmyrah trees are available.

Entrepreneurship in Palmyrah fibre

An entrepreneur is perceived as an individual with characteristics of conceiving, initiating, establishing, running and managing an enterprise. Few major indicators of entrepreneurial behaviour found relevant to palmyrah fibre enterprise are knowledge about palmyrah fibre extraction, ability to coordinate resources and market orientation. Steps in entrepreneurship in palmyrah fibre are:

Extraction of Palmyrah fibre – feasibility analysis

The feasibility analysis for extraction of palmyrah fibre and product making is designed to determine the economic viability of proposed enterprise. Basically, the analysis is aimed to answer three major questions.

1. Factors to be considered to pursue the enterprise.
2. Cost and facilities needed to enter into the enterprise.
3. Expected profits.

However, it is always advisable to consider the parameters like market determination, raw product supply, future input

supply, capital needs and labour needs for making the enterprise viable on sustainable basis.

Advantages of palmyrah fibre extraction as an enterprise

- ❖ **Energy efficient**
- ❖ Simple machine
- ❖ Utilise local resources
- ❖ Produce quality products
- ❖ **Environmental friendly**
- ❖ Able to utilise local farm waste
- ❖ Chemical free
- ❖ Substitute to forest wood
- ❖ **Generates employment**
- ❖ Involves local people after short training
- ❖ Farm level enterprise
- ❖ Long - term sustenance

Training and credit facility

The required knowledge and skills for fibre extraction and market determination are imparted through training programmes organized at CTRI - KVK Kalavacharla, Rajanagaram Mandal, East Godavari District, Andhra Pradesh.

The Khadi Village Industries Commission/Board is encouraging the entrepreneurs to take up palmyrah fibre production industries in the country by providing 35 - 40% subsidy on total cost.

Purchase Points of Palmyrah Fibre

1. Jagannadhapuram, Kakinada, East Godavari District
2. Nallajerla, Dhubacharla, West Godavari District

PROJECT PARTICULARS OF PALMYRAH FIBRE SEPARATOR MACHINE

General Requirements

Raw materials	: Palmyrah fronds
Equipment	: Palmyrah Fibre Separator machine
Work Place	: 10' X10' size room with single phase power supply.
Water facility	: Not required.

UNIT COST

Equipment- One palmyrah Fibre Separator machine	: ₹ 35,000/-
Construction of shed 10' X 10' size	: ₹ 15,000/-
Power supply charges	: ₹ 7,000/-

Working Capital

3000 fronds per day @ 150/-per 1000 fronds for 25 days (150 X 3X 25 = Rs 11,250/-)	: ₹ 11,250/-
	<hr/>
	₹ 68,250/-
	<hr/>

PER DAY PRODUCTION CAPACITY OF UNIT

Per day expenditure

Cost of fronds(3000 nos.)	: ₹ 450/-
Elect..charges / 10 hrs work 10 units @ Rs.3.50/unit	: ₹ 35/-
Machine wear and tear and maintenance	: ₹ 25/-
Wages for engaging one person @ Rs. 90/day	: ₹ 90/-
	<hr/>
Total	: ₹ 600/-
	<hr/>

Per Day production capacity

Fibre quantity produced from 3000 nos. of fronds : 60Kg.

20 gms dry fibre from single frond (20 X 3000)

cost of fibre at auction centers : ₹ 20 - ₹ 25/kg
depending upon length and quality of fibre.

Total gross income per day (60 X 20) : ₹ 1,200/-

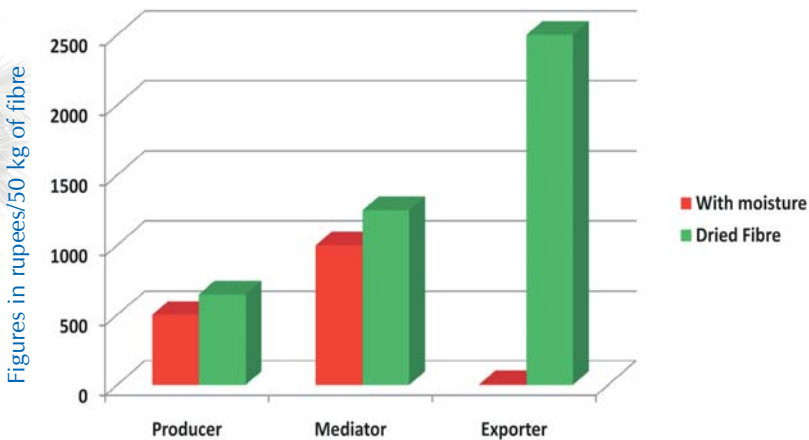
Total net income per day : ₹ 1,200 – 600/-

Net Income

: ₹ 600/-

Rupees six hundred only

Cost of Palm Fibre at various Levels



HORIZONTAL SPREAD

