CHAPTER-1

A STUDY ON PRODUCTION AND MARKETING OF COIR PRODUCTS IN TAMILNADU WITH SPECIAL REFERENCE TO THANJAVUR DISTRICT

1.1 INTRODUCTION

The economic development of any country demands industrialization. Though it has got recognition in our country, it is high time we thought about balanced regional development, an important component of industrialization. Rural development forms a key component in a nation’s progress towards economic freedom and equality. But the migration of rural people to cities and the ineffective utilization of rural resources stand as hurdles to rural development. Hence it is very important to develop and to encourage rural industry by considering its significance on the socio-economic front of the country.

Rural or traditional industry, one of the sub-sectors of small-scale industry, has a direct and important influence on sustainable economic development.1 “Encouraging setting up of rural industries in the small area is an instrument for not merely attaining political freedom, but an instrument for economic freedom and a foundation of a new social order”.2 It is a matter of common knowledge that India is a land of villages and two-thirds of its population live in rural areas. The future of India lies in these teeming rural million. It is only from a progressive, growing and dynamic rural society that India could put herself on the desired developmental path. Rural small-scale industries play an important role under the peculiar Indian conditions. They contribute about half the gross


value of output originating in the manufacturing sector. At present it contributes 40 per cent to exports in the country and provides employment to 13 million.³

The Government of India, in pursuance of its announcement in the Union Budget for 2009-10, came out with a scheme to promote rural industrialisation in the country, called ‘‘SFURTI’’ (SFURTI) with an initial allocation of Rs.115.25 crore.⁴ The scheme’s chief objectives were to make traditional industries more competitive and to strengthen the local governance systems of industry clusters with the active participation of the local stakeholders. The Union Ministry of Agro and Rural Industries implement this scheme. The target sectors and the potential beneficiaries of the scheme include artisans, workers, machinery makers, raw material providers, entrepreneurs, institutional and private business development service providers engaged in traditional industries and working in selected clusters of Khadi, Coir and village industries including leather and pottery.⁵

1.1.2 Coir Industry

Coir Industry has to its credit a tradition and heritage of centuries. It is one of the few rural or traditional industries’ converting the coconut husk, a waste, into wealth. This industry is the largest producer of coir, accounting for more than 80 per cent of the world’s production of coir fibre.⁶ The development of this agro-based industry is the sine qua non for economic prosperity as it has backward and forward linkages. One of the special characteristics of the coir industry is that it provides full time employment to unskilled workers and part time employment opportunities to agricultural labourers. Over six lakh employees, of whom a majority are from rural areas and economically weaker sections of the society. Women constitute nearly 85 per cent of the work force and it

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⁴ The Hindu, dated, Sep 10, 2005, Madurai, Tamil Nadu, p.8.
⁵ Ibid, p.8.
remains as a pet industry for them.\textsuperscript{7} Hence Coir industrialisation is generally considered a vehicle for the generation of productive employment and income for the rural poor.\textsuperscript{8}

It has paramount importance not only in Kerala, the home of coir, but also in the states of Tamil Nadu, Andhra Pradesh, Karnataka, West Bengal, Maharashtra and the union territory of Goa where the industry has spread its wings by utilizing the advantages offered by the coconut industry. As it is growing at a fast pace in all these states, it occupies a premier position in the national industries of India.

Till 1980, the exports from the industry were limited to a few countries, but with the advent of globalization now its horizon has expanded. Initially India’s export trade of coir products mainly consisted of coir and coir matting’s but at present it comprises 14 products namely curled coir, coir fibre, coir rugs, coir rope, coir yarn, coir geo-textiles, coir pith, handloom mats and mattings, powerloom mats and mattings, rubberized coir and tufted mats.\textsuperscript{9} Till to-day, in terms of both quantity and value export, coir and coir products have been continuing to record an upswing. The average annual export earnings of coir was at Rs.8 crores in 1950\textsuperscript{10} but it reached the all time high of Rs.473.40 crores by the end of March, 2005.\textsuperscript{11} The products from the industry are now slowly and steadily capturing the foreign markets too.

Consequent on this, a steady increase in the number of coir units setup in India is witnessed. The number of units which were a thousand in 1950 increased to 6456 in 1995-96 and it further increased to 9597 in 2004-05 and in 2009-2010 it is 13416. The

\textsuperscript{7} Forty Ninth Annual Reports, Coir Board, Kochi, 2003, p.21.
\textsuperscript{9} Fifty First Annual Report of Coir Board, Coir Board, Kochi, 2005, p.31.
estimated annual growth between 2000-01 and 2009-10 worked out to 68.65 per cent. The rapid expansion of coconut cultivation in non-traditional areas further accelerates the growth of this industry in India. The products from the industry that are mainly foreign exchange earners, besides giving large-scale employment, slowly, steadily and successfully are capturing the foreign markets.

1.1.3 Origin of the word “Coir”

The name of coir is said to come from the Malayalam word “Kayar” (from the verb “Kayaru”- meaning “to twist”) through the Portuguese corruption “coire”. But the Malayalam “kayar” does not mean what the word “coir” has now come to denote the word appears in early Arabic writings as “Kaanbar” and “Kanbaar” arising probably from some misreading of the diacritical points (from “Kaiyer”). The first time the word appeared in English language was in that New English Dictionary, as “COIRE” in 1697 and later as “COIR” in 1779. “Kayar” or “kayer” is also the word for “rope” in ancient Tamil or ancient “Adidravidian” language.

Coir is the fibre or thread obtained from the husk of the fruit of the coconut (cocos nucifera). Thus “coir” means “the fibre” obtained from the husk of the fruit of the coconut palm tree. In other words, it is one of the innumerable products of the coconut palm, and is a by-product of the coconut industry.

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1.1.4 The History of Coir

How coir industry evolved and reached great heights is an interesting episode in itself. Coir epitomizes the concept of “wealth from waste”. Coir has been known and is in use in India for more than 1000 years. Coir industry prospers well only in areas where coconut production is abundant because coconut husk is the raw material for the industry. The development of coir industry began taking root in India alongside the coconut groves.¹⁵ So the history of coir industry can be dated back to that of the fruits of the coconut palm. It is rightly remarked that one cannot narrate the story of coir except by starting with the coconut tree—where it really begins.¹⁶

According to early Greek Choronicle, it was Megasthenes, the Ambassador of SeluCes Nicotor, who told the Indian King Chandra Gupta about the coconut palm he found in Ceylon [Sri Lanka] in 300 B.C.¹⁷ The first mentions of the coconut palm are believed to have been generated during the circumnavigation of the globe by Ferdinand Magellan between 1519 and 1522 and by Francis Drake between 1577 and 1580.¹⁸ Martius (1850) claimed that South American as the origin of the coconut. Ceylon, the Philippines and the Caribbean may have been the early stars in the history of the coconut economy but in later years India made its mark. Coconut has a recorded history of 2000 to 3000 years in the coastal areas of Sri Lanka and South India.¹⁹

Arab writers have mentioned Indian coir as early as the eleventh century, stating that coir was used as ships’ cables and fenders.\textsuperscript{20} The remarkable international correspondent Marco Polo’s celebrated travelogue of the twelfth century gives the first and finest description of the various uses of coconut fibre and records how it was made out of the fibre extracted from coconut husk.\textsuperscript{21}

During the thirteenth century there was one reference to the use of coir yarn. It was being used in the rigging of ships and used as auxiliary in the building of ships in the Persian Gulf.\textsuperscript{22}

Coir became known in Europe only by the middle of the sixteenth century when coir fibre and ropes were introduced into Europe through the Arabs and the Portuguese.\textsuperscript{23} England had the first reference to coir industry as early as 140 years ago; three partners of a London founded established the well-known carpet firm for the manufacture of coir into various coir fabrics suitable for floor coverings.\textsuperscript{24} Coir attained commercial importance in England as a result of the great international exhibition held in 1851 in London.\textsuperscript{25} The coir manufacturing industry producing coir mats, matting’s and other floor coverings was started in India on factory basis, over a hundred years ago when the first

\begin{itemize}
\item \textsuperscript{20} I. Lakshiminarayanan, \textit{“Coir – from coconut husk to comedy products”}, Coir Board, Kochi, 2005, p.23.
\item \textsuperscript{23} \textit{“History and Home of Coconut”}, Coconut Bulletin, The Indian Coconut Committee, Cochin, September 1954, p.203.
\item \textsuperscript{24} \texttt{www.coirindia.com}
\item \textsuperscript{25} C. Chandaran, \textit{“The Indian Coir Industry”}, \textit{Agriculture and Industry Survey}, Vol.15, No.2, 2005, p.16.
\end{itemize}
factory was set up in Alleppey in 1859 by Mr. James Darragh, an Ireland born American National.26

1.1.5 Coir - Nature's Wonder Fibre

Nature has provided the coconut with a large outer covering made of fiberous material to absorb shock of the fall and to save the nut from the heat of sunlight. This covering is known as coconut husk. Coir is obtained from the fibrous husk, which lies between the outer coverage of the coconut and the inner shell.27 The nut, which has a thin smooth outer skin, is called the “exocarp”. The space between the nut and the exocarp is filled with a spongy fibrous material called the “mesocarp”. It is this mesocarp part of the coconut husk which is the central importance in the coir industry.28 Coir fibre is 100 per cent natural, biodegradable and environmental friendly. It is tough and durable, versatile and resilient, resistant to flame and fungi. It provides insulation and helps sound modulation.

Coir falls under the category of industrial hard fibres. Sisal, abaca, henequen, hemp and kneaf are other hard fibres competing with coir on its uses. It has been estimated that with about 4 months of immersion in water, coir loses only 35 to 40 per cent of its strength while abaca loses 50 to 54 per cent and sisal even 52 to 59 per cent.29 One important aspect of a cordage fibre is its elongation before break. Coir with about 29 per cent elongation is not approached by any other bast fibre.30 The Chemical composition of coir fibre is also worth mentioning and is presented in Table 1.1.

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26 www.coirindia.org
TABLE 1.1
THE CHEMICAL COMPOSITION OF COIR FIBRE

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Item</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Water Solubles</td>
<td>5.25</td>
</tr>
<tr>
<td>2.</td>
<td>Pectin &amp; Related compounds</td>
<td>3.30</td>
</tr>
<tr>
<td>3.</td>
<td>Hemi-cellulose</td>
<td>0.25</td>
</tr>
<tr>
<td>4.</td>
<td>Lignin</td>
<td>45.84</td>
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<tr>
<td>5.</td>
<td>Cellulose</td>
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</tr>
<tr>
<td>6.</td>
<td>Ash</td>
<td>2.22</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>


1.1.6 Varieties of Coir Fibre

Depending upon the method of extraction coir fibre is of two varieties namely “white fibre” and “brown fibre”.

1.1.6.1 White Fibre

It is obtained by retting the green husks in saline water for 6 to 9 months. This method of extracting white fibre is practised in the coastal line areas of Kerala where natural brackish water facilities are available in the form of lakes and lagoons. As they are comparatively lighter and flexible, they are spun into coir yarn used for producing value-added products like doormats, mattings, carpets, rugs and geo-textiles. This fibre is of superior quality and is unofficially branded as “Golden Fibre”.

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1.1.6.2 Brown Fibre

It is obtained from unretted dry or semi-dry husk. It is the result of a fully machine-aided process. The fibre so extracted after socking the husk barely for five days is called “Brown Fibre”. This fibre is tougher and resilient. It is used for stuffing upholstery, manufacture of curled coir used in rubberized coir industry, needled felt, non-woven geo-textiles and coir ply.

1.1.7 Major Coir Products

The coir yarn, when woven into fabrics, takes various forms, namely mattings, mats, rugs, maurzouks and carpets, according to the types of the material used the pattern of weaving, texture and thickness. These products are used for both decorative and functional purposes. The major coir products are discussed below:

1.1.7.1 Coir Mats

Coir mat is an exemplary comfort material which is most popular and widely used as rod mats, fibre mats, creel mats, loop mats, matting mats, sinnet mats, corridor mats, rope mats, rubber tufted mats and P.V.C. tufted mats.

1.1.7.2 Coir Matting

Coir matting is made on handlooms of sturdy construction and it is primarily used as a floor furnishing material.

1.1.7.3 Coir Rugs

Coir mattings cut to specified length and suitably finished are marketed as “Coir rugs”. Rugs of various sizes with attractive designs are specially produced for overseas markets.
1.1.7.4 Coir mourzouks

These are particularly suitable where heavy and durable floor covering is required and are woven on special cross-weaving looms.

1.1.7.5 Coir carpets

Coir carpets are commonly known as “Alleppey carpets”. These are manufactured by the same techniques as those of mourzouks but for the difference in the thickness and number of the warp strands.

1.1.7.6 Pile carpet

Pile carpet is a novel item, usually manufactured in width up to 72 inches, in different designs and colours.

1.1.7.7 Coir Bhoovastra (Coir Geo Textiles)

Coir Bhoovastra, is a natural coir fibre, holds soil in place and prevents soil erosion. It is a biodegradable and eco-friendly product.

1.1.8 Uses of Coir Fibre and Coir Products

The fibre extracted from the husks of coconuts, coir, has been in use by man from time immemorial. It has been put to a variety of uses integral to daily living: building of houses, boat making, rope making, carpet making and so on. Its diversified new uses will save the tropical forests, increase rural employment opportunities and also promote agriculture.

Another important use of coir fibre is for making rubberised coir which is used in bed mattresses, automobile seats, cushions, carpet underlays, pillows and packing materials. Coir yarn apart from its main use as a semi-finished raw material finds
applications in agricultural operations also. Coir ropes are used for training climbers in traditional agriculture in rural areas, even in small farms in the developed world. There are many other coir products in use in modern agriculture. Coir fibre webs, woven coir mesh mattings, De curled coir fibre mats and woven coir are used in modern soil conservation, landscaping, mulching and other agro-horticultural applications, as a biodegradable material. India exports large quantities of “hop yarn”, a special variety of coir yarn used in the U.K and the U.S as support string for “hop cultivation”.

Even “Coir pith” (coco peat or processed coir pith), a by-product, is a money-spinner if properly used. It is an excellent plant-growing medium and it is exported in brick form and used as a soil conditioner and for plant growing in nurseries and indoor gardens.

“Pith plus” a fungus discovered by the Central Coir Research Institute of the Coir Board, can convert coir pith into an organic manure. The Coir Board has developed a wood substitute named “Coir ply”. The technology has been passed on to private manufactures for commercialisation. This product has wide applications in the packing industry as well. “Coco lawn” is a readymade lawn recently developed at the Central Coir Research Institute. The lawn is hundred per cent natural and can be transported in required measurements as rolls for laying.

Research efforts are on to oxidise lingo-sulphonate and produce “Vanillin”, a flavouring agent used by chefs and confectioners all over the world. The cellulose in coir pith, which remains after the lignin is removed, can be used to make cellulose enzyme in its purest form. This, in turn, is an essential constituent in the production of “glucose-D”.

1.1.9 Production Processes in Coir Industry

The production of process of coir starts from the extraction of coir fibre involving a lengthy process of either retting or unretting of coconut husk. Thus, the process of the extraction of the fibre is done through two methods viz the traditional methods (retting) and the mechanical method (unretting).
The traditional method is generally followed in coastal areas where brackish water facility is available. This method is gradually on the wane as the production of coir fibre and coir products spreads to non-traditional areas. The advent of the mechanical method of extraction reduces the period of retting and speeds up the products of fibre. By using coir fibre, coir yarn, coir products and rubberisation of coir products are affected. The following figure depicts the production process involved in the Coir Industry.

**FIGURE 1**

**Production Process in Coir Industry**

- Collection of Coconut husks
- Retting of husk
- Fibre extraction
- Spinning of coir yarn
  - Manufacturing of Coir Products
  - Rubberisation of Coir Products
    - Dyeing
    - Weaving
      - Leveling of mats and mattings
      - Designing of mats and mattings
1.1.10 Economic Importance of Coir Industry

During the initial period, Coir Industry by and large remained the monopoly of the State of Kerala. From the enactment of the Coir Industry Act in 1953, the control of the Coir Industry has been taken over by the Government of India. The Coir Board turned its attention to other coconut growing states of India also, starting with Tamil Nadu, and later in Karnataka, Andhra Pradesh, Maharashtra, West Bengal and others.

It is common knowledge that rural India is mostly characterized by poverty, unemployment, under-employment, low per capita income, under-utilisation of natural resources, regional imbalances and the like. Encouraging and starting of rural industries like the Coir Industry may hold the key to solving these problems.

The major share of the coir production is contributed by thousands of small entrepreneurs who exploit the untapped rural resources and act as revival agents in villages by generating employment and income in addition to standing as the backbone of the exporters of coir products who earn valuable foreign exchange.

The increased use of coir composites (coir with resin, coir with bamboo) and as alternatives for wood products, plastic moldings and asbestos will encourage the concept of sustainable development. Coir composites in all probability would become the “Sunrise” sector of the Coir Industry.

The domestic market in India has adequate potential for coir and its products. Still it remains unexploited. At present coir is mostly consumed for institutional needs; promoting the manufacture of coir products to turn their attention to tapping the unexploited household sector in the country is the need of the hour.
1.2 IMPORTANCE OF THE STUDY

The agro-based traditional rural industry coir is spreading itself at a fast tempo in the southern parts of the country. Being strongly export-oriented from the very beginning, it has been fetching enormous foreign exchange by offering more than 14 value added products for export. The windfall opportunity offered by the global concern for the environment generated a heat in the industry as its products are totally bio-degradable and eco-friendly. In the changed scenario, any study on this performing sector would be of immense help from a broader perspective.

Analyzing cost and returns, resource-use efficiency, returns to scale and problems relating to production in the industry helps to assess the production efficiency of both the small and the medium size units and thereby indicates efficiency and profitability on their scale of operations. The identification of problems which apply brakes in the production of coir fibre would help the owners to take corrective measures wherever necessary. Specifically, the study would be of much help in convincing the entrepreneurs of the units to move into the second phase of production as all the units of the area still confine themselves to fibre extraction only. It is a future possibility that the entrepreneurs may involve themselves in the manufacture of value-added coir products as they can see the industry as a hub for innovation.

A detailed examination of marketing efficiency undertaken through marketing costs and margins for different channels showed imperfections in the marketing of coir fibre in the study area. The results of the price-spread analysis by disclosing the prevailing ruling price in the terminal market, Alleppey of Kerala, make the owners of the units aware of their share in the industrial users’ price of coir fibre. Further, the analysis on marketing problems and channels highlighted which channels should be chosen for placing and selling coir fibre.
Coir being a highly labour-intensive industry, it is imperative to study the human resource problems encountered by it. The present study, by analyzing the practices, problems and satisfaction level of workers, would help the owners of the units to address the labour issues including working condition so as to make the industry labour-friendly. Therefore, the present study by exposing its potentiality for future growth could be help the industry make an indelible mark in the Thanjavur district in particular and Tamil Nadu in general.

1.3 STATEMENT OF THE PROBLEM

India being a land of villages with more than two-thirds of her population living in rural areas, rural industrialization could play a key role in the country as it produces forward and backward linkages in the rural economy. In this context the Rural Small Scale Enterprises (RSSEs) based on local raw materials, skills and technology have been identified as one of the key sectors in the country. Among the rural small-scale industries, coir industry is the oldest agro-based rural industry, which has got the attention of both the enterprising entrepreneurs and the government alike today.

However, in the present globalised scenario, like any other industry, coir industry is also prone to problems and constrains. Both at the state and at the national levels the problems like inadequate finance to meet the growing cost of production, non-availability of raw material such as coconut husk in the years with scanty rainfalls, obsolete production technology, difficulties in the adoption of modern technology, labour scarcity during the harvesting periods of agricultural crops, absence of an effective marketing system, lack of marketing infrastructure, concentration of markets and demand in select regions, production in only sunny days, irrational selection and mismanagement of human resources in all its functional areas, environmental problems, and unhealthy competition between mechanized units and non-mechanised units and lastly the not-so encouraging government support, apply brakes in the further growth of this sector in the country.
The industry in Thanjavur District, Tamil Nadu, also witnesses the major problems seen at the macro-level but at varying degrees. Despite favourable conditions like abundant supply of husk and labour, nearly 11 units which were started in 1990s became sick and non-operational. It was ascertained from the preliminary study that out of the 82 units which are operating now in the study area, generally complained the lack of financial support from government agencies, change in attitude of workers making the adversely less preferred works still less preferable, absence of ready market nearby and absence of government agencies like the State Co-operative Coir Marketing Federation and the Tamil Nadu State Coir Corporation limited. Moreover it was appalling to note that none of the owners of existing units is prepared to go for the second stage of coir production including the manufacture of value-added products which have a strong export orientation. The enquiries also showed that the owners of the small units were very much reluctant to undertake the expansion programmes for their units.

Even though the industry of the study area is facing hurdles and problems in its functional areas, the presence of some favourable factors points to its future growth potential. It is a fact that while 48 per cent of the available coconut husks is being used at the state level, its utility rate is much less in the study area\(^{31}\) leaving the excess of available raw material, husk unutilised.

In the light of these problems and prospects associated with the industry, it enjoys certain inherent strengths such as low overhead cost, flexibility in production, informality in labour relations, exploitations of local resources and skills, besides a raising demand for coir fibre in the terminal market, Alleppey, Kerala. Therefore, the researcher intended to make a critical appraisal of the industry in terms of its select functional perspectives, so as to bring out the current status and to improve its operational efficiency by offering suggestions based on the study area, Thanjavur district.

1.4 REVIEW OF LITERATURE

The review of literature focuses on the glimpses of earlier studies, which have been done in the area of present study. It explores the avenues for future and present research efforts related to the subject matter. A number of research studies have been carried out on different aspects of the study by researchers, economists, academicians and administrators in India and abroad. It embodies a large number of articles, working papers and research materials covering a wide range of ideas of the study. A free and frank review of the available literature, besides adding distinct vitality to the issues and problems taken for the study, helps to identify the research gaps found in the earlier efforts and thus assures objective linkage to the present study with the past. Therefore, a review of the past studies in the field of Coir Industry was made and presented by the researcher in this section.

K. Bhaskaran Unnithan 1968 in his study “Coir Industry in India With Special Reference to Marketing and Trade” analysed the cost of production of different varieties of coir and coir products in detail. He stated that mechanisation was the key to cost reduction. He also studied in detail the marketing of coir. He stated that marketing of coir could be studied by adopting two approaches namely the institutional approach and the functional approach. He further stated that both approaches could be used simultaneously to understand the problems of the marketing of coir.32

S. Divakaran, T.S. Srinivasan and S.K. Bharat(1969) in their article “Utilisation of Slaughter House as a Retting Agent for Coir” opined that the hike in the price of yarn and other products manufactured was caused by the increased process costs of retting and defibring as they were more conventional. They stated that the cost and price

minimization would alone ensure the revival of the coir industry. The study concluded that cost reduction was possible if the period of retting could be reduced to some extent.\footnote{33}{S. Divakaran, T.S. Srinivasan and S.K. Bharat, “Utilisation of slaughter house as a retting agent for coir”, \textit{Coir Quarterly Journal}, April 1969, pp.29-31.}

The State Bank of India in its study “Financing of Small Scale Industry” observed that entrepreneurs of small units were in too much hurry to buildup fixed assets even at the expense of efficient current operations. This adversely affected the functioning of firms and they failed to maintain the momentum, and as a result the units found it difficult to recover from such a grave situation.\footnote{34}{“Financing of small scale industry”, State Bank of India publication, Bombay, 1975, p.108.}

V.T. Perumal (1988) observed that labour costs work out to 30 to 45 per cent of the total cost in the case of yarn produced under the conventional method. The study stated that labour cost could be kept low if mechanization was introduced in the spinning area. The machine could not only increase the production of coir but also improve the quality of yarn in such a way as to fetch a better price for the producers and higher wages for the workers. He concluded suggesting research aiming at reducing the cost of production and increasing production, productivity, quality of coir and coir products was the need of the hour.\footnote{35}{V.T. Perumal “The Progressive Mechanisation in the Coir Industry”, \textit{Coir News}, October 1988, pp.35-44.}

Y. Gangi Reddy in his article “Growth Performance of Village and Small Industries” analysed the growth performance of the rural industries (khadi and village industry, handloom, sericulture, handicrafts, coir) vis-a-vis small-scale industries during the last few decades in the light of the assistance received from time to time. In his study
four variables—production, capital, employment and export — were considered find out the growth of village and small industries.36

J. Jeya Balaji in his study “An Economic Study of the Coir Industry in Kanyakumari District” pointed out that private efforts played a vital role in the marketing of coir fibre and coir products in the district. He pointed out that limited operations, delay in payments, lack of grading and standardisation and lack of marketing knowledge were some of the problems identified in the internal markets of the district. He concluded that market conditions were weakened by the inaction of government agencies.37

M. Seeni Kamal in his observations on Coir Industry in Thanjavur District, Tamil Nadu” fitted a multiple regression type production function in coir manufacture. The output of coir in rupees was taken as dependent variable. The values of raw material, capital in rupees and labour in rupees have been treated as independent variables. Using the Cobb-Douglas production function, he noticed constant returns to scale prevailed in coir industry.38

D.G. Girdhari in his study “Development of Human Resources in Small Industry” identified that there was considerable diversity amongst small-scale industries in relation to their use of human resource practices. The study showed that 66 per cent of entrepreneurs gave personnel functions the least importance, 28 per cent viewed it as

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worth considerably but 6 per cent of them rejected the idea of looking at personnel matters with scientific outlook.³⁹

B. Vijayachandran Pillai in his study “A study on the role of Government Agencies for the Development of Coir Industry in Kerala” analyzed the marketing costs and price spread for coir and coir products in four marketing channels, and stated that the channel of direct selling was the most profitable while the one through government agencies was the least profitable for coir products.⁴⁰

C.M. Kamaraj in his article “Exportable Coir Products in Tamil Nadu” pointed out that coir pith which was usually dumped on the road side of coir factories, was a mixture of dust, and bits and fibres of lesser strength occupied a lot of space in the vicinity of the coir factories. Being lightweight dust, it is easily blown by wind causing air pollution and even in the case of its burning causing continuous smoke for several days emitting fugitive gases. He finally concluded that unless an appropriate solution was found to control this menace, it would pose serious health problems of space.

Bindu Nair in her article “Women’s Health in a Traditional Sector: A Study of coir yarn spinning industry in Kerala” after undertaking a study with the prime objective of understanding the health effects and working conditions of coir women workers in the unorganized sector of coir industry and the impact on their health and well being of workers, reported that 90 per cent of the workforce form four categories of workers based on four types of activities undertaken in yarn production. The study concluded that women workers face numerous problems as they have no protection from labour laws. She mentioned that they were made to work long hours without any extra pay and most


workers worked standing directly under the blazing sun and the working conditions were unhygienic and oppressive. She found that the health problems common among all of them were chest pain, stomach ache, vomiting, allergic problems and gynecological complaints. Further she concluded that almost all workers suffered either from work related or general health problems associated with working conditions.  

V.R. Mathiazhagan in his study “Economics of Coir Industry in Tamil Nadu used the Cobb-Douglas type production function to express the input-output relationship of per tonne of coir fibre produced to work out the productivity of resources. He considered the production of coir fibre per tonne as a dependent variable. The cost of production per kilogram in rupees, selling price in rupees, cost of living index in numbers and labourers involved in number were considered the independent variables. He further concluded that nearly 87 per cent of coir fibre production was dependent upon the cost of production and the quantum of labour involved.

Vijayachandran Pillai in his article “Government agencies and coir co-operatives in Kerala” compared the performance of coir units in the co-operative sector with their counterparts in the private sector by taking into account the six variables—return on investment, capacity utilization, average annual production, average number of workers employed, average annual man days of employment and average annual sales. He stated that all these six variables were found to be better in the private coir sector.

Manikandan Pillai in his article “Model Coir Village Care for Coir Workers” stated that the model coir village scheme was an innovative and novel concept in the coir


sector focusing on the welfare of coir workers. The scheme laid more emphasis on the
provision of basic services such as sanitation, drinking water and electrification of houses
in the coir villages. He suggested that for improving the efficiency of workers it was
necessary to understand the general health problems and work-related health problems of
the workers. 44

Shinny Philip in her study titled “A study of Manpower Resource Management in
Coir Industry—Kerala, with special reference to Alapuzha District” observed the human
resource management practices and the level of satisfaction of workers in private, the
public and co-operative sectors of coir industry. The study showed that due to lack of
manpower, planners the coir units were unable to utilise human resources effectively.
Further, on the level of job satisfaction of workers, he found that 24.72 per cent of the
workers were fully satisfied were as, 44.20 per cent partially satisfied and the rest
dissatisfied. The study also noticed that the reasons for this dissatisfaction were poor
working conditions, low wages, inadequate amenities, strained relationship with the
manager, and non-participation in management.45

P.T. Joseph in his article “Schemes Implemented by Coir Board with special
reference to public service facilities” stated that the production of coir fibre, coir yarn and
the production of value-added products like door mats and floor coverings were
undertaken on a limited scale.

K.T. Ram Mohan in his study “Technological Change in Kerala Industry: Lessons
from Coir Yarn Spinning” observed that the ongoing technological change in the coir
industry addressed some important issues such as physical conditions of work,

44 Manikandan Pillai, “Model Coir Village Care for Coir Workers”, Coir News, Vol.XXVII, July

45 Shinny Philip, “A Study of Manpower Resource Management in Coir Industry- Kerala with
Special Reference to Alapuzha District”, Unpublished Ph.D Thesis submitted to Gandhigram Rural
Institute Deemed University, Gandhigram, Tamil Nadu, December 1998, p.186.
environmental implications of the production process and possibilities of value-addition. His study showed that new technology resolved these issues with varying degrees of success. He also discussed the positive and negative aspects of the technological change in coir industry. He concluded that the ongoing technological change appeared to have been more successful in improving the physical conditions of work and reducing ecological consequences but less successful in increasing productivity and workers’ income.46

Jurgen Sweegers in his working paper “The coir industry in Kerala (India): Theoretical and Empirical aspects of a Traditional Industry in the Wake of Economic Development” while expressing his view on the modernisation of coir units, contrary to the common belief, opposed it by citing the following four reasons: (i) The modernization process may turn out to be less efficient or as efficient as the labour intensive method, given the local circumstances in India. (ii) The expected reduction in the labour cost may be offset by gaining of importance of factors working against this change like payment of huge wages to people who are about to operate new machines. (iii) The cost of its introduction may also be too high to make the mechanized units a promising alternative, (iv) The process also has an adverse impact on rural employment.47

R. Ramkumar in his article “Costs and Margins in Coconut Marketing: Some Evidences from Kerala” which analysing the three marketing channels, observed that Channel III (Producer–Co-operative Society–Kerala Coconut Marketing Federation–Consumer) was the most efficient and cost-effective compared to costs found in Channels II (Producer–Oil miller–Consumer) and Channel I (Producer Copra Maker–Oil Maker–


Consumer). He concluded that the presence of the intermediaries in the channels led to a low price realization to the producers.  

P. Kumar in his observation on “Coir Industry in India: problems and prospects” has pointed out that the domestic market in India still remains unexploited. He further concluded that the organized selling channels of coir products in the country at present may not sufficient to tap the unexploited house hold sector in India.  

K. Eresi in his article “Personnel Practices in Small-scale Industries of Bangalore City–A Survey” stated that a large majority of the units did not have personnel departments and Human Resource Policies. He suggested that walk-ins may be the sources of recruitment, that too on a temporary basis without any policy on their training and development and he concluded that informality and ad hocism pervaded the units with respect to selection, compensation and promotions.  

M. Soundarapandian and S. Jagadees Pandi in their article “on Prospects and problems of coir Industry”, have mentioned that the introduction of the Minimum Export Price (MEP), may ensure better export realisation for the exporters, but several non-tariff barriers such as allegations of child labour, restrictive banking facilities, import quota restriction and anti-dumping measures were are likely to impede the growth of the export market for coir products. However they concluded that the present liberalization policy of

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he government was certainly a boost and should be continued in the interest of the coir trade.\footnote{M. Soundarapandian and S. Jagadees pandi “Small Scale Industries Prospects and Problems of Coir Industry”, Vol.1, Concept Publishing Company, New Delhi, 2002, pp.95-104.}

K. Thiripurasundari in her article on “Coconut Fibre Units in Tenkasi Taluk – A case study” after surveying 30 fibre units in Tenkasi taluk, pointed out that the major problems faced by the coir fibre units were less amount of subsidy, higher electricity charges and inadequate water supply during summer season. She has also pointed out that the season (January–May) was the best-suited for the coir fibre units. Highlighting that the coir business was a lucrative business in Tenkasi Taluk.\footnote{K. Thiripurasundari, “Coconut Fibre Units in Tenkasi Taluk – A case Study”, Vol.I, (Ed) Soundarapandian, Concept Publishing Company, New Delhi, 2002, pp.105-116.}

Christy Fernandez in his article on “Strategic Alliance for the Development of Coir Industry in the APCC countries has enumerated the eco-friendly applications” mentioned that the stiff competition from synthetic barriers hurdles for the prospective global market. He further concluded stating that an institutionalized mechanism should be set up for bringing the coir producing countries of the world together under an international agreement similar to such arrangements existing for commodities like coffee, rubber, and spices for promotes their export.\footnote{www.coirindia.org/articles/htm.}

M. Murugesan in his study on “A Study on Production and Marketing of Cotton in Virudhunagar District, Tamil Nadu” has stated that the concurrent margin method could be used as a tool to calculate marketing cost and margins. He further suggested that the variations in cost and returns of different intermediaries at different markets could be smoothened by averaging them over the same point of time.\footnote{M. Murugesan, “A Study on Production and Marketing of Cotton in Virudhunagar District, Tamil Nadu”, Unpublished Ph.D Thesis submitted to Bharathiar University, Coimbatore, 2003.}
P.D. Esthappanu in his article “Coir Geo-textiles” states that the total cost of production consists of fixed cost and variable cost. Fixed cost includes depreciation on building and machinery and interest on fixed capital. Variable cost reflects material cost, wages, power, stream and watter.⁵⁵

Chilar Mohamed and Shahul Hameed in their article “Indian Coir Industries Challenges and Future Prospects” have stated that with the advent of synthetic fibres in European countries, Indian exports of coir and coir products have met with a serious setback. They concluded that some form of technological improvement in the coir industry is the need of the hour so as to maintain its position in the world market for its products and sought innovative marketing methods including development of new products which alone could reverse the stagnation in India’s coir exports.⁵⁶

R. Sundaresan in his article on “Globalisation, Technological Change and Traditional Industries: A Study on Coir Yarn Spinning Industry in Kerala” has attempted to compare the traditional and modern technologies in coir industry and evaluated the impact of technological change under the globalised regime. He has mentioned that the modernization of coir industry in the global regime has neither in succeeded bringing more benefits to the workers nor a better prospect to the industry.⁵⁷

An English daily The Hindu stated that the coir fibre manufacturing units in Dindigul district of Tamil Nadu raw materials, power supply and hi-technology. The problem of shortage of raw materials was associated with pest attack and acute drought in

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the region. But the other major problems of production come from erratic power supply causing increased labour cost and slump in productivity.\textsuperscript{58}

Maheswari \textit{et.al.} in their article on “Marketing Strategies for Coconut” stated that the production of coconut was high from March to June but it was low from August to January which ultimately affected not only the coconut industry but also the coir industry. They further stated that the rainfall had the maximum influence on the seasonal variations in the yield not only in the coconut industry but also in the coir industry.\textsuperscript{59}

Sugata Ghose in his article on “Present Status of Coconut Processing Industry in India” observed that the owners of the private coir units were not employing government coir agencies to market their various coconut diversified products and coir and coir products and hence local traders played a vital role in the marketing of coconut processed products.\textsuperscript{60}

Christy Fernandez in his article on “Revitalisation and Cost Management of Small Scale Units through a Consortium approach in the Alleppey Coir Cluster” identified the problems faced by the primary fibre extraction sector—such as high cost of market and. Further he stated that the small producers are at the mercy of middlemen for the supply of raw material and credit as well as for the sale of their products. In this context the author identified the importance and relevance of revitalization and cost management essentials and part of the strategic inputs for revitalizing the small-scale sectors.\textsuperscript{61}

\textsuperscript{58} \textit{The Hindu}, dated, August 18, 2003, Madurai, Tamil Nadu, p.3.


K. Manoharan Nair and R. Ramesh Chandran in their article on “Cluster Approach—A new paradigm for the sustainable development of SSIs in Kerala” suggested that clusters could be successfully developed in different sectors such as rubber, handloom, cashew, ethnic food processing, garments and coir. The cluster approach could bring the entrepreneurs engaged in manufacturing similar products belonging to the same locality together and providing them common facilities, which would remedy the entire problems faced by the existing industries.62

P. Chellar Mohamed in his article on “Sickness in Coir Industries in Tamil Nadu: A scenario” presented an overall picture of the industrial sickness of coir industries in Tamil Nadu. He pointed out that out of the 5209 coir units taken for study, 3756 became sick on account of various reasons such as financial incapacity, lack of demand, revenue realization problem, managerial weakness and mismanagement in financial, technical and operational areas. Further, the author identified the sickness problem-wise and stated that financial problems caused 50 per cent of the sickness in coir units. Production problems caused 29 per cent, marketing problems 15 per cent and pith disposal, lack of Coir Board involvement and miscellaneous problems were responsible for 6 per cent of sickness.63

V. Richard Paul in his study on “A Study on Production and Marketing of Coconut in Theni District” examined the nature of returns to scale and analysed the resource-use efficiency in the production and marketing of coconut with the help of the marginal value product using the Cobb-Douglas production function. He observed that


the sum of the production elasticity for the yield of small, large and overall growers indicated a decreasing return to scale.\textsuperscript{64}

K.R. Gouri Amma in her article on “Modernization of Coir Industry” stated that in the last financial year the industry earned more than Rs.450 crore as foreign exchange and created more employment in the rural areas. The industry had its root in the rural area and since mostly women workers were involved at different stages of production, this industry had an added relevance in the national income. He concluded that coir workers, small and large manufacturers, industrialists and exporters should work together and render their whole hearted support to the government for strengthening the industry.\textsuperscript{65}

S.J. Pandi in his article on “Problems and Challenges of Industrial Co-operatives with special reference to Coir Co-operative Units in Tamil Nadu” pointed out that the causes for losses of the co-operative coir units were the problems of production, labour, marketing, finance and supervision. He identified the high cost of production. AS the main problem of power and fuel supply were the main reason for the high cost of production.\textsuperscript{66}

M. Kumarasamy Pillai in his article “Towards self-reliance in Coir Fibre Production” stated that it might not be possible to utilise the entire coconut husks produced in the country for coir production due to a variety of reasons such as lack of a well-defined mechanism for collection of husks, increased cost of transportation, lack of


awareness among the coconut producers, dealers and domestic households about the economic value of husk.\textsuperscript{67}

C. Chandaran in his article on “The Indian Coir Industry” pointed out that the high labour cost in Kerala forced the manufacturers to take the coconut husk to the neighbouring state for defibring and bring it back as fibre to Kerala which was another reason for the increase in the price of fibre. Further, he observed that when demand had gone up on account of short supply of fibre to the production centers, there had been an unprecedented increase in the price of fibre.\textsuperscript{68}

\textit{The Hindu} The English daily reported that coir pith, once considered a waste product and whose disposal was a problem, today had a booming market in the United States, Europe and Australia. In 2005, coir pith worth Rs.30 crores was exported to these countries, out of which Tamil Nadu’s share was Rs.10 crore.\textsuperscript{69}

The Working Group for the Tenth Plan (2002-2007) on the coir sector framed the following terms and references. (i) Evolving strategies to substantially increase the utilization of coir husk in the country from its existing level of around 30 per cent to 45 per cent. (ii) Turning the attention of the non-traditional states to coir producing, enhancing the post-fibre extraction activities introducing modernization, improving capacity building and infusing the professional outlook in marketing efforts. (iii) Improving the quality of the working conditions as well as generating new jobs in the coir sector. (iv) Identifying the problems relating to technology upgradation, marketing

\begin{flushright}
\textsuperscript{68} C. Chandaran, “The Indian Coir Industry”, \textit{Agriculture and Industry Survey}, Vol.15, No.2, February 2005, pp.16-19. \\
\textsuperscript{69} \textit{The Hindu}, dated January 4, 2006, Thiruvananthapuram, Kerala, p.8.
\end{flushright}
information, innovation and design and suggesting measures to improve the infrastructure facility and extension services.\textsuperscript{70}

M. Srimannarayana after conducting a study in small business units of the Adityapur Industrial Area located at Jamshedpur of Jharkand State in his article titled “Human Resource Management in Small Business” observed that the small units did not have formal Human Resource Management policies in place, but they did have Human Resource Management practices which were characterized by the respect of recruitment and selection, training and performance appraisal, informality and flexibility on finding the constraints and opportunities of small business units.\textsuperscript{71}

R. Bagavathi Muthu in his article on “Performance of Tamil Nadu Manufacturing Sector” recommended that in a manufacturing sector like traditional and rural industry, compound growth rate was more appropriate for analyzing the growth rate over a period of time.\textsuperscript{72}

K.N. Ramanujam and K. Rajesh Kumar in their article titled on “Human Resource Management Practices in Co-operative Organisations” observed a close relationship between the socio-economic factors and employees’ level of


1.5 OBJECTIVES OF THE STUDY

For the critical analysis on the performance of coir industry in Thanjavur district, five performance indicators such as — growth, production cost analysis, returns and resource–use efficiency, marketing and human resource management— are used. The objectives framed for the present study are:

1. To trace the origin, growth and development of coir industry at the national and state levels.

2. To find the profile of the study area, and the organizational and financial set-up of the coir units.

3. To estimate the production cost and returns and to analyse the resource-use efficiency of the units in the production of coir fibre for the small and the medium coir units respectively.

4. To identify the existing marketing channels and to evaluate the marketing cost, marketing margin, price-spread and marketing efficiency of different channels.

5. To study the human resource practices of the industry in the study area and to measure the level of satisfaction of the workers on the prevailing working conditions across their socio-economic factors.

6. To study the major problems in production, marketing and managing human resources of the units in the study area.

7. To offer suggestions for improving the overall performance of coir industry based on the findings of the study.
1.6 METHODOLOGY

Designing a suitable methodology the selection of analytical tools are important for a meaningful analysis of any research problem. In this section, reasons for the choice of the study area, the collection of data, the sampling design and the Tools of analysis are described.

1.6.1 Choice of the Study Area

The study area of the present research work is Thanjavur District, Tamil Nadu. Though it is predominantly an agricultural district, now, it stands at the ninth place in the state in terms of industrial production.

The vast stretches of utilized for coconut cultivation, and the presence of adequate agricultural labourers artisans, the emergence of an ambitious new generation of entrepreneurs and the gradual shift of the people from agriculture to business and industry, have changed the direction and complexion of the district into an industry-friendly region. It is one of the pioneer districts of coir production, experiencing a steady increase in coir units over the years due to ready market for the produced coir fibre in the nearby state of Kerala. It indicates a vast potential for the growth of this industry in the region.

Further, in the district no study or probe has been undertaken so far by any individual researcher or by an institution or a university about coir industry. It sowed the seeds of coir industry in him and finally leads to the selection of this district as the study area for his present topic.
1.6.2 Collection of Data

The researcher has relied both on primary and secondary data for this study. This study is an empirical research based on the survey method. The researcher adopted interview schedules for collecting primary data.

1.6.2.1 Primary Data

The primary data were collected from three sources. The data on coir units, about their organization, investments—sources and pattern, human resource practices, and sales, cost and return on coir fibre manufactured from the owners of the units and for the measurement of satisfaction level of workers, the required data collected from workers. Information relating to price paid and received and a cost incurred in marketing of coir fibre was also collected from market intermediaries. Separate interview schedules were prepared and used to elicit this required data from owners, workers, and market intermediaries. As an initial step, the drafted interview schedules were pre-tested by taking into account 5 owners of coir units, 25 coir workers and 10 intermediaries. Their opinions and suggestions were sought on its construction. In the light of the experience gained in the pre-test, the originally prepared interview schedules were modified and the final draft prepared.

1.6.2.2 Secondary Data

The secondary data relating to coir in respect of its production export, and growth in units and employment for India and Tamil Nadu, and other required information were collected directly from:

i) The Head Office, the Coir Board, Kochi.


iii) The Coir Research Institute, Kalavoor, Alleppey, Kerala.
iv) The Centre for Development of Coir Technology (C–DOT), Trivandrem 
v) The Regional Coir Board, Thanjavur, Tamil Nadu.

The researcher also collected some relevant information from annual reports of the Coir Board, the Coir News Journal, Coir Board magazines, various books written by the Coir Board, Reports published by the State Planning Commission, Thiruvananthapuram, the Centre for Development Studies, Thiruvananthapuram, the Centre for Development Studies, Surat, Gujarat, the Madras Institute of Development Studies, Chennai, and information downloaded from various websites.

1.6.3 Sampling Design

A list of coir units in Thanjavur District was obtained from the District Industries Centre, Thanjavur. It was ascertained that a total of 52 units were functioning as on 31st March 2010 in the study area. These units precisely constituted the population.

These 52 coir units taken for present study were stratified into two groups-namely small and medium size units. The norms prescribed on capital investment by the District Industries Centre (DIC), Thanjavur, have been considered to categorise these units. The units with investment upto Rs.25 lakhs were grouped as small units, and the units with investment between Rs.25 Lakhs to Rs.5 crores as medium units. According to post-stratification, 29 coir units (55.77 per cent) were small size units and the remaining 23 (44.23 per cent) were medium size units. 20 intermediaries, 5 in each category namely native traders, commission agents, market traders and wholesalers, were randomly selected from Thanjavur district.

For the selection of the sample workers, the stratified random sampling technique was adopted. Thanjavur district, the study area, has 8 Taluks namely Kumbakonam, Orathanadu, Papanasam, Pattukkottai, Peravurani, Thanjavur, Thiruvaiyaru, Thiruvídaimarudur. Each taluk in the district is treated as a stratum. Then the total number
of workers for the district was obtained and the taluk-wise distribution of workers was
also obtained from the owners of coir units. The researcher selected 5 per cent of the
workers from each stratum at random to form the sample size which worked out to 300
(Table 1.2). The satisfaction level of the workers was measured across their socio-
economic factors on the working condition prevailing in the units by taking into account
the sample of 300 workers.

TABLE 1.2

SAMPLE FRAMEWORK OF WORKERS IN THE STUDY AREA

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Name of the Taluk</th>
<th>Total Workers</th>
<th>Workers’ Sample Size (at 5 per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Kumbakonam</td>
<td>203</td>
<td>10</td>
</tr>
<tr>
<td>2.</td>
<td>Orathanadu</td>
<td>702</td>
<td>35</td>
</tr>
<tr>
<td>3.</td>
<td>Papanasam,</td>
<td>698</td>
<td>34</td>
</tr>
<tr>
<td>4.</td>
<td>Pattukkottai</td>
<td>1850</td>
<td>94</td>
</tr>
<tr>
<td>5.</td>
<td>Peravurani</td>
<td>1986</td>
<td>98</td>
</tr>
<tr>
<td>6.</td>
<td>Thanjavur</td>
<td>227</td>
<td>12</td>
</tr>
<tr>
<td>7.</td>
<td>Thiruvaiyaru</td>
<td>141</td>
<td>07</td>
</tr>
<tr>
<td>8.</td>
<td>Thiruvidaimarudur</td>
<td>202</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6009</td>
<td>300</td>
</tr>
</tbody>
</table>

Source: Primary data
1.7 PERIOD OF STUDY

The present study covers a period of 10 years starting from 2000-2001 and ending with 2009-2010 for the collection of secondary data. The field survey was carried out from December 2010 to June 2011 to collect primary data. This period December to June is considered the main season for the coir industry of the study area. The reference period for the study is the financial year 2010-2011. Which is considered for the analysis of primary data only. The period taken for the present study is felt sufficient to fulfill the objectives of the study.

1.8 FRAMEWORK OF ANALYSIS

The performance of the coir industry of the study area has been analysed on the basis of secondary and primary data collected. In this study the following tools are used to analyse the data.

Trend analysis

To study the trends in coir production and export of coir a simple regression equation of the following form has been used:

\[ Y = a + bt \]

Where,

\[ Y = \text{Coir Production and export in year } t. \]
\[ a = \text{Constant} \]
\[ b = \text{Regression Co-efficient} \]
\[ t = \text{Time in years} \]
Compound Growth Rate

The compound growth rates with regard to coir production and coir export have been estimated on the basis of the semi-log or exponential function.\(^7\)

\[
\ln Y = a + bt
\]

Where,

\[
Y = \text{Coir Production and Coir exported}
\]

\[
t = \text{Time periods}
\]

‘a’ and ‘b’ are the parameters to be estimated.

The Compound Growth Rate (CGR) = \([(\text{Anti ln (ln b)} – 1) \times 100]\)

Cobb-Douglas

To find out the input variables which influence the gross revenue of coir fibre and thereby resource productivity of coir fibre production at small, medium and pooled category of coir units, a Multiple Log-Linear Regression Model of the Cobb-Douglas type production function of the following form has been used:

\[
\ln Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + U
\]

Where,

\[
\beta_0 = \text{intercept}
\]

\[
y = \text{Estimated gross revenue of coir fibre in rupees}
\]

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\(X_1 = \) human labour in rupees
\(X_2 = \) raw material (Husk) in rupees
\(X_3 = \) unretting in rupees
\(X_4 = \) Power in rupees
\(X_5 = \) Machine running in rupees
\(U = \) Disturbance term
\(\beta_i = \) regression (slope) co-efficients
\(i = 1, 2, \ldots \ldots 5.\)

The return to scale is estimated by the elasticity co-efficients at the production function for the small, medium and pooled category of units.

**Chow’s F-test**

To examine the structural differences between the small and medium size coir units, Chow’s F-test of the following form has been used.

\[
F = \frac{\Sigma e^2 - (\Sigma e_1^2 - \Sigma e_2^2) / K}{(\Sigma e_1^2 - \Sigma e_2^2) / n_1 + n_2 - 2k}
\]

Where,

\(\Sigma e^2 = \) Unexplained or Residual sum of squares of the pooled sample of both small and medium coir units.

\(\Sigma e_1^2 = \) Unexplained or Residual sum of squares of the units corresponding to small size coir units.

\(\Sigma e_2^2 = \) Unexplained or Residual sum of squares of the units corresponding to medium size coir units.
\[ K = \text{The number of parameters included in the regression equation.} \]
\[ n_1 = \text{Number of small size coir units} \]
\[ n_2 = \text{Number of medium size coir units.} \]

**Regression Analysis using Dummy Variable**

In order to find out the structural differences that existed at the slope level and or at the intercept level, a multiple log-linear regression model with slope and intercept dummy variables was used.\(^{74}\) The estimated regression model is given below:

\[
\ln Y = \beta_0 + \beta_d D + \sum_{i=1}^{5} (\beta_i + \Gamma_i D) \ln X_i + U
\]

Where,
\[ \beta_d = \text{Co-efficient of intercept dummy} \]
\[ \Gamma_i = \text{Co-efficient of slope dummy of } i^{th} \text{ input variable.} \]
\[ D = \text{Dummy variable representing 0 and 1 for the small coir units and medium coir units respectively.} \]

**Marginal Value Productivity**

To evaluate the resource-use efficiency in coir fibre production the marginal value product of each of the input variables \((X_1, X_2, \ldots X_5)\) for small and medium size coir units was equated with their acquisition cost by using the following formula:

\[
\text{Marginal Value Product of the } i^{th} \text{ variable} = \beta_i \frac{\bar{Y}}{X_i}
\]

Where,

\( \bar{Y} \) = Geometric mean level of gross revenues of coir fibre

\( \bar{X} \) = Geometric mean level of \( i^{th} \) independent variable

\( \beta_i \) = The regression co-efficient of \( i^{th} \) independent variable

\( i = 1, 2, \ldots, 5 \)

To examine the marketing efficiency of the various marketing channels in the marketing of coir fibre, Shephered’s formula, Acharya and Agarwal’s formula and the composite Index Method have been used.

The Price-spread analysis has been carried out to ascertain the share of different market functionaries in the price of industrial users and would often throw light on the relative efficiencies of the alternative channels of marketing of coir fibre. In the present study, price-spread is measured by using the concurrent margin method where the margin was derived as the difference between the price paid by the industrial users and price received by the manufacturers of coir fibre.

**Multiplicative Model**

Time series analysis has been carried out to study the temporal variations in the prices of coir fibre. In the present study one major market, namely the Alleppey Market, was selected to study the temporal variations in the prices of coir fibre since it is one of the major coir export markets in India and records higher arrivals of coir fibre than any other markets in India.

Thus, in order to study the behaviour of the prices of coir fibre over a period of time, a multiplicative model\(^7\) of the following type has been used:

\[
Y_t = T \times S \times C \times I
\]

---

Where,

\[ Y = \text{Time Series data on prices} \]
\[ T = \text{Trend Components} \]
\[ S = \text{Seasonal Variations} \]
\[ C = \text{Cyclical Variations} \]
\[ I = \text{Irregular Variations} \]

The trend of the time series of prices recorded in the Alleppey Market has been estimated with the linear regression equation for analysing the secular trend behaviour of the prices. Further, to study the variations in trend, cyclical, seasonal and irregular fluctuations, were worked out.

**Chi-Square Test**

The satisfaction level of the workers with prevailing working conditions of the industry has been measured in relation to their select eight socio-economic factors namely age, gender, marital status, educational qualification, community, family size, basic work status and experience. To study the relationship between these independent variables and the level of satisfaction of the workers (dependent variable), hypotheses were framed and tested with the help of the chi-square test.

The formula used for the analysis is

\[
\text{Chi-square Value} = \frac{\sum (O - E)^2}{E}
\]

Where,

\[ O = \text{Observed Value} \]
\[ E = \text{Expected Value} \]

Garrett’s Ranking Technique
Garrett’s Ranking Technique is used to identify and rank the problems in production and marketing of coir fibre, and the factors that influence the owners of the units in selecting a particular market intermediary. Similarly, the same technique is also adopted to identify and rank the problems in managing the human resources of the coir units.

The ranks assigned by the respondents were converted into scores by using Garrett’s Ranking Technique

\[
\text{Per cent Position} = \frac{100(R_{ij} - 0.50)}{N_j}
\]

Where,

\[R_{ij} = \text{Rank given for the } i^{th} \text{ factor by } j^{th} \text{ individual}\]

\[N_j = \text{Number of problems ranked by } j^{th} \text{ individual}\]

The present position of each rank was converted into scores using the table given by Garrett. The scores of various respondents were added and mean values were calculated. The mean values were arranged in the descending order.

1.9 LIMITATIONS OF THE STUDY

The present study has the following limitations:

The study covers only the private coir units located in the study area. They are all engaged in the extraction of fibre only. Since their target of production was the extraction of fibre only. The only coir unit run by a co-operative society in the study area is not considered for the study.

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The primary data relating to workers were collected when they were in the working spot. They generally did not give their opinions categorically on the working conditions prevailing in the units. In such cases, further questions were asked and logical conclusions were drawn based on their replies.

Five performance indicators namely growth, cost, revenue and market margin and human resource management were selected for the present study and the analysis was carried out accordingly. Among the selected indicators, the growth alone was used to study the performance of the industry at the International, National and state levels.

The generalizations derived from the study are based on the socio-economic conditions of the study area, the coir units considered, the size of the sample workers and the availability of the authentic data, and hence the findings of the study may or may not apply to the situations elsewhere. Anyhow utmost care has been exercised by the researcher to reduce the implications of these limitations so as to make the present study more reliable and meaningful.

1.10 Chapter Scheme

The result of the present study, A STUDY ON PRODUCTION AND MARKETING OF COIR PRODUCTS IN TAMILNADU WITH SPECIAL REFERENCE TO THANJAVUR DISTRICT are presented in seven chapters.

The first chapter provides the introduction to the study, the importance of small scale and rural industry in India, and the coir industry and its economic importance and the uses of coir and coir products. This chapter also describes the statement of the problem, the objectives and the importance of the study, the review of previous studies, the methodology, adopted the period of the study and the framework of analysis besides, the limitations of the present study.
The second chapter discusses the origin, growth and development of coir industry during the pre- and post-independence periods, and the role of the Coir Board in India. It also describes world coir production, major coir producing countries, production in India, growth in coir industry and its employment potential, the area, production and productivity of coconut, and export of coir.

The third chapter presents the profile of the study area and the organizational and functional setup of the coir units.

The fourth chapter analyses the cost and returns structure of coir fibre manufacture. The resource-use efficiency of various resource inputs used in coir fibre production and the production problems encountered by the owners of the units are also analyzed.

The fifth chapter analyses the market structure, marketing channels of distribution, marketing cost, marketing margin, price-spread, marketing efficiency of channels and marketing problems faced by the owners of the coir units. It also deals with the temporal variations in prices of coir fibre in the Alleppey market.

The sixth chapter highlights the human resource management practices in the coir industry of the study area. It also analyses the satisfaction level of workers on the working conditions of the coir units across their socio-physiological factors by using the chi-square test.

The last chapter summaries the findings recorded in the preceding chapters and offers suitable suggestions to improve the performance of the coir industry.