

AATMA NIRBHAR BHARAT ABIYAN: SELF RELIANT INDIA



Editors

**Dr. S. Theenathayalan
Dr. V. Sriman Narayanan**

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17	Make in India Versus Make for India Dr. S. Karthikeyan & Dr. M. Satheesh Pandian	106
18	Digital India Innovation in Agricultural Sector Some Reflection Dr. B. Sasikumar	112
19	Effective Utilization of Intellectual Property Potentially Enhances the Role Played by MSMEs S. Seethalakshmi & Dr. K.S. Alakumarimuthu	126
20	Role of Micro, Small and Medium Enterprises in Indian Economy A. Rajeswari & Dr. S. Karthikeyan	124
21	Digital Transaction in India: An Analysis Dr. V. Kannan & Dr. P. Senthilkumar	130
22	A Proactive Support to Empower Entrepreneurs by the Dint of Startup India Scheme Dr. P. Anita	135
23	E-Governance in India - Successes and Challenges: The Way Forward Dr. K.S. Alakumarimuthu & K. Pandi	140
24	Efficiency and Problems Faced by the Micro, Small and Medium Enterprises (MSMEs) in Madurai District R. Dilipan & Dr. S. Theenathayalan	143
25	Role of Micro Small & Medium Enterprises in India Dr. M. Gnanamani	148
26	A Study on Startup and its Impact on MSME in Tamilnadu with Special Reference to Vellore District Dr. S. Jaber Asan	156
27	Digital Payment Ecosystem in India K. Satheeshkumar & Dr. R. Kalirajan	161
28	Impact of Make in India on Indian Economy: Evidences of Secondary Data Dr. A. Kannan & V. Thamaraiselvi	166
29	Micro, Small and Medium Enterprises of India and Economic Growth Dr. M. Manjula	171
30	Self Reliant India with Special Reference to One Nation One Ration Card Dr. G. Angala Eswari	178
31	Role of Ministry of Micro, Small and Medium Enterprises (MSME) of Coir Industry in Pollachi Taluk, Coimbatore District Dr. M. Mehar Banu & Mrs. Divyabharathi R	183
32	A Study on Performances and Prospects of MSME in India Angel D	190
33	Trend Analysis of Revenue Collection from Goods and Service Taxes in India Dr. R. Premalatha	194

ROLE OF MINISTRY OF MICRO, SMALL AND MEDIUM ENTERPRISES (MSME) OF COIR INDUSTRY IN POLLACHI TALUK, COIMBATORE DISTRICT

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Abstract

India is the largest coir producer in the world according for more than 80 percent of the total world production of coir fibre. The sector in India is very diverse and involves Households, Co-operatives, NGO's, Exporters and Manufactures. The coir industry employs more than 7 lakh persons whom a majority is from rural areas belonging weaker sections of the society. Nearly 80 percent of the coir workers in the fibre extraction and spinning sectors are women. The Coir Board is a statutory established under the Coir Industry Act, 1953 for promoting the overall development of coir industry and improvement of the living condition of the workers engaged in this traditional industry. In India coir industry started as small and medium scale industries, MSME plays an important role for the development of coir industry in India and in Kerala. Micro, Small and Medium Enterprises (MSME's) sector contributes significantly to the manufacturing output, employment and export of the country. It estimated that the MSME values account for 45 percent of the manufacturing output and 40 percent of the total exports of the country. The sector is estimated to employ about 395 lakh persons in over 261 lakh enterprises throughout the country. The coir industry in Pollachi has seen 50% decline in domestic supply and a 30% reduction in exports leaving thousands of people jobless. As per data available with various coir manufacturing associations in the district, the number of units has reduced by 40% over the last one year, due to various reasons including a spike in manufacturing costs and the availability of cheaper fibre from Indonesia and Philippines. Pollachi, located 40km from Coimbatore, has 638 coconut trees, cultivated across 30000 acres, which yield 10 million coconuts daily. Each coir manufacturing factory requires about 50000 coconut husks daily. When china entered the market a few years ago, Pollachi saw a boom in the coir industry. In their study area coir industry people minimum number of person only aware of the coir board schemes and beneficiaries, remaining people should not aware of the particular schemes. So in this study mainly focus on an evaluation of coir board schemes in Pollachi region in Coimbatore district.

Keywords: Coir Export, Export Market, Coir Udyami Yojana, Pradhan Mantri Suraksha Bima Yojana

Introduction

In India coir making is largely a dissipated industry with households producing miniscule quantity of products. They had established and appeal of fiber by retting and then beating coconut for the interior husks. In India produced fibers and many as 1402 of the 1831 coir units in yarn hardly bothered about the advantages Kerala where in Alleppey, establishing the of professionally organizing the traditional coastal down as the unchallenged headquarter of coirmaking capabilities. The golden textured Indian coir fibre, which Andhrapradesh, Odisha and Goa produced capture the European and world market. From then on, there was the success of Indian coir's reign and it had no turning back. The big Corporate soon established coir factories in Alleppey, Kollam, Kozhikode, Cochin and other parts of Kerala. Industrial giants including Volkart brothers, William good acre, pierce Leslie and Aspin wall moved into tap the potential offered by the golden fibre, and Alleppey was soon a house hold name all over Europe and India. by 1967 the "golden fiber" had captured the European and the world markets. Today the coir geo-textiles or coir bhoovsastra has shot into the lime light which are mainly due to its eco-friendly characteristics.

MSME play crucial role in providing large employment opportunities at comparatively lower capital cost than large industries but also help in industrialization of rural & backward areas, thereby, reducing regional imbalances, assuring more equitable distributions of national income and wealth. On 9 May 2007, subsequent to an amendment of the Government of India (Allocation of Business) Rules, 1961, the erstwhile Ministry of Small Scale Industries and the Ministry of Agro and Rural Industries were merging in to form the Ministry of Micro, Small and Medium Enterprises (M/o MSME). This Ministry now designs policies and promotes, facilitates programmers, projects and schemes and monitors their implementation with a view to assisting MSMEs and helps them to scale up. MSME sector also promoting growth and development of Khadi, village and coir industries through providing support to existing enterprises and encouraging creation of new enterprises. Coir Industry is an agro based traditional industry, which originated in the state of Kerala and proliferated to the other coconut producing states like Tamil Nadu, Karnataka, Andhra Pradesh, Orissa, West Bengal, Maharashtra, Assam, Tripura, etc. It is an export oriented industry and has greater potential to enhance exports by value addition through technological interventions and diversified products like Coir Geo-textiles etc. The acceptability of Coir products has increased rapidly due to its 'environment friendly' image.

After India's independence, Cottage and Small scale sector was given prime importance in the economic and industrial policies for:

a. Industrial dispersal: There we mention about whether the industries are started in rural areas or in urban areas. Small scale industries are located in urban centres and cottage industries are generally associated with agriculture and provide subsidiary employment in rural areas.

b. Employment creation: given the acute unemployment problem in India, creation of employment opportunities will depend crucially on the development of small-scale and cottage industries. An important constituent of this sector is the manufacturing activity consisting mainly of textile base and agro based products and units producing construction materials.

Review of Literature

Singaravelu, Kavitha has explained that the coconut production and coir industry developed in all other states, Kerala still remains the major producer and exporter of coir and coir products. In an economy like that of Kerala with huge backlog of unemployment, the coir industry is still important. This is because no other industry creates as much employment in the various processes of production with a limited amount of capital investment. The several external interventions including the government-driven ones had marched ahead over the years. Undoubtedly, such initiatives might be instrumental to metamorphosing the traditional industrial sector as a money-spinning sector for its dependent mass.

Since 1945, the Governments [both central and state] have appointed several Committees and Task Forces to study the problems of the industry and they have recommended various measures to solve such problems. But the efforts of the government in solving these problems did not produce the expected results. In the year 1950, the government of Kerala launched a scheme to bring the coir sector under co-operative framework. As a result, a number of coir co-operatives were established in the state. The basic objective of the Scheme was to solve the problems of actual coir workers and small producers engaged in coir industry and to ensure them regular work and a living wage. This was expected to be realized by eliminating the middlemen from the coir sector. The centrally sponsored Co-operativisation Scheme of 1980 gave an impetus to the Co-operativisation Scheme of the state. Under this Scheme, an amount of Rs. 13.91 crores were spent by central government for the development of coir co-operatives in the country for the period from 1982-83 to 1999-2000, of which Kerala's share constitutes 85 per cent.

A Task Force was appointed by the Planning Commission under the chairmanship of M.K.K. Nayar [1973] for evaluating the various types of assistance extended to coir industry and coir co-operatives during the IVth Five Year Plan. Basically the Task Force was intended to suggest suitable measures for coordinating the development programmes for the coir industry and for making a proposal for the Vth Plan. The Committee covered all states producing coir and coir products in India and submitted its report. The report identified the importance of Research and Development, modernization, and mechanization in this sector.

Objectives of the Study

- ↓ To analyse the role of MSME as an Enterpriser of Small and Medium Industries in India.
- ↓ To analyse the role of Coir Board under MSME scheme, as a Credit Institution of Coir Industry in Pollachi Taluk.

Statement of the Problem

The economic viability of the coir cooperative units depends on aspects like full employment for all working members, optimum productivity, adequate turnover and working capital. There are a number of related studies in nearby states which provide valuable information about the working of coir cooperative societies. Vijay a Chandran Pillai (1998)¹³ in Kerala revealed that cooperative coir societies had low capacity utilization in production as compared to the private units. Similarly a study in Andhrapradesh (1995)¹⁴ revealed that the coir cooperative units had lack of infrastructure and low rate of employment. Similar points expressed by Amblikumar (2000)¹⁵ in Kerala explained

that the productivity of labour declined because of the absence of mechanized rates. The Pollachi coir board announced schemes especially for coir manufacturers. But at the same time the scheme only reach up on the minimum numbers and aware. The coir people maximum of HSC education standards, so the scheme how to receive, what are the procedure should not aware of the coir manufacturers.

Methodology

Secondary data used for the study. Secondary data collected from various books published by MSME Departments, Annual Report of MSME, and Annual Report of Coir Board.

Coir Export Schemes in India

- ✦ Coir Vikas Yojana (CVY)
- ✦ Coir Udyami Yojana (CUY)
- ✦ Mahila Coir Yojana (MCY)
- ✦ Pradhan Mantri Suraksha Bima Yojana (PMSBY)
- ✦ Export Market Promotion Schemes (EMPS)

Coir Udyami Yojana

- ✦ This is a credit linked subsidy scheme for setting up of coir units with project cost up to rs.10 lakhs plus one cycle of working capital which shall not exceed 25% of the project cost. Working capital will not be considered for subsidy.
- ✦ The pattern of assistance under the scheme is 40% of the project cost as government of India subsidy, 55% as loan from bank and 5% as beneficiary contribution.
- ✦ Under the cuy scheme, marketing support assistance to the beneficiaries for the following inventions will also be considered.

Mahila Coir Yojana Scheme

The coir industry is a labour intensive and export oriented industry employing more than seven lakh workers predominantly women. The decentralized operations in the coir industry without adequate training of spinners, weavers and artisans engaged in value added product manufacturing have been posing problems particularly for ensuring the desired level of quality in the ultimate products. Inferior quality may ultimately turnout to be detrimental to the concerted efforts towards overall development of the industry and also its survival, particularly it being a traditional product in the present context unprecedented on account of cheap synthetic substitutes, globalization and liberalization.

Pradhan Mantri Suraksha Bima Yojana

- ✦ The coir board coir workers group personal accident scheme has been converged to Pradhan Mantri Suraksha Bima Yojana. The salient features of the schemes are.
- ✦ This is an accidental insurance scheme. The scheme will be a one year cover, renewable from year to year accident insurance scheme offering accidental death and disability on account of an accident.

- All aadhar linked savings bank account holder within the age group of 18-70 are eligible to enroll under the scheme.
- The premium per annum per member is rs.12/-.
- The premium will be deducted from the account holder's savings bank account through 'auto debit' facility in one installment on or before 1st June of each annual coverage period under the scheme.
- The premium amount will be reimbursed by the coir board on receipt of the details from the coir worker after enrolment.

Export Market Promotion Scheme

Market promotion is to expand the share of Indian coir products in global market to access main competitors, product ranges, price, general setting and promotional strategies to motivate distribution channels to promote coir products to assess tariff/ non - tariff barriers on coir visà-vis competing products and pursue possible their elimination/ reduction through bilateral negotiations to engage consultancy services/ professional agents for specific assignments/ projects relating to export promotion seek expert and professional advice on export related matters, foreign trade, etc. and to hold trade talks with decision makers in government/ chambers of commerce & industry, market/ distribution network and vendor development mechanisms.

The major functions of the MSME Organization are: -

1. Advising the Government in policy formulation for the promotion and development of MSME units.
2. Providing techno-economic and managerial consultancy, common facilities and extension services to the MSME Sector;
3. Providing for technology up gradation, modernisation, quality improvement and infrastructure;
4. Developing Human Resources through training and skill up gradation;
5. Providing economic information services;
6. Maintaining a close liaison with the Central Ministries, Planning Commission, State Governments, Financial Institutions and other organisations concerned with development of MSME Sector and
7. Evolving and coordinating Policies and Programmes for development of the MSME as ancillaries to large industries.

Activities of the Coir Board

- Research and Development in Coir Technology
 - Central Coir Research Institute (CCRI), Kala-voor, Alleppey.
 - Central Institute of Coir Technology (CICT), Bangalore.
 - National Research and Development Corporation (NRDC).
1. **Mahila Coir Yojana:** - It is the first women oriented self-employment programme in the coir industry. The scheme envisages that distribution of 4,000 motorised coir yarn spinning rates to women workers who are trained to operate the motorized rate and are able to raise the

beneficiary contribution by means of own resources or loan. The Coir Board will provide one time subsidy of 75 percent of the cost of rate subject to maximum Rs7, 500/-. The remaining 25 percent of the cost has to be raised by the beneficiary through voluntary organization or own source.

2. **Model Coir Village Programme:** - To improve the quality of coir products and provide basic amenities and improved working conditions for coir workers in village which had a predominant coir activity, Coir Board implemented the programme of Model Coir Village. Under this programme, amenities such as houses for SC/ST coir workers, sanitary latrines, smokeless choolas, workshed for rate and rate beating shed, bunding of retting site, community hall, drinking water scheme, rest rooms, godowns electrification of houses, provision of approach roads and construction of foot bridge across the canal to work site etc are provided.
3. **State Development Scheme:-** Government of Kerala formulated a yearly programme known as "Coir Development Scheme", with the objective of modernization of coir industry. Through this scheme it provide assistance to coir co-operatives, formation of coir project investment, investment on Kerala State Coir Corporation & Foam Mattings (India) Ltd, investment in Coir Fed, state share for centre scheme of co-operation, loan for coir development, setting up of raw material banks implementation of ICDP etc.
4. **Raw Material Bank:-** The Raw Material Bank set up by the Coir-Fed in August 2000, were purchased the dyes and chemicals in bulk and these raw materials were supplied to member societies at subsidized rates throughout the years. The service of this bank can also be availed by the entire coir industry. The government of Kerala spent one crore for the Raw Material Bank facilities.
5. **Common Faculty Centre:** - It is being implemented to provide modern facilities for bleaching and dyeing coir fibre and yarn to the small scale units engaged in the manufacture of export quality coir product supply. The scheme provides for grants of one time assistance to among small scale coir manufacturing co-operatives (Alappuzha, Aryard Block, Trivandrum, Cherthala, Ambalapuzhathaluk). Rs.24.98 lakhs have already been spending under this scheme.

Export Market Promotion

The export of coir and coir products from India for the year 2010-2011 reached an all-time high level of 321016.02 tonnes valued at Rs.807.07 crores. This recorded an increase of 9% in quantity and a marginal increase of 0.4% in terms of value over the export achieved during 2009-2010. During 2009-2010, the export of coir and coir products was to the tune of 294508.05 tonnes valued at Rs.804.05 crores. The export during the year under report has surpassed the target set forth at Rs.800 crores fixed by the Ministry of Micro Small & Medium Enterprises, Govt. of India, for coir and coir products for the year 2010-2011. In 2014-15 it was Rs.935.04 crores.

MSME Scheme for Improving the Coir Industry

1. R&D activities of Coir Board under the Central Sector Plan scheme of Science & Technology (S&T) of the Coir Board.
2. Scheme for providing financial assistance to coir units for export under plan (General)
3. Scheme for providing financial assistance to Coir units under REMOT

4. Scheme for providing training to the aspiring coir workers for capacity development and quality improvement under the plan (General)
5. Assistance to coir units for infrastructure development under plan (General)
6. Scheme for providing insurance cover to coir workers under the plan (General)

Suggestions

Evaluation of coir export has the suggestion that, government has to provide various schemes and funds to upcoming coir producers. Thus it will help many exporters to emerge in the market and expand their operation world level. According to the demand manufacture of coir products are produced to give awareness about coir board schemes in rural public. They give awareness through the ways like advertisement, promotion, booklets, etc.

Conclusion

The coir industry in Tamil Nadu has created a major impact on the economy of the state. The use of coir as a renewable resource provides work to the rural poor and important export revenue. Coir, being a natural fiber that is environment friendly in the strictest sense of the term, is now seen as the fiber of the future. The eco-friendly quality of coir will help it to hold its ground even as it battles competition from synthetic fibers. The concentrated efforts of the Coir Board to strengthen the export markets through increased participation in foreign trade fairs, conduct of market study, undertaking generic publicity promotional efforts through various embassies etc., have helped the coir products to expand its global market. A further development of the industry can pave the way for substantial progress in the economic conditions of rural people, which ultimately will lead to their welfare and development. Only 25% of the people know about coir schemes in Pollachi because they do not have any awareness about coir schemes.

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He was also the organizing secretary of 10 National Seminars, 1 National Conference and 3 International Conferences. In addition, he has delivered 80 plus invited lectures at the UGC-HRDC and keynote addresses in Economics in National, International conferences and radio talks. His research contributions are also outstanding. At present, 4 Ph.D. Scholars and one Post-Doctoral fellow are working under him. He is the domain expert and one of the authors of Plus One and Plus Two Economics Text Books of Government of Tamil Nadu.

He has published 40 research papers in national and international journals of repute. His academic contributions involve membership and Chairmanship of Board of Studies of various colleges and universities. He was also a recipient of "Best Teacher Award", "Best NSS Programme Officers Award", "Senior Economists Award", "Eminent Academician Award" and "Distinguished Resource Person Award". Besides, he served as NAAC Coordinator, IQAC Coordinator and Dean of Academics and Research at the College. He was invited to deliver a keynote address in the International Multidisciplinary Conference held at Malaysia.



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Contents

Theme - I

Role of Internet of Things in Primary Sector

Chapter		Page No
1	Iot for Evergreen Revolution in Indian Agriculture <i>Dr. M. Nagesh Kumari</i>	1 - 4
2	Development of Internet of Things (Iot) for Smart Agriculture <i>T. Uma Maheswari & Dr. D .Manimozhi</i>	5 - 16
3	A Study on the Role of Internet of Things (IoT) in promoting Primary Sector <i>A. Rajeswari & Dr. S. Karthikeyan</i>	16 - 29
4	Smart of Internet of Things (Iot) used to the Improvement of High Yielding of Groundnut Production in Namakkal District <i>Dr.K.Saravanan & Mrs.K.V.Jayashree</i>	29 - 37
5	Internet Of Things In Solving Key Challenges In Agriculture <i>Dr. G.Yamuna & Mrs. M.Preethi</i>	38 - 45

Theme - II

Contribution of Internet of Things in Secondary Sector and IPR

6	Impact of Iot in Industries <i>P. Anu Shruthi, Dr. B. Indirapriyadharshini & Dr. R. Ramya</i>	45 - 51
7	Role of Internet of Things (Iot) in Smart Manufacturing <i>R. Divyabharathi & Dr. M. Mehar Banu</i>	52 - 61

2. ROLE OF INTERNET OF THINGS (IOT) IN SMART MANUFACTURING

R. DIVYABHARATHI & DR. M. MEHAR BANU

Abstract

Rapid growth in the manufacturing sector has triggered to explore the potentials of Wireless Sensor Networks (WSN) and Internet of Things (IoT) which paves the way to escalate the efficacy of manufacturing. Industries implemented IoT in various domains starting from purchase of raw materials till customer service and support. IoT is considered as a key technology of the industrial revolution 4.0 and this provides a promising prospect to build influential services and applications for manufacturing. Further, it also provides an interactive relation between smart machines to share the data and information, which is essential for the complex systems to take a decision on the real-time working environment. In this paper, we reviewed the impact of IoT for a sustainable development, especially with regard to the manufacturing dimensions. This will further put forth the current scenario of IoT in manufacturing and this leads the researchers for pioneering their research towards the cyfibre integrated manufacturing.

Keywords; IOT, Smart Machine, Wireless Sensor Network (WSN), Manufacturing

Introduction

During the Industrial Revolution, the manufacturing industry dominated the economics of both nations and businesses. The need for cyber - integrated manufacturing is urgent in this new era of the fourth industrial revolution. IoT-enabled smart manufacturing enables interactive relationships amongst intelligent machines to communicate data and information, which is necessary for complex systems to make decisions regarding the real-time working environment. The primary strategy to achieve sustainability in manufacturing, from a day-to-day perspective, is to increase resource and energy efficiency. As a result of recent technical advancements and intense worldwide competition, business enterprises face numerous difficulties. Innovation in their processes and products is essential to overcoming these problems and achieving sustainable development in the future. IoT is the technology on which companies are concentrating to advance the development of their products and procedures. Although IoT is expanding rapidly across a number of industries, including healthcare, energy conservation, smart retail, agriculture, etc., its adoption in the manufacturing sector is still in its infancy.

Rejeesh et al. (2017) the manufacturing approaches to natural fibre-reinforced composites are leaning toward novel and innovative routes for sustainable production. However, the biocomposite production from natural fibre reinforcement depends on various factors like interfacial fibre to matrix adhesions, length and contents of fibre, treatments of fibres, and the dispersions of polymers into the fibre structure. In this regard, researchers are becoming more interested in biocomposite manufacturing research and so coir fibre-reinforced composites are also getting significant consideration. Different

researchers have reported promising results on developed coir fibre-reinforced biocomposites from different perspectives (thermal, mechanical, morphological, and so on) have suggested that coir fibreboards could function as an alternative flame retardant material to other plywood.

Oliveira et al. (2018) Investigations on short coir fibre-reinforced composites via full factorial design have proposed a design involving short coir fibre reinforced with epoxy thermosets through applying uniaxial pressure, characterized in terms of flexural properties, impact strength, and physical properties. The same study has further claimed that the perceived impact resistance and flexural modulus were satisfactory when 35% fibre volume with 375 g m^{-2} (fibre grammage/density) was used, although they found higher flexural strengths at 300 g m^{-2} .

Ayrilmis et al. (2011) White, Coir fiber reinforced polypropylene composite panel for automotive interior applications, Fibers Polym reported coir fibre reinforcements with polypropylene (PP) in the presence of a coupling agent and found that the increased volume of the fibre loading negatively influenced the internal bonding strength and water resistance of the bio-composites. They also found an optimum fibre loading of coir (60%), up to which the tensile and flexural strengths of the composites increase.

The third industrial revolution, sometimes known as the "digital revolution," which saw the development of electronics like the transistor, microprocessor, telecommunication, and computer, continues to be a key influence on the production process. A coconut tree can produce 50 to 100 coconut fruits per year. The photographs of the coconut palm tree, coconut fruits, coconut husk, and coir fiber

morphology are provided in Fig. 1. The extracted fiber from the husks of the nut-shell is termed coir fiber.

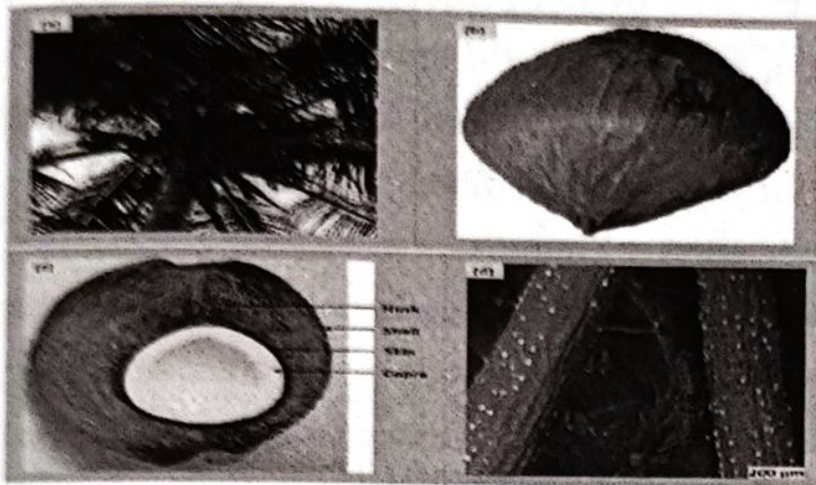
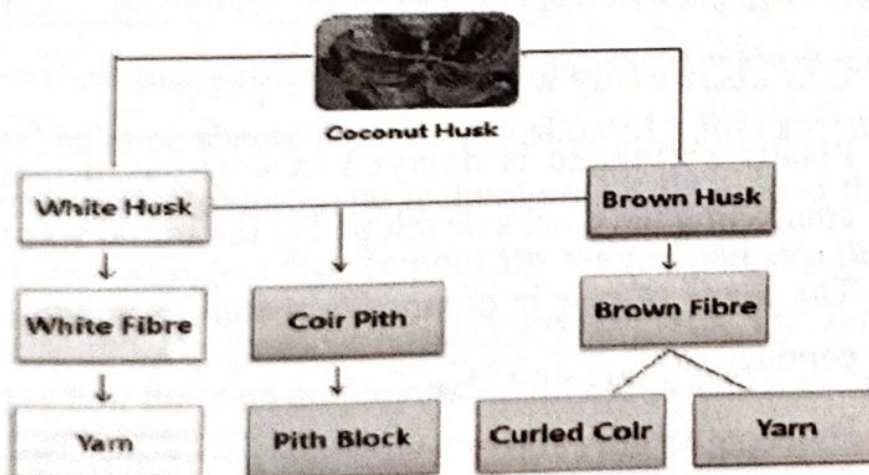


Fig. 1 Photographs showing the physical and morphological structure of coconut plants and coir fiber: (a) coconut plants in Bangladesh (digital photographs taken by Muhammad Abu Taher); (b) coconut fruits (digital photographs taken by Muhammad Abu Taher); (c) cross-section of coconut fruits; (d) SEM image of coir fiber. Adapted with permission from Elsevier (c).43 Copyright, Elsevier 2004 (c).

Production Process

The Product flow from the raw material is depicted in the chart below:



Objectives and Activities

The focus of the project was on coir wet processing technologies, and was directed towards the research and transfer of technologies that would encourage further demand for traditional coir products, for example, coir fibre, yarn and floor coverings (mats, matting and carpets) by improving quality and enhancing appeal. The project required that these technologies should be appropriate and cost effective, and would upgrade the production of coir and yarn manufacture at village level. A strategy was proposed containing five activities for a period of two years to improve drying, dyeing, softening, and bleaching technologies, as well as the printability of coir mats, rugs and carpets. Drying was implemented in Sri Lanka by the Coconut Development Authority (CDA), while the other activities were located in India, and implemented by the Coir Board of India (CBI) with the close involvement of the Central Coir Research Institute (CCRI), Kalavoor.

The properties of mature coir fibers are as follows:

- 100% naturally originated
- Coir fibers are strong and light
- Coir fibers easily withstand saline water
- Coir fibers easily withstand heat exposure
- Plastic shrinkage is delayed in coir-based materials by controlling the cracks developed at the initial stage
- The usage of coir in composite materials enhances thermal conductivity
- Biodegradability and renewability

- . Higher water retention
- . Rot-resistant
- . Moth-resistant
- . Heat insulator
- . Have acoustic properties

Development of Coir Industry

The development of coir industry has all along been in areas where there is a concentration of coconut trees and availability of coconut husk. Historically, the coir industry started and flourished in Kerala which has a long coast line, lakes, lagoons and backwaters providing natural conditions required for retting. However, with the expansion of coconut cultivation, coir industry has picked up in the States of Tamil Nadu, Karnataka, Andhra Pradesh, Orissa, West Bengal, Assam, Tripura, Pondicherry and the Union Territories of Lakshadweep and Andaman & Nicobar Islands through the efforts of Coir Board. The production and processing methods in coir industry still continue to be mainly traditional.

Statement of Problem

Modernization was implemented by the coir units in an effort to increase their profitability. The situation was that the majority of coir plants' balance sheets consistently showed a loss amount. The units started implementing new technology to get around this. The impact of technology advancement on wages and productivity, however, has not yet been thoroughly investigated. The impact of modernizing coir units on employers' ability to generate income and the shift in the number of workdays wasn't even an attempt in any of

the current research works. The impact of a change adopted can only be verified when we can associate the same with the other factors. We can say the modernization is helpful in overcoming the difficulties in production and marketing only and only if it has helped in improving the income and work standards. Hence, this study is having the primary aim of filling this lacuna by establishing links between technological change and variables such as wages, productivity, employment based on various dimensions.

Impact of the Coir Industry

- Reasonable value realization for quality Coir Fibre within the cluster itself
- Multiplied investment, turnover and employment in Coir Spinning activity
- Production of value added competitive products and marketing through strengthened marketing linkages (both domestic and export)
- Increased value addition of Coir Fibre, resulting in enhanced income for Fibre manufacturers by minimum 20%, consequently increased income level to the coir workers in Fibre extraction units by minimum 10%.
- Increase in the overall turnover of the cluster by minimum 10%.
- Additional employment of minimum 300 personnel, due to the establishment of new Coir yarn units under convergence.
- Additional investment to the tune of about 3.50 Crores for the establishment of Coir yarn units by entrepreneurs to meet the yarn requirement of CFC.

- Post interventions, the Cluster's export earnings increase by 15%
- Emergence of specialized support service providers and their active involvement in the development process
- Strong linkages among the Cluster members and actors in all levels of the value chain and an established Collaborative setup in place to undertake development initiatives & address common issues.
- Establishment of new units by converging various schemes of State and Central Governments (such as Coir Udyami Yojana, PMEGP, UYEGP, etc.) resulting in additional investments in Coir sector by the cluster members
- 100% Coverage of cluster artisans under social security schemes
- Improved access to financial capital for cluster members

Conclusion

IoT is widely recognized as a new technology that significantly contributes to the development of the coir production sector. It has the ability to incorporate all manufacturing-related parts, including as sensors, processors, communication tools, and actuation devices. This fully integrated smart cyber-physical system creates new manufacturing market and commercial opportunities and sets the path for a new industrial revolution. The manufacturing industry now has a great chance to improve system performance in distributed and globally-connected contexts. Additionally, IoT adoption in manufacturing is still in its early stages, necessitating a significant

amount of research activity to make the IoT technologies operationally secure and dependable.

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