CHAPTER II
REVIEW OF LITERATURE, PROFILE OF THE STUDY AREA AND THEORETICAL FRAMEWORK

This chapter deals with the detailed review of literature, the profile of the study area and theoretical framework of the study undertaken.

2.1 Review of Literature

An attempt has been made by the researcher to review some relevant studies in the field of small scale, village and cottage industries and coir industry. Such a review would facilitate the researcher to have a comprehensive knowledge of the concepts used in the earlier studies and to adopt, modify and formulate an improved conceptual framework for the use in the present study. For the sake of better presentation, the review of literature has been arranged under the following headings,

1. Studies related to small scale industries.
2. Studies related to coir industry.

2.1.1 Studies Related to Small Scale Industries

Eugene Staley and Richard Morse (1965) have classified the small scale industries into three segments. The first category specializes in the production of traditional commodities with the help of traditional tools. Handicrafts and manufactured traditional and artistic products are good examples of this category. The second category of small scale industries manufacture modern consumer goods through labour intensive methods. The manufacture of
matches, soap, candles and the like could be included in this category. The third category comprises of the modern small units with sophisticated technology. The modern small industry caters to the needs of the emerging modern economy and it is progressive in outlook and adaptable to the changing requirements and uses the results of modern science and inventions in its production process and applies reasonable up-to-date ideas of organization and management.¹

Jeyakodi (1983) made an attempt to analyse the factors which contribute to the growth of the small scale industrial units in Trichirapalli District and to examine the factors which retard the growth of the small scale industrial units there. She had found that the long term liabilities of the sample units, comprised of amounts borrowed by the sample units from the commercial banks, owned capital of the sample units and the funds borrowed from friends and relatives and these amounts had influenced the growth of the small scale units in that district. The non-availability of raw materials, the non-availability of the required skilled labor, financial difficulties, the lack of demand for the products produced, power failure and the frequent repairs of the machines had retarded the growth of the units in the district.²

Natarajan, R. (1983) in his study, “Institutional finance for small scale industries”, observed that all institutions were engaged in promotional finance and fixed capital finance of SSI units but special institutions were not floated to provide the working capital needs. The promotion of SSI units was encouraged by installation of fixed assets only by many financial institutions. Post-promotional financial requirements for meeting the day-to-day business needs were completely ignored by them.\(^3\)

Prabhakara Rao (1990) in his work, on “Problems and Causes of Sickness of Small Scale and Tiny Industries”, had studied about the factors that were responsible for the sickness of the tiny and the small industries. He has found out that among the various factors, the prominent factors were management deficiency, inadequate availability of finance, out-dated technology and the marketing of the products produced.\(^4\)

Bhagwan Prasad (1992) in his study on the organizational structure of the small scale sector had suggested that promotional measures for providing support to the small scale sector had to be looked into. The ownership pattern of the small scale sector had undoubtedly given a disturbing signal. While every other activity was visualized to be proceeding at a higher order, it was a

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pity that, in relative terms, there was a process of “de-scaling” going on in the organizational structure of the small scale industries.\textsuperscript{5}

Lahiry (1997) in his article, on “Rural Industrialization - an Overview”, had pointed out that improvement of the economic conditions of the rural population was closely linked to the growth and development of the rural and small scale industries. Rural industrialization should continue to be a central component of the industrial policy. The khadi and village industries institutions should be strengthened in order to meet the new challenges posed by rapid industrialization and intense competition due to the opening up of the economy. The growth of the small scale sector and its contribution to exports had been quite impressive. However, the sector required further encouragement to be able to grow by it by tapping both the domestic as well as the international markets.\textsuperscript{6}

A study conducted by Mohammed Ibrahim (1998) had revealed that 50 per cent of the 32 sick small scale industrial units were located in the industrial estates of the twin cities of Hubli and Dharwad and the other 50 per cent of the sick units were located in the different parts of the cities. It is worthwhile to note that the sick units in the industrial estate areas where all the facilities were made available accounted for nearly 2.80 per cent of the total number of SSI

units located in the industrial estates. The pre-dominance of sole proprietorship and partnership types of organization would be discouraged and the small industrial units should be encouraged by the Government. The financial institutions to organize the establishments on a joint stock company basis to induct a wider financial base and thereby reduce their dependence on other sources of finance such as the money lenders, friends and relatives and the like. The Government should ensure a reasonable price for the products and services of the small scale industrial units. Thus, the industrial sickness among the small scale industrial units which poses a serious problem to the country should be brought under control as the sector contributes to a great extent in the process of economic development of the country. The Government, the banks and the financial institutions should provide essential support needed by the sick units in order to bring them to the forefront.  

Hina Sidhu (1998) in his study on small scale industries had brought out the relative importance of the SI sector in employment generation over a period of time. The findings of the study were: a decline in employment in the household industries, a decline in the contribution of the large scale sector to employment generation, a substantial contribution by five groups of industries namely, chemicals, non-metallic mineral products, basic metal products and machine tools to employment generation in Gujarat, and inadequate evidence

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on the application of the stylish models in Gujarat as the structural changes in the industrial sector were accompanied by a greater emphasis on the changes in the SSI sector.\textsuperscript{8}

Vikaram Chandha (1999) in his article, on “Financing the Modernization of Small Scale Industries in India: Opportunities and constraints”, had stated that in spite of the phenomenal contribution of the small scale industries to the growth and development of the Indian economy in general, and the industrial sector in particular, the SSIs had remained affiliated with serious techno-economic problems, due to which about 31 per cent (about 2.7 lakhs) of the registered small units in the country had to be either closed down or found to be sick. The problems encountered by the sick SSIs are found to be mainly shortage of credit and finances, under utilization of capacities and lack of competitiveness, along with inadequacy of infrastructural facilities like power and transport. Nevertheless, the most critical constraint in the growth and progress of the SSI sector had been its absolute technological base, which could not utilize its labour and capital potential to optimum levels, resulting in low labour and capital productivities. Due to technological obsolescence, the overall capacity utilization in the SSI sector was found to be merely 48 per cent by the researcher. Further, he had concluded that the era of technological revolution, the opening up of the economy at the global level, the economic

liberalization and the vast entry of the multinational companies into the products, processes and technologies of the SSIs had afforded them the advantages of mass production, superior product quality, and competitive pricing. Hence, the small scale industry which has a predominant place in the Indian industrial scene urgently needs to upgrade its production technologies and methods in order to survive the emerging competitive pressure.\(^9\)

Basavarja (1999) in his study on, “Role of SSI: A study of Karnataka”, had stated that the SSI entrepreneurs should collectively fight for a Swadeshi Movement and try to create public opinion in favour of the indigenously produced goods. In Karnataka, there were about 2,35,000 registered SSI units with a capital investment of about Rs.3000 crores. They manufactured more than 8000 items. The total output was estimated at about Rs.20,000 crores per annum. About 39 per cent of the exports from Karnataka were being made by the SSI units. The SSI sector had received much emphasis in the 1999-2000 budget of the state Government on account of the fact that this sector was recognized as labour intensive and as one which had contributed a lot towards the development of the traditional and non-traditional exports. In the newly emerging business scenario, the government which in former times, used to come to the rescue of SSIs had become helpless to continue and extend such policies in helping the SSIs. By taking into consideration these things, the SSI

sector should seriously consider its basic issues like improvements in quality, the adoption of cost appropriate technologies, and widening its markets for their very survival.\footnote{Basavaraja M.G., (1999), “Role of SSIs: A Study of Karnataka”, Southern Economist, 38, 4, June 5, pp. 4-6.}

Suni George (2000) in his article, on “Small Scale Industries in Economic Liberalization: A Micro view”, had pointed out that small scale industries (SSIs) accounted for 40 per cent of the total industrial production in India and employed 15 million workers. He had stated that SSIs should be a major thrust area in the various industrial policy strategies adopted by the Government. Finally, he had concluded that the policy of protection with a number of privileges for SSI units had induced this sector to remain small and to become more inefficient with poor quality of the products produced. It is not protection but competitive ability, which should be the slogan of the day. Efficient management, strong marketing strategy to cope up with international standards and production of world-class products of top quality alone could infuse a greater degree of competitive skill in the small scale sector.

The Government should provide all the infrastructural facilities at a reasonable cost. In the small scale sector areas where we have a high degree of traditional skills in finishing and the manufacturing, Government should
liberally allow imports of raw materials to attract the foreign investors who could set up a comparatively low cost production base in India.\(^{11}\)

Bala Subrahmanya (2000) in his study, “India’s Small Industry Policy in the 90’s: Waning protectionism”, had attempted to study the redefined Indian small industry policy of the 90’s. He had reviewed the strategy adopted for promoting the development of the small industry and had proposed a few policy measures. He had concluded that the characteristics of the small scale enterprises favourable for the achievement of the desirable socio-economic objectives had led the Indian policy makers to bring the sector into the central focus as a part of the economic development strategy, soon after independence. The subsequent thrust on the institutions for their promotion and the incentives for their protection became comprehensive in terms of institutions, and programmes and the incentives. By the 1980’s the process of their implementation and the projected growth of the small scale enterprises had assumed much significance.\(^{12}\)

Sharma.S.C and Tomar.A.K.S. (2001) in their article entitled, ”Problems of Small Scale Industries in India”, stated that the pattern of the functioning of the District Industries Centre established throughout roof. DIC which they numbered 395 covered 408 districts out of 415 districts in the country.

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reality the DICs were yet to save as a catalyst for the industrial development in the districts where they were opened. There was no co-ordination between them and other agencies. According to them DICs had not produced benefits commensurate with the expenditure involved.\footnote{Sharma,S.C and Tomar,A.K.S. (2001), " Problems of Small Scale Industries in India", Problems of Small Scale Industries in India", Southern Economists, 7, 1. Jan - 22, pp. 20-22.}

Sundar. K.K. Kurral Gandhi and G. Gangatharan (2002) in their article, “The Role of Small Scale Industrial Development Bank of India in Financing SSI units”, attempted to analyse the role of SIDBI in providing financial assistance and observed that SIBBI’s role was commendable both in terms of number of schemes sanctioned and the quantum of loans disbursed over a period of eight years. The bank was mainly financing SSI through refinance and bill financing schemes.\footnote{Sundar. K.K. Kurral Gandhi and G. Gangatharan (2002), “The Role of Small Scale Industrial Development Bank of India in Financing SSI units” Southern Economists, 41, 1 May 8, p. 29.}

Tuteja. S.K, (2002) in his article, “Characteristics and contribution of Small and Medium Scale Enterprises”, stated that, in India many of the small manufacturing enterprises did not access bank finance and only about 16 per cent of total bank credit found its way to the sector. Despite being a priority sector for lending, small manufacturing enterprises got just about eight per cent of their annual turnover as working capital requirements as against normative requisition of 20 per cent.\footnote{Tuteja.S.K, (2002). “Characteristics and contribution of Small and Medium Scale Enterprises”, Laghu Udyog Samachar, XXXI, 6-8, Jan-March, p. 8.}
Namasivayam and Vijayakumar (2004) in their article on, “Globalization and SSI: An Overview”, had discussed the meaning of globalization and the impact of globalization on the SSI units. In their view, globalization provided expanded opportunities to the products of the SSI units in the different parts of the world apart from the domestic and national markets. The process of globalization had exposed the small scale units to rigorous competition from the products of other countries. The authors had provided some statistical data also regarding the SSI. In 1991, there were only 18 lakhs of small scale units, in India and in seven years their number had increased to 31 lakhs. The Tamil Nadu state had accounted for the largest share of employment (20.05 per cent) in the SSI sector and Maharashtra had accounted for the largest share of the fixed investments made in the SSI which had worked out to 33.31 per cent of the total small scale sector investments in the country.

The authors had also discussed the problems faced by the units of SSI like inadequate credit facilities through banks and other financial institutions; lack of infrastructural facilities, lack of experience in managing business foreign trade policy and some procedural problems also. They had also discussed the lack of adequate industrial training centers and the like and also the impact of globalization on the SSI units and their lack of development. They have to explore new markets for their very survival, should encourage products innovation; mergers and combinations, development of ancillary
industries; boost the production of handicrafts and items of toys and promote the rate of employment. They had also suggested that government should provide power supply at concessional rates; provide incentives and subsides; and undertake adequate rural and development activities and encourage the development of SSI and launch a number of time-bound programmes. They had concluded that liberalization and globalization of the country’s economy had brought about in their wake serious challenges for the Indian industry and more particularly for the SSI. They had pointed out that the time had come for the SSI to produce excellent products of good quality and equal to that of foreign goods and at competitive prices and then only the SSI units can survive in the field of the global area.16

Syed Vazith Hussian (2004) in his article, “Performance of Small-Scale Industries in India and the Challenges Ahead”, focused the position and performance of small-scale industries in India in terms of growth of number of units, value of production, number of persons employed and value of export during the last decade. He had also analysed the impact of WTO in the development of SSI sector and offered a few recommendations to the government for the development of SSI sector in India.17


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Mukesh Gulati (2008) observed that though the Small Scale Industry remained high on the policy agenda, it faces several challenges, due to technology, obsolescence, product, quality, information deficiency and inadequate management systems in several substracts of the industry. Most of these enterprises compete only on the basis of low cost of labour and not through improvement on their products, technologies and skills. He suggested that the need to achieve competitiveness at global level has become a matter of primary concern.18

Ponniah.M, (2009) in his study, “Small Scale Industries in Dindigual District”, suggested that government establishes cold storage facilities and processing centres, provide technical know-how for processing, there will be chances for the establishment of more and more small scale industries. Regarding lock units, Lack of support from government authorities and lack of modern methods of production pose a serious threat to their survival. He also suggested that people of this district are generally hard working. Lack of awareness of government incentives and concessions to the industries resulted in the stagnation of industrial growth. If they were properly motivated, guided and trained, this district would have come up as one of the industrially developed districts in Tamil Nadu.19

2.1.2 Studies Related to Coir Industry

Karunakaran (1945) examined the various aspects of the problems of coir industry and in the report stressed the necessity for organizing the coir industry on co-operative basis. The study clarified that for many years in the past attention of the Government was drawn particularly on finding a solution to the disorganized state of affairs that existed in the coir industry of the state in general and the resultant disasters on the labour class in particular. This report laid the foundation for co-operativisation of coir industry in the state.\(^\text{20}\)

Theyyunni Menon (1959) critically evaluated the functioning of various types of coir societies. His report threw light on the various malpractices connected with this sector. He highlighted the fact that co-operative failed to gain any hold on the industry. The causes responsible for this, according to him, were drawback in the accounting system, administrative delays and multiplicity of societies. The Report suggested various measures to attract coir workers into coir co-operative fold, and stressed the necessity for appointing qualified secretaries for coir societies. A change in the audit system prevailing in coir co-operative system was also recommended.\(^\text{21}\)

In an edited book published in the Journal of Industry and Trade, an unidentified writer emphasised the importance of pushing Indian coir goods in


German market to compete with the substitute fibres. The article also highlighted the necessity for launching collective advertising campaign to effect a perceptible change in the attitude of the public. The article recommended new designs and techniques to suit the European market and suggested that such changes can be introduced preferably through collaborations with German manufacturers and importers. It further suggested that production of rubberised coir, particularly in India, must be given priority as the most prospective line of export promotion. The article also suggested that different methods of advertising techniques must be adopted to suit the tasks in different countries.22

Unnithan (1970) examines the various factors related to coir industry in the country. Background of the setting up of coir industry like locational factors, the various processes in the manufacture of coir and coir products, marketing structure and organisation of the industry etc. are covered in his work. It presents an analytical study of the cost of production of different varieties of coir and coir products. According to him coir industry is not an organised industry in the modern sense of the term and functions under the setup of an under-developed country. Coir production is multi-staged and extends from the production of coconuts to the making of coir yarn for the manufacture of the mats. The study is mainly of a general nature and does not

analyse any aspects mentioned above in detail. As a result it does not suggest any policy measures for better prospects.23

Pylee (1975) in his work analysed the various aspects of the coir industry, viz., the structure, export, internal consumption of coir goods, marketing channel, labour force and crisis of the coir industry. The study stressed the necessity for strengthening the base for export production by manufacturing sophisticated coir products through modernisation. The report also stressed the need for making Kerala products cheaper than European coir products and developing a stable domestic market for coir products in India. The Report listed various government orders and notifications related to coir industry in India. The study also emphasised the need for undertaking Research and Development in coir sector.24

Alexander (1977) unveiled the economic and social importance of coir industry in India. According to him no cottage industry in Kerala engages so many people in manufacture and trade as in coir industry. He opined that maintenance of a uniform quality is the most important factor in stabilising and improving exports and the only way to achieve this is evolving suitable quality standards. He stressed the necessity of introducing mechanical spinning and defibering from unretted husk in India. He emphasised the importance of

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diversification and modernisation of coir products and hoped that Coir Development Scheme could ameliorate the conditions of workers in societies and the necessity of expanding domestic market for the development of coir industry. The author also claimed that Indian coir yarn has good reputation in the foreign markets and there is a tendency of preferring natural fibres to artificial fibres. He also accepts the complexity of the problems of coir as it vitally concerns the lives of tens of thousands of people while it is an industry with great potential for export as well as for internal consumption. He concluded the article stating that as long as coconut palms tower high in the coastal belt of Kerala the coir industry can exists in the country.\textsuperscript{25}

Economic Review highlights that as this industry is a highly labour intensive one, any attempt of modernisation will bring labour displacement. What is required is the expansion of external and internal market, which will add a new dimension to the development of coir industry.\textsuperscript{26}

Robin (1984) in his article narrates the historical background of coir industry, features of labour movement in this sector of Kerala state etc. The article throws light on the caste system that prevails in the Kerala society and how it decays the society and the coir workers. The role and influence of ‘moopan’ among coir workers is also touched in the article. He also tries to link


the labour movement (their militancy and stamina) in coir industry with Punnapra - Vayalar Revolt in 1946 in Kerala.  

Thampan (1988) gives a detailed description of different varieties of coir fibre, scientific process of retting (Mechanical and Chemical Methods), process of extraction of fibre (White Fibre and Brown Fibre), use of piths etc. The book generated awareness of the varieties of fibre and grades, chemical composition, methods of spinning coir yarn (through traditional hand spinning and ratt spinning) and their advantages. It also gives an insight into the varied uses of coconut palm to the people.  

Department of Economics and Statistics, conducted a study on production and consumption of coir products in Kerala. The study also examined the potential of coir production in other states in India. Production and consumption, nature of coir, employment in this sector, units engaged in organised and unorganised sector in various activities of coir work etc. were also assessed. The report also analysed distribution of units according to the number of hours worked per day. The study revealed that, the coir industry still continues with unpaid family workers which constituted about 72 per cent of the total workers in the industry and there were considerable underemployment in the industry and the workers were getting only less than 181

days of work in an year. It also revealed that there is considerable under-utilisation of equipment due to lack of raw material at a reasonable price.²⁹

Ajith Kumar (1987) in his work states that coir yarn is the chief item of consumption within the country which is marketed by private traders. According to him domestic market for coir goods has not fully been exploited, particularly for door mats and mattings. Therefore along with the intensification effort for expanding export market for coir goods, efforts should also be made to strengthen the domestic market for withstanding the stress and strain of a fluctuating export market.³⁰

Gobalan Nair (1987) while explaining the relevance of coir industry and Co-operatives in Kerala finds out that the traditional decentralized nature of the coir industry was the major factor that retarded effective quality control. He also has given a brief picture of the technology improvement attempted by the Coir Board and observes that it was essential for reducing human drudgery to a great extent. He identifies that co-operatives are the best agency for effective transformation of results of research to the industry.³¹

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Coir Board (1990) in its survey report provided a detailed account of the coir industry in Andhra Pradesh. Details like coir fibre production, equipments used in coir production, employment, wages paid to coir workers, and the number of coir co-operatives functioning in that state were also provided. The study also highlighted, occupational status, social status, working hours and number of days worked, wages paid, income distribution of coir workers and capital investment in coir industry in the state. The study revealed that 58 percent of the total coir workers were women and children constituted five percent. Even though the survey covered coir co-operatives, it failed to give any detailed information regarding their working.  

Malik (1990) examined the historical background of coir Co-operatives in Kerala. According to him until the starting of coir development scheme during 1950-51, there were no organized attempts made to stabilize and strengthen the industry. The industry was depending on the initiative, enterprise and financial resources of the private industrialists. He found out that the weaknesses of central coir societies [not existing now] were due to the shortage of working capital and concluded with a suggestion that coir Co-operatives should be strengthened in order to protect foreign exchange earning and to prevent the throwing of workers out of employment.  

Suseela (1988) in her seminar presentation, related to the problems and solution of coir industry, mentions that mechanization should be applied in sector where women are not willing to work. In order to reduce the strain of women in running up and down during spinning with conventional ratt, treadle ratt can be implemented. Similarly husk beating machines shall be erected where there is shortage of labour for hand beating of husk and stressed the need for developing domestic market for coir goods. She also adds that in the marketing side a wide net work should be developed in order to market the products of coir primaries. The paper concludes with the forwarding of several recommendations for developing the coir societies.\(^{34}\)

Thomas Issac (1988) in his paper presentation in a seminar, categorically states that mechanization in coir industry is not the sole way for increasing export. On the other hand coir products produced from traditional methods will be more in demand if they are popularized. At the same time a blind opposition against mechanization of any type in the sector is also not an appreciable stand. He states that only one third of the husk potential is used in coir industry and there should be a husk collection machinery to collect the husk to make it available for the coir industry. He also mentions that workers in

coir industry are over crowded and productivity of coir Co-operatives is lower than that of private sector.\textsuperscript{35}

Sudhakumari (1989) in her article on women workers in unorganized sector in India stated the following. The unorganised sector provides employment to a very high proportion of working women in India. Women workers are not only concentrated in low paying jobs but their pay is also lower than that of men workers in equal capacity. Her study is based on the secondary data for the period 1971-81. Unemployment, wage and occupational discrimination are the main problems of the women workers in the unorganised sector corrective measures like poverty eradicating programme, Magalia Mandal scheme and land distribution can improve the lot of women in this sector.\textsuperscript{36}

Thomas Issac (1992) in his book “Modernisation and Employment” explains the crisis in Kerala’s coir industry. This book draws the features of the industry during the fifties, traditional process of coir production, the relevance of coir industry in the economy of Kerala, the pitiable conditions of coir workers and improvement in the conditions of the workers through the leadership of militant trade unionism. It reviews the socio - political, economic

and technological factors that affect trends in the coir industry in Kerala. The
important relevance of the industry it cites the value of shipments of coir from
Malabar Coast from 1889 - 1950. It mentions the untapped husk potential in
Kerala and suggests that through appropriate measures, the industrial utilization
of husk can be increased. This book expresses the view that the policy of
unfettered mechanization is not socially acceptable since coir production is the
major source of employment after agriculture in the coastal tracts. However, at
the same time it suggests technology choice for reducing the period of retting,
mechansization of fibre extraction and spinning process.37

Gurshoran Varandauni (1994) pointed out that the number of women
workers in the organised sector is comparatively insignificant as a large
number of them are engaged either in informal sector of employment or in self-
employment. It is a well known fact that due to inadequacy of labour
legislation and in effective implementation of existing legislation. In
unorganised sector of employment, the exploitation of women workers is
excessive and sometimes it becomes unbearable for them particularly in
occupations like construction work, mat making, ready made garments, saree
and embroidery work, basket-making, cottage and handicraft industries, hand
loom power loom and khadi Industries.... etc.38

37 Thomas Issac, T.M, (1992), Modernisation and Employment: The Coir Industry in Kerala Indo –
Dutch Studies on Development Alternatives, New Delhi, Sage Publications.
Delhi, p. 150.
Ajith Kumar (1995) examines the marketing possibilities of coir and coir products in various countries. European Union accounts on an average more than 65 percent of India’s annual export of coir. In Western countries the demand for eco-friendly products are growing. In U.S.A., Sweden and Korea there exists vast potential for using coir as geo-textiles. Ajith Kumar also complains that creative efforts have not been made for convincing the global market about the unique properties of coir, like high resistance to rotting, ability to withstand high velocity waterflow etc. He suggests that specific promotional efforts need to be taken to popularise Indian coir products in International market.³⁹

Sasi (1996) reveals that the number of coir workers in coir industry has been reduced to 50% with the passing of 50 years. According to him this is due to the increased exploitation of labourers and lack of proper attention by authorities in the coir sector. He adds that the majority of coir Co-operatives are not functioning and the functioning ones are unable to pay Minimum wages to the workers. He stresses the need for ensuring Co-operation between the private sector and Co-operative sector for the healthy growth of the coir sector. The article demands extension of Government assistance to private coir sector too.⁴⁰

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Balachandran (1997) narrates the different types of welfare measures adopted by the government for coir workers in Kerala and the fund distribution to coir workers. It states that the distributed fund so far was above Rs.3 crores to coir workers on several accounts. It also reveals that only 70,000 workers took membership in the Kshemanidhi, which means that Three lakhs workers are yet to become members of this Skhemanidhi. 41

Ananthalavattom Anandan (1998) in his article relating to the renovation of coir yarn sector portrayed the pitiable condition prevailing in the area of wages, working conditions etc. of coir workers. He categorically states that the prevailing production system should be changed so as to suit the domestic and foreign market even though there is some displacement of labourers, and urged that some steps need to be taken to remove the doubts and anxiety existing in the minds of coir workers at the time of modernisation. He also advocated for motorised ratt as the need of the day. 42

Kumaraswami (1998) giving a short account of the rate of production of various coir products and utilisation of fibre potential in India, stresses the need for diversification of coir products manufacture from traditional lines. He also

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highlights the importance and superiority of Polycoir as a substitute to wood products.\footnote{Kumaraswami Pillai, M, (1998), “Coir Vyavasayathile Ulppanna Vyvidhyavalkaranam”, \textit{Souvenir}, Department of Coir Development Thiruvanthapuram, p. 95-99.} 

Dhanya (1999) in her report on the problems of women workers in coir industry, focuses on the life style and social conditions of women workers in coir industry. She analyses the socio-economic profile, health problems, and the nature and status of women coir workers. The study reveals the demographic picture of the workers. They were illiterate in most cases. Moreover hard and irregular employment are common features of coir industry. The study comes to a conclusion that the improvement of the conditions of coir workers should be the main consideration in thinking about improvement in coir sector and also adds that Co-operative sector in coir industry should be revitalized with sufficient funds so as to benefit coir workers too. \footnote{Dhanya, G, (1999), “Problems of women workers in coir Industry,” Project Report, School of Gandhian Though and Development Studies, M.G. University, Kottayam.} 

Kutty (1999) in his article, stresses the vital importance of improving the marketing of coir and coir products in India and elsewhere for survival and growth of coir industry. He warns that severe competition facing from synthetic coir products and natural substitute, Machine spun coir yarn and mats from Sri Lanka, and European Countries may create problems to the industry. Therefore
publicity about the unsurpassable quality of Indian coir products is to be accelerated.\textsuperscript{45}

NCAER (1999) study focused on the impact of MEP and purchase price (Enforcement) scheme on export, employment and protection of wages. The study analysed the perceptions of the workers in the coir industry on various issues affecting the growth of export of coir products, employment and protection of wages. The survey result of the study revealed that MEP and PPES have a positive impact on the protection of their minimum wages and 100 per cent of them said that it was not logical to abolish MEP and PPES. Ten per cent of them opined that this system was helpful to ensure the quality of export products. The feedback from exporters revealed that MEP should continue indefinitely.\textsuperscript{46}

Neena (1999) in her dissertation examines the working conditions of women workers in the unorganised sector. She, along with portraying the geographical peculiarity of coir industrial area, types of coir yarn, and the hazardous nature of coir work, also examines the social problems connected with coir work and the suffering of women coir workers in the state. The study found out that, coir workers enjoy very low status in the society and the majority of them belong to a particular community and the economic necessity


compelled young women coir spinners to engage in the work and work for 8 - 10 hours per day. It also adds that in the unorganised sector women workers are preyed upon by contractors and middlemen who exploit their ignorance.\textsuperscript{47}

Prabhu (2000) in his articles explains the reasons for decreased demand of coir yarn in U.S.A., which was the major market for coir yarn in the globe. The reduction in the area under Hop cultivation, as a consequence of the use of high yielding hybrid varieties is one of the reasons for the reduced on take of coir yarn. Another reason is lack of competition in Indian coir industry, and its continued use of the traditional method of production which could not withstand the competition form Sri Lanka in the U.S.A. market and he broke the Indian monopoly in the matter of supply of coir yarn for Hop cultivation. The reasons for this situation were the emotional policies against modernisation and mechanisation of coir industry in India. For retaining the interest of consumers in coir products it is essential to ensure that items of specified standards of quality are produced and marketed. The articles conclude with the hope that, the lost market can be regained with the adoption of modernisation in all sections of the industry in the changed scenario when good quality yarn is available for export.\textsuperscript{48}


Chandrasenan (2001) in an article requested the Central Government to retain Floor Price for coir and coir products in order to protect the interests of coconut producers, lakhs of poor coir workers and coir producers. This is not against WTO agreement as domestic market price is less than international market price. He puts forward several arguments for maintaining or raising M.E.P as it affects adversely lakhs of coir workers and small producers, most of whom live below the poverty line.49

Ajith Kumar (2001) gives an account of the unique quality of coir geo-textile in soil erosion control and stabilisation of existing slopes and cuttings in highways etc. He highlighted the properties of coir geo-textiles that include—totally biodegradable, 100% natural, water absorbent, act as a wick in the soil mantle and five to ten years longevity. The high tensile strength of coir fibre protects steep surfaces from heavy flows and debris movement and restoration of terrestrial and aquatic riparian habit. They also find that high lignin content of coir makes it more stiff and durable than other natural fibres. Because of its quality, the green movement, increasing environment alertness, and growing preferences for natural products provide substantial opportunity for coir geo-textiles mainly in the industrialised countries of Western Europe, North

America and Japan. He concluded that the versatility of coir and its products and end use applications have no bounds.\textsuperscript{50}

Venkatappa Rao (2002) in his paper in the international seminar on coir, explains the use and the ways of applications of coir geo-textiles for soil conservation through erosion control. It works as a catalyst and holds soil till the vegetation takes over. Cost advantage of coir geo-textiles pari passu with other conventional erosion control measures is also highlighted in his papers.\textsuperscript{51}

Tommy (2006) explain through their presentation the superior quality of coir based products and the need of developing it for substituting timber. Coir, being a natural, environment friendly product should find many uses in building and construction industry. With the production of varied coir based products like coir-cement boards, coir-cement panels, coir-cement blocks, coir-cement tiles etc., it is claimed that in building construction tremendous exploitation of forest resources and destruction of wild life can be avoided.\textsuperscript{52}

Gandhi (2007) draws a brief picture of the international business scenario of coir industry in his presentation. According to him global GDP may fall and settle at around 2.5 per cent, which is considered an indication of


stagnation leading to the recessionary trends. The scenario has not been encouraging in three major economic regions. With the vast and strong domestic market India will ensure the required growth and insulate it from ill effects of developments in the rest of the world. He hopes that we can achieve export earning from coir related products with a target of Rs. 1000 crores in the next six years if required measures are taken. These varied measures include strengthening of marketing effort by ensuring the involvement of private NGO’s for encouraging imports from developing countries, working for preservation of environment by discarding harmful synthetic production to replace them where natural substitutes are available and involve reputed chain stores to accept and promote such products more as a social obligation.53

Ajith Kumar (2010) in their respective articles, explain the reasons for decreased emend of coir yarn in U.S.A. which was the major market for coir yarn in the globe. The reduction in the area under Hop cultivation, as a consequence of the use of high yielding hybrid varieties is one of the reasons for the reduced of take of coir yarn. Another reason is lack of competition in Indian coir industry, and its continued use the traditional method of production which could not withstand the competition from Sri Lanka in the U.S.A. market and he broke the Indian monopoly in the matter of supply of coir yarn

for Hop cultivation. The reasons for this situation are the emotional policies against modernization and mechanization of coir industry in India\textsuperscript{54}.

Anandan (2011) in an article relating to the renovation of coir yarn sector portrayed the pitiable condition prevailing in the area of wages, working conditions etc. of coir workers He categorically states that the prevailing production system should be changed so as to suit the domestic and foreign market even though there is some displacement of labourers, and urged that some steps need to be taken to remove the doubts and anxiety existing in the minds of coir workers at the time of modernization\textsuperscript{55}.

Sasi S., (2012) reveals that the number of coir workers in coir industry has been reduced to 50\% with the passing of 50 years. According to him this is due to the increased exploitation of labourers and lack of proper attention by authorities in the coir sector. He adds that the majority of coir co-operatives are not functioning and the functioning ones are unable to pay Minimum Wages to the workers. He stresses the need for ensuring co-operation between the private sector and the co-operative sector for the healthy growth of the coir sector. The article demands extension of Government assistance to private coir sector too\textsuperscript{56}.


The above studies on review clearly shows that though there are many studies concerning the various aspects of small scale and coir industry in India, no serious attempt has been made to study on the economic analysis of coir industry in a district level. To overcome the above gap, the researcher has chosen this vibrant topic for study.

2.2 Kanyakumari District Profile

Kanyakumari district is named after the Goddess Kanyakumari. This district lies at the southern most tip of peninsula India where Indian Ocean, Arabian Sea and Bay of Bengal confluence. This district was formed out of the Former Princely State of Travancore Cochin under the Linguistic Reorganization Act of 1956. The district is situated at the foot of the Western Ghats and is bound by Tirunelveli district in the east, by Kerala state in the north-west and the Bay of Bengal in the south –east, the Indian ocean in the south and the Arabian Sea in the west. Kanyakumari is also known as Cape Comorin. It is the only place in the entire world where one can witness both rising and setting of the sun. The district headquarters is at Nagercoil.

2.2.1 Administrative setup

The district is divided into two Revenue division Padmanabapuram and Nagercoil having the head quarters at Thuckalai and Nagercoil respectively. There are four Talkus, Vilavancode, kalkulam, Agasteeswaram and Thovalai. The district has four municipalities, namely Nagercoil, Padmanabapuram,
Colachel and Kuzhithurai. There are nine blocks. Six blocks namely Melpuram, Munchirai, Killiyoor, Thiruvattar, Thuckalai, and Kurunthancode come under Padmanabadapuram development division and the remaining three blocks Agasteeswaram, Rajakamagalam and Thovalai come under Nagercoil development division. There are 56 town panchayats in this district alone out of the total 631 Town Panchayats of the state of Tamil Nadu. The district has 6 assembly segments and one parliament constituency.

2.2.2 Location

Kanyakumari is located between 77° 15' and 77° 36' of east of longitudes and 8° 03' and 8° 35' north of Latitudes. It covers an area of 1,685 sq. km, occupying 1.29% of the area of Tamil Nadu.

2.2.3 Population

According to 2011 census, the total population of the district was 1,863,174. Out of the total population males are of 932600 and females are 930574 respectively and 82.47% of the district is urbanized.
Table 2.1
Population of Kanyakumari district

<table>
<thead>
<tr>
<th>Census</th>
<th>Population</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Persons</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>1971</td>
<td>12,22,549</td>
<td>6,19,884</td>
<td>6,02,665</td>
</tr>
<tr>
<td>1981</td>
<td>14,23,393</td>
<td>7,16,952</td>
<td>7,06,441</td>
</tr>
<tr>
<td>1991</td>
<td>16,00,349</td>
<td>8,03,839</td>
<td>7,96,510</td>
</tr>
<tr>
<td>2001</td>
<td>16,69,763</td>
<td>8,40,221</td>
<td>8,29,542</td>
</tr>
<tr>
<td>2011</td>
<td>18,63,174</td>
<td>9,32,600</td>
<td>9,30,574</td>
</tr>
</tbody>
</table>

*Source:* District Statistical Handbook-2011

The district has the second highest population density in Tamil Nadu, i.e., 1106 persons per km², next to Chennai. The district also has a high female sex ratio of 1010 females born to every 1000 males.

### 2.2.4 Literacy

The educational status of this district is very high as compared to other districts of Tamil Nadu. Even though, there is no government college in this district. Kanyakumari district is one of the 100 percent literate districts of India.

### 2.2.5 Language

Tamil and Malayalam are the two languages spoken in the district.

### 2.2.6 Climate

The district has a favourable agro-climatic condition, which is suitable for growing a number of crops. The proximity of equator, its topography and
other climate factors favour the growth of various crops. The paddy varieties grown in the second crop season in Thovalai and Agasteeswaram taluks are grown during the first crop season in Kalkulam and Vilavancode taluks. This shows that there is distinct variation in the climatic conditions prevailing within the district. Unlike other district in Tamil Nadu, it has a rainfall both during the South West and the North East monsoons. The South West monsoon period starts from the month of June and ends in September, While the North East monsoon period starts from October and ends in the middle of December.

2.2.7 Rainfall

Of all the weather elements, rainfall is the most dominant one. It influences plant growth and crop production. Kanyakumari district receives good rainfall throughout the year. The four well known rainfall seasons in the district are (I) South west monsoon period (ii) North-east monsoon period (iii) Winter and (iv) summer.
Table 2.2
The average rainfall in Kanyakumari district during 2007-08 to 2011-12 (in mm)

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Year</th>
<th>South west Monsoon</th>
<th>North East Monsoon</th>
<th>Winter Season</th>
<th>Hot Weather Season</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2007-08</td>
<td>667.8</td>
<td>1069.0</td>
<td>52.7</td>
<td>458.6</td>
<td>2248.4</td>
</tr>
<tr>
<td>2</td>
<td>2008-09</td>
<td>590.4</td>
<td>602.0</td>
<td>204.1</td>
<td>138.8</td>
<td>1535.3</td>
</tr>
<tr>
<td>3</td>
<td>2009-10</td>
<td>894.6</td>
<td>360.3</td>
<td>73.9</td>
<td>419.2</td>
<td>1748.0</td>
</tr>
<tr>
<td>4</td>
<td>2010-11</td>
<td>650.9</td>
<td>484.8</td>
<td>28.2</td>
<td>341.6</td>
<td>1505.5</td>
</tr>
<tr>
<td>5</td>
<td>2011-12</td>
<td>232.0</td>
<td>750.6</td>
<td>0.1</td>
<td>-</td>
<td>982.7</td>
</tr>
</tbody>
</table>

Source: Various issues of season and crop report, Tamil Nadu 2007 to 2012.

2.2.8 Occupational Structure

According to the 2011 census, nearly half of the working populations derive employment from agriculture. The major occupations of the people in this district are agriculture and allied activities. Paddy, Tapioca, coconut, Banana, Cashew, Mango, Jack fruit, Pine apple and Groundnut are the important crops. Paddy and coconut are irrigated while tapioca is a dry crop grown under rain fed conditions. The net area sown is 86,055 hectares and the gross cropped area is 1,16,170 hectares. Paddy accounts for 46 percent of the total cropped area, coconut 13 percent and tapioca 10 percent.

2.2.9 Industrial background

Kanyakumari district is industrially backward one. There are only two cotton textile mills in it. One is the co-operative sector (Kanya spinning mill) and another is private sector (Nagammal Mills). The Indian Rare Earth limited
has a factory at Manavalakurichi. There are also a number of private industries such as Tap co coir industry in Ammandivilai in private sector. Forty six fishing centers are situated in the sea shore. Next to Agriculture, people engaged in fishing. A meager, 10% of the population is engaged in handloom weaving. Coir manufacturing is also to be mentioned, Palmgur production. It is almost over in the district and cashew processing is advancing and having more than 30,000 workers engaged in this sector. A number of factors have hampered the industrial development in the district. The most important among them are lack of mineral resources, industrial raw materials, proper transport facilities and suitable climate.

2.2.10 Handicrafts and Cottage Industries

This district is known for its traditional skills in handicrafts items. Making 'Monkey-doll' from the un-husked coconut and other handicrafts items from coconut shell or wood are two major activities in the cluster. Coconut shell handicrafts include the making of spoons, ladles, forks, ice-cream cups, soup bowls, table lamps, pen-stands, and jewellery. Handicrafts made of seashells are available at Kanyakumari. This district is noted for important agro-products like honey and cashew nuts.

2.3 Theoretical Framework

The theory followed in this study is that of the neo-classical production theory of optimization. Under optimization an entrepreneur who aims at
maximizing his profit will either seek to minimize his cost for producing a
given level of output or he will maximize his output for a given level of cost.
The opportunity either to minimize cost or to maximize output is possible only
in industrial production but in coir production fixing the output target is
difficult because of the influence of heterogeneous factors which can be
partially controlled or even uncontrolled. Nor can the people hold the clutch of
market to sell their produce. Therefore, coir workers in production can take
strenuous efforts to maximize his profit or net revenue by producing greatest
possible output for the available factor inputs he uses. The model formulated
and followed in this study is neo-classical optimization model. Under this
model, the ability of coir sector is captured.

In order to investigate the inter-temporal changes in the structure of a
particular variable, a macro index called transformation index is suggested.

Let a and b two non-negative vectors two different states of a particular
variable say x. θ be the angle between a and b.

Then

$$\cos \theta = \frac{\sum ab}{\|a\| \|b\|} = \frac{\sum ab}{\sqrt{\sum a^2 \sum b^2}}$$

So that $\theta = \cos^{-1} \left[ \frac{\sum ab}{\sqrt{\sum a^2 \sum b^2}} \right]$ for $a \geq 0, b \geq 0, \ ab \geq 0$
i. When $\theta = 0^\circ$, then $a$ and $b$ coincide meaning that there is no change in the state of the variable $x$

ii. When $\theta = 90^\circ$, the angular distance between $a$ and $b$ is $90^\circ$ two vectors are perpendicular to each other.

Thus

$$0^\circ = \cos^{-1}\left[\frac{\sum ab}{\sqrt{\sum a^2 \sum b^2}}\right] \leq 90^\circ$$

and then

$$0 \leq \frac{0^\circ}{90^\circ} = \cos^{-1}\left[\frac{\sum ab}{\sqrt{\sum a^2 \sum b^2}}\right] \leq 1$$

or $0 \leq \lambda \leq 1$, where $\lambda = \frac{\cos^{-1}\left[\frac{\sum ab}{\sqrt{\sum a^2 \sum b^2}}\right]}{90^\circ}$

$\lambda$ is called the Transformation Index. It is unit free and a pure number.

Hence in this case $a$, $b$ may be interpreted as vectors of a relevant variable with the stipulation that each element of $a$ and $b$ denotes the value share in total (ratio) so that $\Sigma a = 1 = \Sigma b$. Thus $\lambda$ will measure the overall change in the structure of the relevant variable. It is to be noted that the higher the value of $\lambda$ higher (smaller), the degree of structural change and vice versa. Clearly, for the vectors (of output/employment) at two time points $\lambda = 0$ implying no change at all. Similarly, $\lambda = 1$ indicates complete structural change. Actual value of $\lambda$ lies between 0 and 1.
In the formation index, two different states (over time) of the variable are considered and compared to ascertain the nature and the degree of the structural transformation. But in the diversification index only one state of the variable is considered and the index is formulated. Subsequently different values of the index (corresponding to different states) are compared to evaluate the nature and the degree of diversification.

Following Theil’s Entropy Index Pal defined the index of diversification as

\[
D = \frac{\sum pi \log \left( \frac{1}{pi} \right)}{\log (n)} \quad 0 \leq D \leq 1,
\]

Where \( pi = \frac{x_i}{\sum x_i}, \) \( x_i; \) \( i^{th} \) value of the variable, \( i = 1, 2 \ldots, n. \)

\( D = 0 \) \( \Rightarrow \) no diversification of activities,

Whereas \( D = 1 \) \( \Rightarrow \) perfect diversification of activities which means that all the \( x_i \)'s (activities) are getting equal importance. Higher (lower) is the value of \( D; \) higher (lower) is the level of diversification. \( D \) has been used in estimation.

The I-O model describe the inter-dependence among the different producing industries of the economy. Thus it becomes a tool to measure the structural interdependence of an economy and to determine the extent and degree of inter-linkages among industries.
There are two approaches to the I-O models. The Input-Use approach is due to Leontief (1941) and the Output- distribution approach is due to Ghosh (1958) which was subsequently modified by Pal (1981).

Define \( a_{ij} = \frac{X_{ij}}{x_j} \) amount of output \( x_1 \) used by industry \( j \) to produce output \( x_j \); it is taken as fixed. We write the balance equation for output \( i \):

\[
X_i = a_{i1} x_1 + a_{i2} x_2 + \ldots + a_{ij} x_j + \ldots + a_{in} x_n + C_i + E_i - M_i \quad \ldots \ldots (1)
\]

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

In matrix notation

\[
X = Ax + D \quad \ldots \ldots (1a)
\]

Where \( x = (x_j) \) an \( n \)-column vector of gross output.

\( A = (a_{ij}) \): an \( nxn \) input coefficient matrix.

\[
X = (X_{ij}) \): \( nxn \) transaction matrix

\( D = (C_j + E_j + IV - M_j) \): an \( n \) column vector of final demand net of competitive imports (\( M_j \)).

\( E \): foreign demand (export), \( C_j \): domestic demand, \( IV \): inventory

Equation (1a) can be solved for the vector of gross output:

\[
X = (I-A)^{-1} D. \quad \ldots \ldots (2)
\]

\((I-A)^{-1} = B\), which is called the Leontief inverse.

‘\( B \)’ is interpreted as the impact matrix. Its element \( b_{ij} = \frac{dx_i}{dd_j} \) measures the impact on the gross output ‘\( I \)’ of the change in final demand for output \( j \).
\[ B > 0, b_{ii} > 1 \text{ and } b_{ii} > \sum_{i=j} b_{ij}, \text{ for each } i \text{ and } j \text{ (pal 1988)} \]

‘B’ the Leontief inverse is used to measure the effect of changes in interdependence among the producing sector (farm and non-farm sectors).

2.4 Concepts used

i. Industry

An industry is a collection of enterprises in which employers and employees are closely associated. It exists only where there is some business, trade, undertaking manufacture or calling.

ii. Small Scale Industry

A small scale industry is defined as one that employs less than twenty five workers with power and fifty workers without power in each.

iii. Cottage Industry

A cottage industry was defined as manufacturing organizations that employ 10 more workers but less than 20 workers.

iv. Tiny Sector

Units with an investment in plant and machinery of up to Rs.5 lakhs, and located in towns with a population of less than 1,00,000 according to the 2001 census figures, were defined as tiny units.
v. Incentives

The term ‘incentive’ may be taken to mean such stimuli for starting to act. In this study, this term is used in the same meaning as such stimuli incite entrepreneurs of the coir units to start and subsidies offered by the government and other institutions to motivate entrepreneurs to set up and operate coir units successfully.

vi. Subsidy

Subsidy denote a single lump sum, which is given by the government for an industry through the District Industries Centers (DIC), which is considered as essential in the national interest for the promotion of the industry.

vii. Technical Assistance

Technical assistance refers to the guidance and advice provided by the DIC to the entrepreneurs while initiating, implementing and operating the enterprise.

viii. Industrial Training

Industrial training refers to the training undergone by the entrepreneur before the actual starting of the industrial units in the training institutes operated by the coir board.
ix. Location of the Industrial Units

Location of the industrial units refers to the place where the sample coir units have been established. The location is understood in terms of rural, semi-urban and urban areas where the sample units are functioning.

x. Fixed Capital

This is the sum of the aggregate values of land, buildings, plant and machinery, equipment and furniture at current levels of prices.

xi. Net Working Capital

This implies the excess of current assets over current liabilities. Current assets include the values of the stock of the raw materials, or inventory, stores, fuels, semi finished goods and the by-products; cash in hand, cash at bank, bills receivables and short-term investments. Current liabilities consist of accounts payable and bills payable in terms of the outstanding expenses. These liabilities are payable within a year. The net working capital is that part of the total capital employed in meeting the day-to-day expenses of the units. In the study, working capital refers to the net working capital.

xii. Employment Generation

The coir units offering employment opportunities to friends, relatives and the local people in a large way are recognized as employment generation units.
xiii. Installed Capacity

Installed capacity refers to the maximum level of production of the items that can be attained in a year on a single shift basis (or two/three shifts, if the process is a continuous one, depending on the technologies involved) with the available machinery and equipment and labour.

xiv. Investment

Investment is a flow of expenditure over a given period of time on a new fixed capital asset of an industry or a firm. It is generally taken to mean the actual production of real capital goods.

xv. Registered Unit

A unit, which is registered with the District Industries Centre (DIC), is referred to as a registered unit.

xvi. Unregistered Unit

The unit, which functions independently, and is not registered with DIC is known as an unregistered unit.

xvii. District Industries Centre (DIC)

District industries centre (DIC) is a statutory agency set up by the government in each and every district to deal with all the requirements of the small scale and village industries.
xviii. Coir Yarn

Yarn is made out of fiber extracted from coconut husk. Different yarn varieties hand or wheels made are used for geo-textile manufacturing.

iix. Coir Rope

The fiber prepared from the husk of the coconut, used in making rope and matting. Coir Rope making is a common cottage industry in India.

xx. Coir pith

Coir pith blocks as they are known are 100% organic and natural growing media. Coir pith is a multipurpose growing medium. Hydroponic growers can use Global International coir pith as a natural soil-less growing medium to produce high yielding quality vegetables and cut flowers.

xxi. Rubberized Coir

Coir fiber is elastic enough to twist without breaking and it holds a curl as though permanently waved. Machine twisted fiber is produced by blending bristle and mattress fibers in varying ratios.