Determinants of the Income of Household Level Coir Yarn Labourers in Sri Lanka

G. H. B. Dilhari, A. A. D. T. Saparamadu

Abstract—Sri Lanka is one of the prominent countries for the coir production. The coir is one of the by-products of the coconut and the coir industry is considered to be one of the traditional industries in Sri Lanka. Because of the inherent nature of the coir industry, labourers play a significant role in the coir production process. The study has analyzed the determinants of the income of the household level coir yarn labourers. The study was conducted in the Kumarakanda Grama Niladhari division. Simple random sampling was used to generate a sample of 100 household level coir yarn labourers and structured questionnaire, personal interviews, and discussion were performed to gather the required data. The obtained data were statistically analyzed by using Statistical Package for Social Science (SPSS) software. Mann-Whitney U and Kruskal-Wallis test were performed for mean comparison. The findings revealed that the household level coir yarn industry is dominated by the female workers and it was identified that fewer numbers of workers have engaged in this industry as the main occupation. In addition to that, elderly participation in the industry is higher than the younger participation and most of them have engaged in the industry as a source of extra income. Level of education, the methods of engagement, satisfaction, engagement in the industry by the next generation, support from the government, method of government support, working hours per day, employed as a main job, number of completed units per day, suffering from job related diseases and type of the diseases were related with income level of household level coir yarn laboures. The recommendations as to flourish in future includes, technological transformation for coir yarn production, strengthening the raw material base and regulating the raw material supply, introduction of new technologies, markets and training programmes, the establishment of the labourers' association, the initiation of micro credit schemes and better consideration about the job oriented diseases.

Keywords—Coir, Income, Sri Lanka.

I. INTRODUCTION

A. Background of the Study

THE word 'coir' comes from the Malaysian word *Kayiru* meaning "rope" or "twisted". There are several legends associated with the origin of the coconut tree in many counties. The origin of coir industry dates back to pre-historic times, but coir products have mostly developed in 19th century. According to [1], Arab writers (of 11th century AD) have recorded the uses of coir for ships, tenders, and rigging. Marco Polo's famous travelogue of 12th century mentioned that coir fiber and mats were used in the sailing ships of Arabs. During

Dilhari G. H. B. is with the Pan Asia Banking Corporation (e-mail: dilhari@pabcbank.com).

Saparamadu A. A. D. T. is with the Department of Business Economics, Faculty of Management Studies and Commerce, University of Sri Jayewardenepura, Nugegoda, Sri Lanka (phone: 094 77 3740243; e-mail: thilini@sjp.ac.lk).

the 13th century, there was evidence of coir yarn being used in building ships in the Persian Gulf. When Portuguese admiral Vasco da Gamma sailed in Kerala, in the late 15th century, it is believed that he has seen this multipurpose fiber. The coir industry in United Kingdom dates back to the second half of the 19th century.

According to [1], India and Sri Lanka were the first countries in the world to discover the multiple uses of coir. The legend and historical books on the introduction of the coconut tree to the Sri Lanka are rare. In Sri Lanka, the coir industry is widely spread in the coastal area because of the soil, weather, and proper water supply for coir retting.

Initially, coir was catered to primary needs of the people. Later, the industry was developed as an income generating source or an occupation. There is much evidence to prove the use of the coir yarn from ancient time in Sri Lanka. In Kandy national museum, the Uva caravan items consists with coir yarn is one of the best examples.

Coir is extracted from the tissues surrounding the seed of the coconut palm. The coconut harvest occurs once in every 45 days. From 1000 coconuts, it is possible to extract 10 kgs of coir. Both traditional and modern techniques are used in the converting process. In the traditional method, coconuts were left to retting in water for several months and the coir was extracted. However, with the use of modern techniques, there is an increased use of coconut husk de-fibering machines. The waste product from milling the coir is pith, which makes high quality mulch and fertilizer.

The coir fiber is classified into different sub categories based on, the maturity and the length of the fiber. Based on the maturity, two types of coir fiber (brown fiber and white fiber) are obtained. The commonly used brown fiber, is obtained from matured coconut and white fiber, is extracted from immature green coconuts after soaking up to 10 months. Brown coir is stronger than white coir. Based on fiber length, the two types are bristle fiber and mattress fiber. Both brown and white coir consist of fibers ranging in length from 10-30cm.Those at least 20cm long are called bristle fiber. Shorter fibers are called as mattress fiber. A 300g coconut husks yields about 80g fiber, one-third of which is bristle fiber.

Coir fiber are either sold as raw material or processed into value added product such as brooms, brushes, doormats, rubberized coir mattresses, yarn, twine, upholstery car seats, garden article from coir (coco pots, coir hanging basket, creeper poles, coir basket) and coir geotextiles.

Even though coconuts are grown in many countries in the world, fewer countries have engaged in the coir production. According to total annual world coir production of coir fiber

in 2012 (Table I), Sri Lanka and India have produced around 650000 tons of coir.

TABLE I
COIR PRODUCTIONS IN THE WORLD 2012

country	Coir production (tones)	Percent
World	1,093,320	-
India	514,000	47%
Vietnam	300,400	27%
Sri Lanka	147,000	13%
Thailand	60,000	6%
Ghana	39,400	4%
Malaysia	20,000	2%
Bangladesh	10,420	1%
Other	2,100	

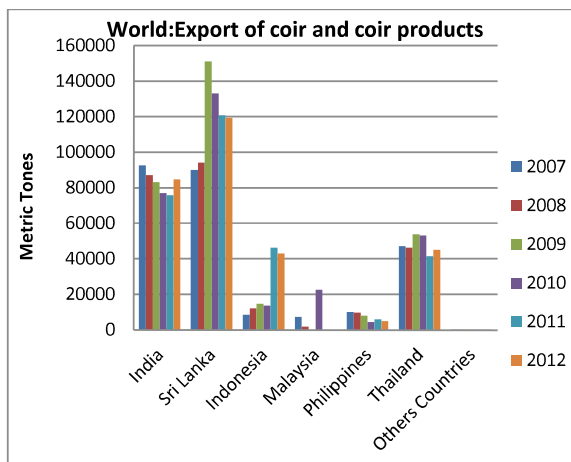(Source: Author's preparation based on [2])

Fig. 1 World: Export of coir and coir products
(Source: Author's preparation based on [2])

India and Sri Lanka are the main exporters of coir fiber and products (Fig. 1), followed by Indonesia, Malaysia, Thailand, Vietnam and the Philippines.

The growth rate of coir and coir exports in Sri Lankan have increased in year 2009, whereas for India it has declined. Even though, Sri Lanka has dominated in raw fiber export market, the value added exports (geotextiles, mats, brushes, coco pots, coir basket) have been low with compared to Indian exports. Coir fiber and coir products are important commodities, when entering in to the international market.

Sri Lanka is the largest exporter of brown fiber and semi-finished and finished products made out of brown fiber. The annual export of brown fiber and products from Sri Lanka amounts to over 70000 MT on average per year. Sri Lanka also exports around 7000 MT of white fiber annually, most in semi-finished from such as yarn. Sri Lanka produces over 25 different types of coir products, ranging from brushes to geo-textiles, with diverse end uses.

China is the principle buyer of Sri Lankan coir fiber. Other major buyers include Japan, Germany, United States, Belgium, United Kingdom and South Korea. Coir is a material which is widely used to overcome soil-erosion, because of its slower decomposition rate and a high strength compared to other natural fibers.

Synthetic substitutes have posed a threat to the industry. But, Sri Lankan coir has good demand because of its quality and unique characteristics.

According to the operation and capacity of the Sri Lankan coir industry, it is further categorized under three levels. Those are household level, small and medium scale level and exporter level. Reference [3] identified that the industry is widely practiced in the household level in the southern province.

The industry has various economic advantages. To achieve these advantages, the problems in the industry should be solved. Coir industry does not need huge capital to initiate. Further, raw material and labour resources are more accessible in Sri Lanka. The Development of the coir industry affects the national economy in various ways. These types of industries mostly depend on the labourers'. This study basically concerns the household level coir yarn labourers.

B. Problem Statement

Small and medium enterprises play a vital role in both developed and developing countries. The coir industry belongs to Small and Medium Enterprises (SME) sector. Reference [4] revealed that personal and entrepreneurial competencies of innovative SMEs are different from those of non-innovative SMEs. Reference [5] emphasize that the coir industry has faced issues on resources and manpower. The contribution of SMEs to the national economy in Sri Lanka is still in a low position when compared with other developed and developing countries in the region [6].

Because of the nature of the industry, various factors affect the growth of the industry. Reference [7] shows that majority of the households who are engaged in coir sector are trapped in poverty with lower educational and occupational status. Reference [8] emphasis that the coir sector has not yet fully recovered, even though a year has elapsed after the major destruction, 'Tsunami'. The main reasons have been identified as the imbalance of specialist aid for business recovery, labour shortage and general inefficiencies of aid management. Reference [9] explained that decline of the coir industry would result in unemployment, thus affecting the socioeconomic balance of the country. Thus, the problem statement can be developed as:

"What are the factors that affect to the income level of household level coir yarn labourers?"

C. Objectives

The following objectives can be identified for the study.
Main Objective:
- To identify the factors affecting to the level of income of coir yarn labourers

Sub Objectives:
- To study the living standard of the household level coir yarn labourers.
- To identify socio-economic issues of the household level coir yarn labourers.

D. Hypothesis

In order to identify the normality, hypotheses would be,
- H_0- Normally distributed
- H_1- Not normally distributed

In order to identify the possibility of significant relationship between independent and dependent variables for determinants, hypothesis would be,
- H_0-Dependent variable does not change according to the independent variable
- H_1-Dependent variable change according to the independent variable

II. LITERATURE REVIEW

A. Theoretical Framework

Poverty is the biggest barrier in the way of economic development. Poverty in a country explains that per capita income is low. When per capita income is low, their capacity for savings is lower. The lower saving leads to lower level of investment and low capital formation. The low capital formation leads to low level of productivity, the real income will be low and vicious circle of poverty is completed in supply side.

When people have low real income, it limits the purchasing power. Due to the small size of the market, there is no incentive to invest in real or human capital. When the rate of investment is low, the capital formation will become low. The low level of capital formation leads to low level of productivity that leads to low per capita income. The country therefore remains in poor.

One of the reasons for a country to remain in poor is low level of utilization of its human and natural resources. In the developing countries, people are mostly unskilled and technologically backward. They are illiterate and lack entrepreneurial skills. Therefore, output remains low and developing nations remains in low income levels.

If per capita income is high, the rate of per capital formation will be high. That is favorable to economic growth.

Harrod-Domar growth model explains that the rate of growth is determined jointly by the national savings ratios and national capital output ratio. This helped [10] to define the take off stage. If a country could just save higher proposition than that of the earlier, it could develop and grow at a much faster rate than those who save less. This is a self-sustaining growth.

The primary policy implication is that the needed investment resources could be met through foreign aid. The two gap theory emphasized that investment and development are restricted by level of either domestic saving or import purchase capacity. The two gap model is on extension of the Harrod-Domar growth model.

In the very long run, capital accumulation appears to be less significant than technological innovation in the Solow Swan growth model.

B. Empirical Framework

Focused areas of the studies by developing nations and developed nations related to the coir industry were different. The developed nations have paid more attention on studying the chemical combination of coir, scientific base of the coir retting process and related areas of chemical nature, whereas, developing nations studies the survival of the coir industry such as the impact of internal and external environment, aspects of producer to seller, performance of the industry and innovations.

Reference [11] identifies three different levels of people engaged in the coir industry (primary level producers, middle level producers and exporter level producers) and examined the constraints faced by the all three levels of the coir industry. the constraints identified by them includes, increasing cost of production, lack of financial assistance for investing in better technology and negative attitude of the younger generation to take up the industry, and concluded that the Sri Lankan coir industry is a viable sector which can be promoted to the level of major export earning industry.

Reference [12] analyzed the exports of coir and coir products from India. The study was based on secondary data from 2000 to 2009 and uses trend analysis to analyze the data. The researcher concluded that India is one among leading exporters of coir in the world. Further, it is estimated that more than 90 percent of Indian coir export revenue come from value added products. In addition to that, both in terms of volume and value of coir and coir exports, India has secured an important place. The impact and magnitude of the problems faced by the industry are country specific. The world coir production is being declining in recent years. In this situation, most of researchers conducted studies to find out the reasons. Further, they recommended the strategies to eliminate and reduce such situation. Reference [9] investigates reasons for decline in coir fiber industry in the northwestern province of Sri Lanka based on 300 fiber millers and found that the main factors affecting to the crisis situation are human resources problem, poor trade behavior, the high cost of production, poor product marketing strategy etc. Further analysis has shown that decline in the industry would result in unemployment, thus affecting to the socioeconomic balance of the country.

Economic issues are one of the major factors affecting to the industry. Reference [13] explained the capital structure determinants in Micro, Small and Medium Enterprises (MSMEs) in east Godavari district, Andra Pradesh. The study had been conducted based on the 50 business units and concludes that there is a close relationship between the type of the firm and type of capital. Apart from that, there is no significant association between type of capital and owner qualification. From this analysis the researcher emphasized that MSMEs performance are restricted by non-availability of funds. Firms are also restricted by non-availability of funds as a result of lower level of bank usage, personal attitudes, and various reasons. Reference [14] explains performance and financial management of coir industry in Karnataka and had been conducted based on 24 coir manufacturing units located

in two districts namely Tumkur and Hassan. Researcher found that investments are higher in co-operative coir units than in the private coir units. Further, it was concluded that value addition was more in private coir units and therefore gross and net returns were also high with compared to co-operative coir units.

Human resource is the important part of any organization to achieve the goals and objectives of the firm. Human resource issues affect to the sustainability of the firms. Reference [15] conducted the case study to investigate the case of coco coir business integration and development, incorporated, (COCOBIND) in Irosih, Sorsosn, The Philippines. This study had been conducted based on desk research and findings of the study revealed that COCOBIND is almost in the brink of insolvency in connection with cash flows as indicated by decreasing profitability, decreasing sales and decreasing liquidity. In addition to that, researcher found that long term success of the organization depends on the commitment of the members of the organization to hold on the overall purpose of the organization.

Those who are in the industry face various diseases and various environmental issues. Reference [16] analyzed pulmonary function abnormalities in symptomatic coir workers of Alappuzha. The study was based on the 100 symptoms of coir workers for the period of six months from February 2001 to August 2001.The researcher concluded that Nasobronchial allergy is prevalent among coir workers of Alappuzha and combined nasal and bronchial symptoms are noticed in majority of the workers. Further, small airway obstruction was noticed in more than 65% of patients.

Since natural disasters are opened to the coir industry. Reference [8] revealed that Sri Lankan experiences of post-Tsunami small business survival and recovery. The study was based on the coir fiber producers in Matara and explained that these firms have not yet fully recovered, the main reasons being the imbalance of specialist aid for business recovery, labour shortages and general inefficiencies of aid management. Further, the study revealed that individual yarn spinners have recovered to a great extent and international donors (NGOs) have played a vital role in the business recovery process. Sri Lanka is the one of highly tsunami affected country among coir producing countries. Most of coir based firms collapsed because of the Tsunami.

Being a traditional industry, coir industry has its inherent norms, values and customs. Those who have engaged in the coir industry have different life styles, experiences, education, and knowledge. With this, one can identify various social issues. According to [7], majority of the households fall within the low socioeconomic status.

The government is one of the major factors affecting the industry. Reference [17] conducted the study about evaluation of national and industry-specific interventions on coir industry in India - a special reference to Kerala. Change-point analysis (CPA) and interrupted time series analysis with segmented regression were used to evaluate the impact of specific interventions, real events, and changes in policy. The study concludes that there is no significant positive impact on coir

exports by governmental programs focusing on coir production and sale.

In this study, discussion on the issues and its impact to determine income level of household level coir yarn labourers has been analyzed.

III. DATA AND METHODOLOGY

A. Conceptual Framework

The study has identified income as the dependent variable and four independent variables, namely, health factors, social factors, economic factors, and other factors. Further, it is identified that several factors affect to income level of the household level coir yarn labourers (Fig. 2).

Levels of education, age, gender, the methods of engagement, attitude of the industry are identified under the social factors. Attitude of the industry has measured by evaluating the satisfaction on the industry and willingness of the worker to send his/her child to the coir industry.

The purpose of the borrowings, the rate of loan obtained, the method of fulfilling urgent financial needs, working hours per day, employed as a main job, number of completed units per day are identified under the economic factors.

The health factors have recognized by using the variables of job related diseases and type of the diseases. Government intervention has identified under the other factors and recognized by the number of labourers who have obtained the support from the government and method of government support.

B. Justification of the Variable

According to [18], Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. In brief, health consists of three parts, physical health, mental health and social well-being. Physical health is everything ranging from the absence of disease to fitness level. This includes few key areas and those are the physical activity, nutrition and diet, rest and sleep, medical self-care, alcohol and drugs. Mental health includes emotional, psychological, and social well-being. This affects thinking pattern, feel, and act. Mental health is important at every stage of life. The Social wellbeing is the interrelationship among others.

Various measurements have been used to measure the various aspects of health. In [19], socioeconomic aspect was one of the major parts of the survey and was covered 2500 coir workers. According to that, work related diseases are identified under ten diseases. That was measured, using number of workers and percentage to total number of workers suffering from allergy, body pain/hand pain/ back pain, cough, skin disease, asthma, sneezing, arthritis, chest pain, bronchitis and other diseases.

Reference [20] has explained the relationship between health and income and concluded that permanent income has a large causal effect on self-rated health and physical health. Most existing work on this question has used a general health status as the dependent variable.
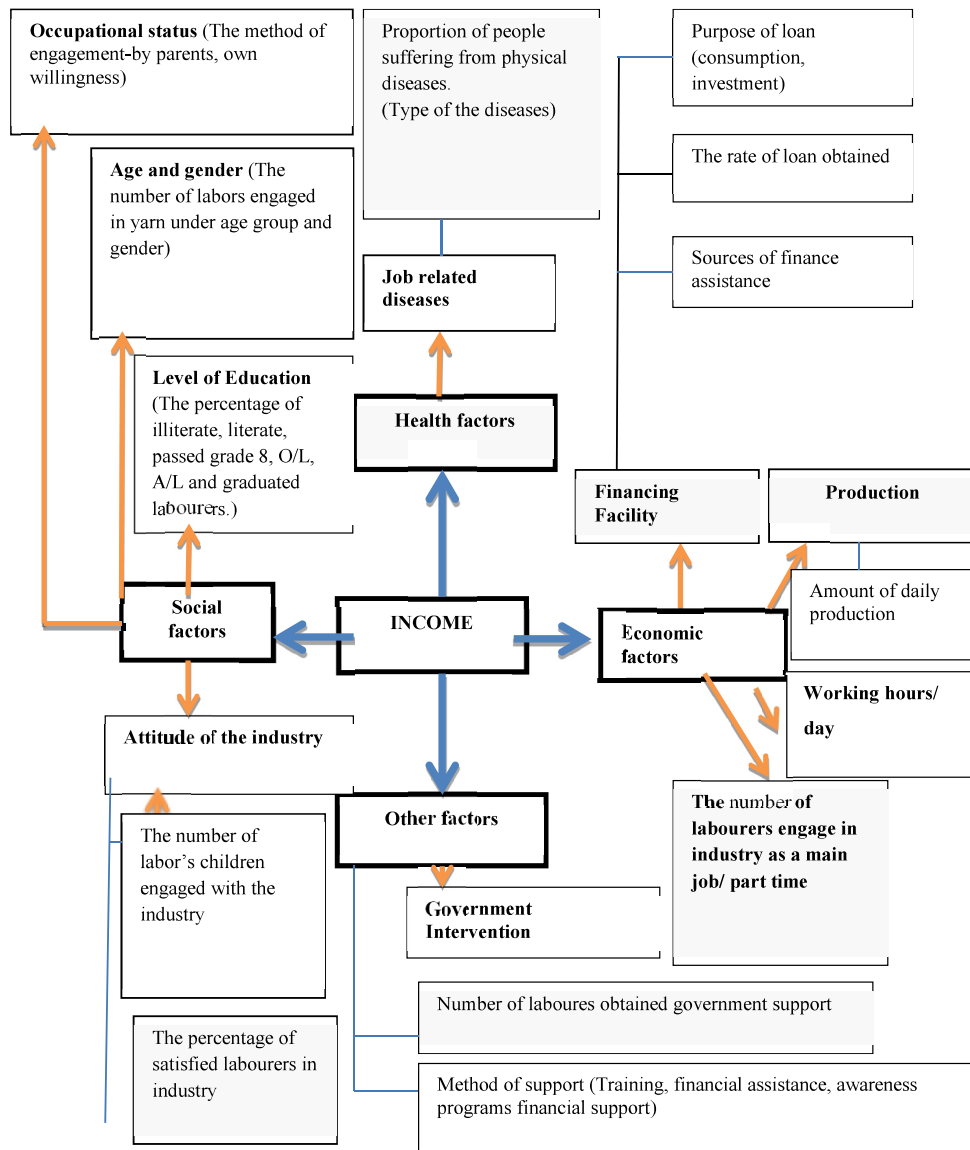
Fig. 2 Conceptual Frame work

Health factors have been identified as independent variables and concern the physical health, and measure the proportion of people suffering from asthma, back pain, skin diseases, headache, and other diseases.

Today, people, live in either multicultural or self-sufficient society which means there are many social factors that affects to the lifestyle of the people, such as religion, ethnicity, family, physical attributes, education, life partner and number of children's schooling, age, gender, occupational status and attitude of the industry are identified as social factors.

Reference [21] explained that rates of return to education are positive and significant for both males and females. The study was based on the household income and expenditure survey (HIES) and the labor force and socioeconomic survey (LFSES) conducted by the Department of Census and Statistics of Sri Lanka.

Occupational status, for the purpose of the study, is identified as, the methods used by the labourers to engage in the industry (willingness, training by parents and other).

Attitude of the industry can be measured based on the job satisfaction. Attitude towards the industry is measured based on satisfaction derives from the nature of the work. That can be identified as the percentage of labourers satisfied with the work. Similarly, it is measured, based on the number of parents who are willing to send their child to the industry.

This study focused on the economic factors that effect to income. That can be discussed under financial facilities, production, and nature of the work.

Financial facilities are defined as the provision of facilities to fulfill financial needs. When obtaining financing facilities one considers interest rate and source of the finance. Similarly, people obtain financial facilities for different perspectives.

The rate of loans obtained has been identified under three categories based on existing interest rates and was measured using the percentage of labourers belongs to each category. Consumption, investment and other perspectives have been identified as the perspectives of obtaining loans, and measured using the percentage of labourers belongs to each category. The labourers borrow money from household produces, from village lender, from different associations in village level, from relations, from private and government sector banks. In this study, this is measured by the proportion of labourers who use each source. In addition to that, economic factors are also, measured using amount of daily production, working hours per day and the number of labourers engaged in industry as a main job or part time. Another important variable was the government intervention. The governments introduce various programmes and policies to improve the labour's income. Reference [17] evaluated the impact of governmental programmes focusing on coir production and sales, but did not find any significant positive impact of these programmes on coir exports. In this study the government intervention is measured as the percentage of labourers who have obtained government support in training programmes, financial assistance, awareness programmes, clinical services and work related diseases.

C. Data

Hikkaduwa secretariat division has been identified as the population in Galle district (southern part of Sri Lanka). According to the statistics, 80% of household coir yarn labourers of Galle district are in Hikkaduwa secretariat division [22]. Coir yarn labourers in the Kumarakanda Grama Niladhari division (located in Hikkaduwa secretariat division) were selected because higher proportion of household level coir yarn labourers is resided in the area.

The study is mainly based on the primary data. Records and reports of Coconut Development Authority, Galle district secretariat division, Food and Agriculture organization, Industrial Development Board and Industrial Development Authority are used as secondary data sources. A field survey was conducted to gather primary information. Simple random sampling was used to generate a sample of 100 household level coir yarn labourers. A structured questionnaire was used to collect data. After pilot study, the questionnaire was modified according to the nature of the area. Personal interviews and discussion were also conducted to get information.

A descriptive analysis was conducted to identify the socio economic factors and its impact to determine the income level of household level coir yarn labourers.

D. Methodology

The collected data was analysed by using a statistical package for social science (SPSS). Descriptive summary statistics such as mean comparisons, proportions, percentages have been used to analyse and identify the issues faced by household coir yarn labourers.

The normality test suggested the use of non-parametric analysis. Under the non-parametric analysis, mean comparison was performed for analysing the data. Mann-Whitney U and Kruskal-Wallis test were done to compare the means.

IV. DATA PRESENTATION AND ANALYSIS

A. Socio-Economic Issues of the Household Level Coir Yarn Labourers

According to the interviews with the elderly persons of the area, we identified that twenty years ago, the coir yarn industry was one of the main income generating activities of that area and was only second to the fishing industry. However, the present situation of coir yarn industry is totally different. Only few persons have engaged the coir industry as the main occupation (38%) but higher proportion of people has engaged with industry as an additional source of income (62%) of the family (Fig. 3)
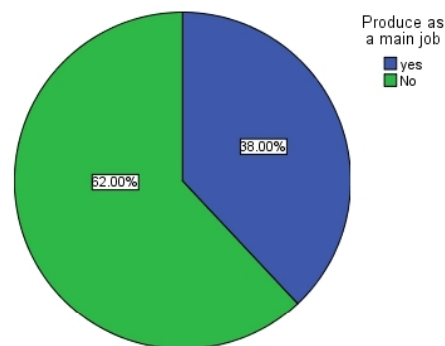

Fig. 3 Coir yarn production as main job

There were lots of reasons behind the existence of the household level coir yarn industry in the area. Geographical location of the area, close relationship with the fishing industry, freedom of the industry, and the connection with the life styles are some of the reasons which were identified by the researcher from the discussions.

Since coconut tree is abundant in the coastal line, coir husk can be obtained from these coconut trees as an input for the coir yarn industry and existence of many lagoons are helpful for coir producing process. There is a close relationship between coir industry and fishing industry and that relationship indicates that coir yarn is used for some activities in the fishing industry. As per the survey, bread-winner of the family has engaged in fishing industry, even though it is not a source of permanent income. In this situation, the household level coir yarn industry contributes to improve the family income. The worker has ability to decide the working time period and that is a one of the motivational factors of the labourers for this industry.

Findings suggest that, elderly participation (>55) in the industry is 40 per cent and more than half of the responders belong to the age limit of greater than 36 years old. In addition to that, the younger generation is not involved to the industry because of the educational, technological, and social

developments of the area. Fewer numbers of youngsters are occupied in the industry. This is one of major issue for the sustainability of the industry.
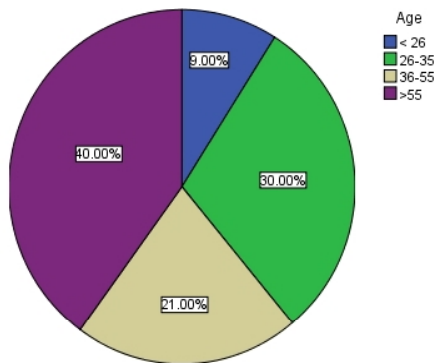

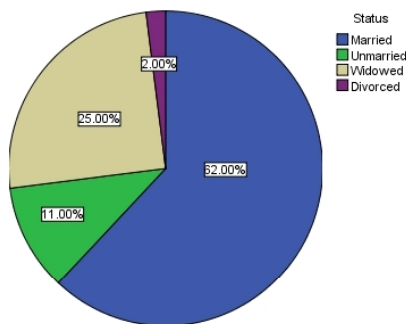Fig. 4 Age of the household level coir yarn labourers

Fig. 5 Status of the household level coir yarn labourers

As per the analysis, the highest percentage (62%) of the labourers are married (Fig. 5) and next higher percentage has (25%) appeared as widowed. Most of married labourers have selected this industry as an extra income source and the widowed have engaged this industry as the main income source. Discussion with labourers revealed few reasons about the widowed engagement in the coir yarn industry as the main income source. Long term practice, educational barriers, role as a head of the family, less job opportunities with the age are some of the reasons.

Female contribution to the coir yarn industry is high. According to the survey respondents, 96% of workers are female (Fig. 6). Engagement of the male workers in the coir industry is at its minimal. Presently, the coir yarn labourers could not able to generate sufficient income from that industry to fulfil the family needs and wants. Hence, males have joined the high income generating activity as the bread-winner of the family. Among female workers, higher proportion has joined to the industry as an extra income source and small proportion joins as the main income sources. Further, it was identified that, workers stay in the industry for a longer period. More than 50% of labourers have stayed in the industry for 11-20 years (Fig. 7). Whereas 12% of labourers are in the industry for more than twenty years and 35% of labourers are working in the industry for less the ten years.
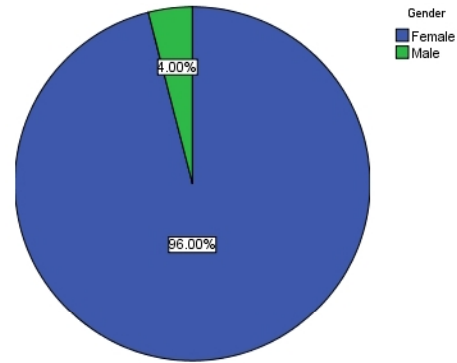

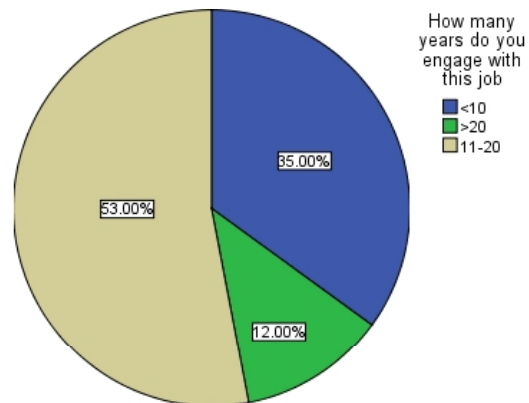Fig. 6 Gender of the household level coir yarn workers

Fig. 7 Years of engagement

The level of education of the labourers is in lower level in the coir industry. It can be revealed by the records of the lower level engagement in higher education. As well as higher proportion of labourers (23%) are illiterate and nearly 18% per cent of people had obtained ordinary level educational qualification. There are large numbers of factors which have affected to lower level education in that area. Financial barriers, lack of awareness about value of the education, less motivation for education are identified as the major reasons. Most of the labourers have obtained an education for some extent that was not continued to higher education. The new generation have involved highly in education than older generation. Discussion of the respondents revealed that most of the youngsters have obtained ordinary level educational qualification.

B. Identification of the Factors That Affect to Income Level of Household Level Coir Yarn Labourers

The normality test is performed by the researcher for each variable to decide the usage of parametric or non-parametric analysis.

The results for normality test can be summarized as follows.

TABLE II
TEST RESULT FOR NORMALITY

Variables		Shapiro-Wilk P Value
Age	< 26	.107
	26-35	.000
	36-55	.003
	>55	.002
Gender	Female	.002
	Male	.161
Level of Education	Illiterate	.005
	Literate	.305
	Passed grade 8	.000
	O/L	.031
	A/L	.404
What is the method you are engaging in the job?	By Parents	.001
	Own willingness	.001
Are you satisfied with this job	Yes	.000
	No	.000
Have you employed your children in this job	Yes	.006
	No	.001
Have you obtained any support from the government	Yes	.000
	No	.001
If yes, which method	Clinic (for job relate diseases)	.006
	Awareness program	.119
What is the purpose of your borrowings?	Consumption	.000
	Investment	.406
At what rate are you borrowing loans?	<15	.254
	>20	.004
	15-20	.000
How are you fulfilling your urgent financial needs?	Borrowing from household producers	.010
	Village level societies	.029
	From private banks	.933
	From village borrows	.005
	From relations	.061
	From Public sector banks	.057
Number of working hours per day	<5	.134
	5-8	.000
	>8	.010
Produce as a main job	yes	.000
	No	.000
Number of completed units per day	<70	.031
	71-80	.249
	81-100	.045
	>100	.010
Do you suffer any diseases relating to this job?	yes	.267
	No	.003
If yes, what are they	Skin diseases Back pain	.123
	Headache	.000
	Asthma	.060

Dependent Variable: income from coir industry

According to the decision rule each variable's P value should be greater than 0.05. In addition, it should be occurred for all variables. Without fulfillment of this requirement, it cannot be identified as the normally distributed variable. When considering about age, only the category of age which is below the 26 age category is greater than 0.05 and other three age categories (26-35, >55, 36-55) appeared as below the 0.05. Therefore, it can be concluded that the age is not normally distributed variable. The other variables are also investigated in the same way and those investigated data are given. Finally, it can be summarized that all sixteen variables are not normally distributed.

As per the analysis, the normality assumption is violated and further analysis is performed based on the non-parametric analysis. According to that, the mean comparison is performed by the researcher.
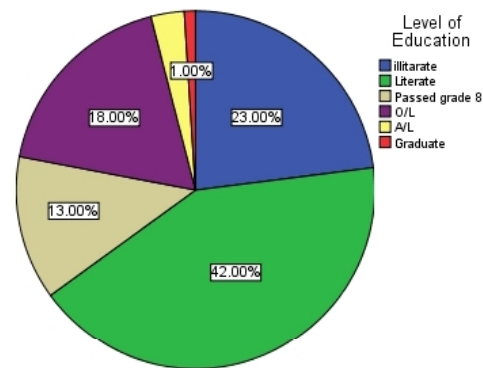

Fig. 8 Education level of the household level coir yarn labourers

1. Age

Since, the recorded P-value is less than 0.05, the null hypothesis could be rejected. That indicates the income has changed according to the age. The highest income has appeared in the age category 'above 55'and the lowest income has appeared in the age category 'lower than 26'. On the other hand, '26-35' age category has obtained significant level of income. It is interesting to note that unproductive age workers earn the highest income. Because of they have lesser job opportunities with the age, long term practice in the coir industry and selection of the job as a main income source. However, most of the other workers have selected the household level coir yarn industry as an extra income source.

2. Gender

As the indicated P value is 0.408, there is a possibility to accept the null hypothesis. Moreover, it can be suggested that the income does not change according to the gender. Among the workers, 96% of workers are female. Basically, the coir yarn industry is a female dominated industry. Male workers are employed in the industry with the intention of supporting the spouse or as a source of extra income.

3. Level of Education

As the indicated P-value is 0.000, the null hypothesis can be rejected and that emphasizes that the income has changed according to the level of education. The highest income is earned by the illiterate workers and the workers who have passed the Grade 8 in their secondary education. However, the lower income is earned by the workers who have higher education. Because of education, there is a less involvement of educated people for this type of industries.

4. The Methods of Engagement

As per the p-value, it revealed that the income has changed according to the methods of engagement. The workers who have employed with the support of their parents have earned

higher income than the workers who involved this industry on their own.

TABLE III
MEAN COMPARISON

Variables		P value	Mean Rank	Test
Age	< 26	.000	6.28	Kruskal-Wallis
	26-35		44.20	
	36-55		31.02	
	>55		75.40	
Gender	Female	.408	51.01	Mann-Whitney
	Male		38.38	
Level of Education	Illiterate	.000	69.85	Kruskal-Wallis
	Literate (not passed grade 8)		49.19	
	Passed grade 8		69.62	
	O/L		19.19	
	A/L		36.50	
	Graduate		17.50	
What is the method you are engaging the job?	By Parents	.000	70.96	Kruskal-Wallis
	Own willingness		22.25	
Are you satisfied with this job	Yes	.000	71.43	Mann-Whitney
	No		33.37	
Have you employed your children in this job	Yes	.000	85.54	Mann-Whitney
	No		36.88	
Have you obtained any support from the government	Yes	.000	61.54	Mann-Whitney
	No		39.01	
If yes, which method	Clinic (for job relate diseases)	.000	37.50	Kruskal-Wallis
			12.00	
	Awareness program			
What is the purpose of your borrowings?	Consumption	.051	53.06	Mann-Whitney
	Investment		38.00	
At which rate are you borrowing loans?	<15	0.462	46.46	Kruskal-Wallis
	15-20		58.45	
	>20		51.41	
How do you fulfil your urgent financial needs?	Borrowing from household producers	.056	37.89	Kruskal-Wallis
	Village level societies		62.24	
	From private banks		45.67	
	From village borrows		51.24	
	From relations		66.11	
	From Public sector banks		50.78	
Number of working hours per day	<5	.000	18.62	Kruskal-Wallis
	5-8		41.05	
	>8		86.00	
produce as a main job	yes	.000	71.83	Mann-Whitney
	No		37.43	
Number of completed units per day	<70	.000	14.27	Kruskal-Wallis
	71-80		39.28	
	81-100		62.47	
	>100		86.00	
Do you suffer any diseases relating to this job?	yes	.047	45.19	Mann-Whitney
	No		56.73	
If yes, what are they	Skin diseases	.001	19.88	Kruskal-Wallis
	Back pain		34.71	
	Headache		34.23	
	Asthma		5.00	

Dependent variable: income from coir industry

5. Satisfaction

As per the p-value, the null hypothesis can be rejected and it concludes that the income has changed according to the satisfaction of the labourers. The satisfied labourers have earned more income than those who are unsatisfied. General opinion is that the satisfied workers have ability to earn more than others.

6. Employment of Children in the Coir Industry

As per the p-value, the null hypothesis could be rejected and that explains that the income has changed according to the employment of children in the coir industry. If employment of children in the coir industry is prevalent, their income is high with compared to the other type. When children have employed in this sector, there is a higher opportunity to obtain the support from them.

7. Support from the Government

As the indicated P value is 0.000, the null hypothesis can be rejected and that indicates the income has changed according to the support from the government. The labourers who have obtained the support of the government have earned higher income.

8. Method of Government Support

The P-value has recorded as the 0.000. Therefore, there is a possibility to reject the null hypothesis and that explains that the income has changed according to the method of government support. The workers who participated to the clinics (Job related diseases), have achieved more income than other methods.

9. The Purpose of the Borrowings

As the indicated P-value is the 0.051, one can accept the null hypothesis. That means the income has not changed according to the purpose of the borrowings.

10. The Rate of Loan Obtained

As the indicated P-value is 0.462, the null hypothesis can be accepted. That indicates that the income has not changed according to the rate of loan obtained. That revealed that if workers need a financial assistance, they only considered about the accomplishment of that need without considering the rate of loan.

11. The Method of Fulfilling Urgent Financial Needs

As per the P-value, the income has not changed according to the method of fulfilling the urgent financial needs. The workers only consider about the fulfilment of the vital financial needs immediately without considering the benefits of the types of the loan and that does not relate with the income level.

12. Working Hours per Day

In this case, one can reject the null hypothesis and it explains that income has changed according to the working hours per day. The people who have worked above 8 hours have accessed the highest income and the people who have worked less than 5 hours, have earned the lowest income. That is true with common rule of working more hours have ability to generate more income.

13. Employed as a Main Job

The P-value has recorded as 0.000. Therefore, the null hypothesis can be rejected. That explains the income has changed according to the selection of the coir production as the main job. If people join the industry as a main job, they

will earn more. As result of selection as a main job, those people who work hard have earned more.

14. Number of Completed Units per Day

Recorded P-value is 0.000. Therefore, null hypothesis could be rejected. That indicates the income has changed according to the completed units per day. The labourers who have produced more than 100 units, recorded highest income, and lowest income is recorded by the people who have produced below 70 units. Further 81-100 unit producers have generated significant income.

15. Suffering from Job Related Diseases

The P-value has recorded as 0.047, rejecting the null hypothesis indicates the income has changed according to the suffering from any job related diseases. People who have suffered a job related diseases have obtained lower income and vice versa.

16. Type of the Disease

The P-value indicates the income has changed according to the type of the disease. The labourers who have earn higher income; they are suffering from back pain and the headache. However, the lowest income is earned by the labourers who suffer from asthma. However, people who are suffering from asthma cannot work more hours because there is dusty environment in the coir yarn industry.

C. Living Standard of the Household Level Coir Yarn Labourers

Under the living standard of the workers following aspects have been analysed and obtained the following results.

1. Ownership of the House

Nearly one third of respondents is living in their own house and earns the highest income. Further, among the respondents, the highest proportions of workers are living in houses which belong to parents and earn lower income. Only 19% and 18% of workers are living in the rented houses and subsidies of tsunami houses and earn lower income.

2. Nature of the Floor

Only 2% of workers are living in the tile floor house and earn high income. Of the remaining, 98 percent are living in clay and cement floor houses and generate low income level. Workers who are living in the cement floor houses, earn more with compared to workers who are living in the clay floor houses.

3. Nature of the Wall

According to the respondents, 46 percent of house's walls are made by using wood and earn lowest income.35 percent of highest incomes obtaining workers live in the house's where the walls are made by using bricks. Of the remaining, 19 percent of worker's house's walls are made from clay.

TABLE IV
SUMMARIZED OUTPUT FOR THE MEAN COMPARISON

Grouping variable	P value	Decision	Test
Ownership of the house	0.000	There is a significant with income	Kruskal-Wallis Test
Nature of the floor	0.013	There is a significant with income	Kruskal-Wallis Test
Nature of the wall	0.000	There is a significant with income	Kruskal-Wallis Test
Nature of the roof	0.000	There is a significant with income	Kruskal-Wallis Test
Nature of the water facility	0.000	There is a significant with income	Kruskal-Wallis Test
Nature of the lighting of houses	0.000	There is a significant with income	Mann-whitney U Test

TABLE V
MEAN RANK FOR OWNERSHIP OF THE HOUSES

	Ownership of the house	N	Mean Rank
Income from coir industry	Own house	27	78.11
	house belongs to parents	36	37.96
	Rented	19	30.71
	as a subsidies for Tsunami	18	55.06
	Total	100	

TABLE VI
MEAN RANK FOR NATURE OF THE FLOOR

Nature of the floor		N	Mean Rank
Income from coir industry	Clay	46	43.47
	Cement	52	55.00
	Tile	2	95.25
	Total	100	

TABLE VII
MEAN RANK FOR NATURE OF THE WALL

Nature of the wall		N	Mean Rank
Income from coir industry	Bricks	35	68.61
	Clay	19	46.29
	Wood	46	38.46
	Total	100	

4. Nature of the Roof

Nearly 66% of workers are living in the asbestos or coconut leaf roofing houses and earn lower income. Only 11% of workers are living in houses with tile roofing. Of the remaining, 23 percent are living in houses with zinc sheet or tar sheet and earn high income.

5. Nature of the Water Facility

Just 57 percent of workers use the public well for the water requirement and earn lower income. Only 22% of workers fulfill water requirement by using the piped water and earn the highest income. The rest of the 21% of workers depend on the private well and generate significant income level.

6. Nature of the Lighting of the House

Just 77 percent of labourers have electricity in their houses and earn higher income. Rest of the 23 percent of labourers depend on the kerosene oil and depend on lower income level.

TABLE VIII
MEAN RANK FOR NATURE OF THE ROOF

	Nature of the roof	N	Mean Rank
Income from coir industry	tile	11	56.50
	coconut leaf roof	30	41.48
	zinc sheet	16	63.38
	Tar sheet	7	79.93
	Asbestos	36	44.74
	Total	100	

TABLE IX
MEAN RANK FOR NATURE OF THE WATER FACILITY

	Nature of the water facility	N	Mean Rank
Income from coir industry	public well	57	43.17
	private well	21	46.21
	piped water	22	73.59
	Total	100	

TABLE X
MEAN RANK FOR NATURE OF THE LIGHTING OF THE HOUSE

	Nature of the lightening of house	N	Mean Rank
Income from coir industry	electricity	77	56.95
	Kerosene Oil	23	28.91
	Total	100	

V. CONCLUSION AND RECOMMENDATION

A. Conclusion

The findings revealed that household level coir yarn industry is dominated by the female workers and less amounts of workers have engaged this industry as the main occupation. In addition to that, elderly participation of the industry is greater than younger participation and most of them engaged in it as a source of extra income. Most of the workers were married and have lower level education in that area. Long term training and practices regarding the activities in the coir industry have helped this industry to survive.

The study was designed to identify the factors which affect to the income. Level of education, methods of engagement, satisfaction, child's engagement in the coir industry, support from the government, method of government support, working hours per day, employed as a main job, number of completed units per day, suffering any job related diseases and type of the diseases were related with income level of household level coir yarn labourers. In addition to that, living standards of the labourers have also been analysed. Those who earn more income, have the ability to maintain better housing condition. Most of the labourers do not have the access to the minimum level housing facilities. On the other hand, sanitation facilities of the labourers are maintained at a considerable level.

B. Recommendation

The proposed suggestions of this study are to increase the income level of the household level coir yarn labourers and it will be supported to resolve the most of problems which are faced by the labourers. There is a need for proper mechanization for the production of coir units. Currently, they are engaged in yarn production by using very simple machines. As well as, the majority of worker use the traditional method only. Therefore, technological transformation is essential for production and it will directly affect to enhance the income level of the labourers.

The raw material (coir fiber) is a common problem of the industry. Household level producers have to depend on the buyers who supply raw materials and collect value added products like yarn. That also affects to the labourers and arise a problem to continuation of the job. The strengthening of the raw material base and regulating the raw material supply is essential for the growth of the industry.

New technologies, markets and training programmes will support to attract the younger generation to the industry. As well as their entrepreneurial skills can be used productively for the development of the industry.

The establishment of the labourers' association is essential and most of the problems could be identified through the association. In addition, establishment of micro credit schemes are the best solution for financial barriers of the labourers.

Secured working environment, proper clinic service for the job related services can be executed. These types of programmes can be used to develop the income level of labourers through the improvement of the attendance workers.

The government consideration about the industry should be improved. Responsible parties of the government should take the necessary actions to develop of the industry with providing special consideration of the labourers. Further, there is an ability to create fund for the retired labourers who have worked for long time in the sector. The new entrance can be motivated thought this. Further introduction of new working and training centres will be supported to develop the efficiency of the labourers.

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