Factors Affecting the Coir Fibre Industry in Down South of Sri Lanka

M.K.M. AMANULLAH[1], M.T.N. FERNANDO[2] and A.M.T. P. ATHAUDA[1]

[1]*Department of Agribusiness management, Faculty of Agriculture and Plantation Management, Wayamba Uuniversity of Sri Lanka, Makandura, Gonawila (NWP)*

[2]*Agronomy Division, Coconut Research Institute, Lunuwila (61150).*

ABSTRACT

Coir fibre industry which continued to play an important role in the national economy of Sri Lanka has shown a downward trend in recent times. This study was carried out in down south of Sri Lanka to find out the major factors that determine the coir fibre production and to identify the problems prevailing in the coir fibre industry and to propose recommendations for the development and sustainability of the coir industry. Primary data was collected through a field survey, using a structured questionnaire. A coir fibre production function was specified and analysed using Ordinary Leased Square Method (OLSQ). The results suggested that the crucial factors affecting the coir fibre production were number of husks, Labour and types of fibre extraction technology. Further, this study reveals that the use of new technology has a greater potential to increase the coir fibre production.

KEYWORDS: Coir Fibre, Coir Products, Coir Industry

INTRODUCTION

Coir is a natural fibre extracted from the husk of coconut fruit (*cocos nucifera*). The husk is the raw material for the coir industry. Coir fibre is mainly categorized into bristle fibre and mattress fibre. Bristle fibre is exported as natural – cut and uncut, dyed – cut and uncut and value added forms such as tawashi brushes, twine, twisted fibre, doormats and rubberized coir. Mattress fibre is exported as bales and value added forms such as twisted fibre, coir yarn, geo-textile and rubberized coir pots and pads. Twisted fibre, twine and yarn are semi-finished products while the other products are finished products. Coir fibre pith is generated as a by-product in fibre processing. It is dried and coco peats are made as packing methods to export.

Coir usage has become very common among professionals in various industries due to its versatility. Coir has established remarkable reputation for its superiority to other available natural fibres. It is an abundant, renewable, natural resource with an extremely low decomposition rate and high strength compared to other natural fibres (Lanka, 1999).

With the increasing realization of the ecological negative impact of the chemical industries, global heating, fast declining natural resources and deforestation etc. in developed countries, the demand for environmentally safe products is increasing strongly. Therefore, renewable raw materials like the plant fibre products have promising market prospects, if they can be produced at an economically competing price and at a scale that the supply can be guaranteed (Dam, 1997).

Out of all Sri Lankan products, over 25 different types of coir products have a market base in over 50 countries in all over the world (Anon, 2002). Sri Lanka earns a substantial foreign exchange by coir industry and it was Rs. 4955.5 million in 2003 (Anon, 2003a).

The main buyers of coir are Germany, United States of America, United Kingdom, Japan, Italy, Netherlands, Spain, Greece, France and South Korea (Anon, 2003b).

The local coir fibre industry has shown a downward trend. Until 1999, Sri Lanka continues to be the world largest exporter of coir fibre and products containing coir, after which India took over.

Coir products face a tough competition from other natural fibres and synthetic products. Innovative, value added products are needed in order to maintain a competitive edge. Eco friendly products and Eco labelling could enhance the market. Supply of high quality raw material is a crucial input to upgrade the coir industry.

In Down South of Sri Lanka, higher cost of production for coir fibre extraction, human resource problem, fewer product diversification, less mechanization and low quality products produced were the major problems. Because of there, the supply base of coir fibre was shrinking; millers were unable to deliver the raw material that meet the market needs and export volumes are decreasing. Therefore, there is an urgent need to identify the causes and potential solutions. However, no detailed study has been conducted so far for coir industry in down south of Sri Lanka.

The objectives of this study were to identify the factors affecting the coir fibre production and to identify the problems in coir industry and to give recommendations for the sustainable growth of the coir industry.

METHODOLOGY

1) Data Collection

Primary data was collected using a pre-tested questionnaire by a field survey conducted from February 2005 to April 2005, in Ambalangoda, Rathgama, Boossa, Dadalla, Nugaduwa, Denipitiya, Matara, Weeraketiya and Tangalle areas in down south of Sri Lanka.

Thirty coir fibre millers were selected from identical areas by cluster sampling techniques. Quantitative and qualitative data about the coir products, raw materials, buying and selling location, Machinery usage and labour usage was collected.

Data on inputs outputs and places of buying and selling was used to develop the marketing channels.

2) Analytical method

Production function was estimated for coir production using the following econometric model.

The output of coir fibre is assumed to be a function of the its major factors of production. The numbers of husks, Labour, cost of maintenance, cost of power, type of technology and land extent. Type of technology has been considered as a dummy variable.

Econometric Model

$Y_f = f$ (Hsk, Lab, Mnt, Pow, Tech, Lnd)

Where,

Y_f = Yield of fibre in kg per day
Hsk = Number of husks per day
Lab = Labour in man-day
Mnt =Maintenance cost in Rs. per day
Pw = Cost of power in Rs. per day
Tech = Type of technology (dummy variable)
Lnd = Land extent in hectares

The following empirical model was employed to estimate the relative importance of the factors affecting the coir fibre production.

Empirical model

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + D_1 + D_2$$

Y - Yield of fibre in kg per day
β_0 - Intercept
β_1 - β_5 partial regression coefficients
X_1 - Number of husks
X_2 - Labour in man day
X_3 - Maintenance cost in Rs. per day
X_4 - Cost of power in Rs. per day
X_5 - Land extent in hectares
D_1 - Dummy variable 1
D_2 - Dummy variable 2

Different functional forms of models such as linear, log-linear, log-log were tested. Linear model was the best fitted compared to other models.

RESULTS AND DISCUSSIONS

Table 1 presents the results of the multiple linear regression model.

Table 1. Results of the Multiple Linear Regression Model for coir fibre production

Variable	Estimated Coefficient	t-value	P-value
Intercept	33.17365	0.42	0.6794
Husks	0.09252	3.03	0.0062*
Labour	43.31136	4.43	0.0002*
Maintenance	0.68266	1.89	0.0727
Power	0.16947	1.09	0.2890
D1	-204.58828	-4.06	0.0005*
D2	-229.96367	-4.47	0.0002*
Land	32.59131	0.51	0.6145

*Significant at 5% $R^2 = 0.9951$

The estimated model with the specified variables explained 99.51 percent of the variability of the yield of coir fibre. The results revealed that the yield of coir fibre was significantly determined by the number of husks, Labour and types of technology (Table 1). It further indicated that the number of husks was significant at the 5% probability level and showed a positive relationship with the yield. The man days of labour showed a positive relationship with the yield and it was also significant at the 5% probability level. The types of technology showed a negative relationship with the yield and it was significant at the 5% probability level.

There were three types of technology used in transformation of husks into fibre.

a) Traditional drum pairs – driven by diesel engine
b) Traditional drum pairs – driven by electric motor
c) Defibering machine

With the use of technology type (a) Traditional drum pairs – driven by diesel engine the yield will reduce by 229.96kg, whereas the yield will reduce by 204.58kg with use of technology type (b) Traditional drum pairs – driven by electric motor. When the technology type (c) is used, the yield is higher compared to the technology type (a) and (b).

The results indicated, average fibre production per man day using new technology was higher (88kg) and lies between 72kg – 93kg whereas in the traditional method it was 53.5kg and lies between 42kg – 64kg. Furthermore, labour cost per kilogram of fibre production using traditional method was significantly higher (Rs. 4.10) and in the range of Rs. 3.60 – 4.70 while using new technology where it was Rs. 1.90 and in the range of Rs. 1.70 – 2.10. This clearly showed that the use of new technology has increased the utilization of the number of man-days of labour as well as the labour efficiency and reduced the cost of production.

As husks were abundant in the region, it is possible to expand the use of husks input to increase the coir fibre production. Labour could be increased only to a certain extent because of the shortage of trained labourers in the industry and the negative attitude of the people. Use of new technology has increased the production and reduced the labour requirement. Therefore, it is important to develop a new technology for coir fibre production.

Marketing channel

Due to the diversity of coir products made in down south, the marketing channels turned out to be very complex (Figure 1). Brown matured husks were purchased by brown fibre producers from fresh coconut wholesalers, while green husks were purchased by a few white fibre producers from fresh coconut wholesalers. Among brown fibre producers, 55% involved only in fibre extraction while the rest 45% fabricated products such as twine, twisted fibre, geo-textiles and door mats. There were no direct exporters among brown fibre producers. The producers of brooms, brushes, mattresses, geo-textiles, doormats, yarn, twine and twisted fibre have directly purchased brown fibre from fibre producers. Exporters purchased some proportion of mattress fibre and bristle fibre.

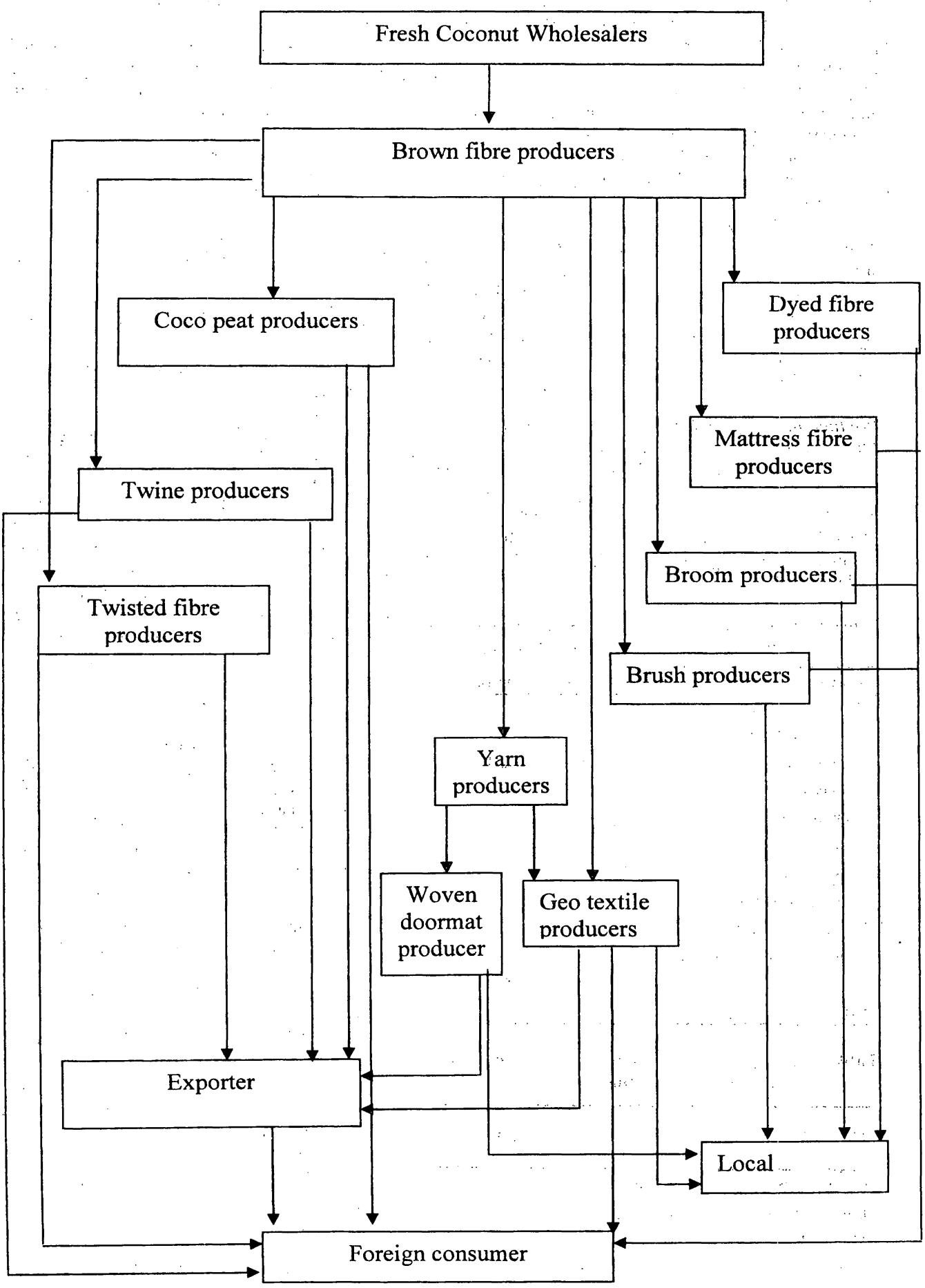

Figure 1. Marketing channel of coir products in down south of Sri Lanka

Mattress fibre as bales and bristle fibre in cut and uncut, natural and coloured forms were exported. Brooms, mattresses and doormats were sold directly to local consumers or through a middleman. Some proportion of brush producers sold brushes to local consumers and rest were directly exported. A portion of yarn was directly transmitted to local consumers and another portion was purchased by doormat producers and geo-textile producers. Geo-textile, twisted fibre and twine were exported directly through exporters or through middleman and exporters.

Brushes, mattresses, doormats, geo-textiles, brooms were exported as finished products. Yarn and twine were exported as finished products while they are also locally used as raw materials for making ropes, mats, mattings, carpets, nets, bags etc. Exported twisted fibre was untwisted to make rubberised coir pads, which were used in the coir industry, mattress and cushioning materials. Coco peat was used as a substitute for peat moss.

Production and Marketing Problems Cited by Coir Millers in Down South of Sri Lanka

Negative attitude of the people, lack of skilled labour, high manual labour cost, high cost for transportation, lack of credit scheme, poor marketing structure, lack of initial capital were the major production and marketing problems cited by coir millers (Table 2).

Table 2. Production and marketing problems cited by coir millers in down south of Sri Lanka

Constraints	% Millers reporting
Negative attitude of the people	92
Lack of skilled labour	86.5
High manual labour cost	82.4
High cost of transportation	74
Lack of credit scheme	66.3
Poor marketing facilities	54
Lack of initial capital	52.7
Lack of mechanization	51.4
Low prices for products	48.5
Synthetic substitute products	40
Lack of extension support	28
Less product diversification	17.5

Table 3. Suggestions stated by the coir millers to overcome the problems

Suggestions	% of millers reporting
Conduct labour training programmes	89
Low interest rate credit facility is required	84.6
Market development	73
Use new technology for fibre extraction	64.5
Improve the product quality	59
Use new fibre extraction techniques to attract the people for coir industry	**28.4**

Suggestion Stated by the Coir Millers to Overcome the Problems

Table 3 shows that conducting of labour training programmes, giving low interest rate credit facilities, market development, use new technology for fibre extraction from husks and improve the product quality were the main suggestions stated by the millers to overcome the present problems.

CONCLUSIONS

The results of the study revealed that the number of husks, man days of labour, and types of technology are the significant factors affecting the coir fibre production. Furthermore, use of new technology had a greater potential to increase the coir fibre production. Existing fibre producers need to expand their firms for large scale production of finished and semi-finished coir products with product diversification while using new machinery such as defibering machines for fibre extraction.

Coir fibre and products were sold to local market and exported directly or through one or more middlemen, while there were no direct exporters among fibre millers.

The major problems faced by millers were negative attitude of the people, lack of skilled labour, high manual labour cost, high cost for transportation, lack of credit schemes, poor marketing structure and lack of initial capital. The study revealed that there is probability to increase coir production by conducting of labour training programme, giving low interest rate credit facilities, market development, use of new technology for fibre extraction from husks and improve the product quality.

ACKNOWLEDGEMENTS

Authors wish to express their sincere gratitude to Prof. S.J.B.A. Jayasekara, Dean Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka for the support and advice in conducting this study. Their sincere thanks are also due to Mrs. N.R. Abeynayake, Lecturer, Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka for the guidance. Also, authors gratefully acknowledge Dr. W.J.S.K. Weerakody and the staff of the computer unit for assisting and giving computer facilities, Wayamba University of Sri Lanka.

REFERENCES

Anon (2002). Sri Lanka is largest exporter of brown fibre. Online edition of Daily News-News.htm Available at: http://www.dailynews.lk/2002/06/18/new17.html (Accessed on 17 Jan 2005).

Anon (2003a). Sri Lanka Coconut Statistics 2003. Coconut Development Authority, Colombo.

Anon (2003b). Coco Market Focus. Coconut Development Authority, Marketing Development and Research Division, Colombo.

Dam, J.E.G.V. (1997). Prospects for coir technology and market developments, p.113, 114. In Arancon, R.N. (ed). Environment friendly coconut products. Proc.xxxiv cocotech meeting.

Lanka Santha, P.E. (1999). Facts on coir. Availableat:http://www.rolanka.com/index.asp?pg=coirarticle (Accessed on 25 Jan 2005).