An Investment and Export Analysis of Coir Enterprise in Tamil Nadu, India

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I. INTRODUCTION

India is the largest coir producer in the world accounting for more than 80 per cent of the total world production of coir fibre. Countries like India, Sri Lanka, Mexico, Vietnam, and Caribbean Countries produce Coir. Coir's global production is about 350,000 tonnes. India and Sri Lanka being the major producers of coir, account for 90 per cent of the world production.. The coir industry is contributing significantly for creation of livelihood in major coconut growing States and union territories of India like Kerala, Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra, Goa, Orissa, Assam, Andaman and Nicobar, Lakshwadeep and Pondicherry. Kerala had exported 73,665 tonnes of products valued at Rs 709.58 crore in 2013-14. In India, Allepy district in Kerala state is the coir hub and is the major deciding factor of coir trade in India. The rate of coir is mainly fixed in other markets of India on the basis of Allepy market. Tamil Nadu is the second largest producer of Coir fiber in the country after Kerala.

Tamil Nadu produces 60 per cent of the total coir yarn, but only a little is being used for making value-added products. The total area of the coconut cultivation in Tamil nadu is 3, 57, 100 hectares and production is 3243.50 million and the productivity is 9083 nuts per hectare which surpasses the all India average productivity of 6632 nuts per hectare. There are about 1300 coir processing units in the State out of 10000 units in the country.

In Tamilnadu, coir is mainly produced in Pollachi taluk of Coimbatore district, Kanyakumari and Nagercoil districts due to its large area under cultivation of coconut which is due to suitable climatic conditions available in these regions for fibre production. Besides these, coir rope making cottage industries are available in Dindigul taluk, Palani taluk and some regions of Salem district. As per the data available with Coir board regional office in Pollachi, there are 600 coir industries in Pollachi taluk. The main products obtained from these industries are coir fibre (white and brown) and coir pith blocks. . In the brown coir fiber sector, Tamil nadu occupies the first place with a production of 1.33 lakh Million Tonne per annum and contributing to 65 per cent of total production in India. This speaks of the immense potential of the coir industry in Tamil Nadu especially in Pollachi district. But enough studies are not available on the economics of investment in this industry and also the export analysis of this sector and hence the present study was taken up in Pollachi district.

OBJECTIVES

The specific objectives of the study are as follows
1. To study the cost and returns of coir enterprise.
2. To estimate the breakeven point of coir production
3. To assess the income and employment generation from coir production
4. To estimate the financial feasibility of coir production units.
5. To analyse the growth and instability in export of coir products.
6. To assess the direction of trade in export of coir products.

II. METHODOLOGY

In Tamil Nadu, the Pollachi taluk in Coimbatore was purposely selected for the study because Pollachi taluk is the leading producer of coir in Tamil Nadu and it has largest number of coir industries namely 600 industries which engaged in coir fibre production (Brown & White) and coir pith production. Twenty industries were selected for primary data collection from this taluk.The secondary information such as export of coir and related products from India both product wise and country wise was collected for the period from 1998-2014 from the website of coir board. The tools of analysis used in the study are

1.Break even output (BEO)

Break even output is the quantity at which all cost allocated to a product are equal to all revenue from its sale. If quantities produced is smaller than BEO, there is loss and vice versa. The BEO for the coir production units was calculated by using the following formula.

Break even output = $F / (P - V)$
Where,

F = Fixed cost (Rs.); P = Unit output price (Rs. /ton) ; V = Unit variable cost (Rs. /ton).

2. Investment Analysis

The discounted methods of analysis namely Net Present Value (NPV), Benefit Cost Ratio (BCR) and Internal Rate of Return (IRR) were used to study the technical feasibility and economic viability of the coir industries.

3. The annual **growth rate** of quantity and value of export of coir products was estimated with compound growth rate analysis. The instability of coir products was measured by Coppack instability index.

4. Markov chain analysis was attempted to analyze the **direction of trade** and change in the export of coir products.

III. RESULTS AND DISCUSSION

I. Economics of coir enterprise

1. The cost and returns of coir enterprise product wise

The cost and returns of coir enterprise product wise is presented in Table 1. The fixed cost included rental value of land, depreciation of machineries, maintenance cost, insurance, tax and interest on fixed capital. The variable cost included cost of raw materials, labour cost, power charges, official expenditure and interest on working capital. It could be seen from the table that more than 80 per cent of total cost was accounted by variable cost and it was highest in the 2ply coir rope and curled coir rope with a proportion of 90.53 per cent and 89.06 per cent respectively. The total cost of coir fiber production (Rs.13.02 lakh/year) was highest among all products followed by curled coir rope (Rs.11.93 lakh/year), thirdly with 2ply coir rope (Rs.10.83 lakh/year) and lastly with coir pith blocks (Rs 9.73 lakh/year).

The gross returns also revealed similar pattern for the first two products with highest return in coir fiber (17.45lakh/year) followed by curled coir rope with Rs, 14.63 lakh/year. The coir pith block and 2ply coir rope ranked third position and yielded similar gross return with Rs.13.10 lakh/year and 13.05 lakhs/year respectively. The net return of coir fiber production (Rs.4.43 lakh/year) was also highest as compared to others. But, the coir pith achieved the second position with Rs.3.37 lakh/year followed by curled coir rope (Rs.2.70 lakhs/year) and 2ply coir rope (Rs.2.23 lakh/year). Even though the total cost for the production of coir pith block was low, the returns obtained was high as compared to 2ply coir rope and curled coir rope. This showed that coir pith block product could be taken as a profitable enterprise by capital scarce entrepreneurs. This is supported by the fact that the proportion of net return per total cost was highest for coir pith block with 34.64 per cent. On the other hand, coir fiber production could be taken by capital surplus entrepreneurs since the product had both high cost of production and high net returns.

Table. 1 Cost and returns of coir enterprise - product wise (Rs.lakh/year)

S. No.	Products	Fixed Cost	Variable Cost	Total cost	Gross return	Net return	Net return/ Total cost (%)
1	2ply coir rope	1.03 (9.47%)	9.80 (90.53%)	10.83 (100.00)	13.05	2.23	20.59
2	Curled coir rope	1.30 (10.94%)	10.63 (89.06%)	11.93 (100.00)	14.63	2.70	22.63
3	Coir fiber	2.45 (18.82%)	10.57 (81.18%)	13.02 (100.00)	17.45	4.43	34.03
4	Coir pith block	1.44 (14.80%)	8.29 (85.20%)	9.73 (100.00)	13.10	3.37	34.64

Table. 2 Cost and returns of coir enterprise - industry wise (Rs.lakh/year)

S. No.	Industry	Fixed Cost	Variable Cost	Total cost	Gross return	Net return	Net return/ total cost (%)
1	2Ply coir rope+ Curled coir rope	2.38 (16.16)	12.38 (83.84)	14.76 (100.00)	21.40	6.60	44.99
2	Coir fiber+ Coir Pith blocks	3.66 (20.96)	13.80 (79.04)	17.46 (100.00)	33.20	15.74	90.15
3	Coir fiber + 2Ply coir rope + Curled coir rope	4.25 (22.38)	14.74 (77.62)	18.99 (100.00)	33.75	14.76	77.25
4	Coir fiber + 2Ply coir rope + Curled coir rope + Coir Pith blocks	6.20 (22.31)	21.57 (77.69)	27.77 (100.00)	53.26	25.49	91.79

2. The cost and returns of coir enterprise – industry wise

The cost and returns of coir enterprise industry wise was also analysed to derive further insights since these industries produced various products of coir and presented in Table 2. It could be seen from the table that as like product wise analysis, the industry wise analysis also revealed the similar pattern of variable cost accounting for a major proportion of total cost as compared to the fixed cost. With regard to total cost, the industry with Coir fibre + 2Ply coir rope + Curled coir rope + Coir Pith blocks had high production cost of Rs.27.77 lakh and hence it was considered as a large scale industry on comparative terms. The said industry was followed by industry with coir fibre + 2ply coir rope + curled coir rope (Rs.18.99 lakh) and Coir fiber + coir pith industry (Rs.17.46 lakh) and these two industries was considered as a medium scale industries again on comparative terms. The 2ply coir rope + curled

coir rope industry with production cost of Rs.14.76 lakh was considered as a small scale industry.

With regard to both gross return and net return, the large scale industry ranked first followed by medium scale industries and lastly with small scale industry. The analysis of net return per total cost revealed that large scale industry was the most profitable enterprise with a proportion of 91.79 per cent and was closely followed by the medium scale enterprise of Coir fiber+ Coir Pith blocks with a proportion of 90.15 per cent. The latter was more profitable among medium scale enterprises as it combined the two successful products of Coir fiber and Coir Pith blocks. Hence this industry could be taken as a profitable enterprise by capital scarce entrepreneurs. On the other hand, the large scale industry could be taken by capital surplus entrepreneurs whose industries had both high cost of production and high returns.

IV. The Breakeven point of coir production

The Break Even Point (BEP) of coir production was analysed and presented in Table 3. It could be seen from the table that BEP was highest for coir pith block with 435.58 Quintals/ year followed closely by coir fiber and curled coir rope. The 2Ply coir rope had the lowest BEP of 91.91 Quintals/ year. The actual production also revealed the similar pattern with coir pith block having the highest production of 1455 Quintals/ year and 2Ply coir rope having the lowest production of 290 Quintals/ year. Coir fiber and curled coir rope formed intermittent positions. Thus the BEP was correlated with actual production as high BEP coincided with high production and low BEP coincided with low production. Finally, it could be concluded from the table that the actual production for all the products was higher than the BEP of the respective products which showed that the production of all these coir products was a profitable venture.

Table.3. Breakeven point of coir production

S.No.	Products	BEP (quintals/year)	Actual production (Quintals /yr.)
1.	2Ply coir rope	91.91	290
2.	Curled coir rope	217.72	665
3.	Coir fiber	252.29	691
4.	Coir pith block	435.58	1455

V. INCOME AND EMPLOYMENT GENERATION OF COIR PRODUCTION

The income and employment generation product wise is presented in Table 4. As already discussed, coir fiber and coir pith block were the profitable products from the analysis of net returns. In respect to employment generation, it depicted a different scenario with 2py coir rope being the labor intensive product (2400 man days) followed by coir fiber (2100 man days), thirdly by curled coir rope (1800 man days) and lastly by coir pith block (1500 man days). Thus it could be concluded from the table that 2Ply coir rope was a labour intensive production and hence it was recommended for labour surplus areas.

The income and employment generation industry wise is presented in Table 5. As already discussed, it was evident from the net return analysis that the large scale industry of Coir fiber + 2Ply coir rope + Curled coir rope + Coir Pith blocks was the most profitable enterprise followed by the medium scale industry of Coir fiber + Coir Pith blocks. With regard to employment generation, the large scale industry was most labour intensive with 7500 man days/ annum and the medium scale industry of Coir fiber + Coir Pith blocks was the least labour intensive with 3600 man days/ annum. Thus it could be concluded from the table that the large scale industry is both capital and labour intensive and recommended for both resource surplus production. On the other hand, the medium scale industry of Coir fiber + Coir Pith blocks is recommended for both capital and labour resource scarce production.

Table.4. Income and employment generation - Product wise

S. No.	Product	Net return (lakhs/year)	Employment (man days)
1.	2Ply coir rope	2.23	2400
2.	Curled coir rope	2.70	1800
3.	Coir fiber	4.43	2100
4.	Coir pith block	3.37	1500

Table 5 Income and employment generation – Industry wise

S.No.	Industry	Net Return (Lakhs/year)	Employment (man days)
1.	2Ply coir rope + Curled coir rope	6.60	4200
2.	Coir fiber + Coir Pith blocks	15.74	3600
3.	Coir fiber + 2Ply coir rope + Curled coir rope	14.76	6600
4.	Coir fiber + 2Ply coir rope + Curled coir rope + Coir Pith blocks	25.49	7500

VI. INVESTMENT ANALYSIS OF COIR PRODUCTION

The investment analysis of coir production was carried out with the three discounted techniques of NPV, BCR and IRR and presented in Table 6. The NPV and BCR were evaluated at the discount rate of seven per cent, the rate of long term lending by commercial banks. It could be seen from the table that the first discounted technique of NPV showed that all the industries were profitable since it yielded the positive NPV. Among the four industries, based on this technique, the large scale industry of Coir fiber + 2Ply coir rope + Curled coir rope + Coir Pith blocks was most profitable followed by the medium scale industry of Coir fiber + Coir Pith blocks which go hand in hand with the already derived results from economic analyses. The BCR analysis also showed that the aforesaid two industries are most profitable with ratios of 1.42 and 1.37 respectively. The IRR analysis also revealed that the above mentioned two industries of Coir fiber + 2Ply coir rope + Curled coir rope + Coir Pith blocks and Coir fiber + Coir Pith blocks were most profitable with IRR of 22.91 and 20.76 respectively. Thus it could be concluded from the table that all the four industries were having efficient investment as they passed the investment criteria of NPV, BCR and IRR, Among the four industries, the industry of Coir fiber + 2Ply coir rope + Curled coir rope + Coir Pith blocks and the industry of Coir fiber + Coir Pith blocks were having sound investment as they had the highest investment criteria of NPV, BCR and IRR.

Table 6 Investment analysis of coir production

S. No.	Product	NPV	BCR	IRR
1.	2Ply coir rope + Curled coir rope	36.86	1.19	17.84
2.	Coir fiber + Coir Pith blocks	95.78	1.37	20.76
3.	Coir fiber + 2Ply coir rope + Curled coir rope	84.57	1.31	18.54
4.	Coir fiber + 2Ply coir rope + Curled coir rope + Coir Pith blocks	169.86	1.42	22.91

VII. EXPORT ANALYSIS OF COIR PRODUCTS FROM INDIA

1. Growth rate and Coppack Instability Index

The compound growth rate of quantity and value of export of coir product from India for the period from 1988-2014 was analyzed and presented in Table 7. It could be seen from the table that the compound growth rate of quantity of export of coir product was 1.16 for the period from 1998 to 2014 and the said growth rate for value of export of coir products for similar period was 1.11. It showed that the growth rate of quantity of export of coir products and the value of the export of coir products from India was almost similar and recorded equal performance in export. The Coppack instability index for quantity of export of coir products was 19.09 and for value of coir export, it was lesser with 15.33 which showed a positive sign .The Coppack instability index of both quantity and value of export of coir products was less than 30 which showed the stability of coir exports from India. These two analyses showed that the export of coir products from India are stable and growth rate is similar both in quantity and value of export.

Table 7 Export of coir products - quantity and value– India (1998 – 2014)

S.no	Particulars	Quantity	Value
1.	Compound growth rate	1.16	1.11
2.	Coppack instability index	19.09	15.33

2. Direction of Trade of coir exports

The direction of trade of coir exports was analysed by Markov chain analysis and the results are presented in Table 8. The transitional matrix presented in table provides a broad indication of change in direction of export of coir products from India for the study period (2005 – 2006 to 2013 -2014).The major Indian coir products importing countries were Republic China, USA, South Korea, Spain, Netherland, Italy and all other importing countries were grouped under the category of the other countries. The row elements in the transitional probability matrix provide the information on the extent of loss in trade, on account of competing countries. The columns element indicates the probability of gains in volume of trade from other competing countries and the diagonal element indicates probability of retention of the previous year's trade volume by the respective country.

A major share of India's coir products export Republic China's market was retained to the tune of 86 percent during the current period. Of the remaining 14 percent was diverted to South Korea. Also Republic China has probability to gain 57 percent of market share of South Korea alone. India's coir products export to the USA market was retained to the level of 62 percent during the current period. The remaining 38 percent was diverted to Spain (16 percent), Italy (5 percent) and other countries (17 percent). India's coir products export to South Korea market was retained to the level of 13 percent and the remaining 29.9 percent was diverted to Spain (6.9 percent), Netherland (7.1 percent), Italy (9.8 percent) and other countries (6.1 percent). And a probability gain 57.1 percent of the India's coir product export to South Korea.

During the current period India's coir products export to Spain could not be retained. About 75percent was

diverted to Netherland and has76 percent of probability gain from Netherland. Similarly Netherland could not retained in current period. It also has probability gain of 26 percent from others and 53 percent was diverted to other countries. In Italy the export market was retained about 40 percent and has a probability gain of 0.2 percent from other countries. India's coir products export to the other countries market was retained to the level of 62 percent.

A major share of India's coir products export Republic China's market was retained to the tune of 87 percent during the current period. Of the remaining 12 percent was diverted to South Korea. Also Republic China has probability to gain 100 percent of market share of South Korea alone. India's coir products export to the USA market was retained to the level of 83 percent during the current period. The remaining was diverted to Spain (6 percent) and other countries (10 percent). India's coir products export to South Korea market was not retained

and has a probability gain of 24 percent from Netherland and other countries (0.3 percent).Netherland was retained to the level of 36 percent and the remaining was diverted to other countries (39 percent) and has a probability gain from Italy (61 percent) and other countries (5 percent). Italy has retained 0.7 percent and 4 percent was diverted to other countries and has a probability gain from other countries (8 percent). The export market retention of other countries was 76 percent.

The results of transitional probability matrix of quantity and value of India's coir product export was Republic China was major importer of coir products from India in quantity (86 percent) during the current period followed by USA 62 percent, others (62 percent), Italy (41 percent) and South Korea (13 percent). In the value of export of coir products, Republic of china was high (88 percent) followed by USA (83 percent), others (76 percent), Netherland (36 percent) and Italy (8 percent).

Table 8   Transitional probability matrix for quantity of coir product export from India

	China	USA	South Korea	Spain	Netherland	Italy	Others
China	0.8554260	0.0000000	0.1445740	0.0000000	0.0000000	0.0000000	0.0000000
USA	0.0000000	0.6214035	0.0000000	0.1625052	0.0000000	0.0432621	0.1728292
South Korea	0.5713943	0.0000000	0.1295269	0.0691651	0.0709351	0.0975548	0.0614238
Spain	0.0000000	0.2479956	0.0000000	0.0000000	0.7520044	0.0000000	0.0000000
Netherland	0.0000000	0.0500931	0.3386333	0.0768224	0.0000000	0.0000000	0.5344512
Italy	0.0000000	0.0000000	0.5930117	0.0000000	0.0000000	0.4069883	0.0000000
Others	0.0000000	0.1040916	0.0000000	0.0000000	0.2689434	0.0028575	0.6241075

Table 9 Transitional probability matrix for value of coir product export from India

	China	USA	South Korea	Spain	Netherland	Italy	Others
China	0.878148	0.000000	0.121852	0.000000	0.000000	0.000000	0.000000
USA	0.000000	0.831054	0.000000	0.066259	0.000000	0.000000	0.102687
South Korea	1. 000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Spain	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1. 000000
Netherland	0.000000	0.000000	0.241195	0.000000	0.364376	0.000000	0.394429
Italy	0.000000	0.000000	0.000000	0.263355	0.616515	0.078427	0.041703
Others	0.000000	0.074786	0.003108	0.010388	0.057960	0.089865	0.763893

CONCLUSIONS

The study revealed that labour and capital surplus agripreuners are advised to go in for Coir fiber product or Coir fiber + 2Ply coir rope + Curled coir rope + Coir Pith industry which yielded high net returns but with higher investment. MSME enterprises can choose coir pith product or Coir fiber + Coir Pith blocks industry as it had the highest net return and less labour intensiveness. Entrepreneurs with labor intensive technologies can choose 2 ply coir rope industries as it had the highest employment generation.

Exporters can promote Value chain export of coir products as it was relatively more stable than quantity export by adopting tertiary export with branded

products. Export promotion organizations like APEDA and coir board should try to retain China and USA which are the stable importers from India both quantity wise and value wise. At the same time, countries like South Korea and Italy which lost in the value export should be captured by tertiary export.

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