CHAPTER 4

4.1 INTRODUCTION

As far as coir units of the study area are concerned, invariably all of them are engaged in the manufacture of brown fibre only. The production related functions analysed in this present chapter are for brown fibre only.

The analysis on cost, returns and resource-use efficiency of coir fibre production assumes great significance as it determines the overall profitability of the coir industry in the study area. The size of the unit, the type of coir fibre manufactured and the method of decorticating adopted are the major influencing factors in the cost of the production of fibre. For the purpose of analysis the present chapter has been divided into three sections. The first section deals with the production practices adopted by the units of the study area. The second section analyses the cost of production of the fibre manufactured and the returns from its production. The productivity and the resource-use efficiency are discussed in the third section. The last section deals with the production problems faced by the coir units of the study area.

4.2 PRODUCTION PRACTICES IN THE COIR UNITS OF THE STUDY AREA

Knowledge on the production practices followed by the units of the study area in the extraction of coir fibre is of vital importance as it helps to understand the various costs involved in its manufacture. There are generally two methods popular in the extraction of fibre namely the natural method and the mechanical method. The units of the study area could not employ the natural method of fibre extraction as it did not enjoy the natural coastal advantage in the region. The mechanical process of extraction involves two methods— the combing/ Defibring method and the beating/Decorticating method.
The units of the study area generally follow the mechanical process for the extraction of the fibre. But none of the units either fully employ the defibring or the Decorticating methods. The process that is followed is a matter of convenience and mostly based on size of units and the resources in hand. The method includes partly defibring and partly decorticating.

Then to separate the fibre from the crushed husk the unretting of fibre is carried out by pouring water daily. Which is done for reducing the retting period? The dry husk is soaked with water for a period of maximum of 10 to 15 days, while green husk is soaked only for 4 hours. Which is called the process of soaking? The specified period of soaking is neither reduced nor increased in order to gain the maximum output of fibre from the crushed husk. In the medium sized units the conveyor belts are used for transporting both the raw husk and the soaked husk to the burster machine in order to reduce the number of workers involved in the process.

The husks so soaked or unretted are fed into the Defibring machine and the Beating machine without allowing dry and green husks to undergo a process of retting. The fibre obtained from the decordicator or the defibring machine is fed into the sifter or turbo cleaner to remove the pith and the husk from the fibre. The resultant fibre is called the mixed fibre. It is then dried and baled into bundles of 35 kilograms each. The fibre thus obtained is called brown fibre or bristle fibre. Though another variety of white fibre is extracted in Kerala and some parts of Tamil Nadu, the units of the study area engage only in the manufacture of brown fibre.

Under the decorticating method, the use of machinery is limited to beating, cleaning and shifting activities. As many of the activities are carried out manually, it considerably increases the cost of production of fibre.
4.3 COST OF PRODUCTION

Cost refers to the amount of expenditure incurred or value of resources sacrificed either to manufacture a product or to render a service. The cost of production means the total expenditure incurred in manufacturing a product and becomes the preponderant portion of the total cost. It includes the cost of raw material, labour and manufacturing overheads. The cost of production being a parameter in determining the production efficiency of an industry its analysis is of vital importance. and thus the consideration enters into every business decision.

The cost of production in coir industry of the study area means the expenses incurred in the sequence of manufacture of coir fibre. The costs which are incurred on manufacturing of coir fibre are placed in two broad categories namely variable cost and fixed cost. Variable costs vary in direct proportion to changes in output and an increase in output means a proportionate increase in the total variable cost. thus is a linear relationship between the output and the variable cost. These costs are incurred on the employment of the variable factors of production like labour and raw material. Fixed costs, on the other hand, remain constant in total regardless of the changes in volume up to a certain level of output further they are not affected by changes in output. There is an inverse relationship between the output and the fixed cost per unit. These costs will exist even if no output is produced.

4.3.1 Input-output structure

The input-output structure shows a significant variation in the terms of gross revenue between the small and medium sized units in the use of resources in the manufacture of coir fibre. The resource inputs namely labour, material (husk), unretting, power and machine running are taken to have formed the input resources per 100 bundles of coir fibre. Similarly, the gross revenue of 100 bundles is considered as a measure of
the output. The input-output structure per 100 bundles of coir fibre for the small and medium size coir units is presented in Table 4.1.

**TABLE 4.1**

INPUT-OUTPUT STRUCTURE AT MEAN LEVELS OF MANUFACTURE OF COIR FIBRE FOR SMALL AND MEDIUM UNITS

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Small Units</th>
<th>Medium Units</th>
<th>t–Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross revenue (in Rs Per 100 bundles)</td>
<td>23857.60</td>
<td>25288.10</td>
<td>8.809*</td>
</tr>
<tr>
<td>Labour (in Rs Per 100 bundles)</td>
<td>7542.70</td>
<td>7182.12</td>
<td>3.876*</td>
</tr>
<tr>
<td>Material (Husk) (in Rs Per 100 bundles)</td>
<td>4397.62</td>
<td>4095.35</td>
<td>4.254*</td>
</tr>
<tr>
<td>Unretting (in Rs Per 100 bundles)</td>
<td>328.08</td>
<td>328.21</td>
<td>0.026</td>
</tr>
<tr>
<td>Power (in Rs Per 100 bundles)</td>
<td>2502.17</td>
<td>2244.97</td>
<td>6.935*</td>
</tr>
<tr>
<td>Machine running (in Rs Per 100 bundles)</td>
<td>820.39</td>
<td>319.58</td>
<td>77.589*</td>
</tr>
<tr>
<td>Number of Units</td>
<td>29</td>
<td>23</td>
<td></td>
</tr>
</tbody>
</table>

* The differences is significant at the 5 per cent level

Source: Primary data

It could be observed from Table 4.1 that the gross revenue of the output per 100 bundles of coir fibre for the small and medium units was Rs.23857.60 and Rs.25288.10 respectively. The difference in gross revenue between the two sizes of units stood at Rs.1430.50 and the difference was statistically significant at the 5 per cent level. Among the five variable inputs, the four inputs namely labour, material, power and machine running are found to be significantly different between the small sized and medium sized units. The amount spent on these variables by the small sized units stood at Rs.7542.70, Rs.4397.62, Rs.2502.17 and Rs.820.39 while it was Rs.7182.12, Rs.4095.35, Rs.2244.97 and Rs.319.58 for the medium sized units. The only input variable which is found to be not significantly different between the small and medium sized units is the unretting cost.
The small coir units spent on this input variable is Rs.328.08 but it was Rs.328.21 for the medium sized units.

It could be concluded that the significant difference between the two sized coir units was found in the application of the four variable inputs namely labour, material, power and machine running.

4.3.2 Cost Components

A study on various costs involved in the manufacturing of coir fibre plays a significant role in the price and output determination of a coir unit. A unit that produces the maximum output with the minimum cost is considered to be the most efficient and productive. Therefore, the cost incurred in the manufacture of coir fibre is an important factor for decision making. In order to maximize the profit, all the endeavors are to increase the revenue and lower the cost. The manufacturing cost of any industry basically falls under three elements namely cost material, labour and overheads. But the division of costs on the criterion of variability depends upon the nature of industry. The cost components in the coir industry are grouped under two heads namely variable and fixed by taking into account the nature of the distinct characteristics of production prevailing in the industry. Accordingly, the items which constitute the variable costs in the manufacturing of coir fibre are husk cost, that is raw material, labour cost, unretting cost, power cost, machine running cost, interest on working capital and pith disposal cost. The fixed costs include depreciation and interest on long-term borrowings.

The categories and their elements of cost components are given below.

4.3.2.1 Variable Cost

The major break-up of variable cost that relates to the manufacturing of coir fibre is raw material cost, labour cost, unretting cost, power cost, machine running cost, pith disposal cost and interest on working capital.
4.3.2.1.1 Cost of Labour

The cost of labour is the most visible and decisive element of cost in a manufacturing unit. In an industry like coir, right from the process of the unretting of the husk to the extraction of the fibre, labour plays a dominant role in every stage of production. It is the foremost major cost in the manufacture of fibre which takes more than 50 per cent share in the total cost. The labourers are employed in the industry either on a permanent or temporary basis.

The status survey of coir industry in Orissa (odisha) classifies the workers into regular and casual workers. The regular workers work for about 7 hours, while the casual workers work for 8 to 9 hours depending upon the production demand of the unit. Irrespective of sex, a worker is required to work in a coir unit for eight hours of a shift. Two or three shifts may be undertaken in a day. The workers get work on an average of fifteen days to twenty-five days in a month. Shangri measured labour in terms of man-day units of eight hours of work done by one adult man. For the purpose of standardizing the work, units of different categories of labour as men and women labourers were formed. Sundaresan observed that for the estimation of the cost of production, the wages paid to workers could be taken as the rate prevalent in the locality where the coir unit was located. Vijayachandran Pillai pointed out that labour productivity is the output per worker in eight hours per shift. Labour being a part of variable cost, is an important factor of production in the provision of the various elements of cost. Suganta

Ghose stated that out of the total workers engaged in the industry, 80 per cent were women. The number of female workers in the labour force overwhelmingly surpasses that of male workers. The majority of such workers are from agriculture. Further, he stated that the female worker gets lower wages than male workers in the coir industry.\footnote{Suganta Ghose, “Present Status of Coconut Processing Industry in India”, Vision, Vol.XXXII, No.3-4, Jan – June 2003, p.19.}

In the present study, labour cost included wages paid to both male and female workers. Even though the coir industry is not seasonal in nature, the availability of workers depends upon the agricultural seasons. Thus, some workers are employed on a casual and contract basis while the others are on a permanent basis. The cost of labour was calculated at the rate of Rs.80 per man-per shift of 8 hours which was the prevailing wage rate during the period of study. In the case of female workers, the prevailing wage rate was Rs.60 per man-day-per shift of 8 hours. No family labour was considered; it was not involved in the manufacturing of coir fibre. The commonly accepted method of wage payment in the study area is on time basis.

4.3.2.1.2 Cost of Raw Material (Husk)

Coconut husk which is considered a waste material is used as raw material by the coir industry. It is generally available in plenty. The raw material cost is the major portion of cost next to labour. Dr. P.K Balakrishnan, observed that for estimating the cost of production of fibre, the price of husk is determined for a lot of 1000 numbers by market forces in each locality.\footnote{P.K. Balakrishnan, “Evolution and Working of Coir Industry in India”, Coir Board, Kochi, 2005, p.194.} Sivaramana Reddy and P.K. Thampan, pointed out that nuts from coastal belts contain a comparatively higher percentage of husks, valued at the market price prevailing in that locality.\footnote{L. Sivaramana Reddy and P.K. Thampan, “Commercial Exploitation of Coconut Husk in Orissa”, Indian Coconut Journal, Vol.XIX, No.4, 1998, p.14.}
In the present study, the husks procured from own source was valued at the price prevailing in that locality whereas the husk purchased from outside was valued at the purchase price. Normally, the husks are purchased in lots of 1000 numbers. The price of husks ranges from Rs.185 to Rs.220. The price is normally higher during the period between September and January, because of short supply of husk due to the monsoon rain which affects its free movement. How ever price is low during the rest of the year where the supply of husks is abundant.

4.3.2.1.3 Cost of Unretting

The watering cost is incurred for unretting of husk in order to soften it making it suitable for subsequent operation. During the unretting, the dry husks or green husks are first soaked in water and then it is beaten with the help of the decorticator machine. The dry husk is normally soaked after it is beaten by that machine. The dry husk so beaten is soaked by pouring water for a minimum of 10 days. But the process of defibring of green husk is carried out usually four hours after it is beaten. The whole process is done with the help of watering. Therefore, the cost incurred in connection with water is another major component of the variable cost in coir industry. Invariably all the owners of coir units have bore wells of their own. Watering cost is mainly incurred by way of expenses on oil and grease used by motor pumps while pumping water. Depending upon the volume of the extraction of fibre, the watering expense may either increase or decrease as it is closely linked with the consumption of oil and grease. However while estimating the watering cost, the labour involved in the unretting process and the cost of power are not taken into consideration.

4.3.2.1.4 Cost of Power

Electrical Power is the backbone of coir industry and plays a vital role in fostering its industrial activity. The cost of consumption of electricity is a decisive factor in determining the cost of production of coir fibre. In coir industry all operations like
unretting of husks, defibring of fibre, separation of fibre and pith, drying and bundling of coir fibre, are all carried out with the help of electricity. The adoption of the shift system, work during nights and the increasing process of mechanization in the industry lead to increased consumption of power.

Power is the major item of cost, which takes more than 10 per cent of the total cost of production. For the present study the power consumed was valued at the rates charged by the local electricity board. The Board charges Rs.4.84 for one unit of electricity.

4.3.2.1.5 Cost of Machine running

Another important variable cost component in manufacturing of coir fibre is machine running cost. Kalpana observed that the machine running cost was an important part of the production cost and as such, for the purpose of her study the cost included the amount spent on fuel oil and lubricants, power, chemicals, consumables, packing material and water. She valued that cost at the purchase price.\(^{135}\) The unique feature of manufacturing in the industry is the frequent change of fuse carriers. The change of fuse carrier is required as and when it gets burnt. This occurs very often, once in two or three days. The cost of a fuse carrier ranges from Rs.2000 to Rs.4000. Therefore a sizeable amount is invested in the purchase of fuse carriers. The continuous operation of machines increased the extraction of fibre on the one side, but it leads to frequent change of fuse carriers on the other. As a result every coir unit has to stock a large number of fuse carriers causing heavy machine operating cost.

The amount spent on fuel, oil and lubricants, spares and parts, consumables and packing material (rope) are also included in this cost. In the present study the costs were valued at the purchase price. Since fuse carriers are generally used frequently, the

actual cost price of the number of fuse carriers used was considered in calculating the cost of power.

4.3.2.1.6 Cost of Pith Disposal

The need for the disposal of coir pith arises when it accumulates enormously in the vicinity of the coir units. After the separation of husk from fibre, the coir dust is to be disposed of properly, as it is capable of causing more environmental hazards to the areas where coir units are located. The expenses incurred in respect of the disposal of coir dust by way of transportation forms a significant part in the total cost of fibre.

Generally, it is estimated that from producing one k.g. of coir fibre, two k.g. of coir dust arises. It is usually dumped in the factory premises and it occupies a lot of space in the vicinity of the coir industry. It is disposed of every day in the early morning after night shift is over. The transport cost depends upon the load of the coir pith and the dust that has to be cleared off every day.

In the present study the expenses incurred on the consumption of diesel and oil for transporting the disposal of coir pith on owned tractor are calculated at the purchase price. In the case of a hired tractor, the actual hire charge paid was taken.

4.3.2.1.7 Interest on Working Capital

The working capital is more relevant than the fixed capital in the coir industry because of its possible impact on production. Balakrishnan observed that for all practical purposes the incidence of the depreciation is charged by taking into account the total cost of yarn. Similarly the volume of working funds required in the fibre extraction sector is much more than that of the product sector and that too only in the retting sector.\textsuperscript{136} The amount of the working capital available ensures the uninterrupted production of fibre in

the industry. The cost of working capital is another important factor to be considered in
the cost of the production of fibre.

Therefore, the interest on the working capital was taken into account for the
present study. It was charged at the rate of 11.5 per cent per annum which was the on-
going rate charged by the commercial banks during the period of survey in the study area.

4.3.2.2 Fixed Cost

The break-up of the total fixed cost of manufacturing of coir fibre are office and
administrative expenses, depreciation on building and machinery and interest on long
term borrowings.

4.3.2.2.1 Office and Administrative expenses

The office and administrative expenses of coir units include expenses on telephone
charges, stationery purchased, lighting expenses and property tax paid.

4.3.2.2.2 Depreciation

In the case of the coir industry, the block of fixed assets are plant and machinery,
furniture and fixtures, tools and implements, vehicles, and the like, acquired and used
over a number of years. The machines used for different functions in the coir industry are
highly depreciable assets. When these assets are used for the extraction of fibre, their
value diminishes because of wear and tear. In the coir industry the depreciation is
calculated based on number of shifts operated per day.
The depreciation amount on assets was calculated by the diminishing balance method, as per the rates prescribed under section 32 of the Income Tax Act 1961. Depreciation was charged at the rates specified below.\footnote{V.P. Gaur, and D.B. Narang, “Income Tax Law and Practice”, Kalyani Publishers, New Delhi, 2006, p.2/225.}

- Buildings 10 per cent
- Crusher Machine 15 per cent
- Defibring Machine 15 per cent
- Turbo Cleaner Machine 15 per cent
- Bailer Machine 15 per cent
- Welding Machine 15 per cent

**4.3.2.2.3 Interest on long term borrowings**

The owners of coir units of the study area have borrowed from commercial banks, financial institutions and also from co-operative banks. The interest payable on such borrowings is also considered for computing the total cost of production. Interest on long term borrowings was calculated at the rate of 10 per cent, which is usually charged by lending institutions.

**4.3.3 Total Cost of Production of Coir Fibre**

After having discussed the major break-up of the total cost of production of coir fibre, an attempt is made to present the total cost of production according to total cost as well as components-wise, in the present section.
4.3.3.1 Cost of Production According to Total Costs

The details of the average cost of production per 100 bundles of coir fibre for the small and medium sized units according to the total costs were computed and shown with the break-up of costs viz, Variable and Fixed, in Table 4.2.

**TABLE 4.2**

COST OF PRODUCTION PER 100 BUNDLES OF COIR FIBRE

<table>
<thead>
<tr>
<th>Size of the Unit</th>
<th>Variable Cost</th>
<th>Fixed Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amount in Rs</td>
<td>Percentage</td>
<td>Amount in Rs</td>
</tr>
<tr>
<td>Small</td>
<td>16,808.49</td>
<td>90.40</td>
<td>1786.36</td>
</tr>
<tr>
<td>Medium</td>
<td>14,917.92</td>
<td>82.11</td>
<td>3250.87</td>
</tr>
<tr>
<td>Overall</td>
<td>15,983.44</td>
<td>86.58</td>
<td>2477.01</td>
</tr>
</tbody>
</table>

Source: Primary data

Table 4.2 presents the cost of production of coir fibre per 100 bundles for the small and medium size units of the study area by taking into account the major components of cost namely the variable and fixed costs. The total cost for the small and medium units were Rs.18594.85 and Rs.18168.87 respectively.

The variable and fixed costs for small units were Rs.16,808.49 and Rs.1786.36 which constituted 90.40 per cent and 9.60 per cent of the total cost respectively. In the case of the medium sized units these costs were Rs.14,917.92 and Rs.3250.87 constituting 82.11 per cent and 17.89 per cent respectively. In the overall category, the variable and fixed costs stood at Rs.15,983.44 and Rs.2477.01 constituting 86.58 per cent and 13.42 per cent respectively in the overall total cost.
4.3.3.2 Cost of Production Components-Wise

Further the production efficiency of the respective size of units of industry may also be analysed and reported. Therefore, the total cost was computed components-wise per 100 bundles of coir fibre and the results are present in Table 4.3.

**TABLE 4.3**

**COST OF PRODUCTION PER 100 BUNDLES OF COIR FIBRE**

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Cost Component</th>
<th>Small Units</th>
<th>Medium Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Amount in Rs.</td>
<td>Percentage</td>
</tr>
<tr>
<td>1.</td>
<td>Cost of Labour</td>
<td>7842.96</td>
<td>42.19</td>
</tr>
<tr>
<td>2.</td>
<td>Cost of Material (Husk)</td>
<td>4397.62</td>
<td>23.65</td>
</tr>
<tr>
<td>3.</td>
<td>Cost of Unretting</td>
<td>328.08</td>
<td>1.77</td>
</tr>
<tr>
<td>5.</td>
<td>Cost of Machine running</td>
<td>820.39</td>
<td>4.41</td>
</tr>
<tr>
<td>6.</td>
<td>Cost of Pith Disposal</td>
<td>315.69</td>
<td>1.69</td>
</tr>
<tr>
<td>7.</td>
<td>Interest on Working Capital</td>
<td>601.58</td>
<td>3.23</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong> (VARIABLE COST-1 to 7)</td>
<td>16,808.49</td>
<td>90.40</td>
</tr>
<tr>
<td>8.</td>
<td>Office and administrative</td>
<td>143.86</td>
<td>0.77</td>
</tr>
<tr>
<td>9.</td>
<td>Depreciation on Building &amp; Machinery</td>
<td>1122.00</td>
<td>6.03</td>
</tr>
<tr>
<td>10.</td>
<td>Interest on long-term Borrowings</td>
<td>520.50</td>
<td>2.80</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong> (FIXED COST- 8 to 10)</td>
<td>1,786.36</td>
<td>9.60</td>
</tr>
<tr>
<td>11.</td>
<td><strong>TOTAL COST</strong> (VARIABLE COST + FIXED COST- 1 to 10)</td>
<td>18,594.85</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Table 4.3 shows the cost of manufacturing production of 100 bundles of coir fibre for the small and medium units. It is understood from the table that the total costs were Rs.18,594.85 and Rs.18,168.79 for the small and medium sized units respectively. It is further understood that the total variable costs which stood at Rs.16,808.49 and Rs.14,917.92 for the small and medium size units recorded 90.40 per cent and 82.11 per cent respectively in their respective total costs.

In the case of small units, the element-wise analysis of the variable costs showed that the labour cost (Rs.7842.96) constituted 42.19 per cent in its total cost. followed by raw material-husk which accounted for 23.65 per cent by incurring Rs.4397.62. It is followed by other variable costs like power Rs.2502.17 (13.46 per cent), machine running Rs.820.39 (4.41 per cent), interest on working capital Rs.601.58 (3.23 per cent), unretting Rs.328.08 (1.77 per cent) and pith disposal cost Rs.315.69 (1.69 per cent).

In the case of the medium sized units, the analysis of the variable costs showed that the cost of material, Rs.7182.12, constituted 39.53 per cent in its total cost. It is followed by the cost of material [Rs.4095.35 (22.54 per cent)], power [Rs.2244.97 (12.36 per cent)], interest on the working capital [Rs.407.03 (2.24 per cent)], cost of pith disposal [Rs.340.65 (1.87 per cent)], cost of unretting [Rs.328.21 (1.81 per cent)] and cost of machine running [Rs.319.58 (1.76 per cent)].

As far as fixed costs are concerned, the small units and medium units had a share of 9.60 per cent and 17.89 per cent each by spending Rs.1786.36 and Rs.3250.87 respectively. In the case of small units, the fixed costs on depreciation for building, machinery and interest on long-term borrowings were Rs.143.86 (0.77 per cent) Rs.1122 (6.03 per cent) and Rs.520.50 (2.80 per cent) respectively. In the case of the medium size units these costs were 269.98 (1.49 per cent), 1805.75 (9.94 per cent) and 1175.14 (6.46 per cent) respectively.
However, a close perusal of the table shows that:

The costs of labour, material, power, machine running and interest on working capital were less by 2.66 per cent (49.19 per cent-39.53 per cent), 1.11 per cent (23.65 per cent-22.54 per cent), 1.10 (13.46 per cent-12.36 per cent) 2.65 per cent (4.41 per cent-1.76 per cent) and 0.99 per cent (3.23 per cent-2.24 per cent) are in the medium size units when compared to the small size units. It is because of the economics of large-scale production. The costs of unretting and the cost of coir pith disposal were more by 0.04 per cent (1.81-1.77) and 0.18 per cent (1.87-1.69) respectively in the medium size units. It is because of the effect of huge extraction of coir fibre by such units.

With regard to fixed costs the medium size units were not in an advantageous position. The depreciation on building, machinery and interest on long term borrowings were more by 0.72 per cent (1.49-0.77), 3.91 (9.94-6.03) and 3.66 per cent (6.46-2.80) respectively when compared with small-size units. It is because of the reason that the medium size units generally borrowed heavy funds from outside sources and invested their major funds in their block of fixed assets.

It could be concluded that the total cost of production per 100 bundles of coir fibre was less by Rs.425.06 (Rs.18,594.85-Rs.18,168.79) in the medium sized units indicating their efficiency in production when compared to small sized units of the study area.
4.3.4 Returns from Coir Fibre Production

The gross and net return per 100 bundles of coir fibre for the small and the medium size units in the study area were worked out and presented in Table 4.4.

TABLE 4.4

STATEMENT OF INCOME FROM COIR FIBRE PRODUCTION
(Per 100 bundles)

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Particulars</th>
<th>Small Units</th>
<th>Medium Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Gross Revenue</td>
<td>23,857.60</td>
<td>25,288.10</td>
</tr>
<tr>
<td>2.</td>
<td>Less: Marketing Cost</td>
<td>3,407.60</td>
<td>3,152.62</td>
</tr>
<tr>
<td>3.</td>
<td>Gross Returns</td>
<td>20,450.00</td>
<td>22,135.48</td>
</tr>
<tr>
<td>4.</td>
<td>Less: Variable Cost</td>
<td>16,808.49</td>
<td>14,917.92</td>
</tr>
<tr>
<td>5.</td>
<td>Net Return</td>
<td>3,641.51</td>
<td>7,217.56</td>
</tr>
<tr>
<td>6.</td>
<td>Less: Fixed Cost</td>
<td>1,716.36</td>
<td>3,250.87</td>
</tr>
<tr>
<td>7.</td>
<td>Net Profit</td>
<td>1,855.15</td>
<td>3,966.69</td>
</tr>
</tbody>
</table>

Source: Primary data

It is understood from Table 4.4 that the gross revenue per 100 bundles of coir fibre was Rs.23,857.60 and Rs.25,288.10 for the small and medium sized units respectively. The net profit stood at Rs.1,855.15 and Rs.3,966.69 for the small and medium units respectively. The medium sized units by showing an increased net profit of Rs.2111.54
(Rs.3966.69-Rs.1855.15) indicating enhanced profitability than the small units in the study area.

The gross returns worked out after deducting the marketing costs were Rs.20,450.00 and Rs.22,135.48 for the small and medium sized units respectively. After deducting the variable costs the net return came to Rs.3,641.51 and Rs.7,217.56 for the small and medium sized units respectively. It shows that a huge difference existed in net return earned per 100 bundles of coir fibre in the study area between the small and medium sized units. The net return earned by the medium sized units was more by Rs.3576.05 (Rs.7217.56-Rs.3641.51).

It may be finally concluded from the Table that on account of the advantages of size, the medium size coir units of the study area have an edge over the small size units on profitability.

4.3.5 Comparative Analysis of Cost and Returns for Small and Medium Sized Coir Units

In order to find out the better economic prosperity of the coir units in the study area, a comparative analysis of the cost and return of the small and medium coir units is presented in Table 4.5.
<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Particulars</th>
<th>Small Units</th>
<th>Medium Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Gross Returns</td>
<td>20,450.00</td>
<td>22,135.48</td>
</tr>
<tr>
<td>2.</td>
<td>Total Variable Cost</td>
<td>16,808.49</td>
<td>14,917.92</td>
</tr>
<tr>
<td>3.</td>
<td>Net Returns Over Variable Cost</td>
<td>3,641.51</td>
<td>7,217.56</td>
</tr>
<tr>
<td>4.</td>
<td>Total Cost</td>
<td>18,524.85</td>
<td>18,168.79</td>
</tr>
<tr>
<td>5.</td>
<td>Net Return Over Total Cost</td>
<td>1,925.15</td>
<td>3,966.69</td>
</tr>
<tr>
<td>6.</td>
<td>Variable Cost Per k.g</td>
<td>4.80</td>
<td>4.26</td>
</tr>
<tr>
<td>7.</td>
<td>Total Cost Per k.g</td>
<td>5.29</td>
<td>5.19</td>
</tr>
<tr>
<td>8.</td>
<td>Input – Output Ratio (Gross Return / Variable Cost)</td>
<td>1.22</td>
<td>1.48</td>
</tr>
<tr>
<td>9.</td>
<td>Input – Output Ratio (Gross Return / Total Cost)</td>
<td>1.10</td>
<td>1.22</td>
</tr>
<tr>
<td>10.</td>
<td>Cost Benefit Ratio (Net Return Over Total Cost/Total Cost)</td>
<td>0.10</td>
<td>0.22</td>
</tr>
</tbody>
</table>

Source: Primary data

From Table 4.5, it could be evident that the input-output ratio in terms of the variable cost is the highest in the case of the medium sized coir units. The ratio for the medium units was 1.48 whereas it is 1.22 for the small units. In the case of the total cost, the input-output ratio for the small units worked out to 1.10 whereas it is 1.22 for the medium sized coir units. It also shows that each rupee spent leading to a benefit of Rs.0.10 and Rs.0.22 for the small and the medium sized units respectively.

It could be observed from the analysis that the benefit of higher revenues and profit per 100 bundles of coir fibre by the medium size coir units of the study area put these units in a better economic and institutional position. On the other hand, the
small sized units did not enjoy better economical return and thus they could be considered to have less profitability.

4.4 RESOURCE-USE EFFICIENCY

Resource-use efficiency refers to the efficient use of factors inputs, namely human labour, material, capital and the enterprise. Technical efficiency measures are related to human labour use efficiency and machinery efficiency, whereas economic efficiency measures are concerned with the analysis of cost ratios, capital ratios and income ratios. Hence it is important to understand the resource-use efficiency of different factors of production.

In the present study, an attempt has been made to analyse the input variables influencing the gross revenue of fibre manufacture. The resource productivity by the small, medium and pooled category of coir units was also taken for the study. The structural differences were examined between the small and medium units. Further, an attempt is also made to examine the resource-use efficiency from the production functions by equating the Marginal Value Productivity (MVP) of each resource input to its Marginal Factor Cost (MFC), for small, medium and pooled categories of coir units. This helps to determine whether the resource inputs are used optimally in the manufacture of coir fibre in the coir industry of the study area.

4.4.1 The Analytical framework

The production function analysis helps to identify the uneconomic use of resources by the units. The production function is the result of the co-operation between different factors of production and output. It may be defined as a mathematical expression of the technical relationship between input and output, which would remain
constant as long as technology remained invariant.\textsuperscript{138} The production function refers to the technical relationship between the input and the output of a firm. An input is simply anything which the firm buys for use in its production or other processes.

There are several production functions developed by economists. Amongst them the Cobb-Douglas Production Function is well known and popular production function. It is an outcome of the statistical investigations conducted by C.W. Cobb and P.H. Douglas in the field of manufacturing industries in the U.S.A. and other industrial countries of the world. It is convenient for the comparison of partial elasticity coefficients. It is a multiplicative type and is a non-linear in function in its general form. It is easier to compute the Cobb-Douglas type production function when expressed in the log-linear form. The marginal product of factors, marginal rate of substitution, factor intensity and the efficiency of production can be calculated from the parameters in the Cobb-Douglas type production function.

T.V. Moorti and M.S. Pathania\textsuperscript{139} have used a Cobb Douglas type of production function for estimating the resource-use productivity in their studies. Hence, this study also uses the Cobb-Douglas production function to estimate resource returns, returns to scale and resource-use efficiency in the coir fibre production by the industry of the study area. The gross revenue of coir fibre has been taken as a dependent variable. Labour in rupees, raw material in rupees, unretting in rupees, power in rupees and machine running in rupees have been taken as dependent variables. The analysis has been used for estimating the relationship between the coir fibre production and other explanatory factors computing the resource use efficiency for the small, medium and pooled

\textsuperscript{138} Lawrence R. Klein, “An Introduction to Econometrics”, Prentice Hall of India Private Limited, New Delhi, 1973, p.84.

categories. One dependent and five independent variables have been used in the log-linear regression model. The estimated production function is of the following form:

\[ \ln Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + U \quad (4.1) \]

Where,

\[ \beta_0 = \text{intercept} \]
\[ y = \text{Estimated gross revenue of coir fibre in rupees} \]
\[ X_1 = \text{labour in rupees} \]
\[ X_2 = \text{raw material (Husk) in rupees} \]
\[ X_3 = \text{unretting in rupees} \]
\[ X_4 = \text{Power in rupees} \]
\[ X_5 = \text{Machine running in rupees} \]
\[ U = \text{Disturbance term} \]
\[ \beta_i = \text{regression (slope) co-efficients} \]
\[ i = 1, 2, \ldots \ldots 5. \]

### 4.4.2 Estimated Results of Cobb-Douglas Production function

The researcher has identified five inputs factor such as labour, material (husk), unretting, power and machine running as most important independent variables which influence the gross revenue of coir fibre production in the study area. Therefore an attempt is made to estimate the production function and to analyse the estimated results by using the method of the least squares for the small, medium and pooled category of units in Thanjavur District with special reference to resource returns.

The estimated results of the regression model for the small, medium and the pooled category of units are presented in Table 4.6.
## TABLE 4.6

**ESTIMATED RESULTS OF COBB-DOUGLAS TYPE PRODUCTION FUNCTION FOR SMALL, MEDIUM AND POOLED CATEGORY OF UNITS MANUFACTURING COIR FIBRE**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Variables</th>
<th>Parameter Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Small Units</td>
</tr>
<tr>
<td>1.</td>
<td>Intercept</td>
<td>-1.8479</td>
</tr>
<tr>
<td>2.</td>
<td>LnX₁</td>
<td>0.6109*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(7.9977)</td>
</tr>
<tr>
<td>3.</td>
<td>LnX₂</td>
<td>0.2729*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4.7004)</td>
</tr>
<tr>
<td>4.</td>
<td>LnX₃</td>
<td>0.0387</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.7140)</td>
</tr>
<tr>
<td>5.</td>
<td>LnX₄</td>
<td>0.2510*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4.1651)</td>
</tr>
<tr>
<td>6.</td>
<td>LnX₅</td>
<td>0.2939*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.5334)</td>
</tr>
<tr>
<td>7.</td>
<td>R²</td>
<td>0.8223</td>
</tr>
<tr>
<td>9.</td>
<td>Residual sum of squares - Σe²</td>
<td>0.0052</td>
</tr>
<tr>
<td>10.</td>
<td>No. of observations</td>
<td>29</td>
</tr>
</tbody>
</table>

**Note:**
1. * indicates that the co-efficient are statistically significant at the 5 per cent level.
2. Figures in bracket are t-values.

It is understood from Table 4.6 that the explanatory variables taken for the analysis (model) for the small units, medium units and the pooled category have indicated greater variation in the gross revenue of coir fibre. In the case of the small units the co-efficient of multiple determination of \( R² \) was 0.8233 indicating 82.33 per cent variation.
in gross revenue in relation to the variables namely labour, material, power and machine running which were significant at the five per cent level, and that means that for every one per cent increase in the investment of these resources, the gross revenue could be increased to 0.6109, 0.2729, 0.2510 and 0.2939 per cent respectively. The regression coefficient of the variable “unretting” is positive but found to be non-significant. Among the significant variables of small units labour had a greater influence on gross revenue of coir fibre. The F-value shows that the regression model is found statistically significant at one per cent level.

As far as the medium coir units are concerned, all the five explanatory variables are jointly responsible for 81.69 per cent of the gross revenue of coir fibre. The coefficients of labour, material, power and machine running were statistically significant at the five per cent level and they had a positive impact on the gross revenue of coir fibre. It implies that every one per cent increase in these variables would lead to 0.5462, 0.2143, 0.2105 and 0.1091 per cent increase in gross revenue respectively. The coefficient of variable of unretting has been found to be positive but statistically insignificant. The F-value shows that the regression model fitted is found to be significant at one per cent level.

For the pooled category, $R^2$ indicates that 80.00 per cent in the dependent variables are explained by all the explanatory variables taken in the model. The variables labour, material, power and machine running were statistically significant at the five per cent level but they had a positive impact on the gross revenue of coir fibre. Which implies that every additional percentage of these variables would increase gross revenue by 0.6583, 0.1980, 0.2206 and 0.1320 per cent respectively. It could be noted that in the case of the pooled category also labour had a greater influence on the gross revenue of coir fibre in the study area. The F-value indicates that the estimated regression model is statistically significant at one per cent level.
Thus it may be concluded from the analysis that among the significant variables, labour, material, power and machine running were more important resource inputs for the small, medium and pooled categories of units in the study area. The variable “labour” had a greater influence on the gross revenue of coir fibre than all other variables.

4.4.3 Test for Structural Difference

The structural differences between the small and the medium units are tested by using Chow’s\textsuperscript{140} F-test.

\[
F = \frac{\sum e^2 - (\sum e_1^2 - \sum e_2^2) / K}{(\sum e_1^2 - \sum e_2^2) / n_1 + n_2 - 2k}
\]  \hspace{1cm} \text{(4.2)}

Where,

\[\sum e^2 = \text{Unexplained or Residual sum of squares of the pooled sample of both small and medium coir units.}\]

\[\sum e_1^2 = \text{Unexplained or Residual sum of squares of the units corresponding to small size coir units.}\]

\[\sum e_2^2 = \text{Unexplained or Residual sum of squares of the units corresponding to medium size coir units.}\]

\[K = \text{The number of parameters included in the regression equation.}\]

\[n_1 = \text{Number of small size coir units}\]

\[n_2 = \text{Number of medium size coir units.}\]

Under the F-test, if the computed value of F is less than table value at one per cent level of significance at \((K, n_1 + n_2 - 2k)\) degrees of freedom, the null hypothesis of no structural difference between the two groups of units may be accepted.

Therefore, Chow’s test has been applied to examine whether structural differences existed between the small and the medium coir units and the results obtained are presented in Table 4.7.

**TABLE 4.7**

**EQUALITY TEST BETWEEN SMALL AND MEDIUM COIR UNITS MANUFACTURING COIR FIBRE**

<table>
<thead>
<tr>
<th>( \Sigma e^2 )</th>
<th>( \Sigma e_1^2 )</th>
<th>( \Sigma e_2^2 )</th>
<th>((n1+n2-2k))</th>
<th>F*</th>
<th>F (6, 40) at 1 per cent level</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01922</td>
<td>0.0052</td>
<td>0.0043</td>
<td>40</td>
<td>74.49</td>
<td>3.2910</td>
<td>Structural difference exists between Small and Medium coir units</td>
</tr>
</tbody>
</table>

It could be seen from Table 4.7 that the computed F-value (F*) is greater than the table value of F at one per cent level with (6, 40) degrees of freedom. Thus it can be concluded that there existed a structural difference between the small and the medium coir units in the study area.
4.4.4 Test for Structural Difference at intercept and Slope Level

If the null hypothesis is rejected it means that structural differences between the small and medium size coir units. The intercept and slope dummies are introduced in the regression model (Equation 4.1) to find out whether the differences occurred at the intercept level or at the slope level or at both.141

The regression model (equation 4.1) becomes

\[ \ln Y = \beta_0 + \beta_d D + \sum_{i=1}^{5} (\beta_i + \Gamma_i D) \ln X_i + U \] …(4.3)

Where,

\[ \beta_d = \text{Co-efficient of intercept dummy} \]

\[ \Gamma_i = \text{Co-efficient of slope dummy of } i^{th} \text{ input variable.} \]

In the equation 4.3, D is the dummy variable representing 0 and 1 for the small units and medium units respectively.

The methods of the least squares are used for estimating the regression equations 4.1 and 4.3.

In this section, an attempt is made to find out whether the structural difference between the small and medium coir units existed at the slope level or at the intercept level. The regression model (Equation 4.3) is estimated by using the method of the least square and the results obtained are presented in Table 4.8.

TABLE 4.8
TESTS OF THE STABILITY OF INTERCEPT AND SLOPE LEVEL FOR SMALL AND MEDIUM COIR UNITS

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Variables</th>
<th>Parameter Estimates</th>
<th>t - Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Intercept</td>
<td>0.1928</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Intercept dummy</td>
<td>0.9189 0.4395</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>ln X₁</td>
<td>0.6916* 8.0198</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>ln X₂</td>
<td>0.2401* 3.5530</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>ln X₃</td>
<td>0.0840 1.3509</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>ln X₄</td>
<td>0.2624* 3.7022</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>ln X₅</td>
<td>0.1294* 5.5480</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Dln X₁</td>
<td>-0.1446 -1.1522</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Dln X₂</td>
<td>-0.0242 -0.2441</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Dln X₃</td>
<td>-0.0682 -0.6727</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Dln X₄</td>
<td>-0.0516 -0.5314</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Dln X₅</td>
<td>0.2393* 4.0130</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Adjusted R²</td>
<td>0.8331</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>F – Value</td>
<td>24.1462</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Residual Sum of Squares</td>
<td>0.0126</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>No. of observations</td>
<td>52</td>
<td></td>
</tr>
</tbody>
</table>

Source: Primary data

* Indicates that the co-efficients are statistically significant at 5 per cent level

Table 4.8 shows that the co-efficient of the dummy variable at the intercept level is statistically in significant, which indicates that there is no difference between the small and medium-sized coir units with regard to technical change in the study area.
For small units (except machine running) all the explanatory variables have a positive impact on the gross revenue of coir fibre. However, variables such as human labour, material (husk) power and machine running are statistically significant at the five per cent level. It means that if these variables are increased by one per cent, the gross revenue could be increased by 0.6916, 0.2624 (and 0.1294) per cent respectively. Human labour was the most influential variable in relation to gross revenue, followed by power.

Further, it indicates that a one per cent increase in the variable machine running may enhance the gross revenue of small units by 0.1294 per cent and that of the medium units by 0.3687 per cent.

Thus, it may be finally concluded from the analysis that there is no structural difference at the intercept level but exists only at the slope level. The resource input which cause the difference may be perhaps be due to machine running.

### 4.4.5 Return to Scale

The sum of the regression co-efficient in the Cobb-Douglas type production function refers to return to scale. The return to scale is estimated employing the elasticity co-efficients at the production functions. The magnitude of the return to scale indicates the per cent increase in coir fibre production when all variables (human labour, material, unretting, power and machine running) are increased simultaneously by one per cent. This concept seeks to explain the behaviour of output in response to changes in the scale of production.

The returns to increase in scale may either be equal or more than equal or less than equal in proportion. If the increase in all variables leads to more than proportionate increase in the output, the gross revenues of returns to scale are said to be increasing. If the increase in all factors inputs in a given proportion and the output/gross revenue increases in the same proportion, returns to scale are said to be constant. If the increase in
all variable inputs leads to a less than proportionate increase in the output, returns to scale are said to be decreasing.

The estimated return to scale for the small, medium and overall categories of coir units is presented in Table 4.9.

**TABLE 4.9**

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Size of Units</th>
<th>Sum of the Elasticity Co-efficients (Return to Scale)</th>
<th>Nature of Return to Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Small</td>
<td>1.4674</td>
<td>Increasing Returns</td>
</tr>
<tr>
<td>2.</td>
<td>Medium</td>
<td>1.0936</td>
<td>Increasing Returns</td>
</tr>
<tr>
<td>3.</td>
<td>Overall</td>
<td>1.2894</td>
<td>Increasing Returns</td>
</tr>
</tbody>
</table>

Source: Computed data

It could be observed from Table 4.9 that the return to scale are 1.4674, 1.0936 and 1.2894 for small, medium and overall categories of units respectively. The magnitude of the return to scale indicates the increasing return to scale for all these units irrespective of their size. Further, the table shows that the return to scale to the gross revenue of coir fibre is expected to increase by 1.47 per cent, 1.09 per cent and 1.29 per cent for these units when the variables human labour, material (husk), unretting, power and machine running in the production functions are simultaneously increased by one per cent.

Therefore, it could be concluded from the analysis that the coir industry in the study area operates in an efficient manner.
4.4.6 The Marginal Value Productivity and Resource-Use Efficiency:

The marginal value productivity explains how the amount of extra output could be achieved by making a change in an input factor by keeping all the other inputs factors constant. This analysis also helps to assess which input factor is more important than the other input factors. The marginal value productivity of resources and the cost of that resource would help us to evolve a suitable proportion of reallocation of resources and its best returns.

The efficiency of resource-use is studied with the help of the Marginal Value Product-Marginal Factor Cost ratio using the Cobb-Douglas production function. The Marginal Value Product (MVP) to the factor of cost ratio is the measure of the resource-use efficiency. By the use of resource-use efficiency, the ratio of the Marginal Value Product (MVP) of each resource input to the price of that resource namely Marginal Factor Cost (MFC) is worked out. The equality of the Marginal Value Product (MVP) and the Factor Cost (MVP/MFC = 1) indicates the optimum resource-use efficiency of a particular input. If the ratio (MVP/MFC >1) is more than unity the resource input is said to be used efficiently. If the ratio (MVP/MFC <1) is less than unity, the resource input is not utilized efficiently or is used improperly. But the resource input is said to be overutilised, where the ratio is negative.

The most reliable and perhaps the most useful estimate of the marginal value productivity is obtained by taking the resources (Xi) as well as the output (Y) at their geometric mean. The marginal value productivities of each of the resource inputs are calculated at the geometric mean levels of independent variables by using the following formula:

\[
\text{Marginal Value Product of the } i^{\text{th}} \text{ variable} = \beta_i \frac{\bar{Y}}{\bar{X_i}} \tag{4.4}
\]

Where,
\( \bar{Y} = \) Geometric mean level of gross revenues of coir fibre
\( X_i = \) Geometric mean level of \( i^{th} \) independent variable

\( \beta_i = \) The regression co-efficient of \( i^{th} \) independent variable
\( i = 1,2,\ldots,5 \)

After computing the marginal value product of the various resource inputs, it is divided by the marginal factor cost to arrive at the ratio of the marginal value product to the factor cost. In the present study, the marginal value product of the inputs \( X_1, X_2,\ldots\ldots X_5 \) for both the small and medium size coir units are calculated by using the following formula (Equation 4.4)

\[
\begin{align*}
\text{MVP} X_1 - \text{Labour} & = \beta_1 \frac{\bar{Y}}{\bar{X}_1} \\
\text{MPV} X_2 - \text{Material (Husk)} & = \beta_2 \frac{\bar{Y}}{\bar{X}_2} \\
\text{MVP} X_3 - \text{Unretting} & = \beta_3 \frac{\bar{Y}}{\bar{X}_3} \\
\text{MVP} X_4 - \text{Power} & = \beta_4 \frac{\bar{Y}}{\bar{X}_4} \\
\text{MVP} X_5 - \text{Machine running} & = \beta_5 \frac{\bar{Y}}{\bar{X}_5}
\end{align*}
\]

Where,
\( \bar{Y} = \) Geometric mean level of gross revenues of coir fibre
\( \bar{X}_i = \) Geometric mean level of \( i^{th} \) independent variable

\( \beta = \) The regression Co-efficient of \( i^{th} \) independent variable
\( i = 1,2,\ldots,5 \)

The marginal value products of resource inputs and the ratio of marginal value products to the respective cost of the factor inputs for the small coir units are estimated and the results are presented in Table 4.10.
Table 4.10 shows the ratios of Marginal Value Productivity to the Marginal Factor Cost for the small coir units and they were 1.86, 1.48, 2.39 and 8.55 for the significant resource inputs such as labour, material (husk), power and machine running respectively. All these variables show more than unity suggesting that these variable inputs are utilized efficiently. The marginal value productivity of the resource inputs and the ratio of marginal value products of the variable inputs for the medium sized coir units are estimated and presented in Table 4.11.
TABLE 4.11
MARGINAL VALUE PRODUCTIVITY OF THE RESOURCE-USE FOR MEDIUM COIR UNITS IN MANUFACTURING COIR FIBRE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Geometric Mean</th>
<th>Elasticity of Output</th>
<th>Marginal Value Product (MVP)</th>
<th>Marginal Factor Cost (MFC)</th>
<th>Ratio of MPV to MFC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour (Rs / 100 bundles)</td>
<td>7182.12</td>
<td>0.5462*</td>
<td>1.85</td>
<td>1.00</td>
<td>1.85</td>
</tr>
<tr>
<td>Material (husk) (Rs / 100 bundles)</td>
<td>4095.35</td>
<td>0.2143*</td>
<td>1.32</td>
<td>1.00</td>
<td>1.32</td>
</tr>
<tr>
<td>Unretting (Rs / 100 bundles) (X3)</td>
<td>328.21</td>
<td>0.0135</td>
<td>1.04</td>
<td>1.00</td>
<td>1.04</td>
</tr>
<tr>
<td>Power (Rs / 100 bundles) (X4)</td>
<td>2244.97</td>
<td>0.2105*</td>
<td>2.37</td>
<td>1.00</td>
<td>2.37</td>
</tr>
<tr>
<td>Machine running (Rs / 100 bundles) (X5)</td>
<td>319.58</td>
<td>0.1091*</td>
<td>8.63</td>
<td>1.00</td>
<td>8.63</td>
</tr>
</tbody>
</table>

* indicates that the Co-efficient are statistically significant at the 5 per cent level.

It is observed from Table 4.11 that the ratios of Marginal Value Product to the Factor Cost for the medium sized coir units were 1.85, 1.32, 2.37 and 8.63 for the
significant resource inputs such as labour, material (husk), power and machine running respectively. All these variables show more than unity and suggesting that these resource inputs were utilized efficiently. Among the significant marginal resource inputs, machine running is found to be the most important factor input in the manufacture of coir fibre followed by power, labour and material (husk). Further, the ratio also explains that for every additional rupee spent on these variables, the gross revenue of coir fibre could be increased to Rs.8.63, Rs.2.37, Rs.1.85 and Rs.1.32 respectively. Thus, it may be finally concluded that there is adequate scope to increase all these variable inputs to maximize the revenue.

The marginal value products of the resource inputs and the ratio of such marginal value products are also worked out from the production functions for the overall categories of coir units to find out the general behaviour of the resource inputs to the revenue of coir fibre not withstanding the size of the coir units. The results are presented in Table 4.12.
Table 4.12 shows that the ratios of the marginal value product to the marginal factor cost for the pooled category were 2.10, 1.14, 2.26 and 5.98 for the significant resource inputs namely labour, material (husk), power and machine running respectively. All these variables show more than unity suggesting that these resource inputs are utilized efficiently. Among the significant marginal resource inputs, machine running was found to be the most important input factor in the manufacture of coir fibre followed by power, labour and material. It is also clear from the table that every additional rupee spent on these marginal resource inputs could result in the increase of revenue by Rs.5.98, Rs.2.26, Rs.2.10, and Rs.1.14 respectively. As the ratios of these significant
variables were more than unity, there is scope to increase all these resource inputs to maximize their revenue.

4.5 PRODUCTION PROBLEMS

Coir industry has been encountering a number of production problems. The industry is said to be localized as it is mostly located in coastal regions and areas where coconut cultivation is high. Therefore, the problems may be industrially related but location-oriented. The problems of finance, labour, materials and the problem of modernization are regarded as industrially related problems, whereas the problem of short supply of labour during peak agricultural seasons and the problem of drying fibre during rainy seasons may be taken to form the location-oriented problems.

The study also indicates that a difference existed in facing the problems between the small and medium sized units. The production problems which are generally faced by the owners of the units are raising the required finance, procuring the raw material, finding the skilled labour, problem in power supply and problem of obsolescence and modernization.

Taking into account the general as well as the location-oriented problems prevailing in the industry, the researcher prepared a list of problems that are faced by the units and supplied these to the owners of units to seek their opinion. The problems which were so identified and ranked by them were shortage of labour, inadequate supply of green husks, heavy machine maintenance expenses, inadequate finance, erratic power supply, traditional methods of production and problem of drying fibre during rainy seasons.
In this section, the problems so identified and ranked by the owners of the coir units were converted into scores by using the Garrett Ranking Technique.\textsuperscript{142} The mean scores were worked out for each problem and arranged in a descending order. Accordingly the ranks were given and the important problems were identified. The ranks for such problems were worked out separately for the small as well as the medium sized units and presented in Tables 4.13 and 4.14.

\begin{table}[h!]
\centering
\caption{Production Problems Faced by Small Coir Units}
\begin{tabular}{|c|p{7cm}|c|c|}
\hline
\textbf{Sl. No} & \textbf{Problem} & \textbf{Mean Score} & \textbf{Rank} \\
\hline
1. & Inadequate finance & 60.86 & I \\
2. & Shortage of workers & 59.07 & II \\
3. & Inadequate supply of green husks (Raw Material) & 58.52 & III \\
4. & Heavy Machine maintenance expenses & 44.91 & IV \\
5. & Traditional method of fibre production & 42.83 & V \\
6. & Erratic power supply & 41.31 & VI \\
7. & Problems of drying fibre during rainy seasons & 40.76 & VII \\
\hline
\end{tabular}
\end{table}

Source: Primary data

Table 4.13 shows the production problems faced by the small coir units of the study area. It is understood from Table 4.13 that the problem of inadequate finance with the mean score of 60.86 was ranked first. It is because a huge amount of funds has to be locked in purchasing and stocking of raw materials, advance payment to workers besides

their regular wages and on machine maintenance. Hence the owners of the units faced severe scarcity of funds to meet those expenses and considered the inadequate finance the major and foremost production problem.

The shortage of workers was very much felt by owners of the coir units during the peak agricultural seasons in the area. Most of the workers of the coir units are basically agricultural workers and they are mostly casual. Therefore the coir units found the short supply of workers for nearly four months in a year where agriculture seasons were peak in the study area. This affects the production of the coir units during those months. The problem with a mean score of 59.07 is ranked second.

Though coconut husk is the basic raw material for coir industry, the green husk is mostly preferred by the coir units as the fibre from such husk fetched a higher price besides yielding more output. But green husk was always in heavy demand and the inadequate supply of green husk was another problem that affected production adversely. Hence, the problem with the mean score of 58.52 ranked third.

The other production problems identified by the small units are heavy machine maintenance expenses, traditional method of fibre production, erratic power supply and problem of drying fibre during rainy seasons. They had the mean scores of 44.91, 42.83, 41.31 and 40.76 and ranked fourth, fifth, sixth and seventh respectively.
Table 4.14 shows the production problems faced by the medium sized coir units of the study area. It is seen from the table that like the smaller units the shortage of labour was very much felt by the medium sized units also. Its mean score being 61.57 ranked first. The medium units are generally capable of procuring huge quantity of green husk but it was not sufficient to achieve their production target. Hence, this problem was considered another major production problem and it ranked second with a mean score of 59.35.

The other production problems faced by the medium sized units were inadequate finance, the traditional method of production, erratic power supply and the problem of drying fibre during rainy seasons. They had mean scores of 43.52, 43.26, 41.03 and 40.83, ranking fourth, fifth, sixth and seventh respectively.