Chapter IV

Production Practices in Coir Units
CHAPTER – IV

PRODUCTION PRACTICES IN COIR UNITS

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 chapter are for brown fibre only.

The analysis of cost, returns and resource-use efficiency of coir fibre production assumes greater 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, this 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 last section deals with the productivity and the resource-use efficiency.

4.2 PRODUCTION PRACTICES IN THE COIR UNITS

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 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.

To separate the fibre from the crushed husk, the unretting of fibre is carried out by pouring water daily so that the retting period can be reduced. The dry husk is soaked
with water for a maximum period 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 size 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 decorticator 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 units of the study area refers to 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. There 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.

**INPUT-OUTPUT STRUCTURE**

The input-output structure shows a significant variation in terms of gross revenue between the small and medium size 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 difference 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 in the small size and medium size units. The amount spent on these variables by the small size 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 size units. The only input variable, which is found to be not significantly different between the small and medium size units, is the unretting cost. The small coir units spent on this input variable was Rs.328.08 but it was Rs.328.21 for the medium size units.

It could be concluded that there is a significant difference in cost of production of small size coir units and medium size coir units.

**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 reduce the cost. The manufacturing cost of any industry basically falls under three elements namely cost of material, labour and overheads. But the division of costs on the criterion of variability depends upon the nature of coir units. The cost components in the coir units 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 raw material cost (Husk), 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 are given below.
**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.

- **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 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. Sugata 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 the male workers. The majority of such workers are from agriculture. Further, it is stated that the female worker gets lower wages than male workers in the coir industry.

  In this study, labour cost includes 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 as it was not involved in the manufacturing of coir fibre. The commonly accepted method of wage payment in the study area is time basis.

- **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. It was 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.\(^\text{109}\) It was pointed out that nuts from coastal belts contain a comparatively higher percentage of husks, valued at the market price prevailing in that locality.\(^\text{110}\)

In this 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. However, price is low during the rest of the year when the supply of husk is abundant.

- **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 in 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.

- **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 per unit of electricity consumed.

- **Cost of Machine running**

  Another important variable cost component in manufacturing of coir fibre is machine running cost. It was 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.\(^\text{111}\) 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

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days. The cost of a fuse carrier ranges from Rs.2,000 to Rs.4,000. 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.

- **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 in the production of one kilogram of coir fibre, two kilograms of coir dust arise. It is usually dumped in the factory premises and it occupies a lot of space in the vicinity of the coir unit. 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 this study, the cost incurred on the consumption of diesel and oil for transporting the disposal of coir pith on owned tractor was calculated at the purchase price. In the case of a hired tractor, the actual hire charge paid was taken.

- **Interest on Working Capital**

  The working capital is more significant than the fixed capital in the coir industry because of its possible impact on production. It was 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.\footnote{P.K. Balakrishnan, Op.cit, pp.193-194.} 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 11.5 per cent per annum and was the rate charged by the commercial banks during the period of survey in the study area.

**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.

- **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.

- **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.}

  \[
  \begin{align*}
  \text{Buildings} & \quad - \quad 10 \text{ per cent} \\
  \text{Crusher Machine} & \quad - \quad 15 \text{ per cent}
  \end{align*}
  \]
Defibring Machine – 15 per cent
Turbo Cleaner Machine – 15 per cent
Bailer Machine – 15 per cent
Welding Machine – 15 per cent

- 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.

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 as well as component-wise in the present section. The details of the average cost of production per 100 bundles of coir fibre for the small and medium size units were computed and shown in Table 4.2.

**TABLE 4.2**

<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 size 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.

- **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 component-wise per 100 bundles of coir fibre and the results are presented in Table 4.3.


<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Cost Component</th>
<th>Small Units</th>
<th>Medium Units</th>
<th>Small Units</th>
<th>Medium Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Amount</td>
<td>Percentage</td>
<td>Amount</td>
<td>Percentage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in Rs.</td>
<td></td>
<td>in Rs.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Cost of Labour</td>
<td>7842.96</td>
<td>42.19</td>
<td>7182.12</td>
<td>39.53</td>
</tr>
<tr>
<td>2</td>
<td>Cost of Material (Husk)</td>
<td>4397.62</td>
<td>23.65</td>
<td>4095.35</td>
<td>22.54</td>
</tr>
<tr>
<td>3</td>
<td>Cost of Unretting</td>
<td>328.08</td>
<td>1.77</td>
<td>328.21</td>
<td>1.81</td>
</tr>
<tr>
<td>4</td>
<td>Cost of Power</td>
<td>2502.17</td>
<td>13.46</td>
<td>2244.97</td>
<td>12.36</td>
</tr>
<tr>
<td>5</td>
<td>Cost of Machine running</td>
<td>820.39</td>
<td>4.41</td>
<td>319.58</td>
<td>1.76</td>
</tr>
<tr>
<td>6</td>
<td>Cost of Pith Disposal</td>
<td>315.69</td>
<td>1.69</td>
<td>340.65</td>
<td>1.87</td>
</tr>
<tr>
<td>7</td>
<td>Interest on Working Capital</td>
<td>601.58</td>
<td>3.23</td>
<td>407.03</td>
<td>2.24</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong> (VARIABLE COST-1 to 7)</td>
<td>16,808.49</td>
<td>90.40</td>
<td>14,917.92</td>
<td>82.11</td>
</tr>
<tr>
<td>8</td>
<td>Office and administrative</td>
<td>143.86</td>
<td>0.77</td>
<td>269.98</td>
<td>1.49</td>
</tr>
<tr>
<td>9</td>
<td>Depreciation on Building &amp; Machinery</td>
<td>1122.00</td>
<td>6.03</td>
<td>1805.75</td>
<td>9.94</td>
</tr>
<tr>
<td>10</td>
<td>Interest on long-term Borrowings</td>
<td>520.50</td>
<td>2.80</td>
<td>1175.14</td>
<td>6.46</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong> (FIXED COST- 8 to 10)</td>
<td>1,786.36</td>
<td>9.60</td>
<td>3250.87</td>
<td>17.89</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>
<td>18,168.79</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Primary data

Table 4.3 shows the cost of manufacturing production of 100 bundles of coir fibre for the small and medium units. It was understood from the table that the total costs were Rs.18,594.85 and Rs.18,168.79 for the small and medium size units respectively. It was 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 size 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 size units indicating their efficiency in production when compared to small size units of the study area.

### 4.4 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>Particulars</th>
<th>Small Units</th>
<th>Medium Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amount</td>
<td>Amount</td>
</tr>
<tr>
<td>Gross Revenue</td>
<td>23,857.60</td>
<td>25,288.10</td>
</tr>
<tr>
<td>Less: Marketing Cost</td>
<td>3,407.60</td>
<td>3,152.62</td>
</tr>
<tr>
<td>Gross Returns</td>
<td>20,450.00</td>
<td>22,135.48</td>
</tr>
<tr>
<td>Less: Variable Cost</td>
<td>16,808.49</td>
<td>14,917.92</td>
</tr>
<tr>
<td>Net Return</td>
<td>3,641.51</td>
<td>7,217.56</td>
</tr>
<tr>
<td>Less: Fixed Cost</td>
<td>1,716.36</td>
<td>3,250.87</td>
</tr>
<tr>
<td><strong>Net Profit</strong></td>
<td><strong>1,855.15</strong></td>
<td><strong>3,966.69</strong></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 size 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 size units, by showing an increased net profit of Rs.2111.54 (Rs.3966.69-Rs.1855.15), indicate 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 size 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 size 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 size units. The net return earned by the medium size units was more by Rs.3576.05 (Rs.7217.56-Rs.3641.51).

It may be finally concluded from the Table 4.4 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 the profitability.

**Comparative Analysis of Cost and Return for Small and Medium Size 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 4.5

**COMPARATIVE ANALYSIS OF COST AND RETURN**

**PER 100 BUNDLES OF COIR FIBRE**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Small Units</th>
<th>Medium Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Returns</td>
<td>20,450.00</td>
<td>22,135.48</td>
</tr>
<tr>
<td>Total Variable Cost</td>
<td>16,808.49</td>
<td>14,917.92</td>
</tr>
<tr>
<td>Net Returns Over Variable Cost</td>
<td>3,641.51</td>
<td>7,217.56</td>
</tr>
<tr>
<td>Total Cost</td>
<td>18,524.85</td>
<td>18,168.79</td>
</tr>
<tr>
<td>Net Return Over Total Cost</td>
<td>1,925.15</td>
<td>3,966.69</td>
</tr>
<tr>
<td>Variable Cost Per Kilogram</td>
<td>4.80</td>
<td>4.26</td>
</tr>
<tr>
<td>Total Cost Per Kilogram</td>
<td>5.29</td>
<td>5.19</td>
</tr>
<tr>
<td>Input – Output Ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Gross Return / Variable Cost)</td>
<td>1.22</td>
<td>1.48</td>
</tr>
<tr>
<td>Input – Output Ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Gross Return / Total Cost)</td>
<td>1.10</td>
<td>1.22</td>
</tr>
<tr>
<td>Cost Benefit Ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(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 was the highest in the case of the medium size coir units. The ratio for the medium units was 1.48 whereas it was 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 was 1.22 for the medium size coir units. It also shows that each rupee spent leading to a benefit of Re. 0.10 and Re.0.22 for the small and the medium size 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 position. On the other hand, the small size units did not have better economic return and thus they could be considered to have less profitability.
4.5 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.

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{114} 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

\textsuperscript{114} Lawrence R. Klein, “An Introduction to Econometrics”, Prentice Hall of India Private Limited, New Delhi, 1973, p.84.
countries of the world. It is convenient for the comparison of partial elasticity co-efficient. 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{115} 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 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:

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

Where,

- $\beta_0$ = intercept
- $y$ = Estimated gross revenue of coir fibre in rupees
- $X_1$ = labour in rupees
- $X_2$ = raw material (Husk) in rupees
- $X_3$ = unretting in rupees
- $X_4$ = Power in rupees
- $X_5$ = Machine running in rupees

\[
\begin{align*}
U & = \text{Disturbance term} \\
\beta_i & = \text{regression (slope) co-efficient} \\
i & = 1, 2...5.
\end{align*}
\]

**Estimated Results of Cobb-Douglas Production function**

In the study area, five input factors such as labour, material (husk), unretting, power and machine running were identified as most important independent variables which influence the gross revenue of coir fibre production. Therefore, an attempt is made to study the production function and to analyse the estimated results by using the method of 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 PRODUCTION FUNCTION FOR SMALL, MEDIUM AND POOLED CATEGORY OF UNITS MANUFACTURING COIR FIBRE

<table>
<thead>
<tr>
<th>Variables</th>
<th>Parameter Estimates</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small Units</td>
<td>Medium Units</td>
<td>Pooled Category</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.8479</td>
<td>1.1519</td>
<td>1.2107</td>
<td></td>
</tr>
<tr>
<td>LnX₁</td>
<td>0.6109* (7.9977)</td>
<td>0.5462* (6.7298)</td>
<td>0.6583* (9.2470)</td>
<td></td>
</tr>
<tr>
<td>LnX₂</td>
<td>0.2729* (4.7004)</td>
<td>0.2143* (3.3611)</td>
<td>0.1980* (3.5391)</td>
<td></td>
</tr>
<tr>
<td>LnX₃</td>
<td>0.0387 (0.7140)</td>
<td>0.0135 (0.1955)</td>
<td>0.0805 (1.4562)</td>
<td></td>
</tr>
<tr>
<td>LnX₄</td>
<td>0.2510* (4.1651)</td>
<td>0.2105* (3.5495)</td>
<td>0.2206* (3.9648)</td>
<td></td>
</tr>
<tr>
<td>LnX₅</td>
<td>0.2939* (2.5334)</td>
<td>0.1091* (2.2476)</td>
<td>0.1320* (10.9048)</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.8223</td>
<td>0.8169</td>
<td>0.8000</td>
<td></td>
</tr>
<tr>
<td>F–value</td>
<td>21.2925</td>
<td>15.1731</td>
<td>36.8019</td>
<td></td>
</tr>
<tr>
<td>Residual sum of squares - ∑e²</td>
<td>0.0052</td>
<td>0.0043</td>
<td>0.01922</td>
<td></td>
</tr>
<tr>
<td>No. of observations</td>
<td>29</td>
<td>23</td>
<td>52</td>
<td></td>
</tr>
</tbody>
</table>

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

It is understood from Table 4.6 that the explanatory variables taken for the analysis (model) of 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 ($R^2$) was 0.8223 indicating 82.23 per cent
variation in gross revenue in relation to the variables namely labour, material, power and machine running which were significant at five per cent level and it shows 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 co-efficient 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 co-efficient of labour, material, power and machine running were statistically significant at 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 co-efficient 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 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.
Test for Structural Difference

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

\[
F = \frac{\sum e^2 - (\sum e_1^2 - \sum e_2^2)}{\sum e_1^2 - \sum e_2^2} \frac{K}{n_1 + n_2 - 2k}
\]

...(4.2)

Where,

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

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

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

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

\[n_1\] = Number of small size coir units

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

Under the F-test, if the computed value of F is less than the 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
EQUALLY TEST BETWEEN SMALL AND MEDIUM COIR UNITS

<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% 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.

Test for Structural Difference at Intercept and Slope Level

The null hypothesis is rejected. Hence, there is a structural difference 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.\(^{117}\)

The regression model (equation 4.1) becomes

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

Where,

$\beta_d$ = Co-efficient of intercept dummy

$\Gamma_i$ = Co-efficient of slope dummy of $i^{th}$ 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>Variables</th>
<th>Parameter Estimates</th>
<th>t - Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.1928</td>
<td></td>
</tr>
<tr>
<td>Intercept dummy</td>
<td>0.9189</td>
<td>0.4395</td>
</tr>
<tr>
<td>ln X₁</td>
<td>0.6916*</td>
<td>8.0198</td>
</tr>
<tr>
<td>ln X₂</td>
<td>0.2401*</td>
<td>3.5530</td>
</tr>
<tr>
<td>ln X₃</td>
<td>0.0840</td>
<td>1.3509</td>
</tr>
<tr>
<td>ln X₄</td>
<td>0.2624*</td>
<td>3.7022</td>
</tr>
<tr>
<td>ln X₅</td>
<td>0.1294*</td>
<td>5.5480</td>
</tr>
<tr>
<td>Dln X₁</td>
<td>-0.1446</td>
<td>-1.1522</td>
</tr>
<tr>
<td>Dln X₂</td>
<td>-0.0242</td>
<td>-0.2441</td>
</tr>
<tr>
<td>Dln X₃</td>
<td>-0.0682</td>
<td>-0.6727</td>
</tr>
<tr>
<td>Dln X₄</td>
<td>-0.0516</td>
<td>-0.5314</td>
</tr>
<tr>
<td>Dln X₅</td>
<td>0.2393*</td>
<td>4.0130</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.8331</td>
<td></td>
</tr>
<tr>
<td>F – Value</td>
<td>24.1462</td>
<td></td>
</tr>
<tr>
<td>Residual Sum of Squares</td>
<td>0.0126</td>
<td></td>
</tr>
<tr>
<td>No. of observations</td>
<td>52</td>
<td></td>
</tr>
</tbody>
</table>

Source: Primary data.

* Indicates that the co-efficient 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 insignificant which indicates that there is no difference between the small and medium-size coir units with regard to technological 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 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 one per cent increase in the variable machine running may enhance the gross revenue of small units by 0.1294 per cent and for medium units it was 0.3687 per cent.

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

Returns to Scale

The sum of the regression co-efficient in the Cobb-Douglas production function refers to return to scale. The return to scale is estimated employing the elasticity co-efficient 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 factor 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 less than proportionate increase in the output, returns to scale are said to be decreasing.
The estimated returns to scale for the small, medium and overall categories of coir units are presented in Table 4.9.

**TABLE 4.9**

RETURNS TO SCALE FOR SMALL, MEDIUM AND OVERALL CATEGORY OF COIR UNITS

<table>
<thead>
<tr>
<th>Size of Units</th>
<th>Sum of the Elasticity Co-efficient (Returns to Scale)</th>
<th>Nature of Returns to Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>1.4674</td>
<td>Increasing Returns</td>
</tr>
<tr>
<td>Medium</td>
<td>1.0936</td>
<td>Increasing Returns</td>
</tr>
<tr>
<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 returns to scale are 1.4674, 1.0936 and 1.2894 for small, medium and overall categories of units respectively. The magnitude of the returns to scale indicates the increasing returns to scale for all these units irrespective of their size. Further, the table shows that the returns 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 units in the study area operates in an efficient manner.

**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 the other entire input 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 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 over-utilised, 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:

\[
\frac{\text{Marginal Value Product of the } i^{th} \text{ variable}}{\text{Marginal Factor Cost}} = \frac{\beta_i \frac{Y}{X_i}}{X_i} \quad \text{... (4.4)}
\]

Where,

\[Y = \text{Geometric mean level of gross revenues of coir fibre} \]

\[\overline{X_i} = \text{Geometric mean level of } i^{th} \text{ independent variable} \]

\[\beta_i = \text{The regression co-efficient of } i^{th} \text{ independent variable} \]

\[i = 1,2,\ldots,5 \]

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 \(X_1, X_2,\ldots,X_5\) for both small and medium size coir units are calculated by using the following formula (Equation 4.4)
MVP X₁ - Labour \[= \beta_1 \frac{\bar{Y}}{\bar{X}_1}\]

MPV X₂ - Material (Husk) \[= \beta_2 \frac{\bar{Y}}{\bar{X}_2}\]

MVP X₃ - Unretting \[= \beta_3 \frac{\bar{Y}}{\bar{X}_3}\]

MVP X₄ - Power \[= \beta_4 \frac{\bar{Y}}{\bar{X}_4}\]

MVP X₅ - Machine running \[= \beta_5 \frac{\bar{Y}}{\bar{X}_5}\]

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, ………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
MARGINAL VALUE PRODUCTIVITY OF THE RESOURCE-USE EFFICIENCY FOR SMALL COIR UNITS

<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 MVP to MFC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour (Rs / 100 bundles) (X₁)</td>
<td>7542.70</td>
<td>0.6109*</td>
<td>1.86</td>
<td>1.00</td>
<td>1.86</td>
</tr>
<tr>
<td>Material (husk) (Rs / 100 bundles) (X₂)</td>
<td>4397.62</td>
<td>0.2729*</td>
<td>1.48</td>
<td>1.00</td>
<td>1.48</td>
</tr>
<tr>
<td>Unretting (Rs / 100 bundles) (X₃)</td>
<td>328.08</td>
<td>0.0387</td>
<td>2.81</td>
<td>1.00</td>
<td>2.81</td>
</tr>
<tr>
<td>Power (Rs / 100 bundles) (X₄)</td>
<td>2502.17</td>
<td>0.2510*</td>
<td>2.39</td>
<td>1.00</td>
<td>2.39</td>
</tr>
<tr>
<td>Machine running (Rs / 100 bundles) (X₅)</td>
<td>820.39</td>
<td>0.2939*</td>
<td>8.55</td>
<td>1.00</td>
<td>8.55</td>
</tr>
</tbody>
</table>

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

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 size coir units are estimated and presented in Table 4.11.


TABLE 4.11
MARGINAL VALUE PRODUCTIVITY OF THE RESOURCE-USE EFFICIENCY FOR MEDIUM COIR UNITS

<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)</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)</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)</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 size 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 category of coir units to find out the general behaviour of the resource inputs to the revenue of coir fibre notwithstanding the size of the coir units. The results are presented in Table 4.12.
TABLE 4.12
MARGINAL VALUE PRODUCTIVITY OF RESOURCE-USE EFFICIENCY
FOR POOLED CATEGORY OF COIR UNITS

<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) (X₁)</td>
<td>7681.41</td>
<td>0.6583*</td>
<td>2.10</td>
<td>1.00</td>
<td>2.10</td>
</tr>
<tr>
<td>Material (husk) (Rs / 100 bundles) (X₂)</td>
<td>4261.27</td>
<td>0.1980*</td>
<td>1.14</td>
<td>1.00</td>
<td>1.14</td>
</tr>
<tr>
<td>Unretting (Rs / 100 bundles) (X₃)</td>
<td>328.14</td>
<td>0.0805</td>
<td>6.00</td>
<td>1.00</td>
<td>6.00</td>
</tr>
<tr>
<td>Power (Rs / 100 bundles) (X₄)</td>
<td>2384.96</td>
<td>0.2206*</td>
<td>2.26</td>
<td>1.00</td>
<td>2.26</td>
</tr>
<tr>
<td>Machine running (Rs / 100 bundles) (X₅)</td>
<td>540.65</td>
<td>0.1320*</td>
<td>5.98</td>
<td>1.00</td>
<td>5.98</td>
</tr>
</tbody>
</table>

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

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 a scope to increase all these resource inputs to maximise their revenue.
4.6 SUMMARY

In this Chapter, cost of production and return from coir fibre and resource–use efficiency are analysed. The following are the major findings of this chapter:

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 was analysed and found that the total cost for the small and medium units were Rs.18594.85 and Rs.18168.87 respectively. The variable costs 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 size 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.

Returns from coir fibre production was analysed and found 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 size 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 size units, by showing an increased net profit of Rs.2111.54 (Rs.3966.69-Rs.1855.15), indicate enhanced profitability than the small units in the study area.

Resource –use efficiency was analysed and found that among the significant variables, labour, material, power and machine running were most important resource inputs for the small, medium and pooled categories of units in the study area. The variable “labour” was found to have a greater influence on the gross revenue of coir fibre than all other variables.