Chapter VIII

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ANALYSIS OF RESOURCE UTILISATION

Unlike other developing economies, Indian economy is witnessing growing unemployment and poverty amidst plenty. Manpower that powers the churning wheels of economy is available in plenty. Hence theoretically lots of goods can be produced more economically in the rural industries than in the large scale sector. Much has been said about manpower of all the factors of production, since effective utilisation of all the other resources depends ultimately on the manpower, be it a nation, industry or even a manufacturing unit. The efficiency of mechanisation and technological progress for increasing productivity in less developed areas, which are the threshold of industrial revolution is very important. According to Angus Maddison for the economy as a whole, labour productivity is the crucial variable, it is labour which is the factor to be economised. This emphasis on labour saving suggests that, the developing nations should realise the great importance of labour productivity in the macro-economic sense and for the long-run. This means that they should give equal weightage both to labour intensity and the productive power of labour, because effective labour productivity is the product of both these characteristics. (Labour intensity is the amount of work performed within a unit of time. Productive power is the potential amount of production per unit of concrete labour.

Thus it becomes important to accelerate, adopt changes in technology, create ion-human energy, capital instruments, etc., for improving the productive power of labour employed in the industrial sector. This in the long run would substantially contribute towards the improvement of gross national production which is inevitable or keeping the bogey of diminishing returns at bay, whilst initiating and sustaining economic growth.
This chapter covers the utilisation of resources in terms of technology, capacity utilisation (meaning the utilisation of installed capacities of machinery) in the rural industries under study.

8.1 TECHNOLOGY

According to Papola\textsuperscript{3} capital intensity is a good measure of the technology involved in the production process. V.V. Bhatt\textsuperscript{4} measures technology in terms of horse power capacities of the machinery involved. More simply it can be expressed as horse power per labour. Both these yardsticks cannot be used in this study, since the production process in many of the rural units under study are so traditional, that they do not involve any mechanised procedures and hence are purely manual, without involving any machinery. Thus comparing quantified technology levels with output and labour productivity in the rural units though important, was difficult to be implemented. Next it becomes very essential to ascertain to what level technological progress has been implemented in these rural units? Even more, was there any requirement for furthering of technology in the various categories of industries under study? Because, according to Khanvinde, D.J.\textsuperscript{5} technology should be based on a careful study of the market demand. Secondly if the rural industries have to provide letter-paying employment to the rural people (and thus promote the development of the rural areas) technology has to be furthered in order to realise enhanced output and productivity. But the rural industries are bound by one more vital economic objective of uplifting the poverty of the rural masses by absorbing the surplus labour. Hence in principle they ought to be labour intensive.

Thirdly, as maintained by the Ashokmehta committee (1966)\textsuperscript{6} tire technology in the rural industries should be properly guided (by research institutions and the rural Industries Commission) to enable proper utilisation of local resources and skills of the available manpower. Thus pondering into these three major objectives of technology in the rural industries have been realised.
HANDLOOM (SOCIETIES) SECTOR:

As discussed earlier raised-pit looms were used by a majority of the weavers, while frame looms were used only to produce coarser varieties of fabrics, for (example) when producing bedcovers, pillow cases etc. These looms were operated purely by manual operations involving psychomotor dexterity of the foot which pedalled the looms and the fingers which handled the healds and reeds of the looms. With regard to utilisation of the available skills in the manpower, this technology seemed to utilise the skills available utmost. It has to be reminded here that almost cent percent of the manpower in the societies were traditional weavers, having imbibed the trade skills from their parents and grand parents. Hence the source of skill input was carried down from generations, and hence very much traditional. The weavers thus were found to be traditional without any updation in their skills. Formal training was almost nil excepting one weaver who was a Diploma holder in mechanical engineering and had resorted to weaving since it was their ancestral occupation and since he could not acquire a suitable career elsewhere.

Considering the output accomplishment and productivity yardsticks the power looms which were utilising electric power instead of manual, were more than 15 times more effective than the pit looms. The standard output of an efficient weaver in the manual looms was 6mts/ per day, while a worker in the power loom sector could produce 100mts per day. While the All-India average productivity per loom was 5.12 mts per day, the Tamil Nadu average was 4.7 mts per day, the productivity in the societies under study the productivity estimated was a much lower 1.4mts per day per loom. Though there were some minor influences already discussed for this lowered productivity, the standards recorded are obviously, relatively very low.

Considering the demand for the handloom produce, there seems to be a huge rift between the preferred and the produced. The weavers were found to stick on to
traditional designs and colours which were rendering the handloom products less attractive, which were already facing tough resistance from the consumers due to the uncompetitive prices, (the prices were relatively higher due to the high, labour intensive, conversion cost). Almost all the 22 societies in the organised sector were seeing the red; due to heavy stagnation of the produce. The products of the competitive mill sector and power loom sector were more cheaper, more attractive in terms of fresh colours and new designs. A few societies have resorted to training their weavers in jacquard looms, and other modernised loom accessories, which enabled the incorporation of fresh designs and more colour yams. These societies have resorted to export ventures which have proved to be highly successful. (The 2000-2001 target of Rs.1 crore export for the Trichy District was accomplished well ahead of the stipulated time by these societies). Since die export outlets provided an immediate buyer, enhancing the exporting capability of the societies can be envisaged.

Analysing the alternatives available to redeem die societies from the threat of getting irrevocably stuck due to the very low productivity, either the weavers should venture into the next step in the technical progress namely the powerlooms, or strive to better their skills in adopting the present technology itself for improved output.

Resorting to powerlooms would not be a feasible solution, for various reasons. Electricity was a problem, since all the weaver households were not electrified. Even if centralised workshops with all facilities of power and looms were provided (like in the industrial societies of the early days), the marketing of the produce was a Perinmeal problem, since the weavers were neither able to produce new designs (they were not skilled enough) nor willing to come out of their inhibited skill levels. obstructed by the problems of demand, they were not willing to risk into undertaking raining for new designs.
Secondly the shift into powerlooms from the present traditional pit looms would result in disproportionate lessening of employment throwing out considerable portion of weavers jobless. Another major obstacle the societies would face, will be the working capital requirement. Hence unless cash credit is operated, working on conversion into power loom would be a major failure.

The other alternative to remedy the lowered productivity would be to revive the idle looms in the weaver households (on an average each family would have at least 1-2 idle loom-) so that the under-utilisation of manpower, in terms of family labour that was only partially used, and in terms of lowered quantity produced due to pre-weaving preparation leading to idle machine hours and hence idle man hours can be rectified. Thus removing the partial idling of looms can ensure fuller utilisation of manpower and machine power available by saving man hours and machine hours. Thus the output per worker can be raised.

With regard to the opportunity identified in the success of the export ventures undertaken by the societies with the aid of the registered exporter members of the handloom Exports Promotion council (HEPC), simplification of the whole procedure of exporting and the establishment of an exclusive entity for promotion of exports of the societies produce would enable the exploitation of this new opportunity to the maximum. At present the handlooms for exports are produced based on the specifications given by the private handloom exporters or merchandise exporters who are registered members of the Handlooms export promotion council. The Government can entrust the responsibility of exports of the society's produce to a separate Export promotion council, which can coordinate directly with the HEPC holding itself accountable for the successful accomplishment of the export agreement in whole. At present the societies coming forward to export, draw an agreement with a merchandise exporter, or handloom exporter who must necessarily be a member of the HEPC. Specifications of the product and time limits are also provided by the
member exporter who only helps in coordination but does not hold the accountability for the completion of the export process.

This exclusive council would be able to frame, and maintain quality control standards that are very much important in these export ventures. Identifying new outlets (countries) with export potentials, and updating the societies with feedbacks from these outlets can be the other responsibilities of the council.

Thus the SWOT analysis of the 'traditional' technology adopted in weaving has revealed that the weavers considered 'skilled', were not able to ensure productivity in their tasks. The technology was not able to enable them produce demand-based products. Capitalising and utilising on the export potentials identified, would save the societies of the threat of further suffocation in demand, which would prove to be fatal, if not curtailed immediately (because all the 22 societies were in the red for a considerable period of time, and needed an immediate turn-around.)

KHADI AND VILLAGE INDUSTRIES SECTOR

In the case of the technologies adopted in the various Khadi units (including the Nepali Loom centres and the Rural Textile centres) and the village industries units laudable progress has been accomplished, basically because of two reasons. The Government through the Khadi and Village Industries Commission (which has been engaged in the production and development of Khadi and Village industries for over a quarter of a century) has been carrying on research and development activities to improve tools and equipment and the techniques of production in the various industries (details given under 6.2.3). Secondly only 12% of the artisans (mostly belonging to the traditional leather tanning and carpentry and black-smithy units) were found to have imbibed the trade skills from their parents and grand parents, inclined to stick on to their age-old tools and techniques. The rest of the manpower (more than 85%) seem to have developed their skills from job exposure, for years.
They were not tangled in the traditional web of out-dated technology, and hence were willingly able to adapt and adopt the technological break-throughs made available to them by the R&D centres of the KVIC, and the private entrepreneurs and other institutions implementing KVI programme. Thus only about 12% of unit were manned by traditional - technology- based manpower, (including the leather, and carpentry and blacksmithy units).

In the case of cotton Khadi, the traditional Charkha has a very lower productivity of about 2 hanks per 8 hours-day. The New Model Charkha (NMC) having upto 12 spindles have been introduced, and is adopted in die Rural Textile Centres (KVI units). The productivity of the charkha has been confirmed to be about 30 hanks per eight - hour- day. Increased production in this charkha is attributed to the increased delivery and higher speed of the spindles. Slub Spinning charkha and fancy doubler are modernised versions for producing fancy yarn with slubs at intervals and doubled yarn with knots etc, in order to enable attractive designs. With a view to totally eliminating winding of yam in weaving operation a modification has been made to wind the yarn directly on pirn. Thus the traditional charkha has been carefully modernised, to improve the finishing of the yarn and at the same time retain the manual operation base of the charkhas, ensuring the labour-intensive nature of the sector.

In the case of weaving again, the KVI Nepali loom centres, as the name indicated, were using nepali looms which were introduced by the KVI research institutions especially to train new entrants to the weaving profession, thus providing fresh vistas of employment and solving the problem of accumulation of yam due to paucity of weavers. The 6-spindle, 8-spindle and 12-spindle charkhas were used. The pedal operated spinning frame of die 12-spindle charkha was first introduced in Tamil Nadu. The spinning and weaving units of the KVI were thus pioneers in
introducing improvised machinery which not only did not destabilise the already employed, but also opened up new vistas of employment.

The Khadi soap unit used the small scale power-operated soap making machinery evolved in 1978, which had been a revolutionary break through to decentralise die production of this sophisticated product.

The carpentry and blacksmithy units and the leather tanning units were on die contrary, very traditional in their production technology, with their production process almost purely manual, without the use of electric-power. Tools and small manually operated equipments were used, which were obviously time consuming, and involved physical exhaustion.

With regards to utilisation of die available skills in the manpower it was obvious that excepting the carpentry and balcksmithy units and the leather tanning units, the other units were fairly on the path of technology upgradation. The workers and artisans were found to have sufficient work exposure which had helped them adapt to changes in die techniques of production. But it has to be mentioned here that though the KVIC was implementing long term training programmes spread through out the five-year plans in order to inject fresh, improvised, appropriate techniques for artisans / and workers entrepreneurs and managers of the KVI units the training schemes were still not sufficiently distributed. Out of a total of 61,199 persons trained in the various KVI categories during the Eighth Plan (1996-97) about 23,144 belonged to the Khadi units, 932 to the leather units, 263 from the carpentry and blacksmithy units. At the end of 1999-2000 more than 76,656 persons had benefited out of the various training programme of die commission. The training programmes, probably due to want of spread distribution, had not benefited the units in the district.

With regard to the productivity in terms of per capita output, die KVI units were relatively less productive with an average of Rs.35,000 produced per worker
per year. Improvised technology had improved die employment vistas and also enhanced the output per machinery / equipment per day. But the excessive use of manpower (discussed earlier) in diese units seems to have resulted in lowering the per capita out put in the sector.

SMALL SCALE INDUSTRIES SECTOR:

The technology adopted in the SSI units when compared with the other sectors of the rural industries, were found to be highly capital intensive. Observation of the average investment on fixed assets and the per capita output sector-wise confirms die capita intensive nature of the SSI units which was almost more than 8 times that of the odier units (Table 6.1.2.2).

Thus both die capital intensity and the manpower productivity were found to be the highest in SSI units while botfi diese variables were the least in the societies. The data by itself was self explanatory, supporting the association of higher manpower productivity with higher capital intensity and hence higher technology.

As shown in Table 8..JM, the societies seem to be the least sophisticated with regard to technology, with all the machines operated manually, with no involvement of electric power in the production process.

The sophistication of technology in the SSI units is confirmed from the consumption of electricity per machine measured by Horsepower per machine. The highly mechanised production processes invariably involved in mass production, were found to be easily flexible, fluctuating according to the demand status in the market and hence there was no problem in steering the production to match the demand.
### Table 8.1.1

**Technology Status – Nature and number of machines in the type of industries.**

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Category of Industries (2)</th>
<th>Traditional (3)</th>
<th>Intermediate (4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>Modern (Purely mechanised) (8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tiny</td>
<td>Purely manual (No machine)</td>
<td>Manually operated machines</td>
<td>.25 H.P machines</td>
<td>Up to .5 H.P machines</td>
<td>Up to 1 H.P machines</td>
<td>1 to 10 H.P machines</td>
<td>10 to 20 H.P machines</td>
<td>20 to 50 H.P machines</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Tiny</td>
<td>13 units</td>
<td>8</td>
<td>-</td>
<td>32</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td>11</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>SSI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>25</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>3.</td>
<td>KVI</td>
<td>2 units</td>
<td>122</td>
<td>22</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>4.</td>
<td>Society</td>
<td>-</td>
<td>1317</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Research Survey.
TINY SECTOR:  

The technology status in the tiny units can be explained to exhibit both the extremes with about 40% of the units purely manual in their operations, (including the handicraft units producing paper mesh, cotton applique works, wooden handicrafts and bricks) while some of die units like those in the coir, defibring units utilised more than 10 horse powered machinery. Similarly within the same sub sector, for (e.g) like in coir, there were both die extremes, both the purely manually operated units (spinning coir yarn & ropes using treadle and cycle ratts) and those units using highly mechanised machines, with more than 10 horse power capacities.

Similarly the turnover or output was not directly correlated with the level of technology in this sector. For (e.g.) the brick units (producing bricks for construction units) were manned by artisans who moulded the bricks deftly using only tools to aid their dexterity. The turnover in the brick units were several lakhs per year. Similarly the applique works produced to decorate temple chariots and Shamainas and stalls of religious meetings were very cosdy, a single assembled unit costing around Rs.70,000 to Rs.80,000.

Again, some of the units like those producing paper mesh idols involved the creative dexterity of the artisan's hands and were highly aesthetically finished, and sometimes taking even 6 months to be completed, as in the case of applique works for temple chariots, while the production process was a mere monotonous mass production activity, producing voluminous units per hour, as in the case of brick cutting.

Considering the ability of the technology adopted to match die demand, again there were both the extremes. In the case of products which had very high demand, the production process was highly time consuming and could be produced only in very limited levels. For (e.g) in the case of the applique works one complete
assortment of the applique, required about 6 months since the number of artisans in this occupation were very scarce by number (only 2 families in the whole of Trichy district, produced such applique works). But applique works had very high market, and were encouraged. Orders were sometimes placed from foreign countries. In the case of the tiny sector products like ropes, coir yarn, coir fibre, bricks, mats (grass), baskets and semi-precious stones/gems, the market absorption was continuous and also very competitive, and hence the artisans / workers had to work, sometimes even on shifts to meet the demand. In a third category of tiny sector units, the demand was highly seasonally, sometimes the market demand existed only for a couple of months, like as in papermesh and P.O.P. works (lord Vinayaga for ‘Chathurthi’ festival) and mud lamps (for Karthikai festival), compelling the artisans to resort either to agriculture or other part time occupations during off-seasons.

There were no formal technical inputs or research institutions to boost technological upgradations in the traditional units line the handicraft units and the brick works. Inspite of lack of formal support and subsidies, some traditional sub-sectors of the handicraft sector in this district were found to imbibe technological improvisations like the mororised pot wheels (shaila engine) instead of the highly traditional hand-operated potter's wheel since they were both time-saving and energy saving for the artisans. The coir units which were a highly labour intensive, capital saving segment was an exception. The Government in this particular segment intervened through centralised institutions like the Coir Board, and other supportive institutions which provide both improvised machinery and training in upgraded technology and the financial support, to lift the artisans up, to more productive endeavours. But in the case of the coir industries, the adoption of improvised technologies seems to be a very slow process. For (e.g) in the spinning of coir ropes more than ninety percent of the yarn / rope producing coir units were found to use only manually operated cycle ratts or treadle ratts, which were both less productive
and involved highly tiring process. The traditional, manually operated cycle ratt required 3 persons to operate, and during the process of weaving, the artisans walked about 3 to 4 kmts per day, twisting the yarn/rope from and to the wheel of the ratt. The new motorised ratt advocated by the Regional coir Training and Development Centre, - Coir Board, (Thanjavur, Tamil nadu), was operated by a single person and the per capita output per day was about 8 to 10 kgs of coir yarn while in the case of the traditional cycle / treadle ratt the per capita output was 4 to 5 kg of yarn per day. Moreover the motorised ratt required only about a third of the space required by the traditional ratt, and also could be handled by the artisan along with their household chores, of housekeeping and cooking. The Coir Board apart from training the artisans with a stipend of 500/- per month, provided a capital subsidy of 25% of the equipment cost (amounting to Rs.2500 per motorised ratt). The Regional coir Training and Development Centre of the Coir Board at Thanjavur, TamilNadu was providing training in this new motorised ratt to 60 female artisans every year under the Manila coir Yojana scheme.

In the year 2000-2001 alone, a sum of Rs.4.23 lakhs was spent on this scheme of training for motorised ratt, out of which Rs. 1.75 lakhs was spent on the stipend to the artisans while the amount expended as subsidy for purchase of the equipment (motorised ratt) was about Rs. 14.33 lakhs. Inspite of all these supportive subsidies and stipends the motorised ratt project seem to gain acceptance at a very low pace. Throughout Tamil Nadu and Pondichery put together the Coir Board was able to push only around 248 motorised ratts since 1995, when the ratt was introduced. Similarly training in dyeing, bleaching, shade matching, weaving mattings, brush making and spinning, and rope making were provided through the artisan training courses, the coir craft training courses and the coir technology courses. These courses that were aimed at developing the artisans skills also would help to utilise better the coir fibre produced in the district which was actually sold to the other
districts in the state. Lack of skilled manpower and suitable technology in the existing coir units were the reasons for this unutilised coir fibre, produced in the district. The Coir Board was providing subsides ranging from Rs.40,000 per unit to about Rs.1.5 lakhs per unit, depending upon the nature of the new technology adopted, (including rope making, curled coir making, traditional spinning, automatic spinning and coir pith converting units.

Thus the pace of technological progress in the coir units of the Tiny sector was very slow than planned, resulting in low productivity in the existing units and unutilised surplus raw material namely coir fibre in the district, inspite of a good demand for coir fibre and coir based products in the market, (both local, national and foreign markets).

8.2 CAPACITY UTILISATION

By capacity utilisation, is meant the extent of utilisation of the installed capacity of machinery in the rural units of study. It has been expressed in percentage ratio in this study.

Whether the installed capacities in the machinery and installation of the rural units were utilised to the extent of having a positive influence on the output in these units was the problem to be contemplated.

It is assumed from the primary data that the capacity utilization is linearly correlated with the production. To find out the coefficient of correlation, the average output (y) are considered.
Table 8.2.1

Correlation of capacity utilisation (in %) with average output (in lacs of rupees)

<table>
<thead>
<tr>
<th>Item</th>
<th>X</th>
<th>Y</th>
<th>X²</th>
<th>Y²</th>
<th>XY</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
</tr>
<tr>
<td>Tiny</td>
<td>72.5</td>
<td>16.4</td>
<td>5256.25</td>
<td>268.96</td>
<td>1189.0</td>
</tr>
<tr>
<td>SSI</td>
<td>61.6</td>
<td>91.6</td>
<td>3794.56</td>
<td>8390.56</td>
<td>5648.56</td>
</tr>
<tr>
<td>KVB</td>
<td>39.5</td>
<td>15.25</td>
<td>1560.25</td>
<td>232.5625</td>
<td>602.375</td>
</tr>
<tr>
<td>Society</td>
<td>58.2</td>
<td>26.60</td>
<td>3387.24</td>
<td>707.56</td>
<td>1548.12</td>
</tr>
<tr>
<td></td>
<td>231.8</td>
<td>149.85</td>
<td>13998.3</td>
<td>9599.6425</td>
<td>8982.055</td>
</tr>
</tbody>
</table>

Then,

\[ r = \frac{4(8982.055) - (231.8 \times 149.85)}{\sqrt{4(13998.3) - (231.8)^2 \times 4(9599.6425) - (149.85)^2}} \]

\[ = 0.1987. \]

To check the validity of the assumption about the linearity, the Student's t-test is applied.

\[ |t| = \frac{0.1987\sqrt{4-2}}{\sqrt{1-(0.1987)^2}} \]

Thus, the value of t is not significant at 5% level of significance. So, it may be concluded that capacity utilisation is not linearly related with average output of the four category of industries.

Hence this variable does not call for further analysis.

8.3 SUMMARY:

With regard to the technology adopted, almost cent percent of the weavers in the handloom societies used traditional pit looms which utilised highly skilled labour
(in terms of experienced gained) to perform deftly on the looms. But die weavers lacked the versatility to handle improvised versions of the looms since they had inherited the traditional outdated skills. The productivity recorded was the lowest, 3.4 mts per loom per day when compared to the National and Tamil Nadu average of 5.12 mts and 4.7 mts per day per loom respectively. The produce of the pit looms equally were less attractive both in terms of colours and designs, and prices, resulting in heavy stagnation of the handloom produce. This almost fatal suffocation in the market resulted in the irrevocable breaking of the working capital cycle driving the poverty stricken weavers to irredeemable debts. Unlike the traditionally skilled artisans of the handloom industry, majority of the KVI artisans / workers were rich in on-the-job experience and hence willing to adapt and adopt the technological improvisations made available by the R&D efforts of the Government. However the technological progress was deliberately contained at a slow pace in order to maintain the labour intensive nature of the KVI sector units. With regard to the productivity in terms of per capita output, the KVI units were the least productive (Rs.35,000/- per yr). Improvised technology had improved the employment vistas and also enhanced the output per machinery / equipment per day. But the excessive use of manpower in these units seem to have resulted in lowering the per capita output in this sector.

The technology in the Tiny sector exhibited both the extremes, with 40% of the units adopting purely manual operations in their production process, while a considerable amount of mechanisation were involved in 25% of the units. The technology adopted rendered the production more demand-flexed, with both the lower and higher levels of technology, enabling production in smaller units and in mass, according to the demand requirements. Though the government intervention for promoting technological progress was meagre, there was voluntary initiation in many segments of this sector towards adoption of technological improvisations. Synchronising the highly seasonal demand was the unique problem in this sector.