CHAPTER – IV

RESEARCH METHODOLOGY

4.1 Introduction:

Research in common refers to a search for knowledge. According to Redman and Mory, “Systematized effort to gain new knowledge\(^1\). It is the pursuit of truth with the help of study, observation, comparison and experiment. In short, the search for knowledge through objective and systematic method of finding solution to problem is research. The systematic approach concerning generalization and the formulation of a theory is also research. As such the term ‘research’ refers to the systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the facts or data, analyzing the facts and reaching certain conclusions either in the form of solutions (s) towards the concerned problem or in certain generalizations for some theoretical formulation.

The researcher in relevance to the above discussed concept has developed a research program to emphasize on the observations he has made over twenty years of industrial experience in spinning industry to depict and prove a new concept of marketing of process waste in spinning mills. The research is exploratory in nature and is analytical in its behavior when the analysis of his data collected from various variables such as workers, jobbers, and production managers and managing directors has been done. This is a research because potential of cotton process wastes and its utility for the end users and simultaneous demand in the market has made the researcher by experience to investigate the importance and its returns after marketing to the organization. This is very important point of view especially for the co-operative spinning mills who are not practicing marketing philosophy for selling their cotton process wastes. The researcher would like to investigate the potential returns from waste marketing to the spinning mills.

Ref 1 :L.V.Redman & A.V.H.Mory, The Romance of Research, 1924,p. 10
4.2 Selection of the topic

The researchers twenty years of industrial experience has developed a passion to emphasize on every product generated in spinning mill, private or co-operative to be explored to generate a capital which can provide feasibility in any form to the spinning unit.

The researcher in his twenty years of experience in both private and co-operative sectors, from 1985 to 2005 has found that most of the mills are neglecting the process wastes as non-productive or useful product to be marketed. The researcher has tried to convince the co-operative spinning mill management to explore the potential of process wastes in the market and earn better returns through marketing.

The researcher has selected this topic to investigate the amount of returns to the spinning mill management after effective marketing of process wastes. This topic has become very important in the view of the researcher for the amount of returns obtained by selling this process wastes especially by modernized mills like M/S Jawahar Sahakari Soot Girni Dhule, M/S Loknayak Jayprakash Narayan Sahakari Soot Girni Shahada and M/S Priyadarshini Sahakari Soot Girni Shirpur, who generate more than eight to ten tons of process wastes per day that is sellable in the markets.

As per the SITRA norms an export oriented spinning mill has to maintain a quality of yarn which is acceptable in the global market. According to SITRA the beat quality of yarn can be obtained at a realization of 78% to 80%. It is also necessary that the raw material ginned cotton should possess those parameters which can provide global standard yarn. The above mentioned mills in Khandesh are producing export oriented combed and carded yarns as per the requirements in the market. For combed yarns the SITRA norms say that 76% to 78% realization from quality ginned cotton for specific counts would yield quality yarn. Now considering 78% as a realization of yarn from the processed cotton means that 20% to 22% waste is generated in the mill.
The successful mills in Khandesh are producing various counts of yarn such as 16s, 18s, 20s, 24s and 32s combed yarn and 38s, 36s, 42s and 24s carded yarns with a total production of more than eight ton per day. For producing eight tons of yarn per day of above mentioned counts the cotton consumed naturally increases. After modernization the quality of process wastes have improved considerably and is demanded by various vendors in the market. As the demand increases for a improved quality standard of the product the prices also increase in the market.

The researcher in his observation has found that there is a closed tender system, selected vendors for sale and non-recording of wastes, non recording of received amount from sales in the audit books which leads to negligence of process wastes as a feasible product in the market.

In the period from 2002 – 03 to 2011 – 12 the co-operative spinning mills in Maharashtra underwent tough times and most of them closed down due to non modernization, non-availability of funds and selfish motives of management body.

Considering the above said facts the researcher has selected this topic to promote the process waste sale of cotton spinning mills to fetch a reasonable returns which can look after overheads like MSEB Electricity Bills, labour payment, inventory purchase, administrative expenses or support fund for expansion. The researcher in his twenty years experience of which more than ten years from 1995 to 2005 in co-operative spinning mill in Maharashtra has found that uncultured behavior of labours in the departments has generated more amount of process waste especially from 1995 to 2005, a period just before modernization under the Technical Up gradation Fund (TUF) for the textile industry. This excess waste which could have been reused with proper care and segregation was sold without any high returns from waste vendors.

After modernization the co-operative spinning mills have been consuming more cotton to produce more variety of yarns as per the requirement of the market. The production of yarn when compared to 2002 – 03 has escalated to more than 800% by the end of 2011 – 2012. The waste is not recorded by the co-operative
spinning mills in Maharashtra because the amount received after sale has to be recorded in the audit books. There are various types of wastes generated from the first department of spinning mill i.e. blow room to the last department i.e. cone winding. To name the particular waste and the percentage of the waste generated to the total process in the department can be briefly stated as below.

**Blow room** – 4.5% of total processed material (cotton).

**Carding** – 4.8% of total processed material (cotton). Of which 2.8% to 3% is flat strip waste which commands highest rate in the market on sale. (Rs. 38/kg to Rs. 46/kg)

**Combing** – 12% to 14% of comber noil is extracted in these department which is very lustrous, clean and short fiber waste which is utilized by the concerned mills up to 5% of the total mixing as re-process able wastes and 85% of the comber noil is sold at an average rate of Rs.75/kg to Rs. 80/kg to the open-end spinning units who produce coarser counts of yarns.

**Cone winding** – After the implementation of auto coners the hard waste generation has considerably decreased from 2.5% to 0.75% but the cleanliness of hard waste has considerably increased to command high rates in the market. The rates of hard wastes was around Rs. 80/kg to Rs. 90/kg.

The researcher having analyzed the selfish gains of select persons in a co-operative spinning mill in handling the sales of cotton process wastes feels necessary that a system has to be adopted by the governing body to make a transparent sale methods with the help of marketing techniques to benefit the management body of the co-operative spinning mill with a capital that can support its overhead expenses and function successfully to survive any tumultus situations in the global market.

Another important issue which prompted the researcher to select this topic was from 2004 – 05 to 2010 – 2011 the prices of raw material (ginned cotton) have been escalating to more than 300% every year, while the rates of yarns produced did not show the same tendency in prices which led to most of the co-operative spinning mills to shut down. The co-operative spinning mills which underwent modernization in this period were able to produce more and as well quality product. The modernized machinery makers developed automatic waste collection
methods for various departments which enabled the quality of process wastes increase considerably and help the end users to make quality end products. This has automatically enhanced the prices of wastes.

The successfully co-operative spinning mills which are producing export oriented combed and carded yarns have increased their production in multiple times. This also results in high amount of process wastes in the mill. For a mill generating on and average 6.5 tons of process wastes per day of which 40% of waste commands Rs. 60/kg or more in the market generates nearly Rs. 25,00,000 per month. If this waste is marketed properly can fetch a capital of Rs. 30,00,000 and above which will be very supportive amount for the co-operative spinning mill management. Keeping this point in view the researcher has selected this topic to show that there is financial feasibility for the mills which can be utilized effectively to reduce overhead burdens.

4.3 Title of the Research: -

4.4 Objectives

1. To study the quality of cotton process wastes of co-operative spinning mills after modernization.
2. To understand whether process wastes of cotton spinning mills are useful marketable products.
3. To analyze the marketing procedures if any, adopted by co-operative spinning mills for marketing their process wastes.
4. To analyze the prices of process wastes commanded by co-operative mills as compared to private mills.
5. To study the impact of marketing of process wastes on profitability of co-operative spinning mills.
4.5 Hypothesis :

The hypothesis for the research has been divided into null hypothesis (H₀) and alternative hypothesis (H₁).

1. H₀: The awareness amongst the employees of co-operative spinning mills about importance of process waste is poor.
   H₁: The awareness amongst the employees of co-operative spinning mills about importance of process waste is high.

2. H₀: The co-operative spinning mills have an inferior marketing system for process waste than that of private spinning mills.
   H₁: The co-operative spinning mills have a superior marketing system for process waste than that of private spinning mills.

3. H₀: Poor handling and marketing of process waste of spinning mills does not have an impact on profitability of spinning mills.
   H₁: Poor handling and marketing of process waste of spinning mills have an impact on profitability of spinning mills.

4.6 Scope of the study

1. The scope of the study is centered to Khandesh region
2. The focus of the study is for marketing practices of co-operative spinning mills for process wastes.
3. The scope of study is limited to cotton growing areas of Khandesh (Dhule, Nandurbar and Jalgaon).
4. The research is binded by the idea of exploring cotton spinning mill process wastes as a useful byproduct (resource/raw material) for producing useful industrial products.
5. The scopes of the study concentrates on handling of process wastes of cotton spinning mills, improving their quality and marketing them for better prices and support the mills financially.
4.7  Research Methodology:

The researcher has applied explorative and analytical research methods to explore his research ideas in this study. Research Methodology applied is based on the data collection and its interpretation.

There are two types of data:
1. Primary data
2. Secondary data.

1. **Primary data**: It is data collected by the researcher personally by contacting the person of resource. The researcher has visited all the five mills with the questionnaires and met the workers selected for study and filled up the questionnaires from all the sample workers selected for study. He conducted interviews of production managers and managing Directors of all the mills with select questions as shown in the questionnaires and collected the vital data which is useful for his study. This data collected by the researcher in person is the primary data. The number of workers and jobbers selected for the study have been shown in the below table (3.1).

2. **Secondary data**: The researcher has selected the secondary data from various sources such as Annual Reports of all the co-operative spinning mills under study from 2002 -03 to 2011 -12. The other secondary data sources were Maharashtra State Co-operative Society journals, Spinning Mill Federation journals, Spinning hand books, SITRA Norms, internet services through various web sites and periodicals. The literature related to this study was collected from reference books, international journals such as Marketing journals, Textile journal and other e – journals. Bulletins of Textile Spinning from SITRA were also useful secondary data for the researcher.
4.8 Sampling Method for Sample Selection:

The researcher has applied stratified sampling method to collect samples and used the maximum samples available. The total sample size available is shown below. He has categorized available samples in to four categories namely; workers, jobbers, production managers and managing directors. The workers and jobbers have given vital information regarding quality of process wastes and also the methods of packing, labeling and storing. Another category of production managers and managing directors have given the management policies and implementation problems related to this topic.

In Khandesh there are total five Spinning Mills. The researcher has selected all the five Co-operative Spinning Mills which are modernized, running in full capacity.

The five mills are:

1. Jawahar Sahakari Soot Girni, Dhule
2. Lok Nayak Jai Prakash Narayan Sahakari Soot Girni, Shahada
3. Priyadarshini Co-operative Spinning Mill, Shirpur
4. J.T. Mahajan Co-operative Spinning Mill, Yawal
5. Dindayal Co-operative Spinning Mill, Pimpalner

The researcher has selected 100% mills for his study.

From these five mills the researcher has divided the samples into two categories,

**Category A – Workers and jobbers.**

**Category B – Managing Director/Production Manager / Spinning Masters (Production)**

**Sample collection criteria** – Samples were selected in random. The following table shows the distribution of samples.
4.1 Table shows the distribution of worker samples selected for Study

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of the Co-op.Spg. Mill</th>
<th>Total sample population of workers (Population I)</th>
<th>Workers with more than 10yrs exp. (Population II)</th>
<th>Sample size of workers selected</th>
<th>Percentage of samples</th>
<th>Mode of sample study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jawahar sahakari soot Girni Ltd, Dhule</td>
<td>2400</td>
<td>350</td>
<td>35</td>
<td>10%</td>
<td>Questionnaire</td>
</tr>
<tr>
<td>2</td>
<td>Loknayak sahakari soot Girni Ltd, shahada</td>
<td>1100</td>
<td>180</td>
<td>27</td>
<td>15%</td>
<td>Questionnaire</td>
</tr>
<tr>
<td>3</td>
<td>Priyadarshini sahakari soot Girni Ltd, Shirpur</td>
<td>2800</td>
<td>450</td>
<td>45</td>
<td>10%</td>
<td>Questionnaire</td>
</tr>
<tr>
<td>4</td>
<td>J. T. Mahajan sahakari soot Girni Ltd, Yawal</td>
<td>300</td>
<td>90</td>
<td>27</td>
<td>30%</td>
<td>Questionnaire</td>
</tr>
<tr>
<td>5</td>
<td>Deendayal sahakari soot Girni Ltd, Pimpalner</td>
<td>200</td>
<td>30</td>
<td>30</td>
<td>100%</td>
<td>Questionnaire</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>7100</strong></td>
<td><strong>1100</strong></td>
<td><strong>164</strong></td>
<td><strong>15%</strong></td>
<td></td>
</tr>
</tbody>
</table>
4.2 Table showing samples selected for study from various categories

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Particulars</th>
<th>Sample Population</th>
<th>Sample selected</th>
<th>Percent of Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jobbers</td>
<td>90</td>
<td>90</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>Production Managers</td>
<td>07</td>
<td>07</td>
<td>100%</td>
</tr>
<tr>
<td>3</td>
<td>Managing Directors</td>
<td>05</td>
<td>05</td>
<td>100%</td>
</tr>
<tr>
<td>4</td>
<td>Spinning Mills</td>
<td>05</td>
<td>05</td>
<td>100%</td>
</tr>
<tr>
<td>5</td>
<td>Workers</td>
<td>1100</td>
<td>164</td>
<td>15%</td>
</tr>
</tbody>
</table>

A) Workers and Jobbers

The workers sample population is categorized into population – I which shows total available samples in the mill while the other is categorized as population - II which shows the total number of workers with 10 or more years of experience. The workers were selected on a criteria based on working experience of ten years and more in the mill. The number of workers selected is shown in the above table (3.1). The workers selected for questionnaire varied from mill to mill depending on the total sample size. As Jawahar Sahakari Soot Girni Dhule has seven departments in the process five workers from each department were selected for questionnaires with 5% of total workers were women workers. In Lok Nayak Jayaprakash Narayan Sahakari Soot Girni Shahada three women workers and 15 male workers were selected for questionnaire. In PriyadarshininaSahakari Soot Girni Shirpur, there are three processing lines distributed for carded weft, Carded warp and Combed yarns making a total of 20 departments. The researcher here has selected two workers each from every department and five women workers for the questionnaire. In J.T. Mahajan Sahakari Soot Girni Yawal the researcher has selected five workers from each department. In Deendayal Sahakari Soot Girni Pimpalnair two workers from each department were selected. All the above said selection of workers from population - II was completely in random giving priority day shift workers.
The number of jobbers selected for study was 100% with 35 jobbers from PriyadarshininSahakari Soot Girni Shirpur, 21 jobbers from Jawahar Sahakari Soot Girni Dhule, 14 jobbers from Lok Nayak Sahakari Soot Girn Shahada, 12 jobbers from J.T. Mahajan Sahakari Soot Girni Yawal and 8 jobbers from Deendayal Sahakari Soot Girni Pimpalnair making a total of 90 jobbers selected for questionnaire.

B) Officers: Managing Director/Production Manager/ Spinning Masters

100% production managers (7) and 100% managing directors (5) were selected as sample for study.

Officers were interviewed with the questions prepared in the questionnaires and the relevant data was collected through personal interview of all Managing Directors & Spinning Masters / Production Managers making 100% of samples.

4.9 Tools Used for Research Study

As this research is explorative and analytical in its nature and its samples selected for the study were related and part of the organization. So, this research is a non parametric research with characteristics or humane variables not considered for analyzing the data. The researcher has clubbed the four categories of samples as variables for correlation (Workers and jobbers, production managers and managing directors) and the researcher has applied following statistical tools such as ‘Mean’, ‘Standard Deviation’ and ‘Correlation’ to analyze his primary data and applied the non-parametric test for testing his hypothesis. The test applied to test the hypothesis is ‘t’ test method for unequal sample sizes. For testing the hypothesis the researcher has taken ‘p’ value as 0.05 and tested his hypothesis as per the requirement of the research norms.
For secondary data the researcher has used E-mail services, Internet services, Annual report reviews of all the mills, journals of Maharashtra State Co-operative Spinning Mill Federation, Annual Reports of SITRA and Hand-Books for Spinning by various authors published by SITRA and Spinning Technology Web-sites for collecting relevant data to analyze his research work.

4.10 Period of study:

The study has considered the mills performance for a period of 10 years from 2002-03 to 2011-12

This period has been considered by the researcher because the government of India brought about the industrial and financial reforms in 1990 and in 2001 there was a kind of relief to textile industry in the form of technical up gradation fund (TUF) to encourage the industry to increase productivity and quality. After 2001 most of the co-operative spinning mills in Maharashtra underwent modernization under this scheme. Therefore the researcher has taken 2001-02 to 2010-11 as the period of study to get the real picture of his research title.

4.11 Expected contribution from the study:

From this study the co-operative spinning mill managements will be able to understand the importance of marketing the process wastes with help of new marketing techniques. The process wastes which one time was seen as non-resource able and non-marketable product will now be considered as an important financially viable source which can benefit them from capital burdens. There is also further scope for investigation and research from the study.
4.12 Limitations of the study:

1. The study is limited to co-operative cotton spinning mills of Khandesh region only

   The area of research work is limited to geographical limitations of Khandesh. Khandesh area includes three major districts of Jalgaon, Dhule and Nandurbar. All the three districts of this area are having co-operative spinning mills in their areas.

2. The study is limited to Cotton process wastes only.

   The research is limited to cotton processed waste of co-operative spinning mills in Khandesh area only. The research does not consider cotton yarn or other by product wastes such as metallic, lubricants of scarps in this study. The research focuses only on cotton process wastes i.e. generated in the departments of the spinning unit.

3. The study is limited to marketing of process adopted by co-operative spinning mills only

   The research is limited to marketing techniques and procedures adopted by Co-operative cotton spinning mills which are running successfully in Khandesh.

4. Findings of the study are based on the responses of the select samples of spinning mills only

   The study is entirely depending on the responses of the workers and jobbers which has been treated as data for hypothesis testing.

5. The study is limited to 10 years period from 2002 – 03 to 2011 -12

   The research is limited to 10 years period from 2002 -03 to 2011 – 12.
4.13 Concepts in Cotton Spinning

Yarn: The cotton fibers twisted together to form a continuous thread is called as yarn.

Count: The number given to the yarn based on fineness (Diameter of yarn) which is defined as number of 840 yards of yarn weighing one pound.

Bale: The package of ginned cotton i.e. brought from suppliers to the spinning unit in the form of bundle is called as bale.

Mixing: The process where varieties of cotton are mixed for processing to produce a particular count of yarn is called as mixing.

Blow room: It is the first department of spinning process where opening and cleaning of ginned cotton lint takes place.

Carding: It is the second department of spinning where cleaning and combing of fibers and as well removal of short fibers and thrash takes place and the processed material comes out in the form of sliver.

Sliver: The cotton fibers which are combed are spiraled in round structure in a continuous format is called as sliver.

Drafting: The stretch induced in the fibers under process to induce parallelization in the fibers is called a drafting.

Sliver lap: A preliminary machine in the combing process where the carded slivers are combined with eight to ten slivers to form a lap is called as sliver lap.

Ribbon lap: A second preliminary process in combing where the sliver lap is converted into a single ribbon like lap is called as ribbon lap.

Super lap: A third preliminary process in combing where the ribbon laps are again processed to form a thin and uniform lap is called as super lap.

Comber noil: It is short fibers waste i.e. combed out from the main process cotton and collected at the head of the draft zone of comber machine in the form of circular noil.

Drawing: The carded sliver and the combed sliver are process together with six to eight slivers to form a uniform parallel and light sliver for the next process. In drawing there are two processes namely breaker and finisher.

Speed frame: It is the fifth department in spinning where the slivers from drawframes is converted into roving with small amount of twist induced in the fibers of the sliver with help of rotating flyers of the speed-frame machine.
**Roving**: It is a small rope like structure brought about by speed-frame machines through induction of twist to the fibers of the sliver in the process.

**Ring frame**: This is the most important department which brings out the final structure of the process cotton to form a yarn. The roving is converted into yarn with high amount of twist to the fibers by the ring traveler which rotates at a speed of more than 35000 to 40000 rpm (Rotations per minute) over the ring.

**Blow room dropping**: This is the thrash, dust, broken cotton seeds that are there in the ginned cotton lint and are removed in the preliminary machines in the blow room department.

**Flat strips**: This is a waste which contains short fibers, dust, leaflets that are there in the blow room lap which was fed to the carding machine. This flat strip is extracted by the flats which rotate in the opposite direction to the rotation of cylinder of carding machine. This waste is extracted after the combing process done by the flats.

**Fan waste**: This waste is completely micro dust waste collected in draw frames, speed frames and ring frame machines at the fan end.

**Hard waste**: The yarn which is removed from the ring frame plastic bobbins which cannot be winded over the cones in cone winding is called as hard waste.

**Sweeping**: It is a combined waster of sliver, roving, micro dust, fly waste and small dust i.e. thrown out by various machine into the department and as well by the operators in the departments i.e. swept together is called as sweeping.

**Yarn Realization**: It is the ratio of yarn produced to the total cotton process to produce yarn at the finishing stages is called as yarn realization.

\[
\text{Yarn realization} = \frac{\text{Yarn obtained}}{\text{Total cotton processed}} \times 100
\]

**Waste percentage**: Total cotton processed – Total yarn produced / 100
4.14 Chapter Scheme:

The chapter scheme under taken in this research work is as follows;

Chapter – 1 – Introduction

In this chapter, there is a discussion on the background of cotton spinning industry in England, America and then in India. The researcher also has discussed the status of cotton spinning industry from pre-independence to present age and also enlightened the importance of the subject keeping in view the turbulent situation for Cotton Spinning Mills.

Chapter – 2 – Working of a Spinning Mill

In this chapter, the processing of ginned cotton into yarn of desired count has been discussed in detail with flowchart and machinery lay out and photos of all the departments with functions and processes of these departments and the researcher has discussed waste collection methods of various departments in this chapter.

Chapter – 3 – Review of Literature (Marketing techniques & Management)

The researcher has reviewed many research papers and other literature related to his research topic in which the researcher has emphasized on the importance of the cotton process waste as an industrial by product very useful for various sectors such as petroleum, civil constructions and energy sectors.

Chapter – 4 – Research Methodology

In this chapter, the researcher has discussed the type and nature of research under taken, the reason for selection of topic with objectives and hypothesis and indicating the methodology adopted for his research. The researcher has also given the scope of his study, and the concepts of spinning with terminologies.
Chapter – 5– Profile of Khandesh Co-operative Cotton Spinning Mills

In this chapter, a brief historical background of Khandesh, traditional and cultural set up, industrial developments in Khandesh is discussed and a background for the development of Spinning Mills is enlightened. A brief profile of all the five co-operative spinning mills of Khandesh has been shown and discussed for the period of ten years of research study. The consumption of cotton per day and production of yarn of all the individual mills has been shown in this chapter.

Chapter – 6 – Data Analysis and Interpretation

The data collected in the form of questionnaires (Primary data), and through literature and production reports of mills were analyzed through tabulation and graphs and then these graphs were interpreted. In this chapter the hypotheses have been tested with the help of ‘t’ tests and they have been interpreted.

Chapter – 7 – Results & Discussions

The researcher has listed his findings from the data available from previous chapter data analysis and interpretation. The observations made by the researcher in this study are completely depicting his experience in spinning industry and the observations made by him in various types of ring spinning mills during his industrial experience. Suitable and useful recommendations have been put forward by the researcher to the co-operative spinning mill federation and other governing bodies for suitable and necessary actions.

Chapter – 8 - Contributions To The Body Of Knowledge

The researcher has lighted that the co-operative spinning mills should adopt marketing practices for selling process wastes. The researcher also shown the importance of processed wastes as a useful byproduct to various industries.

Chapter – 9 - Further Scope for the Research

The researcher has given large scope for further research in this field for generating more market potential for the products.