CHAPTER IV
RESEARCH METHODOLOGY
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RESEARCH METHODOLOGY

4.1 Introduction

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how is done scientifically. In it study the various steps that are generally adopted by a researcher in the studying the research problem along with the logic behind them. It is necessary for the researcher to know not only the research methods/techniques but also the methodology. Research methodology has many dimensions and research methods do constitute a part of the research methodology. The scope of research methodology is wider than that of research methods. Thus, when we talk of research methodology we not only talk of the research methods but also consider the logic behind the methods we use in the context of our research study and explain why we are using a particular method or technique and why we are not using others so that research results are capable of being evaluated either by the researcher himself or by others.

The core concept underlying in research is its methodology. It controls the study, dictates the assumption of the data, and arranges them in logical relationships, sets up a means of refining the raw data, contrives an approach so that the meaning that lie below the surface of those data become manifest, and finally issue a conclusion or series of conclusions that lead to an expansion of knowledge. The entire process is a unified efforts as well as an appreciation of its component parts.¹

Man is always trying to collect knowledge. Research is a process of investigation. It is an examination of a subject from different points of view. Research is not only a trip to the library to pick up a stack of materials but also a hunt for the truth. In a very simplified manner, research can be described as the search for and development of new knowledge. In reality, research is a collective responsibility shared by all the researchers. Research is a methodic progression of collecting and analyzing information to amplify our understanding of the observable fact under study.
Research in common parlance refers to a search for knowledge. Once can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact research is an art of scientific investigation. It is a process of investigation. It is an examination of a subject from different points of view.

The word ‘Research’ is derived from the French word ‘recherché’. Its literal meaning is a systematic process of collecting and analyzing information in order to discover new knowledge.

4.2 Definitions of Research

The Advanced Learners Dictionary of Current English Lays down the Meaning of research as “A careful investigation or inquiry specially through search for new facts in any branch of knowledge”.

According to D. Slesinger and M. Stephenson in the Encyclopedia of social sciences define research as “The manipulation of things, concept or symbols for the purpose of generalizing to extent, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art.”

According to Webster’s International Dictionary, “Research is a studious inquiry or examination; especially critical and extensive investigation or experimentation having for its aim the discovery of new facts and their correct information, the revision of accepted conclusions, theories or laws in the light of newly discovered facts, or the practical applications of new or revised conclusions, theories or laws”.

4.3 Research method

Research process consists, series of actions or steps that are effectively performed in a specific order, necessary to carry out research. These actions or activities usually overlap each other than pursuing specific sequence. Research process is a systematic process, which is undertaken in order to study the research problem and to arrive at certain firm conclusion. Thus research process provides us with the sequence of the steps to initiate and complete the entire research project.
While doing research on ‘A Geographical Study Of Agricultural and Economic changes in Command Area of Kukadi Canal irrigation Project in Western Maharashtra.’ Researcher has used field survey method. The main goal of this type of research is to describe the data and characteristics about what is being studied. It is a quantitative and uses questionnaire, surveys, sampling etc. Agricultural data collected from Kukadi Command Area in Pune, Ahmednagar and Solapur district. Researcher used primary and secondary data for research.

4.4 Sampling

The research is a systematic study to examine or investigate the issue or problem and find out the relevant information for solution. For present study data collected from the farmer comes under Kukadi command area. It is not possible to collect data from every one of the population. Population is very large number of farmers or objects or items which is not feasible to manage. Out of total farmers comes under kukadi command area, which of them some samples are taken for measurement. For research purpose selected sample Tahsils, villages and farmers from command area. For this research study purpose out of different sampling methods the Stratified Random Sampling Method has been used.

The universe includes selected farmers those are benefited of Kukadi Canal irrigation, located in different parts of command area. Out of total command area Pune, Ahmednagar and Solapur districts have been selected. From this three benefited districts, five Tahsils has been selected which comes under Kukadi left bank canal. Further 10 percent villages have been selected from each Tahsil on the basis of more and less benefited farmers. (Table no.4.1) Then about one percent farmers have been selected from these villages. So, stratified random sampling has been used for the study. The total sample size selected is 602 farmers (Table no. 4.2)
Table 4.1 Sample of Benefited Villages

<table>
<thead>
<tr>
<th>Sr. no</th>
<th>Benefited districts under Kukadi canal irrigation.</th>
<th>Benefited Tahsils under Kukadi canal irrigation.</th>
<th>Benefited villages under Kukadi canal irrigation.</th>
<th>Sample villages (10% villages)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i.</td>
<td>Pune</td>
<td>Junner</td>
<td>06</td>
<td>01</td>
</tr>
<tr>
<td>ii.</td>
<td>Ahmednagar</td>
<td>Parner Shrigonda Karjat</td>
<td>20 42 25</td>
<td>02 04 03</td>
</tr>
<tr>
<td>iii.</td>
<td>Solapur</td>
<td>Karmala</td>
<td>56</td>
<td>05</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td>149</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 4.2 Sample of benefited Farmers

<table>
<thead>
<tr>
<th>Sr. no</th>
<th>Benefited Tahsils.</th>
<th>Selection of Villages</th>
<th>Total Benefited farmers</th>
<th>Sample of farmers (1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i.</td>
<td>Junner</td>
<td>Pimpalwadi</td>
<td>7995</td>
<td>80</td>
</tr>
<tr>
<td>ii.</td>
<td>Parner</td>
<td>Nighoj</td>
<td>6475</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shirsule</td>
<td>252</td>
<td>03</td>
</tr>
<tr>
<td>iii</td>
<td>Shrigonda</td>
<td>Shrigonda Pargaon</td>
<td>15947 4637</td>
<td>159 46</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rhavdi Bhibbgaon</td>
<td>461 185</td>
<td>05 02</td>
</tr>
<tr>
<td>iv.</td>
<td>Karjat</td>
<td>Rashin Baradgaon (su.)</td>
<td>11468 3872</td>
<td>114 38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Raigavan</td>
<td>3677 590</td>
<td>36 06</td>
</tr>
<tr>
<td>V.</td>
<td>Karmala</td>
<td>Veet Jategaon Parewadi</td>
<td>3677 1493 1231</td>
<td>36 15 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mangi kamone</td>
<td>1135 963</td>
<td>11 10</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td>09 06</td>
<td>60381 602</td>
</tr>
</tbody>
</table>
As above given researcher has to select 5 Tahsils from Pune, Ahmednagar and Solapur districts, 15 villages from these Tahsils and 602 benefited farmers of Kukadi left bank canal, would be selected to study this topic.

4.5 Research period
‘A Geographical Study of Agricultural and Economic Changes in Command Area of Kukadi Canal Irrigation Project in Western Maharashtra.’ For this study period is from the Year 1990-91 to 2009-10.

To carry out the study the time permitted by the University for Research work is two years and it has been completed and submitted within the permitted time period.

4.6 Limitations
To carry out the study the following limitations were expected and faced:

1. Research period is taken in account of only 20 years, from 1990-91 to 2009-10.

2. The study of farmers of Pune, Ahmednagar and Solapur district Who are benefited with Kukadi left bank canal.

3. For this study, 15 benefited villages from 5 Tahsils of Pune, Ahmednagar and Solapur district of Western Maharashtra out of The 602 benefited farmers are taken in account.

4. Availability of secondary data from various departments was difficult.

5. Time, cost and location factors caused difficulties.

6. Sample size might not be exact representative of the universe.

However sincere efforts have been put to overcome the limitations faced.

4.7 Data Collection
This research is based on field survey method. The data has been collected from different sources. The secondary data collected from Kukadi left bank canal command area as well as irrigation department of Govt. of Maharashtra, district gazetteers, reports, books internet etc.
The primary data collected from selected farmers in command area. These data used in combination as per need of the study. These data having different merits and demerits and will serve our purpose of the research study.

4.7.1 Primary Data

Primary data collected by a researcher specifically for a research assignment. In other words, primary data are information that a farmers must gather because no one has complied and published the information of benefited farmers in command area of Kukadi canal irrigation project in a forum accessible to the public. Various agencies like private as well as government generally take the time and allocate the resources required to gather primary data only when a question, issue or problem presents itself that is sufficiently important or unique that it wants the expenditure necessary to gather the primary data. Primary data are original in nature and directly related to issue or problem and current data. Primary data are the data which the researcher collects through various methods like interview, questionnaires, surveys etc. the primary data have own advantages and disadvantages.

The primary data are original and relevant the topic of the research study so the degree of accuracy is very high. It can include a large population and wide geographical coverage. This data is current and it can better give a realistic view to researcher about the topic under consideration. The reliability of this data is very high because these are collected by the concerned and reliable farmers in study area.

A lot of time and efforts are required for collection of data. By the time the data collected, analyzed and report is ready the problem of the research becomes very serious. So, researcher has taken consideration of this problem. The trained persons are required for data collection. In experienced person in data collection may give inadequate data of the research. For collection of the Primary data following instruments have been used:
I. Questionnaires

For this relevant study researcher has carefully read related reference books and prepare Questionnaires for Farmers. The Primary data collected through these questionnaires from selected 602 sample farmers those come under the Command Area of Kukadi Project. Questionnaire is a set of questions has been prepared to ask a number of questions and collect answers from respondent farmers relating to the research topic. A number of questions usually in printed form are to be answered by the individuals. The forms often have Multiple choice questions and some blank spaces in which the answers can be tick mark or written respectively. Sets of such questionnaires are distributed to farmers and the answers are collected relating to research topic. A questionnaire is a series of questions asked to individuals to obtain statistically useful information about a given topic. When properly constructed and responsibly administered, questionnaires become a vital instrument by which tables can be made about specific groups or people or entire populations. In this study a structured questionnaire has been used with different types of questions such as closed ended and open ended.

II. Interview

The data collected through to taking an interview of related persons of Kukadi Project. In this method the researcher has personally meet the informants and ask necessary questions to them regarding the subject inquiry. The researcher efficiently collects the data from the informants by cross examining them. The researcher has been taken interviews like personal interview, depth interview or telephone interview can be conducted as per the need of the study. The researcher meets the following persons for collecting data.

1. Ex. Engineer, Kukadi canal irrigation Project, divisional office Narayangaon, No. 1
2. Deputy engineer, Kukadi canal irrigation Project, divisional office Shrigonda, No. 2
III. Field Survey

For the present study, researcher has visited at many places to collect information directly for analysis. The researcher directly visited to divisional offices of Kukadi project, Tehsil offices of sampled Tahsils, agricultural departments of 5 Tahsils, forest offices, sample farmers farmlands, dam sites of kukadi project etc.

4.7.2 Secondary Data

Secondary data are the data collected by a party not related to the research study but collected these data for some other purpose and different time in the past. If the researcher uses these data then become secondary data for the current users. This type of data may be available in written, typed or electronic forms. For this study researcher have available a variety of secondary information sources to collecting data on canal irrigation, agricultural practices, cropping patterns and many other. The secondary data gives a frame of mind to the researcher that which direction should goes for the specific research. The researcher has made use of secondary sources such as statistical records, district Socio-economic survey reports, books published on Irrigation and agriculture, the record of Kukadi canal project, gazetteers, internet etc. the researcher gives details of used secondary data at appropriate manner in the thesis.

Keeping in view the advantages and disadvantages of sources of data requirement of the research study and time factor, both sources of data i. e. primary and secondary data have been selected, and these are used in combination to give proper coverage to the study topic.

4.8 Tools of Data Analysis

For the present study work the Primary and Secondary data was collected for the period 1990-91 to 2010-11. For the clear cut picture of the study patterns of land utilization, cropping patterns, trends of production and yield, agricultural efficiency, and indicators of economic development is made with the help of secondary data obtained from Socio-economic survey reports, District census hand book, season and crop reports, District gazetteers, Agricultural statistical information from agricultural department of Maharashtra. Primary data obtained from questionnaires and field survey.
Statistical tools play important role in present research. Statistics help the researcher in designing the research, analyzing its data and drawing conclusions there from. Statistical data is divided in to major areas that are Descriptive statistics and inferential statistics. Descriptive statistics deals with development of certain indices from raw data while inferential statistics deals with the process of generalization.\textsuperscript{7} For data analysis measures of central tendency, average, percentage, standard deviation etc. have been used for tabulation and presentation of data.

As the study purpose to be geographical spirit the chorographic and chorological methodologies were adopted. These involve the description and interpretation of the regional patterns revealed through choropleth method.

For studying the change in land use pattern in six major land use categories are considered in five tahsil, i.e. area under forest, area not available for cultivation, uncultivated land without fallow land, net sown area and gross cropped area. Percentage of area under every categories of land to total geographical area is computed.

For the changes in cropping patterns in the five tahsil 20 yearly moving averages are considered. Ranking of major agricultural crops are computed by selecting 1990-91 as a base year. For the study of trends of area under every selected crop in the tahsil and their percentage for 1990-91 and 2010-11 are worked out. Compound growth rate and variability of selected crops also find out for study the changes in the period of investigation.

Weaver’s (1954)\textsuperscript{8}, method of Crop combination has been used for calculating of crop combination in five tahsil. Following formula is used for this

\[ d = \frac{d^2}{n} \]

The patterns of crop diversifications in five tahsil are calculated by Bhatia’s method (1965).\textsuperscript{9}

The modified formula used for this

\[
\text{Index Of Crop Diversification} = \frac{\text{Percentage of Net Sown Area}}{\text{Number of 'n' Crops}}
\]
Where ‘n’ crops are individually occupy five or more than five percent of crop to net sown area in five tahsils.

The Kendall’s ranking co-efficient method is used for identification and delineation of agricultural efficiency in fifteen sample villages.\textsuperscript{10} The agricultural efficiency calculated for the years 1990-91 and 2010-11, by formula as

\[
X = \frac{\sum R}{N}
\]

Here, \(X\) = agricultural efficiency, \(\sum R\) = Total ranks of the region and \(N\) = No. of crops.

For showing the impact of canal irrigation on agricultural changes and economic changes in command area are calculated with the help of Kendall’s ranking co-efficient method. For this seven major agricultural indicators and ten economic indicators are considered. The changes in agricultural productivity in five tahsils of command area also calculated for the years 1990-91 and 2010-11. Here, used of Kendall’s co-efficient method (1968).\textsuperscript{11}

In the present work various Maps, Tables and Graphs are used at appropriate places. To prove the aim with available information he tried to get findings from collected data analysis and put it in a systematic ways then he put it in report.

4.9 Conclusion

The present chapter revels, that the research process is a systematic process. So that here adopted field survey method for collecting data. Primary and secondary data arranged systematically and analyzed in next chapter. For these various statistical methods are used i.e. Weavers method of crop combination, Bhatia’s method of agricultural efficiency, Kendall’s Ranking Co-efficient method. With the help of these methods shows the changing patterns of land utilization, cropping patterns levels of agricultural development and impact of irrigation on economic development. In the next chapter, the distribution of variables shows with the help of Graphs, tables, and maps.
REFERENCES


