CHAPTER – III

RESEARCH METHODOLOGY

This chapter deals with various strategies and methodologies adopted by the investigator for the research study. It comprises of the approach, source of data, data collection variables, population sample, sample size, criteria for sample selection and analytical approach used in analysis of data. The estimates of different variables were obtained and a relationship established between output and input on sample farms in order to meet the requirements of the study.

3.1 Data Collection

The present study is based on both primary and secondary data. Primary data was collected from dairy farmers, Primary Dairy Cooperative Societies and Dairy Officers with the help of personal interview methods. The questionnaire provides information about the dairy farmers on the following aspects:

1. Household composition
2. Family income and social group
3. Land ownership details
4. Cropping pattern and livestock details
5. Labour force in the family and employment details
6. Capital assets owned, cost of milk production and output obtained from dairy activities
7. Marketing aspects of the final products
8. Constraints in dairy farming
Primary Dairy Cooperative Societies were interviewed to obtain the following information:

1. Establishment year
2. Number of farmer members
3. Number of staff
4. Milk procurement per day
5. Assets owned
6. Problems faced

Primary data relevant for dairy farmers, was collected from 240 sample families from Karveer, Panhala, Kagal and Radhanagri talukas of Kolhapur District during the year 2008–09.

Secondary data was obtained from various Government departments like Animal Husbandry, Agriculture, Census report and Dairy Cooperatives.

3.2 Selection of Study Area

The present study was conducted in Kolhapur district of South–West Maharashtra. The livestock population of Kolhapur district is shown in Table 3.1.

3.3 Selection of the Talukas

Karveer, Panhala, Kagal and Radhanagri talukas of Kolhapur district were selected, based on the data collected on highest milk procurement and number of societies.
### Table 3.1: Livestock Population in different Talukas of Kolhapur District

<table>
<thead>
<tr>
<th>Name of Taluka</th>
<th>CB In Milk</th>
<th>ND In Milk</th>
<th>Buffaloes In Milk</th>
<th>CB Dry</th>
<th>ND Dry</th>
<th>Buffaloes Dry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ajara</td>
<td>609</td>
<td>443</td>
<td>14071</td>
<td>123</td>
<td>256</td>
<td>5062</td>
</tr>
<tr>
<td>Bhudargad</td>
<td>2241</td>
<td>756</td>
<td>6807</td>
<td>621</td>
<td>467</td>
<td>6640</td>
</tr>
<tr>
<td>Chandgad</td>
<td>2756</td>
<td>2126</td>
<td>27029</td>
<td>446</td>
<td>643</td>
<td>6574</td>
</tr>
<tr>
<td>Gadchinglaj</td>
<td>2906</td>
<td>904</td>
<td>34947</td>
<td>908</td>
<td>377</td>
<td>11250</td>
</tr>
<tr>
<td>Gagan Bavada</td>
<td>222</td>
<td>781</td>
<td>4546</td>
<td>11</td>
<td>331</td>
<td>1102</td>
</tr>
<tr>
<td>Hatkangale</td>
<td>5103</td>
<td>1795</td>
<td>36251</td>
<td>1568</td>
<td>707</td>
<td>16526</td>
</tr>
<tr>
<td>Kagal</td>
<td>7463</td>
<td>1633</td>
<td>30661</td>
<td>1483</td>
<td>502</td>
<td>8836</td>
</tr>
<tr>
<td>Karveer</td>
<td>12780</td>
<td>2070</td>
<td>52522</td>
<td>3186</td>
<td>927</td>
<td>15103</td>
</tr>
<tr>
<td>Panhala</td>
<td>8427</td>
<td>2178</td>
<td>35718</td>
<td>1968</td>
<td>928</td>
<td>8484</td>
</tr>
<tr>
<td>Radhanagari</td>
<td>5771</td>
<td>4277</td>
<td>24203</td>
<td>1526</td>
<td>1126</td>
<td>7550</td>
</tr>
<tr>
<td>Shahuwadi</td>
<td>3454</td>
<td>3530</td>
<td>20276</td>
<td>713</td>
<td>1958</td>
<td>7312</td>
</tr>
<tr>
<td>Shirol</td>
<td>3409</td>
<td>1784</td>
<td>32602</td>
<td>940</td>
<td>768</td>
<td>12372</td>
</tr>
<tr>
<td>Chikodi</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Belgaum</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Hukkeri</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Sindhudurg</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Athani</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Source: Kolhapur district census 2007-2008 data  
NA- Data not available
3.4 Selection of Villages, Societies and Members

Two villages from each Taluka namely Wakre and Hanumantwari from Karveer, Ketkawari and Jeur from Panhala, Kasabasangaon and Sulkud from Kagal and Anaje and Khindi Varvale from Radhanagri were selected randomly. 60 sample families were selected from each of the four talukas and randomly interviewed. 30 respondent-farmers were randomly selected based on the criteria of owning milch animal from each of the villages. Table 3.2 shows the number of respondent-farmers from each village.

3.5 Sampling Design

The sampling design for the present study was three stage random sampling design with taluka as a primary sampling unit, village as a secondary sampling unit and dairy farmer as an ultimate unit of sampling. The break-up of the sample farmers is provided in Table 3.2.

Table 3.2: Sample distribution

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Taluka</th>
<th>Village</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Karveer</td>
<td>Wakre</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hanumantwari</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>Panhala</td>
<td>Ketkawari</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jeur</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>Kagal</td>
<td>Kasaba Sangaon</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sulkud</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>Radhanagri</td>
<td>Anaje</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Khindi Varvale</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td><strong>Kolhapur</strong></td>
<td><strong>Total No. of Talukas - 4</strong></td>
<td><strong>Total No. of Villages – 8</strong></td>
</tr>
</tbody>
</table>

*Source: Field Data*
3.6 Reliability of Data

Most of the respondent-farmers were free during the interview as they realised that the questions posed to them would not affect their livelihood. The data thus collected is reliable, although there could be possibilities of underestimated yield and overestimation of costs. However, this has been taken care of to a large extent by adopting internal checks in the schedule. For example, questions on cost incurred on milch animal and production of milk were posed at two locations. The entire schedule was checked on the spot and discrepancies were corrected by seeking additional information.

Due to some constraints, complete information on certain aspects could not be collected especially in the case of respondent-farmers having large herd size, as the respondents were unable to give detailed information of each animal in the farm. In such cases, information about the herd and average yield of the animals was noted.

During the survey, the respondent-farmers were asked whether they were maintaining any record of accounts and if they were willing to share this information. Very few respondent-farmers maintained any record and even fewer were willing to share their records. Those respondent-farmers who had initially expressed their willingness to share this information later on tried to avoid showing their accounts.

3.7 Reference Year

The study was conducted in the year 2008–09 in the month of July.

3.8 Methods of Data Analysis

After data collection, the researcher used certain techniques to analyse the data. Statistical tables were formulated for the information collected from 240 respondent-farmers based on the questionnaire filled in by them.

Mean, percentage, correlation coefficient, ANOVA and chi-square tests were used for analysis of the data. Graphs were used for pictorial representation of the data.

**Frequency** means the state of being frequent or frequent occurrence. Frequent tabulation is the basic technique to place the data in tabular form. In the current study, the
researcher has divided the total 240 samples of respondent-farmers into five categories – landless, marginal, small, medium and large, based on their land holdings.

**Percentage** is a tool used to present the frequency in hundreds. Percentage method has been used in the present study, to have a comparative analysis of different factors and to draw conclusions depending on the highest and lowest percentage of contribution made by different factors.

**Mean** refers to the arithmetic average of the data when the data is numerical in nature. Mean or average is considered to be the mid-point of a set of values around which the other values cluster. The average of non-numerical or qualitative data is the “mode”. For example, in this study, educational qualification being qualitative data, the mode, meaning the most repeated value, is the mean. Mean is a single number that represents a group of values.

**Correlation coefficient** is a mathematical measure of how much one factor can be expected to be influenced by changes in another factor. Correlation coefficient ranges from -1 to +1. A correlation coefficient of +1 means that the two factors are perfectly correlated with each other. If one factor grows, so does the other and the change in one factor is a multiple of change in other. A correlation coefficient of -1 means that the numbers are perfectly inversely correlated. If one factor grows, the other falls. The growth in one factor is a negative multiple in the growth of the other. A correlation coefficient of zero means that the two factors are not related. A non-zero correlation coefficient means that the factors are related but unless the coefficient is either +1 or -1 there are other influences and the relationship between the two factors is not fixed. Hence, if one factor is known, the other can be estimated but not with certainty. The closer the correlation coefficient is to zero, the greater the uncertainty. Low correlation coefficient (both positive and negative) means that the relationship is not certain enough to be useful and may be insignificant.

**ANOVA** technique is selected because the researcher wishes to compare the effect of multiple level of two factors in the current study namely effects of land holding on different cost factors. The ANOVA technique used in the present study is Two–Way ANOVA. The basic version of the Two–Way ANOVA has one observation in each cell.
The two null hypotheses to be tested are $H_{01}$ and $H_{02}$, as can be seen in Chapter five where the Two-Way ANOVA analysis has been used to analyse the effects of different cost factors (fixed and variable cost) on different land holding categories in case of buffaloes and cows. The assumptions in ANOVA are normality, independent and equality of variance. The advantage of Two-Way ANOVA over One-Way ANOVA is that it is more efficient. This is because there are two assignable sources of variation (cost factors and land holding categories in this study) that help in reducing error variation, thereby making this tool more efficient. Two-Way ANOVA enables to test the effect of two factors at the same time. A Two-Way ANOVA also satisfies three principles of replication, randomisation and local control. In the principles of replication, the same treatment is applied to all the subjects of the sample and randomisation reduces the bias in the sample, eventually leading to less error in variation. The principle of local control means to make the observation as homogenous as possible so that the error due to one or more assignable causes may be removed from the experimental error and Two-Way ANOVA is made more efficient.

**Chi-Square test** – There are basically two types of random variables which lead to two types of data numerical and categorical or qualitative data. A Chi-square statistics is used to investigate whether the distribution of categorical variables differs from each other. Basically, categorical variables yield data in the categories and numerical variables yield data in numerical form. The Chi-square statistics compares the tallies or counts of categorical responses between two or more independent groups. An important characteristic of Chi-square tests is that it can only be used on actual numbers and not on percentages, proportions, means, etc. There are several types of Chi-square tests depending on the way data is collected and the hypothesis is formed. The simplest way of representing categorical data in a tabular form is $2\times 2$ contingency table.

### 3.9 Concepts used in the Study

In order to find out the financial impact of dairy farming on the respondent-farmers, different items of costs and revenues were worked out. Various items of cost were categorised into two groups viz.
1. Fixed costs

2. Variable costs

Fixed costs are those which are not dependent on the production of milk but are incurred by the respondent-farmers and taken into consideration while estimating the cost of dairy farming activity. They include investment on animals, construction of cattle sheds, dairy utensils, machineries and depreciations incurred on animals, cattle shed and dairy utensils.

Variable costs are those, which change according to the change in the volume of milk production. They include investment of feed and fodder, labour and veterinary expenses. Variable cost in case of dairy farming activity includes:

1. **Fodder**

   Based on the purchasing power, the respondent-farmers had either grown green and dry fodder on their own farm or purchased them from the market. In both the cases, the market price prevailing in the market was considered for evaluation.

2. **Concentrates**

   The expenditure incurred by the respondent-farmers on the purchase of concentrates was taken into account for evaluation.

3. **Labour**

   Labour is an essential requisite in dairy farming activity. Labour is required for activities like bringing fodder from field, cleaning of cattle shed, grazing and milking the animals, etc. Thus, the valuation of labour was done on the basis of wages paid to them in cash and in kind and family labour was evaluated on the basis of prevailing wage rate for labour.

4. **Veterinary expenses**

   The expenditures include purchase of medicines, availing veterinary services and other required activities.
5. Depreciation on animals

The depreciation was calculated on the basis of age of animals. No depreciation was charged on animals till the third lactation. 10 per cent was charged at three years of age.

6. Interest

Ten per cent interest was charged on fixed capital including animals, cattle shed and dairy machineries.

3.10 Limitations of the Study

The study is based on micro level data on various aspects of a dairy farm such as herd size, credit facilities available to the farmers, cost of milk production borne by the farmers, value of the capital assets owned by the farmers, output obtained, marketing aspects, motivational factors and problems faced by farmers in dairy farming. The study is limited to 240 farm families selected from four talukas of Kolhapur district. The different practices in dairy farming, will affect the use of the findings of the study. Hence, the outcome from this study has to be verified carefully, before applying to other studies related to diverse agro-climatic conditions. It can be anticipated that the input and output prices will be different in different periods.

3.11 Summary

This chapter deals with the research methodology. The chapter includes source of data collection, selection of the study area, talukas and village societies and members. Data has been collected on the basis of three stage random sampling. The reliability of the data collected has been verified. Methods of data collection and analysis have been explained wherever necessary. The scope of the study is limited to Kolhapur district in South-West Maharashtra. Concepts used in the study along with the limitations have also been addressed by the researcher.