CHAPTER – 3

DATA BASE AND METHODOLOGY

3.1. Introduction

All social science researchers are in agreement that the use of proper methodology and research techniques plays a very crucial and important role in any primary survey. The precision and accuracy of any study is dependent upon and determined by the research method and techniques employed in the study. Such techniques when guided by the objectives of the study yield accurate results. In any research the choice of appropriate techniques must be based on and dictated by the objectives of the study under consideration. This chapter discusses the sources of data, research design and methodology, the sample selection methods and the statistical tools used in conducting this study.

3.2. Research design

A research design is the arrangement of conditions for collection and analysis of data with the aim of combining the relevance to the research purpose while attempting economy in procedure. It is basically the Framework or Blue Print or Action Plan for defining and completing a research study. It is an area of investigation which includes collection, analysis and interpretation of data. The research has to proceed systematically in the already planned direction through a number of steps arranged in sequential order. In short, it is all about the method adopted by the researcher for completing the project.
3.3 Type of Research

The present study is descriptive and exploratory in nature. It is based on field surveys both at the dairy level and at the consumer level.

3.4 Sources of data

Most often it is found that data available are inadequate and hence it becomes necessary to collect data that are appropriate. The methods differ considerably in context of financial implications, time available to the researcher and other resources at the disposal of the researcher. The present study is based on both primary and secondary data.

3.4.1. Secondary data

It is mainly used to support primary data. Secondary data is collected through company documents, company websites, annual reports, books, journals, magazines, online data bases etc. The secondary data is collected from both published and unpublished documents of census of India and Karnataka, various reports published by National Dairy Development Board, Gujarat Cooperative Milk Marketing Federation and Karnataka Milk Federation. The secondary data has also been collected from the various milk union offices across Bangalore, Mysore, Mandya, Belgaum, Dharwad and Bijapur. Further the Government publications like Human Development Report, various plan documents and other notifications have been studied for collection of secondary data. Apart from this, the various research papers and articles published in the National and International Journals are referred widely for collection of secondary data and other relevant information in connection with this study.
3.4.2 Primary data

The primary data is collected through the properly designed and structured schedule administered to the sample milk consumers exclusively selected for the present study. The schedule is tested and validated through a pilot study conducted in some parts of Bangalore. The primary data is also collected using a structured direct interview schedules administered to the quality personnel selected for the study. These schedules are designed after preliminary visits to Bangalore dairy and discussions with their personnel. Both the schedules were carefully and systematically designed relating to the objectives of the study. Though the questions were in English, in some cases, they were translated into Kannada and Hindi while asking the questions to the consumers in order to avoid ambiguity.

The researcher personally visited all customers and also the six milk dairies in Bangalore, Mysore, Mandya, Belgaum, Dharwad and Bijapur to collect the required data. This gave an opportunity to the researcher to have a face to face interaction with the customers as well as the quality personnel in the dairies. At times, the interview deviated slightly from the structured schedule and useful and detailed discussions on related aspects took place. This information has also been considered while preparing the report. The survey was conducted during the period November 2012 to January 2013. After completion of the field work, all the filled schedules were rechecked and some information jotted down during the visits were incorporated at the appropriate places so as to facilitate subsequent analysis of the data. Thereafter, the data of each customer was fed into the computer for further tabulation and interpretation. Statistical methods, like averages, chi-square and ANOVA were used at appropriate places for analyzing the data.
3.5. Study area - Karnataka State Profile

Karnataka state is selected for the present study. The total geographical area of Karnataka state is 191,976 square kilometers which approximately accounts for 5.83 percent of the geographical area of the country and it is the eighth largest state in India. According to the census of India (2011), Karnataka is the ninth largest state by population with 611.31 lacs inhabitants. It comprises of 30 districts. Again as per 2011 figures, Karnataka is ranked 12th in Human Development Index (HDI). Out of 30 districts, thirteen districts have established milk unions in their districts and they also cater to the needs of neighboring districts.

The state has three principal geographical zones, the coastal region of Karavali, the hilly Western Ghats and the Deccan Plateau. It is situated on table land between the western and eastern ghat ranges coverage in the Nilgiri hills complex, in the western part of the deccan peninsular region of India. The major cities of Karnataka are Bangalore, Hubli, Dharwad, Mysore, Gulbarga, Belgaum and Mangalore.

The sex ratio in Karnataka is 1000 males for every 964 females. The population density is 275.6 per km and 33.98 per of the people live in urban areas. The literacy ratio overall is  66.6 per, 76.1 per for males and 56.9 per for females. 83 per of the population is Hindu, 11 percent are Muslim, 4 percent Christian and 2 percent are others,

For many rural residents of Karnataka, agriculture is the major occupation. About 123, 100 Sq Kms of Land is cultivated in Karnataka constituting 64.6 per of total geographical area of the state. The main crops grown in Karnataka are Rice, Ragi, Jowar, Maize, Pulses and Oil seeds. Arecanut, Cardamom, Chilles, Cotton, Sugarcane, Cashews,
Cocunuts and Tobacco are also produced in the state. The other traditional products are Coffee, Silk, Sandalwood, Agarbathis and Ivory carvings.

On the industry front, Karnataka emerged as the manufacturing hub for some of the largest public sector units like BHEL, BEL, BEML, HAL etc. It has also become the home of many automobile companies such as Volvo, Toyota, and Reva. It is also the home of IT giants like Infosys, Wipro, Dell, Accenture, IBM, and many others and is rightly called as the silicon valley of India.

Karnataka has large number of universities, medical colleges and engineering colleges. Premier institutions like Indian Institute of Science, Raman Research Institute, National Institute of Mental Health and Neuro Sciences, Central Food Technological Research Institute, Indian Space Research Organization and National Aeronautical Laboratory are located in Karnataka.
3.6 Milk unions and cooperatives under KMF

Diagram 6

Source: Derived from KMF Brochure 2012
There are thirteen milk unions under Karnataka Milk Federation. They are listed below in alphabetical order.

1. Bangalore milk union
2. Bellary milk union
3. Belgaum milk union
4. Bijapur milk union
5. D.K milk union
6. Dharwad milk union
7. Gulbarga milk union
8. Hassan milk union
9. Kolar milk union
10. Mandya milk union
11. Mysore milk union
12. Shimoga milk union
13. Tumkur milk union
3.7 Selection of milk unions for study

Table 3.1 Population in thirteen cities where milk unions are present.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>City</th>
<th>Population (in lacs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bangalore</td>
<td>84.99</td>
</tr>
<tr>
<td>2</td>
<td>Mysore</td>
<td>9.84</td>
</tr>
<tr>
<td>3</td>
<td>Dharwad</td>
<td>9.44</td>
</tr>
<tr>
<td>4</td>
<td>Belgaum</td>
<td>6.10</td>
</tr>
<tr>
<td>5</td>
<td>Bijapur</td>
<td>3.26</td>
</tr>
<tr>
<td>6</td>
<td>Mandya</td>
<td>1.38</td>
</tr>
<tr>
<td>7</td>
<td>Mangalore (DK)</td>
<td>6.19</td>
</tr>
<tr>
<td>8</td>
<td>Gulbarga</td>
<td>5.42</td>
</tr>
<tr>
<td>9</td>
<td>Bellary</td>
<td>4.09</td>
</tr>
<tr>
<td>10</td>
<td>Hassan</td>
<td>1.73</td>
</tr>
<tr>
<td>11</td>
<td>Kolar</td>
<td>1.38</td>
</tr>
<tr>
<td>12</td>
<td>Shimoga</td>
<td>3.22</td>
</tr>
<tr>
<td>13</td>
<td>Tumkur</td>
<td>3.05</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>140.09</td>
</tr>
</tbody>
</table>

Source: en.wikipedia.org/wiki/Demographics_of_Karnataka

As can be observed from table, the total population of the thirteen cities where the milk unions are located is 140.09 lacs out of the total Karnataka population 611.31 lacs which work out to 23 per cent. The milk unions are spread across Karnataka. In order to take a fair representation, the researcher decided on six milk unions – three from South Karnataka and three from North Karnataka. The three milk unions chosen from South Karnataka are Bangalore, Mysore and Mandya and those from North Karnataka are Dharwad, Belgaum and Bijapur. The population of chosen six cities is 115.01 lacs as
against 25.08 lacs for the other seven cities. Amongst the six chosen, if we exclude Bangalore, the population of the other five cities is 30.02 lacs which alone are more than 25.08 lacs for the other seven cities. Hence the researcher is convinced that the cities chosen are a fair representation of the total population.

3.8 Brief description of the six Milk Unions considered for study

Bangalore dairy (BAMUL) is one of the modern and state-of-the-art plant located at Bangalore. It was set up in 1965 and now covers 12 talukas and 1877 societies. The current processing capacity is 6 LLPD expandable to 10 LLPD. There are 121 bulk milk coolers and 570 automatic milk collection units. It has chilling centres at Anekal, Byrapatna, D.B Pura, Vijayapura, Solur and Hosakote. Bangalore dairy is totally computerized in operations.

Mysore dairy or The Mysore-Chamarajanagar District Cooperative Milk Producers’ Societies’ Union Limited set up 1987 is located at Siddarthanagar. It covers 11 talukas and 1288 district cooperative societies. It has chilling centres at Chamarajanagar, Hunsur and Kollegala. There are 49 bulk milk coolers and 232 automatic milk collection units. The processing capacity is 1.6 LLPD.

Mandya dairy or The Mandya District Cooperative Milk Producers’ Societies’ Union Limited was set up in 1982 and covers 7 talukas and 1044 district cooperative societies. It has chilling centres at K.R Pet and Nagamangala. There are 23 bulk milk coolers and 371 automatic milk collection units. The processing capacity is 2 LLPD. Mandya union also owns a 18 MT/day powder plant taking care of the surplus of Mandya as well as the neighboring Hassan and Mysore unions. The union also possesses an
export marketing license to market SMP. In fact, it was the first union to export milk powder.

Dharwad District Cooperative Milk Producers’ Societies’ Union Limited (DAMUL) was registered in 1986. It covers Dharwad, Haveri, Gadag and Uttara Kannada Districts. It covers 28 talukas and 741 district cooperative societies. The specialty of Dharwad union is that the district cooperative societies include 191 exclusive women dairy cooperatives. The processing capacity is 2.10 LLPD. It has chilling centres at Haveri, Hirekerur, Gadag, Sirsi, Ron and Kumta. There are 18 bulk milk coolers and 92 automatic milk collection units. Dharwad milk union is committed to the welfare of milk producers and have adopted several innovative programmes.

Belgaum milk union established in 1988 covers 10 talukas and 423 district cooperative societies. Its processing capacity is 60000 litres per day and it markets the milk in the neighboring states of Maharashtra and Goa. It has chilling centres at Gokak, Ramadurga and Athani. It has 12 bulk milk coolers and 89 automatic milk collection units.

Bijapur dairy covers Bijapur and Bagalkot districts and has a processing capacity of 50000 litres per day. It covers 11 talukas and 227 district cooperative societies. It has 12 bulk milk coolers and 48 automatic milk collection units. Bijapur union came into being in 1991.
3.9 Selection of officials in the dairies

The researcher visited the dairies of the selected six milk unions and studies the process adopted by them starting with receipt of raw milk, inspection, storage, processing of the milk, packaging, final inspection and dispatch. The researcher decided to meet two important officials in the dairies. One is the Quality Head and the other is Customer Relations Head. Together they could answer all the questions raised in the schedule prepared for interviewing them. They were also able to show the related documents and records. The interaction with the dairy personnel proved to be of mutual benefit and learning for both the researcher and the respondents.

3.10. Customers selected for administering the schedule

In order to ensure a fair representation, the researcher met customers residing in apartments as well as those residing in independent houses. While these customers were the ones getting door delivery of milk, the researcher also contacted the customers when they were in the process of buying the milk from Hopcoms or Convenience Stores. The researcher also contacted few small restaurants buying milk. Although the idea was to contact only the Nandini milk consumers, it was not practically possible. The majority of the consumers, were, however Nandini milk consumers. The researcher also tried to contact consumers in a wide range covering factors such as age, gender, annual income and consumption pattern. With this, the researcher has ensured a fair representation of consumers from the population. The researcher targeted people in the middle class and upper class. The reason for not including the lower class is that majority of them are buying loose milk and also that they would not have been able to understand and appreciate the Schedule.
The geographical areas covered in Bangalore are J.P. Nagar, Jayanagar, Hanumanth Nagar, Bhanshankari, Sri Nagar, Vijay Nagar and Srinivas Nagar. The areas covered in Mysore are Vidyaranyapura, Saraswatipura, J.P. Nagar and Near City bus stop. The areas covered in Mandya are city center and Mandya – Maddur road. The areas covered in Hubli-Dharwad are Keshwapur, Durgadbail, Koppikar road, Deshpande Nagar, Subhash road, Line Bazaar, NTTF circle and near Lakshmi theater. The areas covered in Belgaum are Tilakwadi, Bhagya Nagar, Hanuman Nagar and Piranwadi. The areas covered in Bijapur and Muddebihal are Freedom Fighter Colony, BLDE road, Shivaji circle, Vidya nagar, Sangamesh nagar and Bharpet galli

3.11. Sample Design

The researcher must decide the method of selecting a sample or what is popularly known as the sample design. In other words, a sample design is a definite plan determined before any data are actually collected for obtaining a sample from a given population.

The present study followed Systematic Quota sampling method to collect the data. Based on the population in these six cities, sample size has been selected. Through this process it is ensured that the sample size is optimum and it will fulfill the requirements of representativeness, reliability and flexibility.

Certain assumptions were made by the researcher for selecting the sample. First the population in the six cities covered by the six milk unions was considered and reduced to 25 percent assuming four members per family. Then it was reduced to 50 percent on the basis that the probability of purchase of loose milk is 50 percent and packed milk is 50 percent. 0.5 percent of the figure obtained was considered for the
sample size. In case of Bangalore, it worked out to over 5000 but for large populations, a sample size of 1000 is considered as ideal. Hence the researcher decided to use 1000 sample size for Bangalore. For Dharwad, Belgaum and Mysore the sample size has been rounded off on the lower side and for smaller cities Bijapur and Mandya, the sample size has been rounded of the higher side.

For the six Dairies chosen and based on their population, the following sample size has been considered.

<table>
<thead>
<tr>
<th>City</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangalore</td>
<td>1000</td>
</tr>
<tr>
<td>Belgaum</td>
<td>500</td>
</tr>
<tr>
<td>Bijapur</td>
<td>310</td>
</tr>
<tr>
<td>Mandya</td>
<td>300</td>
</tr>
<tr>
<td>Dharwad</td>
<td>500</td>
</tr>
<tr>
<td>Mysore</td>
<td>500</td>
</tr>
</tbody>
</table>

3.12. Analysis of Data

After the data is collected, the researcher’s next task is to analyze the data. The raw data is coded, tabulated and inferences drawn using statistical tools. Analysis work is generally based on the computation of various percentages, coefficients etc through the application of well defined statistical formulae.

3.13. Hypotheses Testing

After analyzing the data, the researcher is in a position to test the hypotheses, formulated earlier. The researcher finds out whether the facts support the hypotheses or they happen to be contrary. Hypotheses testing will result in either accepting the hypotheses or rejecting it.
Hypotheses tested in the present study are as follows:

1. $H_0$: There is no association between brand currently being used and the influence of place on the brand choice.  
   $H_a$: There is association between brand currently being used and the influence of place on the brand choice.

2. $H_{10}$: There is no association between brand currently being used and the household income on the brand choice.  
   $H_{1a}$: There is association between brand currently being used and the household income on the brand choice.

3. $H_{20}$: There is no association between brand currently being used and the family size on the brand choice.  
   $H_{2a}$: There is association between brand currently being used and the family size on the brand choice.

4. $H_{30}$: There is no association between factors for purchasing milk and overall satisfaction.  
   $H_{3a}$: There is association between factors for purchasing milk and overall satisfaction.

5. $H_{40}$: There is no linear relation between set of independent variables on Overall Satisfaction (Beta of $X_1$ to $X_3$ with $Y$ is equal to zero)  
   $H_{4a}$: There is linear relation between set of independent variables on Overall Satisfaction (Beta of $X_1$ to $X_3$ with $Y$ is not equal to zero)
3.14 Statistical Techniques

The study followed basic statistical tools such as frequency distribution, mean and standard deviation. The second level analysis is hypothesis testing and ANOVA, Z test and chi square are applied. In the third level, multivariate analysis such as factor analysis and multiple linear regression analysis are applied.

Descriptive statistics – this is a sort of univariate analysis. It is used to know the distribution or summarizing the variables in terms of frequency percentages, mean and standard deviation. Also cross tabulation of Marketing mix and overall satisfaction by some of the selected demographic variables such as Region, Sex, Age and Household Income etc have also been carried out.

Hypothesis Testing is employed in order to test the above said hypotheses. This is sort of bivariate analysis, where two variables are considered. Depending on the scale of measurement and objectives of the study, various tests such as chi square, one way ANOVA, Z test are used. Both ANOVA and Z test are mean based tests. Chi square is count based test.

Multivariate Analysis – when variables are more than two, multivariate analysis is used. The study used very common techniques like factor analysis and multiple linear regressions. The factor analysis is used to reduce dimension and for the purpose of data summarization. Multiple linear regressions are used to test the causality between marketing mix and overall satisfaction of the Nandini milk users in the Karnataka state. All the above statistical techniques are executed with the help of SPSS version 18.
3.15. Summing up

Database and Methodology followed has been described in this chapter. The logic for selection of study area and the customers in that area has also been detailed here. The hypotheses formulated, the data analysis and the tools used have been described in this chapter. From here we proceed to the study of the macro view of the dairy industry.