CHAPTER 4
RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter is a window to the whole study and gives an overview of the entire methodology behind this research work. The objectives of the present research, scope of the study, sampling framework, methods of data collection and tools used for analysis the data are discussed in this chapter. The study was undertaken in the context of Mid-day Meal Scheme in the State of Punjab. Punjab was one of the few states to implement the MDM scheme in 2002 when the scheme was initially started.

4.2 SCOPE OF THE STUDY

The scope of the present study is to examine the effectiveness of Mid-day Meal in Punjab. The response to Mid-day Meal scheme was positive across all the states and it gradually boosted from the year 2002. This study of Mid-day Meal scheme in Punjab will be beneficial to the Central Government Authorities to explore the impact of Mid-day Meal scheme in an economically developed state like Punjab. As per Census 2011, the total population of Punjab state is 27704236 and the present literacy rate of the state is 76.7%. Punjab is divided into 20 Administrative Districts (2 more new districts have been constituted), 72 Tehsils and 216 Educational Development Blocks). It has a high percentage of Schedule Caste population i.e., 28.9%, which is one of the highest in the Country. The rural female literacy rate is lower at 55.3%. The literacy rate of SC female is 48.2%. Hoshiarpur is having highest literacy rate (85.4%) and Mansa district of Punjab is having lowest literacy rate (62.8%) followed by
Sangrur and Barnala (68.9%). Currently, mid-day meal scheme covers 22.23 lacs children in Punjab (1354626 at primary and 868849 at upper primary level). As Mid-day Meal scheme was introduced by Central Government to improve enrolment, retention, attendance and nutritional level of children especially of disadvantaged sections of the society. So the present study moved to understand various aspects of the scheme viz. increase in enrollment, attendance, retention and nutritional status and implementation of the scheme. This study worked upon logistics and timely availability of resources. The study includes the important factor of diet content in terms of quality and quantity. Further the perception of three major stakeholders viz. teachers, children and parents have been included to understand the effectiveness and implementation of the scheme. The gaps later can be filled after the major study is conducted. The objectives of the present study are to assess the coverage of children under Mid-day Meal scheme, availability of infrastructure for implementation, improvement in enrollment, attendance, retention and health status of children. The study tries to find the impact of mid-day meal on teaching and learning activities in school, involvement of teachers and parents in the implementation of the scheme at various levels. However, information on health status has been captured but not on nutritional status from the available data.

4.3 OBJECTIVES OF THE STUDY

1. To study the implementation level of Mid-day Meal scheme in various districts.

2. To analyze the impact of Mid-day Meal scheme on promoting enrollment, attendance and retention.

3. To study the perception of teachers, students & parents about the impact of Mid-day Meal Scheme on improving health status of the students.
4. To study teachers’ involvement in Mid-day Meal activities.

5. To study the association of teachers, students & parents responses regarding the implementation of mid-day meal scheme.

4.4 SIGNIFICANCE OF THE STUDY

- The findings of the study can be utilized by Ministry of Human Resource Development, Education Department and policy makers for framing new guidelines and norms. The analysis of implementation level of MDMS among teachers, students and parents can suggest amendments for further improvements in the scheme.

- The study is likely to throw light on the importance of scheme and its impact on the improving enrollment, attendance, retention and health status of the students. The study will emphasizes the role played by this scheme in promoting education in children especially of those of socially and economically backward sections of the society as deprived financial conditions and poor health of the students are directly associated with education.

4.5 SAMPLING FRAMEWORK

Primary data was collected to test the various parameters inherent in the objectives. The sampling frame consists of Schools Teachers (Representing Each Sample School), Beneficiary students and Parents of the Beneficiary students from the State of Punjab and each unit of sampling frame is selected by using a proportionate stratified random sampling method.
4.5.1 SAMPLING UNIT

The following nine blocks of three districts had constituted the sampling Unit:

- Lehragaga, Cheema and Sunam Blocks of Sangrur District.
- Mehal Kalan, Sehna and Barnala Blocks of Barnala District.
- Budhlada, Mansa and Bareta Blocks of Mansa Districts.

**Table 20: Detail of Sample Districts and Blocks**

<table>
<thead>
<tr>
<th>Name of Sample District</th>
<th>Total number of Blocks in the District</th>
<th>Sample Block from each District</th>
<th>Name of Sample Blocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangrur</td>
<td>11</td>
<td>3</td>
<td>Lehragaga, Cheema and Sunam</td>
</tr>
<tr>
<td>Barnala</td>
<td>3</td>
<td>3</td>
<td>Mehal Kalan, Sehna and Barnala</td>
</tr>
<tr>
<td>Mansa</td>
<td>5</td>
<td>3</td>
<td>Budhlada, Mansa and Bareta</td>
</tr>
<tr>
<td><strong>Total Blocks</strong></td>
<td><strong>19</strong></td>
<td><strong>9</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Criteria for Selection of Districts**

While selecting the districts from the State, the criteria were literacy rate as the stratifying parameter. Punjab is divided into 20 Administrative Districts. The present research has been carried out in three districts viz., Sangrur, Barnala and Mansa. The present literacy rate of Punjab is 76.7%. Hoshiarpur district is the most literate district in the state, with a literacy rate of 85.4 percent, followed by S.A.S Nagar (84.9%), Rupnagar (83.3%), Ludhiana (82.7%), Jalandhar (82.4%), Gurdaspur (81.1%) and all these districts have more than three-fourths of their population literate. On the other hand, Muktsar has a literate population of only 66.6 per cent and Mansa at the bottom with only (62.8%). Sangrur and Barnala districts are also in this category with 68.9%
literate population. So, these three districts have been taken as a sample to assess the impact of Mid-day Meal scheme on improving education level in these low literacy districts by influencing enrolment, attendance, retention and nutritional status of the children.

4.5.2 SAMPLE SIZE AND SAMPLING TECHNIQUE

SELECTION OF SCHOOLS

For the purpose of the study, both primary and upper primary schools have been covered under the survey. As mid-day meal is provided up to 8th standard, so the primary as well as upper primary schools serving mid-day meal were undertaken for the purpose of the study. Schools were selected through proportionate stratified random sampling. The schools with parameters of minimum 2 teachers and with minimum 100 students were selected. All the Govt. schools, Govt. aided schools, Schools under Zila Parishad, EGS, AIE centres etc., in three districts which are covered under mid-day meal scheme, were considered as the total population. The sample consists of 10% of the total population (1850). For the purpose of generating a suitable sample, the population consists of all School in three districts at the precision level of 10% and the level of confidence at 95%. This helped to generate the representative sample size of School for desired results. As shown in Table 21, 185 schools were selected for the purpose of the present study. One teacher from each sample school was interviewed through structured schedule.
Table 21: Detail of Sample School Surveyed

<table>
<thead>
<tr>
<th>District</th>
<th>Block</th>
<th>Type of School surveyed</th>
<th>Total no. of schools surveyed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Primary</td>
<td>Upper Primary</td>
</tr>
<tr>
<td>Sangrur</td>
<td>Lehragaga</td>
<td>38</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Cheema</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Sunam</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>Barnala</td>
<td>Mehal Kalan</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Sehna</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Barnala</td>
<td></td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Mansa</td>
<td>Budhlada</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Mansa</td>
<td></td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Bareta</td>
<td></td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Total no. of schools surveyed</strong></td>
<td>119</td>
<td>66</td>
</tr>
</tbody>
</table>

SELECTION OF BENEFICIARY STUDENTS

From each sample School/Centre, 5 beneficiary students were selected randomly by giving minimum consideration to the sex of the respondents. A total of 925 (595 from primary and 330 from upper primary schools) school children were surveyed from 185 schools that are availing the benefits of MDM scheme. The district and block wise details of surveyed children are:
Table 22: Block wise Detail of Students Surveyed

<table>
<thead>
<tr>
<th>District</th>
<th>Block</th>
<th>No. of Student Interviewed from</th>
<th>Total No. of students surveyed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Primary School</td>
<td>Upper Primary School</td>
</tr>
<tr>
<td>Sangrur</td>
<td>Lehragaga</td>
<td>190</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>Cheema</td>
<td>80</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>Sunam</td>
<td>90</td>
<td>25</td>
</tr>
<tr>
<td>Barnala</td>
<td>Mehal Kalan</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Sehna</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Barnala</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>Mansa</td>
<td>Budhlada</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Mansa</td>
<td>60</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Bareta</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td><strong>Total No. of students surveyed</strong></td>
<td>595</td>
<td>330</td>
</tr>
</tbody>
</table>

**SELECTION OF PARENTS OF BENEFICIARY STUDENTS**

Parents of beneficiary students were interviewed to study their perception regarding implementation and impact of mid-day meal scheme. In total 105 parents (i.e, 35 from each district) of the beneficiary students were interviewed for the research purpose.

**4.6 PILOT SURVEY**

First step in the process of the data collection was a pilot survey. For this, 10 teachers each from Sangrur, Barnala and Mansa were selected and an informal talk was held with these teachers keeping in mind the objectives of the study. On the basis of pilot survey, necessary modifications were made to the Schedule and then it was finalized. Similarly the schedule for students and parents was finalized in consultation with teachers.
4.7 COLLECTION OF DATA

To achieve set objectives under the study primary data has been collected. The collection of quantitative data has been done with the help of self-developed, pre-designed and pre-tested schedule from various stakeholders like Teachers (Schools), Students, Parents of beneficiary students involved in the mid-day meal programme. The reference period for the study was from 2009 to 2015 and stakeholders i.e., teachers, students and parents of cooked mid-day meal scheme was covered under the survey. The field work was carried out personally in above three districts of Punjab States (India) from February 2011 to June 2011. The interview schedule has covered the information related to the infrastructure and institutional arrangements for mid-day meal scheme, the performance of mid-day meal Scheme, impact of mid-day meal scheme on enrollment, attendance, retention and nutritional status of children. The schedules were used to collect the information about perception of the all the stakeholders regarding the scheme and also collected suggestions for improvement of the implementation of the programme. Different Schedules have been developed for different stakeholders. In totality, three schedules, each for school teachers, students and parents have been developed. The schedule for teachers/students/parents has been designed in consultation with the academicians/officers at state/district/block level and teachers of the schools.

4.7.1 SCHEDULE FOR THE TEACHERS

Data has been collected through schedule from Teachers or Schools Heads (One mid-day meal representative from the sample school) who are dealing in the implementation of mid-day meal scheme. Various aspects related to the implementation of the scheme, quality &
quantity of food grain supplied, opinion regarding impact of mid-day meal on enrolment, retention, attendance and nutrition level of the children, issues related to timely funding, infrastructure and other arrangements of the scheme, suggestions for improving the scheme etc, have been incorporated in the schedule. The copy of the schedule has been attached as Schedule-I. The schedule is divided into following four parts:

Part I constituted the profile of the school and the basic information related to mid-day meal scheme in the school.

Part II dealt with the question related to implementation level of mid-day meal scheme in the schools. Various questions have been included in this part of the schedule to check the status of implementation and the hurdles, which the school authorities are facing in the execution of the MDMS.

Part III focused on gathering the information which will help to analyze second and third objectives of the study. It included the questions related to enrolment, attendance, and retention and health status of the students after implementation of MDMS.

Part IV tried to fulfill the fourth objective of the study. It included the questions related to involvement of the teachers in mid-day meal activities. In this part, there are questions which further collected the information relating to impact of teachers’ involvement on teaching activities.

4.7.2 SCHEDULE FOR THE STUDENTS

Data has been collected through predesigned schedule from the students to check their perception regarding implementation of the scheme. Their satisfaction level regarding mid-
day meal served in the schools has also been analyzed in the study. The schedule has questions related to quantity, quality aspects, about the regularity of service and availability of infrastructure for mid-day meal scheme. The copy of the schedule has been attached as Schedule-II.

4.7.3 SCHEDULE FOR THE PARENTS

The perception of the parents regarding their satisfaction towards various factors related to mid-day meal was evaluated through predesigned schedule. The schedule includes the items similar to those of student’s schedule. The copy of the schedule has been attached as Schedule-III.

4.8 HYPOTHESIS FORMULATION

Hypotheses are single tentative guesses, assumed for use in devising theory or planning experiments intended to be given a direct experimental test when possible. The hypothesis is formal statement either describing the phenomenon or developing relationship between the variables. The objective of hypothesis development phase is to identify scientific evidence to generate research questions and hypothesis. Taking the objectives into consideration, the respondents with respective demographics were taken and hypothesis were designed, formulated and analyzed from teachers, children and parents perspective. The inclusion criterion for districts in the study was literacy rate. The data from districts with lowest literacy rate in the state who have implemented mid-day meal were used to test the general formulated hypotheses.

H₀₁: There is no significant difference in the response(s) of the teachers amongst the districts regarding the delay in supply of mid-day meal grain at proper time.
H₀₂: There is no significant association between availability of funds (cooking cost) from authorities on time and sufficiency of the amount (cooking cost) of mid-day meal scheme for the smooth running of MDMS.

H₀₃: There is no significant correlation between construction of kitchen shed and sufficiency of amount sanctioned for construction of kitchen shed.

H₀₄: There are no sufficient utensils for distribution of cooked Mid-day Meal.

H₀₅: There is no significant difference amongst districts in selected parameters i.e., supply of MDM Grain at the proper time; availability of funds (cooking cost) from govt. authorities on time, construction of kitchen shed, availability of sufficient utensils for distribution of meal, availability of water facility and space availability for distribution of cooked meal in the school, maintenance of MDM register and regular inspection by authorities.

H₀₆: There is no significant association between category (Caste) of the students and their (household) income status.

H₀₇: There is no significant difference in the responses teachers in various districts for improvement in school attendance after implementation of mid-day meal scheme.

H₀₈: There was no significant correlation between availability of sufficient quantity and health problems among the students according to the perception of teachers, students & parent.
H_{09}: There is no significant correlation between regular visits of the doctor, medical checkups record maintenance and positive change in health status of the students according to perception of teachers, students & parents.

H_{10}: There is no significant correlation between washing hands and positive change in health status of the students according to teachers’ and students’ perception.

H_{11}: There is no significant difference in the perception of respondents (teachers, students and parents) about various factors i.e, sufficient quantity of food, the regular visit by the doctors, record maintenance and health issues.

H_{12}: There is no significant correlation between the Stakeholders’ responses regarding regularity in the provision of mid-day meal.

H_{13}: There is no significant correlation between the Stakeholders’ responses regarding quantity and quality of mid-day meal served.

H_{14}: There is no significant correlation between the Stakeholders’ responses regarding likeliness of the students towards mid-day meal weekly menu.

H_{15}: There is no significant correlation between teachers’ and students’ responses regarding the availability of utensils for eating cooked MDM.

H_{16}: There is no significant correlation between teachers’ and students’ responses regarding washing hands before eating cooked MDM.

H_{17}: There is no significant correlation between students’ and parents’ responses regarding the impact of MDMS on academic environment.
H₁₈: There is no significant correlation between students’ and parents’ responses regarding the purpose of going to school.

H₁₉: There is no significant difference between the stakeholders’ opinion on the provision of MDM, quantity and quality of MDM, liking of students for items of the menu of MDM.

4.9 DATA ANALYSIS TECHNIQUES

After collecting the information from the self-designed schedule, the following procedure was adopted such as checking the data consistency, transforming and coding the data, key in data into the computer, developing a database structure. The data has been analyzed using SPSS 20 to measure the relationship and differences between variables. Descriptive analysis using Frequency Distribution, Percentage, Compounded Annual Growth Rates was used for analysis of the collected data and to determine a significant relationship amongst the variables, techniques such as Chi Square Test of Independence, Correlation were used. Few multivariate tools like Multiple Discriminant Analysis and ANOVA were applied.

4.9.1 CHI-SQUARE TEST OF INDEPENDENCE

The test is applied for two categorical variables to determine the significant association between two variables. It is suitable for unpaired data from large samples. It tests the null hypothesis stating that frequency distribution observed in a sample is consistent with particular theoretical distribution. A test of independence assesses whether period observation on two variables in a contingency table is independent of each other. The null hypothesis is accepted if there is no difference between the distributions and can be rejected with selected level of confidence.
Let ‘Oi’ represent the observed counts of category ‘i’; ‘Ei’ represent the expected counts of category ‘i’; ‘k’ represent the number of categories. Then the formula,

$$\chi^2 = \sum \left[ \frac{(O_{i,k} - E_{i,k})^2}{E_{i,k}} \right]$$

4.9.2 KENDALL TAU-B

It is used to measure the association between two variables. A positive value indicates that both variables increases together. A negative value indicates that both variables decrease. It ranges between -1 (for all pairs disagree) to +1 (for all pairs agree).

4.9.3 CORRELATION ANALYSIS

Correlation is a statistical measure that indicates the extent to which two or more variables fluctuate together. A positive correlation indicates the extent to which those variables increase or decrease in parallel; a negative correlation indicates the extent to which one variable increases as the other decreases. Correlation is computed into what is known as the correlation coefficient, which ranges between -1 and +1. Values close to +1 indicate a high degree of positive correlation, and values close to -1 indicate a high degree of negative correlation. Values close to zero indicate the poor correlation of either kind, and 0 indicates no correlation at all.

Correlation is useful in discovering possible connections between variables.

$$r = \frac{n \sum xy - (\sum x)(\sum y)}{\sqrt{n(\sum x^2) - (\sum x)^2} \sqrt{n(\sum y^2) - (\sum y)^2}}$$

where ‘n’ is the number of pairs of data.
In this study, Karl Pearson Correlation Analysis was used:

- To study whether there was any significant correlation between the different variable of mid-day meal scheme.

- To study whether there was any significant correlation between mid-day meal scheme and its impact on health status.

- To study whether there was any significant correlation between responses of the stakeholders regarding different parameters of mid-day meal scheme.

4.9.4 MULTIPLE DISCRIMINANT ANALYSIS

Multiple Discriminant Analysis is a method for compressing a multivariate signal to yield a lower dimensional signal towards classification. It is related to an analysis of variance and regression analysis which also attempt to express dependent variables as a linear combination of other features of measurement and involves the determination of linear equation like the regression that predicts while group the case belongs to.

\[ D = V_1X_1 + V_2X_2 + V_3X_3 + \cdots + V_iX_i + \alpha \]

- \( D \) = Discriminant Function
- \( V \) = Discriminant coefficient or weight for that variable
- \( X \) = Respondents’ score for that variable
- \( \alpha \) = a constant
- \( i \) = the number of predictor variable
STANDARDIZED DISCRIMINANT COEFFICIENT: It uses beta weights in regression. Good predictors tend to have larger weights. The function is to maximize the distance between the categories which helped us to measure strong discriminating power between the groups. Cases are classified after that. The discriminant function is always one less than a number of groups. This helped us to investigate the difference between groups on the basis of MDM attributes, indicate which attribute contribute the most to group separation.

PREDICTIVE DISCRIMINANT ANALYSIS: It helps to assign new cases to the group and to test theoretically where the cases are correctly predicted. All statistical tools like Chi-square and F-value enables us to see how well the function separates the group and how each MDM attributes Discriminant more with the help of its discriminating power.

4.9.5 ANALYSIS OF VARIANCE (ONE WAY-ANOVA)

This technique was used to test the equality of two or more population by examining the variances of samples taken. It allows us to determine whether the difference between stakeholders are due to random error or there are systematic treatment effects that cause mean in one group to differ from mean in another group. ANOVA is based on comparing variance between the data samples to variation within each particular sample. If the between the variance is larger than within the means of different districts and blocks will not be equal. If the between and within are of the same size, there will no significant differences between sample means.

If $F_{\text{Observed Value}} > F_{\text{CV}}$ (Critical Value)

We rejected the null hypothesis at 95% confidence level.
4.9.6 POSTHOC TESTING OF ANOVA

Multiple comparisons are commonly used in ANOVA by obtaining significant ANOVA F-test. The significant ANOVA result suggests the global null hypothesis $H_0$ that the means are same across the group being compared. Multiple comparison procedure was used to determine which means differ. Tukey inter-comparison are generally viewed test. The situation where the variance of the group being compared differs is more complex. Multiple-comparisons are done using pair-wise comparison and to determine, post hoc tests were significant. Tukey test is statistical tool for multi comparison procedure. Tukey’s test compares the means of every treatment to means of every other treatment; it applies simultaneously to all set of all pair wise comparisons $\mu_i - \mu_j$ and identifies any differences between two means that is greater than expected SE (Standard Error). Tukey method is conservative when there are unequal sample sizes.

4.9.7 COMPOUNDED ANNUAL GROWTH RATE (CAGR)

It is a useful tool for determining the annual growth rate on various inputs like beginning value, ending value and time period. The CAGR represent the growth rate of an initial investment assuming it is compounded by the period of time specified.

$$CAGR = \left[ \frac{\text{Ending Value}}{\text{Beginning Value}} \right]^{\frac{1}{\text{# of Years}}} - 1$$

This tool was used in the study to check the growth rate in the enrollment of the students after implementation of Mid-day Meal scheme.

4.10 PRESENTATION OF THE STUDY

For clarity and understanding, the present study has been presented in six chapters. The
first chapter describes the idea behind the research as well as the introductory part of mid-day meal scheme at National level. In this chapter, the need for mid-day meal scheme is highlighted along with the description of various guidelines and norms of MDMS. The second chapter throws light on the implementation of mid-day meal scheme in Punjab. An account of available literature on mid-day meal scheme is included in the third chapter. The fourth chapter discusses the research methodology adopted for the present study which describes the objectives, scope of the study, sampling unit, sample size, sampling technique, the limitations of the study etc. The fifth chapter presents analysis and interpretations of primary data. The sixth chapter presents the conclusions along with suggestions.

4.11 LIMITATIONS OF THE STUDY

- The study was restricted to three districts only. Other districts were not included in the study.

- Although good rapport was maintained with teachers yet some teachers were hesitant to disclose the problems they face in the implementation of the scheme. When they were told that their responses will not be discussed with the upper authorities, they discussed their problems.

- Students in the primary wing were too young to respond properly. Students in primary and upper primary wing were also in fear of the teachers to disclose the true situation of implementation of scheme.
• Parents of the beneficiary students were not aware of the MDMS exactly as they were not directly associated with the scheme. They responded to the questions on the basis of the feedback that they get from their children regarding the scheme.

In spite of above limitations, all the efforts were made to make the study all-inclusive and investigative so that the study brings significant suggestions for government, state, district and block administrators and the teachers.