CHAPTER-III
RESEARCH METHODOLOGY

The present chapter includes scope of the study, sample and sampling design, data collection, data analysis, descriptive analysis and limitations.

SCOPE OF THE STUDY

The present study evaluates the performance of Agricultural Development Banks in Punjab. It intensively examines the various aspects of structure, growth and financial performance of Punjab State Cooperative Agricultural Development Bank and its member banks, Primary Cooperative Agricultural Development Banks (PADBs) in the state, assesses the opinion of borrowers regarding functioning of the PADBs and evaluates the perception of managers of PADBs regarding working of the Punjab State Cooperative Agricultural Development Bank. The study covers Punjab State Cooperative Agricultural Development Bank and its 89 PADBs having 19 district offices categorized into three divisions as on 31st March 2013 (Table 3.1).

SAMPLE AND SAMPLING DESIGN

One of the main objectives of the study has been to know the opinion of borrowers regarding functioning of the PADBs. For this purpose a sample of 240 borrowers with 80 borrowers each from the three divisions of the Bank, Patiala, Ferozepur and Jalandhar was planned. For the selection of borrowers, three stage sampling has been adopted. At the first stage, two districts were randomly selected from each division and thus, six districts have been selected for this purpose. These are Jalandhar, Gurdaspur, Patiala, Sangrur, Muktsar and Mansa. At the second stage, 12 PADBs taking two PADBs from each district have been chosen one having maximum loans outstanding and other having minimum loans outstanding as on 31st March 2013. Thus, approximately 13 per cent of PADBs in the state have been covered in the sample. At the third stage, 20 borrowers have been selected from each selected PADB by adopting convenient sampling.
### Table: 3.1

**District-wise Break-up of PADBs of SCADB in Punjab as on 31.03.2013**

<table>
<thead>
<tr>
<th>Division</th>
<th>District</th>
<th>Number of Primary Agricultural Development Banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jalandhar</td>
<td>Jalandhar</td>
<td>06</td>
</tr>
<tr>
<td></td>
<td>Nawanshahr</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td>Hoshiarpur</td>
<td>05</td>
</tr>
<tr>
<td></td>
<td>Kapurthala</td>
<td>04</td>
</tr>
<tr>
<td></td>
<td>Gurdaspur</td>
<td>05</td>
</tr>
<tr>
<td></td>
<td>Amritsar</td>
<td>04</td>
</tr>
<tr>
<td></td>
<td>Taran-Taran</td>
<td>04</td>
</tr>
<tr>
<td>Patiala</td>
<td>Patiala</td>
<td>08</td>
</tr>
<tr>
<td></td>
<td>Fatehgarh Sahib</td>
<td>04</td>
</tr>
<tr>
<td></td>
<td>Barnala</td>
<td>02</td>
</tr>
<tr>
<td></td>
<td>Sangrur</td>
<td>08</td>
</tr>
<tr>
<td></td>
<td>Ludhiana</td>
<td>08</td>
</tr>
<tr>
<td></td>
<td>Ropar</td>
<td>04</td>
</tr>
<tr>
<td>Ferozepur</td>
<td>Ferozepur</td>
<td>06</td>
</tr>
<tr>
<td></td>
<td>Muktsar</td>
<td>04</td>
</tr>
<tr>
<td></td>
<td>Bathinda</td>
<td>05</td>
</tr>
<tr>
<td></td>
<td>Mansa</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td>Faridkot</td>
<td>02</td>
</tr>
<tr>
<td></td>
<td>Moga</td>
<td>04</td>
</tr>
<tr>
<td><strong>03</strong></td>
<td><strong>19</strong></td>
<td><strong>89</strong></td>
</tr>
</tbody>
</table>

While selecting the borrowers it was kept in mind that borrowers from all age groups/occupations/castes/income level/landholding size education level and for every purpose of loan were included. The selected borrowers were asked to fill the pre-tested questionnaire at PADB, their workplace, farms and place of their residence.

Second main objective of the study has been to assess the perception of managers of PADBs regarding working of the State Agricultural Development Banks, a sample of 60 managers taking 20 from each division have been selected. The managers have been selected on the basis of convenient sampling. To ascertain the satisfaction level of managers, they were asked to register their extent of satisfaction on a five-point scale regarding various aspects related to the loan agreement and the statements related to the functioning of PSCADB.

**DATA COLLECTION**

For the purpose of study, two sets of data have been collected. The secondary data for the study pertaining to the period from 1999-00 to 2012-
13 has been compiled from secondary sources such as annual reports of the Bank, Bye-laws of the Bank, Official records, Financial Statements of Cooperatives, Statistical Abstracts of Punjab, Statistics on Cooperatives, Statistical Statements published by NABARD, Annual reports of NABARD, RBI Bulletins, various Reports on Trend and Progress of Banking in India and personal discussion with the officials of the Bank. Important information has been collected through personal discussions and observations of the member and non-member borrowers of the Bank. The secondary data has been collected for Punjab State Co-operative Agricultural and Rural Development Bank and its member Banks i.e. Primary Co-operative Agricultural and Rural Development Banks in Punjab.

The second set of data is primary data, which has been collected through a sample survey with the help of two questionnaires. To develop these questionnaires existing literature on rural co-operative banking was reviewed, predesigned questionnaires were reviewed and discussions with the staff of PSCADB and PADBs during the visits to the bank and various PADBs were held. Further, discussions with borrowers and managers also helped in preparing the questionnaires. The preliminary drafts of questionnaires were pre-tested on 25 borrowers and 15 managers. This helped in improving the questionnaires. The final questionnaires after making improvements according to the responses of beneficiaries have been attached as Appendix-I and Appendix-II.

The questionnaire of borrowers contains questions relating to the demographic features of borrowers and purpose of loan, tenure of loan, amount of loan, sufficiency of loan amount, security provided for loan, time taken to sanction the loan and disbursement of the loan, usage of loan, repayment schedule, satisfaction level of borrowers regarding various factors relating to loans, problems faced by borrowers in availing loans, their preference in future for loans and their opinion regarding overall working of the PADBs in Punjab. The questionnaire of managers contains questions relating to the demographic features of managers and 35 statements regarding the working of PSCADB, to know the perceptions of manager and their overall level of satisfaction regarding the working of PSCADB.
Further, to study the working of PSCADB and PADBs in Punjab in depth, the researcher visited the apex bank and its PADBs in the State a number of times. The discussions with the bank managers and other officials and researcher’s observations helped in collecting important information related to the present study.

**DATA ANALYSIS**

For the purpose of analysis, the data collected from borrowers has been analysed with respect to two variables viz., division-wise and land holding size-wise. Division-wise data has been classified into three categories viz., Patiala Division (D₁), Ferozepur Division (D₂) and Jalandhar Division (D₃). Table 3.2 shows division-wise distribution of borrowers.

### Table: 3.2
**Division-wise Distribution of Respondents**

<table>
<thead>
<tr>
<th>Divisions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patiala (D₁)</td>
<td>80 (33.33)</td>
</tr>
<tr>
<td>Ferozepur (D₂)</td>
<td>80 (33.33)</td>
</tr>
<tr>
<td>Jalandhar (D₃)</td>
<td>80 (33.33)</td>
</tr>
<tr>
<td>Total</td>
<td>240</td>
</tr>
</tbody>
</table>

Similarly, land holding size-wise data has been classified into three land holding size categories viz., Marginal (L₁), Small (L₂) and Large (L₃). Marginal farmers include landless borrowers and borrowers having less than 2.5 acres of land. Small farmers include borrowers having land between 2.5 acres to 10 acres. Large farmers include borrowers having land above 10 acres. Table 3.3 shows the land holding size wise distribution of borrowers.

### Table: 3.3
**Land holding size-wise Distribution of Respondents**

<table>
<thead>
<tr>
<th>Land holding size</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marginal Farmers (L₁)</td>
<td>75 (31.25)</td>
</tr>
<tr>
<td>Small Farmers (L₂)</td>
<td>98 (40.83)</td>
</tr>
<tr>
<td>Large Farmers (L₃)</td>
<td>67 (27.92)</td>
</tr>
<tr>
<td>Total</td>
<td>240</td>
</tr>
</tbody>
</table>
The responses of borrowers have been classified and presented in a tabular form, both in percentages and numbers. Figures given in parentheses in all the tables represent percentages while those without parentheses are simple frequencies.

Primary data collected through two questionnaires has been analysed with the help of various tools including simple percentages, cross tabulation, Chi-square test, ANOVA (analysis of varience), KMO-MSA (Kaiser-Meyer-Olkin Measure of Sampling Adequacy) and Bartlett’s Test, Principal Component Analysis, Step-wise Multiple Regression Analysis and t-value significant at 1 per cent and 5 per cent level and Average Weighted Score. All statistical calculations have been made by the use of Microsoft Excel and SPSS version 16 and 20.

The growth of agricultural development banks has been reviewed through the selected parameters as given below:

**Punjab State Co-operative Agricultural Development Bank:**
1. Number of PADBs in Punjab
2. Share Capital
3. Owned Funds
4. Borrowings
5. Loans outstanding
6. Deposits
7. Investments
8. Employees
9. Volume of Business
10. Working Funds

**Primary Co-operative Agricultural Development Banks in Punjab:**
1. Membership in PADBs
2. Share Capital
3. Owned Funds
4. Borrowings
5. Loans outstanding
6. Investments
7. Working Funds
8. Profits at PADBs and PSCADB level

The selected growth variables of Agricultural Development Banks in Punjab has been analysed with the help of statistical tools like average, percentage analysis, exponential growth rate, co-efficient of variation, trend co-efficient, future projection in absolute and relative terms of all the growth variables for the year 2019-20. The year 2019-20 has been chosen to evaluate the long-term growth of the banks during the period of two decades. The relationship analysis has been done by using the correlation matrix and step-wise multiple regression by taking loans and advances as dependent variables and other growth variables as independent variables at 1 per cent and 5 per cent level of significance.

Loan Policies of the Punjab State Co-operative Agricultural Development Bank and Primary Co-operative Agricultural Development Banks in Punjab have been analysed on the basis of various schemes of the Bank given below:

1. Total Loans Issued
2. Farm-sector Loans and Non-Farm Sector Loans
3. Minor Irrigation Loans
4. Land Development Loans
5. Farm Mechanisation Loans
6. Plantation and Horticulture Loans
7. Animal Husbandry Loans
8. Storage Godowns Loans
9. Farm Forestry Loans
10. Non-Conventional Energy Sources Loans
11. Rural Housing Loans
12. Bee Keeping Loans
13. Swarojgar Credit Card Scheme Loans
14. Agri Export Zone/Contract Farming Loans
15. Kisan Credit Card Scheme Loans
16. Education Loans
17. Recovery Position
18. Non-Performing Assets
Loan policies of the agricultural development banks have been analysed with the help of average, percentage analysis, standard deviation, co-efficient of variation and exponential growth rate.

Financial Performance of the Agricultural Development Banks in Punjab has been analysed on the basis of following indicators:

Profit Performance of the Agricultural Development Banks in Punjab:
1. Interest Earned
2. Interest Expended
3. Spread
4. Non-Interest Income
5. Non-Interest Expense
6. Burden
7. Total Income
8. Total Expenses
9. Net Profit

Profitability of the banks has been analysed under two dimensions viz., Earning Efficiency and Operational Efficiency. Earning efficiency has been analysed on the basis of following indicators:
1. Interest Income Ratio
2. Interest Expense Ratio
3. Spread Ratio
4. Non-Interest Income Ratio
5. Non-Interest Expense Ratio
6. Burden Ratio
7. Total Income Ratio
8. Total Expenses Ratio
9. Net Profit ratio

The following indicators have been used to analyse the efficiency of loans and advances of the Banks:
1. Non-Performing Assets to Loans and Advances
2. Return on Advances
3. Loans and Advances Ratio
Productivity of Agricultural Development Banks in Punjab has been analysed on the basis of following indicators:

1. Volume of Business per Employee
2. Loans and Advances per Employee
3. Spread per Employee
4. Burden per Employee
5. Net profits per Employee

PADBs are not allowed to accept deposits on their own, they accept deposits as agents of PSCADB, so volume of business per employee and deposit per employee has not been calculated in case of PADBs.

Financial Productivity of Agricultural Development Banks in Punjab has been analysed on the basis of following indicators:

1. Credit Deposit Ratio
2. Debt-Equity Ratio
3. Coverage Ratio
4. Cost of Deposits

Financial performance of Agricultural Development Banks in Punjab has been analysed with the help of ratio analysis. The relationship analysis has also been done by using the correlation matrix and step-wise multiple regression by taking net profit ratio as dependent variables and other ratios as independent variables at 1 per cent and 5 per cent level of significance.

**DESCRIPTIVE ANALYSIS**

Descriptive analysis has worked out to study the nature and distribution of different variables. These are as follows:

**Exponential Growth Rate**

The exponential growth rate has been calculated by using regression model in its exponential form as follows:

\[ Y = ab^t u \]

Where,

- \( Y \) = a parameter
- \( a \) = a constant term
- \( t \) = time variable (No. of years under study)
- \( b \) = regression coefficient of time
u = a random error term

Log transformation of the above function is:

\[ \ln Y_t = \ln a + t \ln b + e \]

Where,

\[ \ln b = \ln (1 + r) \] and
\[ r = [\text{antilog} (\ln b) - 1] \times 100 \]

\[ \text{EGR} (%) = [\text{antilog} (\ln b) - 1] \times 100 \]

The exponential growth rates were tested to determine their statistical significance with the help of t-test.

**Coefficient of Variation**

To see the variability in loans coefficient of variation is calculated for this mean and standard deviation is calculated.

Coefficient of Variation (C.V) = \( \frac{\sigma}{\bar{X}} \times 100 \)

Where \( \bar{X} \) = Mean
\( \sigma \) = Standard Deviation

There is inverse relationship between the coefficient of variation and consistency. More the value of coefficient of variation, lesser the consistency or vice-versa.

**Mean**

Mean refers to an average, which attempts to Measure single figure to describe the whole figures.

\[ \bar{X} = \frac{1}{n} \sum X \]

Where \( \bar{X} \) = Mean
\( n \) = Number of Observations
\( \sum X \) = Sum of Number of Observations

**Standard Deviation**

Standard Deviation refers to a square root of mean of the squared deviation from Arithmetic mean.
\[ \sigma = \sqrt{\frac{1}{n} \sum x^2} \]

Where \( \sigma \) = Standard Deviation

\[ \sum x = \text{Sum of Square of Deviations from Mean} \]

\[ n = \text{Number of Observations} \]

**Trend Equation**

To make future projections of different performance indicators, trend equations were developed in the form of linear regression as under:

\[ Y = a + bt + u \]

Where,

\( Y \) = a performance indicator

\( a \) = a constant term

\( t \) = time variable (No. of years under study)

\( b \) = regression coefficient of time

\( u \) = a random error term

Then the coefficient of \( a \) and \( b \) were used to make future projections for the year 2019-20.

**Correlation**

In order to determine the nature and strength of relationship between two variables, the co-efficient of correlation has been applied. It is a statistical tool used to describe the degree to which one variable is linearly related to another. The co-efficient of correlation is applied to find out the relationship between two variables. If there are only two variables, then the model is known as simple correlation. If multiple variables are used to explain the correlation among them, it is called bi-variate correlation model. In partial correlation we measure the degree of relationship between a dependent variable and one of the independent variables \( X_1, X_2, X_3, X_4, \ldots, X_N \) with the effects of all the other variables removed (Gupta, 1997: p. A-9.2)

**Step-wise Multiple Regression**

Regression analysis has been applied to study the relationship of independent variable with dependent variable. If there is only one dependent
variable and one independent variable used to explain the variation in a dependent variable, then the model is known as simple regression. If multiple independent variables are used to explain the variation in a dependent variable, it is called multiple regression model (Gupta, 1997: p. A-9.10). The following regression equation has been used for this purpose:

\[ Y = a + b_1x_1 + b_2x_2 + \ldots + b_nx_n + \mu \]

where

- \( Y \) = Level of satisfaction
- \( a \) = a constant term
- \( x_1 \) to \( x_n \) = independent variables
- \( b_1 \) to \( b_n \) = regression coefficients of independent variables

When all the independent variables are not of equal importance and the correlation among the independent variables is strong then step-wise multiple regression method has been frequently used. The method begins by entering into the model the variable that has the strongest positive or negative correlation with the dependent variable and at each subsequent step at the variable with the strongest correlation is entered. Thus at each step the variables are tested for removal.

**Cross Tabulation**

It can be done by combining any of the two questions and tabulating the data together. It was carried out to understand relationship between demographic variables of the respondents and their perception regarding different attributes.

**Chi-Square Test**

In case of cross tabulation featuring two variables a test of significance called the Chi-square test has been applied to determine whether the two variables are associated with each other or not. It helps in finding the association between two or more attributes. A proper application of the Chi-square test requires that the expected frequencies in each cell are not too small. When the theoretical frequencies are less than 10 and especially less than 5, the ordinary table values of \( \chi^2 \) are less reliable. This is
especially true for one degree of freedom, it is also true but to a lesser extent for two or three degree of freedom. However the error is negligible for more than three degrees of freedom (Gupta, 2005: p.959). It has been worked out as follows:

\[ \chi^2 = \sum \left( \frac{(O-E)^2}{E} \right) \]

Where, \( O \) = Observed frequencies
\( E \) = Expected frequencies

Cochran (1954) recommends that in Chi-squared tests for which the degree of freedom are greater than one, expected frequency of not more than 20 per cent cells should be less than 5 and no cell should have expected frequency less than one (Siegel and Castellen, 2002, p. 199). The calculated value of \( \chi^2 \) is compared with the table value, for given degree of freedom at specified level of significance, (generally at 5% level of significance). If the calculated value of \( \chi^2 \) is more than the table value, then difference between the variables is considered to be significant or otherwise insignificant.

**ANOVA**

The analysis of variance frequently referred to by the contraction ANOVA is a statistical technique specially designed to test whether the means of more than two quantitative samples are equal. It consists of classifying and cross-classifying statistical results and testing whether the means of a specified classification differ significantly. In this way, it determines whether the given classification is important in affecting the results (Gupta, 1997, p. A-5.5). To compare more than two means at a time, analysis of variance (ANOVA) was carried out. The process of the analysis is given hereunder:

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>d.f.</th>
<th>T.S.S.</th>
<th>M.S.S.</th>
<th>F-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Categories</td>
<td>n-1=a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>b-a=c</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>N-1=b</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
where  
\( n = \text{No. of categories to be compared} \)

\( N = \text{Total number of respondents} \)

\( \text{T.S.S.} = \text{Total Sum of Squares} \)

\( \text{M.S.S.} = \text{Mean Sum of Squares (TSS/d.f.)} \)

\( \text{d.f.} = \text{Degree of Freedom.} \)

**Factor Analysis**

Factor analysis has been employed in the study to assess the respondents’ attitude towards an issue.

**Mathematical model**

for \( i = 1, \ldots, 200 \) the \( i \)th respondent’s scores are

\[
X_{1,i} = \mu_1 \ast 1_{1 \times 200} + L_{1,1}F_i + L_{1,2}F_2 + \varepsilon_{1,i}
\]

. . .

. . .

. . .

\[
X_{n,i} = \mu_n \ast 1_{1 \times 200} + L_{n,1}F_i + L_{n,2}F_2 + \varepsilon_{n,i}
\]

where

\( x_{k,i} \) is the \( i \)th respondent’s score for the \( k \)th statement

\( \mu_k \) is the mean of the respondents scores for the \( k \)th statement

\( n \) is the number of statements (10, 10 and 15)

\( F_i \) is the \( i \)th respondent’s "first factor",

\( F_2 \) is the \( i \)th respondent’s "second factor", and so on

\( \varepsilon_{k,i} \) is the difference between the \( i \)th respondent’s score in the \( k \)th statement and the average score in the \( k \)th statement of all the respondents,

In matrix notation, we have

\[
X = \mu \ast 1_{1 \times N} + LF + \varepsilon
\]

where

\( N \) is No. of respondents
X is a statements × No. of respondents matrix of observable random variables,

µ is a number of statements × 1 column vector of unobservable constants,

L is a statements × 2 matrix of factor loadings,

F is a 2 × consumers matrix of unobservable random variables,

ε is a statements × respondents matrix of unobservable random variables.

**Type of Factoring**

**Principal Component Analysis (PCA):** The most common form of factor analysis, PCA seeks a linear combination of variables such that the maximum variance is extracted from the variables. It then removes this variance and seeks a second linear combination which explains the maximum proportion of the remaining variance and so on. This is called the principal axis method and results in orthogonal (uncorrelated) factors.

**Factor Loadings:** The factor loadings, also called component loadings in PCA, are the correlation coefficients between the variables (rows) and factors (columns). Analogous to Pearson’s r, the squared factor loading is the per cent of variance in the indicator variable explained by the factor. To get the per cent of variance in all the variables accounted for by each factor, add the sum of the squared factor loadings for that factor (column) and divide by the number of variables (note the number of variables equals the sum of their variances as the variance of a standardized variable is 1). This is same as dividing the factor’s eigenvalue by the number of variables.

**Communality:** The sum of the squared factor loadings for all factors for a given variable (row) is the variance in that variable accounted for by all the factors and this is called the communality. The communality measures the percent of variance in a given variable explained by all the factors jointly and may be interpreted as the reliability of the indicator.

**Eigenvalues/Characteristic Roots:** The eigenvalue for a given factor measures the variance in all the variables which is accounted for by that factor. The ratio of eigenvalues is the ratio of explanatory importance of the factors with respect to the variables. If a factor has a low eigenvalue, then it
is contributing little to the explanation of variances in the variables and may be ignored as redundant with more important factors. Eigenvalues measures the amount of variation in the total sample accounted for by each factor.

**Extraction Sums of Squared Loadings:** Initial eigenvalues and eigenvalues after extraction "Extraction Sums of Squared Loadings" are the same for PCA extraction, but for other extraction methods, eigenvalues after extraction will be lower than their initial counterparts. In "Rotation Sums of Squared Loadings" for PCA, the eigenvalues will differ from initial and extraction eigenvalues, though their total will be the same.

**Factor Scores** (also called component scores in PCA) are the scores of each case (row) on each factor (column). To compute the factor score for a given case for a given factor, one takes the case's standardized score on each variable, multiplies by the corresponding factor loading of the variable for the given factor and sums these products. Computing factor scores allows one to look for factor outliers. Also, factor scores may be used as variables in subsequent modelling.

**Criteria for Determining the Number of Factors**

**Varimax Rotation:** is an orthogonal rotation of the factor axes to maximize the variance of the squared loadings of a factor (column) on all the variables (rows) in a factor matrix, which has the effect of differentiating the original variables by extracted factor. Each factor will tend to have either large or small loadings of any particular variable. A varimax solution yields results which make it as easy as possible to identify each variable with a single factor. This is the most common rotation option (Jolliffe, 2002).

**Average Weighted Score**

Average Weighted Score has been used to study the borrowers’ and managers’ preferences and views expressed in terms of ranks of preferences for different attributes relating to functioning of Agricultural Development Banks in Punjab according to their degree of importance. Five-Point Likert Scale has been selected to measure the extent of agreement, importance or degree of satisfaction. The range of scale is 5, 4, 3, 2, 1. The weighted
average score has been calculated by assigning weights like 5 to highly satisfied, 4 to satisfied, 3 to neither satisfied nor dissatisfied, 2 to dissatisfied and 1 to highly dissatisfied. On the basis of frequency of ratings for each attribute, average weighted scores have been calculated with the help of the following formula:

\[ W = \frac{\sum Wfw}{\sum f_w} \]

W= Average weighted score
w= Weight given to the attribute
f= Number of respondents who attached weight to the attribute

**Students’ t-test**

In order to measure the distinctiveness between two constructs, t-test has been carried out. The test statistics ‘t’ is calculated from the sample data and then compared with its probable value based on t distribution at a specified level of significance for concerning degrees of freedom for accepting or rejecting the null hypothesis (Gupta, 1997,p: A-3.36). The students’ unpaired t-test was applied by using the following formula:

\[ t = \frac{X_1 - X_2}{SE(X_1 - X_2)} \]

\[ SE(X_1 - X_2) = S \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \]

\[ S = \sqrt{\frac{\sigma_1^2 (n_1 - 1) + \sigma_2^2 (n_2 - 1)}{n_1 + n_2 - 2}} \]

where ,
SE = standard error of mean difference
X1 = mean value in 1st category
X2 = mean value in 2nd category
σ1 = standard deviation in 1st category
σ2 = standard deviation in 2nd category
S = common standard deviation

\( n_1 \) = number of observations in 1st category

\( n_2 \) = number of observation in 2nd category

To evaluate financial performance of ADBs following ratios have been calculated:

1. Interest Income Ratio = \( \frac{\text{Interest Earned}}{\text{Working Funds}} \times 100 \)
2. Interest Expense Ratio = \( \frac{\text{Interest Expenses}}{\text{Working Funds}} \times 100 \)
3. Spread Ratio = \( \frac{\text{Spread}}{\text{Working Funds}} \times 100 \)
4. Non-Interest Income Ratio = \( \frac{\text{Non-Interest Income}}{\text{Working Funds}} \times 100 \)
5. Non-Interest Expense Ratio = \( \frac{\text{Non-Interest Expense}}{\text{Working Funds}} \times 100 \)
6. Burden Ratio = \( \frac{\text{Burden}}{\text{Working Funds}} \times 100 \)
7. Total Income Ratio = \( \frac{\text{Total Income}}{\text{Working Funds}} \times 100 \)
8. Total Expenses Ratio = \( \frac{\text{Total Expenses}}{\text{Working Funds}} \times 100 \)
9. Net Profit Ratio = \( \frac{\text{Net Profits or Losses}}{\text{Working Funds}} \times 100 \)
10. Non-Performing Assets to Loans and Advances = \( \frac{\text{NPAs}}{\text{Loans outstanding}} \times 100 \)
11. Return on Advances = \( \frac{\text{Interest Earned on Advances}}{\text{Loans outstanding}} \times 100 \)
12. Loans and Advances Ratio = \( \frac{\text{Interest Earned}}{\text{Working Funds}} \times 100 \)
13. Volume of Business per Employee = \( \frac{\text{Volume of Business}}{\text{Number of Employees}} \)
14. Loans and Advances per Employee = \( \frac{\text{Loans and Advances}}{\text{Number of Employees}} \)
15. Spread per Employee = \( \frac{\text{Spread}}{\text{Number of Employees}} \)
16. Burden per Employee = \( \frac{\text{Burden}}{\text{Number of Employees}} \)
17. Net profits per Employee = \( \frac{\text{Net Profits or Losses}}{\text{Number of Employees}} \)
18. Credit Deposit Ratio = \( \frac{\text{Loans and Advances}}{\text{Total Deposits}} \times 100 \)
19. Debt-Equity Ratio = \( \frac{\text{Outside Liabilities}}{\text{Owned Funds}} \times 100 \)
20. Coverage Ratio = \( \frac{\text{Capital Funds-Accumulated losses}}{\text{Total Deposits}} \times 100 \)
21. Cost of Deposits = \( \frac{\text{Interest Paid on Deposits}}{\text{Total Deposits}} \times 100 \)
LIMITATIONS OF THE STUDY

1. The present study covers Agricultural Development Banks in Punjab, based on secondary data; shortcomings of secondary data may affect the results and in certain cases data was not available.

2. In tables there may be slight difference between the analysis of the constituent items and total items because of rounding off.

3. Any study based on primary data through predesigned questionnaires carries all the limitations of the possibility of difference between what is recorded and what is truth, no matter how carefully the questionnaires have been designed. The perceptions of the respondents in the selected sample may be influenced by their experience, knowledge and attitude of individuals as beneficiaries may not give their true opinion. However, efforts have been made to minimize the errors by conducting personal interviews of beneficiaries.

4. The size of population was very large; therefore, the sample has been drawn on judgement and convenience basis. Therefore, the shortcomings in this method of sampling may creep into the sample used in the study.

5. The beneficiaries of only six districts were selected for the present study. As a result, the generalizations of the findings of the present research should be considered carefully.

6. A number of suggestions of the study are based on the researcher’s observations in the Agricultural Development Banks and discussions with staff working in these banks.
REFERENCES


