CHAPTER-III

RESEARCH METHODOLOGY
The study has been conducted in the prominent areas having sunflower cultivation during last five years. For this, a sample of Lucknow, Kanpur, Allahabad and Agra divisions was considered as main area of sunflower crop. The study was conducted in eight districts (two districts from each division) selected on the basis of maximum area available. A sample of eight subdivisions (one from each district) was selected looking into the maximum area in the subdivision. The data having a bearing on the study were obtained from both official staff (extension personnel and subject matter specialists.) and farmers. In each K.S.circle one K.S. and five sunflower farmers were selected using a stratified random sampling technique. The official category comprised of one Additional Director (oil seed), four J.D.As., Eight Deputy Directors, eight S.D.A.E.Os., ten scientists and five representatives from N.S.C., U.P.S.T.D.C., P.C.F (cooperatives) and private traders and private seed companies. Structured and open end schedules were used for data collection through personal interviews.

Efforts were also made to supplement the data with a few in depth case studies. The data collected were analysed through appropriate statistical tests for meaningful and valid conclusions.
SELECTION OF AREA OF THE STUDY

The study was conducted in eight districts selected on the basis of area under sunflower crop using purposive stratified sampling technique as depicted from the table 2 given below.

**TABLE-2**  
AREA UNDER SUNFLOWER IN U.P. DURING 1990-91

<table>
<thead>
<tr>
<th>Sl. no.</th>
<th>DIVISIONS</th>
<th>DISTRICTS</th>
<th>AREA IN HA.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>AGRA</td>
<td>1. ETAH</td>
<td>783</td>
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<tr>
<td></td>
<td></td>
<td>2. MAINPURI</td>
<td>343</td>
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<td></td>
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<td>3. MATHURA</td>
<td>164</td>
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<td></td>
<td></td>
<td>4. FIROJABAD</td>
<td>106</td>
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<tr>
<td></td>
<td></td>
<td>5. AGRA</td>
<td>96</td>
</tr>
<tr>
<td>II.</td>
<td>ALLAHABAD</td>
<td>1. FATEHPUR</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. ALLAHABAD</td>
<td>75</td>
</tr>
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<td></td>
<td></td>
<td>3. PRATAPGARH</td>
<td>NIL</td>
</tr>
<tr>
<td>III.</td>
<td>KANPUR</td>
<td>1. FARRUKHABAD</td>
<td>6932</td>
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<td></td>
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<td>2. KANPUR DEHAT</td>
<td>5986</td>
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<td></td>
<td></td>
<td>3. ETAWAH</td>
<td>542</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. KANPUR CITY</td>
<td>374</td>
</tr>
<tr>
<td>IV.</td>
<td>LUCKNOW</td>
<td>1. UNNAO</td>
<td>447</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. HARDOI</td>
<td>174</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. RAEBARELI</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. SITAPUR</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. LUCKNOW</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. KHIRI</td>
<td>24</td>
</tr>
<tr>
<td>V.</td>
<td>MEERUT</td>
<td></td>
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</tr>
<tr>
<td>VI.</td>
<td>BARAEILLY</td>
<td></td>
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<tr>
<td>VII.</td>
<td>MORADABAD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIII.</td>
<td>JHANSI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IX.</td>
<td>VARANASI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X.</td>
<td>GORAKHPUR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>XI.</td>
<td>FAIZABAD</td>
<td></td>
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<tr>
<td>XII.</td>
<td>BADAUN</td>
<td></td>
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</tr>
<tr>
<td>XIII.</td>
<td>GARHWAL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL** - U.P. 9901

* (1-8) Selected districts
MAP: SHOWING DISTRICTS OF UTTAR PRADESH SELECTED FOR STUDY
The study included a sample of 76 official category of respondents associated with sunflower cultivation. The respondents have been drawn from four divisions and included in the study. The sample included additional Director of Agriculture (Oil seeds), Joint Directors of Agriculture, Deputy Directors of Agriculture (One from each district), Sub Divisional Agricultural Extension Officers (Two from each district), 40 K.S. (Five Kisan Sahayaks from each subdivision), 10 scientists and five other field functionaries.
FIG. 1 SAMPLE OF EXTENSION PERSONNEL
SCHEMATIC SAMPLING PLAN

Additional Director (oil seeds) U.P. = 1 ADA

JDA  JDA  JDA  JDA
Agra  Allahabad  Kanpur  Lucknow

DDA  DDA  DDA  DDA
(= Same as *)

SDAED  KS  KS  (Same as JDA Agra)

KS  KS

SF  SF  SF

Scientists = 10

NSC, UPSTDC, PCF (Co-operative)
Private Company & Traders (representatives) = 5

Where,

ADA  : Additional Director of Agriculture (oil seeds)
JDA  : Joint Director of Agriculture
DDA  : Deputy Director of Agriculture (Extension)
SDAED : Sub Divisional Agricultural Extension Officer
KS  : Kisan Sahayak
SF  : Sunflower Farmer
NSC  : National Seed Company
UPSTDC : Uttar Pradesh Seed & Tarai Development Corporation
PCF  : Pradeshiik Cooperative Federation
RESEARCH DESIGN

Descriptive case study design has been applied for the present research work considering the appropriateness of the design such a deep investigative type of work.

VARIABLES AND THEIR MEASUREMENT

This part deals with the measurement procedure of different variables. The following table describes the variables under taken and the instruments adopted or developed for measurement of these variables.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Variables</th>
<th>Empirical Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Family composition</td>
<td>Trivedi and Pareek (1964)</td>
</tr>
<tr>
<td>2</td>
<td>Extension Exposure</td>
<td>Schedule developed</td>
</tr>
<tr>
<td>3</td>
<td>Education</td>
<td>Trivedi and Pareek (1964)</td>
</tr>
<tr>
<td>4</td>
<td>Farming Experience</td>
<td>Length of Experience of cultivator in years</td>
</tr>
<tr>
<td>5</td>
<td>Social Participation</td>
<td>Choudhary and Singh (1984)</td>
</tr>
<tr>
<td>6</td>
<td>Innovativeness</td>
<td>Scale developed</td>
</tr>
<tr>
<td>7</td>
<td>Scientific orientation</td>
<td>Schedule developed</td>
</tr>
<tr>
<td>8</td>
<td>Risk orientation</td>
<td>Supe (1968)</td>
</tr>
<tr>
<td>9</td>
<td>Attitude</td>
<td>3 Point scale will be developed</td>
</tr>
<tr>
<td>II. Communication variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Contact with extension</td>
<td>Number of contacts made in a crop season with different levels of extension workers</td>
</tr>
<tr>
<td>2</td>
<td>Communication source use pattern</td>
<td>Extent of use of sources of communication like Radio, TV, Printed literature etc.</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>-----------</td>
<td>----------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>III. Economic variables</td>
<td>Actual area covered by the respondents &amp; pattern of tenancy</td>
<td>Total crop area as related to net sown area in a particular year</td>
</tr>
<tr>
<td>1. Size of holding</td>
<td></td>
<td>Crops cultivated and changes in crops produced</td>
</tr>
<tr>
<td>2. Cropping intensity</td>
<td></td>
<td>Area irrigated in hectare and total cropped area</td>
</tr>
<tr>
<td>3. Cropping pattern</td>
<td></td>
<td>Man days of employment on own land and relative engagement of family members</td>
</tr>
<tr>
<td>4. Sources and irrigational potential</td>
<td></td>
<td>Sources of income, employment opportunity of the family member</td>
</tr>
<tr>
<td>5. Family labour availability and use pattern</td>
<td></td>
<td>Number of implements possessed</td>
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<tr>
<td>6. Occupational pattern</td>
<td></td>
<td>Income from agriculture, service and other sources</td>
</tr>
<tr>
<td>7. Farm mechanisation</td>
<td></td>
<td>Categorywise number of respondents counted procuring seed from different sources</td>
</tr>
<tr>
<td>8. Source &amp; level of income</td>
<td></td>
<td>Price of seed, produce fluctuations overtime, centres of purchase and subsidy etc. given by the government and other agencies</td>
</tr>
<tr>
<td>9. Sources and availability of inputs</td>
<td></td>
<td>Quantity of seed recommended and actually used</td>
</tr>
<tr>
<td>10. Price &amp; marketing / storage support/economic incentives</td>
<td></td>
<td>Quantity of NPK fertilizers doses recommended and quantity adopted</td>
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<td></td>
<td></td>
<td>Number of irrigation recommended and actually applied.</td>
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<tr>
<td>IV. Level of gap</td>
<td></td>
<td>Recommended normal cost of PPM and percentage of this amount spent by the farmers.</td>
</tr>
<tr>
<td>A. Resource gaps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Seed gap</td>
<td></td>
<td></td>
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<td>2. Fertilizer use gap</td>
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<td>3. Irrigation</td>
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<tr>
<td>4. Plant protection</td>
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</tbody>
</table>
B. Technological gap

1. Time and method of sowing
   Category wise and district wise of seed number of respondents adopting the technology
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PERCENTAGE:

Simple comparisons have been made on the basis of percentages. The frequency of a particular cell was multiplied by hundred and divided by total number of respondents in that category to which they belonged. It was helpful in organizing the data with clarity and precision.

AVERAGE

The simplest and the most important measures of average are weighted average and arithmetic average. These two averages have been used. Using following formula:

\[
\text{Weighted average} = \frac{\sum w \cdot X}{\sum w}
\]

where, 
- \( w \) = weight of \( X \)’s
- \( X \)’s = variate values

\[
\text{Arithmetic average} = \frac{\sum X}{n}
\]

where,
- \( X \) = variate value
- \( n \) = No. of respondents

MEAN SCORE

It was calculated to know the average value of a particular item. The formula used is as given under:

\[
\text{Mean score} = \frac{\text{Total score on particular item}}{\text{No. of respondents}}
\]

It was used for each statement and for each region.

CORRELATION COEFFICIENT

Correlation coefficient were worked out to examine the relationship between the variables of knowledge and source utilization; knowledge and perception of technology. The formula
used for estimation of Coefficient of correlation is given below :

\[ r = \frac{\text{Eor}(XY)}{\sqrt{\text{Var}(X) \cdot \text{Var}(Y)}} \]

where

\[ \text{Var}(X) = E(X - \bar{X})^2 = \frac{\text{EX} - (EX)^2}{n} \]

\[ \text{Var}(Y) = E(Y - \bar{Y})^2 = \frac{\text{EY} - (EY)^2}{n} \]

\[ \text{Var}(X) \cdot \text{Var}(Y) = E(X - \bar{X})(Y - \bar{Y}) = \frac{\text{EXY} - (EX)(EY)}{n} \]

\[ \bar{X} = \text{deviation of scores from the mean of } X, (X - \bar{X}) \]

\[ \bar{Y} = \text{deviation of scores from the mean of } Y, (Y - \bar{Y}) \]

2

\[ \text{EX} = \text{the sum of squares of the deviation scores in one distribution} \]

2

\[ \text{EY} = \text{the sum of squares of the deviation scores in the other distribution}. \]

Critical Ratio :

\[ \frac{x_{\text{Xh}} - x_{\text{Xl}}}{\sqrt{\frac{E(X_{\text{Xh}} - X_{\text{Xh}})^2 + E(X_{\text{Xl}} - X_{\text{Xl}})^2}{(n_1 + n_2 - 2)} \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \]

where:

\[ t = \text{critical ratio} \]

\[ X_{\text{Xh}} = \text{high} \]

\[ X_{\text{Xl}} = \text{low} \]

\[ E(X_{\text{Xh}} - X_{\text{Xh}})^2 = \frac{\text{EX}_{\text{Xh}}^2 - (EX_{\text{Xh}})^2}{n} \]

\[ E(X_{\text{Xl}} - X_{\text{Xl}})^2 = \frac{\text{EX}_{\text{Xl}}^2 - (EX_{\text{Xl}})^2}{n} \]