Chapter - III
PLAN AND PROCEDURE OF THE STUDY

The review of literature presented in previous chapter enabled the investigator to choose the appropriate method of investigation for this study and to construct suitable tools for gathering data. In the present chapter an attempt has been made to present the method and procedure of the study for data collection. It includes the description of the sample, tools, procedure of data collection and statistical techniques used.

3.0 Introduction:

Each researcher develops plan and procedure of investigation to achieve the laid down objectives of the study and to test the hypothesis. Plan and procedure of the study are based on the tested norms and processes undertaken by the pioneers in the field of education research.

Kerlinger (1978) says, “The function of the methodology data collection section of the research report is to tell the reader what was done to solve the problem.”

3.1 Research Method:

There are mainly three types of research approaches in education i.e. Historical approach, Descriptive approach and Experimental research (Best, 1981), but in recent years some investigator have undertaken clinical studies, replicative studies and comparative studies. Thus, the scope of educational research has increased both horizontally and vertically. The main aim of the present study was to assess the needs of environmental education in
pre-service and in-service training programmes of DIETs pertaining to its academic, curricular planning and organisational components. In view of this different objectives were formulated for realising these objectives “Survey Method” of research was considered most appropriate to needs assessment under investigation. Therefore, it was used to realise the objectives of the present study. The term ‘Survey’ suggests gathering of related evidence to contemporary conditions. Survey research is a method of collecting and analysing data obtained from large number of respondents representing a specific population. According to Best (1978):

“A descriptive survey study described and interprets what is. It is concerned with conditions or relationship that exist, opinions that are held processes that are going on, effects that are evident or trends that are developing. It is primarily concerned with the present, although it often considers past events and influences as they relate to current conditions.”

Weisberg and Bowen (1977) opined that: “Survey research permits us to study public opinion as well as attitude. It can also be used to obtain factual information. Not only is there variety in the type of questions which can be explored with surveys, but there are variety of survey designs that can be used to accommodate different substantive needs and problems, if those problems are anticipated in the planning of the survey. Survey research can therefore be a flexible technique for ascertaining information about people.”
3.2 Sample:

The inductive reasoning is an essential part of scientific approach. The inductive method involves making observations and then drawing conclusions from these observations. If one can observe all instances of a population, he can, with confidence, base conclusions about the population on those observations (perfect induction). On the other hand if he observe only some instances of a population than he can do no more than infer that these observations will be true of the population as a whole (imperfect induction). This is the concept of Sampling and it is the basis of any scientific investigation. Probably no concept is as fundamental to the conduct of research and interpretation of its results as is ‘Sampling’ (Mouley). Sampling is indispensable to the researcher. It is invariably conducted by means of a sample drawn from the target population on the basis of which generalisations are drawn and made applicable to the population as a whole.

The target population in the present study covered all the DIETs in the State of Himachal Pradesh. Six DIETs were selected randomly out of twelve DIETs in the State of Himachal Pradesh. From these six DIETs 123 Teacher Educators were selected by following random cluster techniques. DIET wise detail of teacher educators selected is given in Table 3.1 below:
Table – 3.1

DIET-wise Teacher Educators Sample Size of the Study

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of DIETs</th>
<th>Teacher Educators</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>1</td>
<td>Shimla</td>
<td>09</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>Solan</td>
<td>08</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>Nahan</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Kinnaur</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>5</td>
<td>Dharamshala</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>Chamba</td>
<td>12</td>
<td>08</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td><strong>62</strong></td>
</tr>
</tbody>
</table>

Table 3.1 revealed that total of 123 teacher educators in the six DIETs was selected. Out of which 62 teacher educators were male and 61 teacher educators were female.

Further all the pre-service trainees studying in Six DIETs were included in the sample. 184 pre-service teacher trainees were selected randomly from Six DIETs. DIET-wise detail of pre-service trainees selected is given in Table 3.2 below:

Table – 3.2

DIET-wise Pre-service Sample Size of the Study

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of DIETs</th>
<th>Pre-service Teachers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>1</td>
<td>Shimla</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>Solan</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>Nahan</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>Kinnaur</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>Dharamshala</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>Chamba</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td>93</td>
</tr>
</tbody>
</table>

Table 3.2 depicted that total of 184 out of pre-service trainees were selected. Out of which 93 were male and 91 were female.
Besides teachers and teacher-trainees, incidental-sampling techniques was employed for the purpose of selecting 180 in-service teachers from the Six DIETs under study. The in-service teachers selected were working in the feeding primary schools of each DIET. DIET-wise details of in-service primary teachers selected is given in Table 3.3 below:

Table – 3.3

Sample Size of DIET-wise In-service Primary Teachers

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of DIETs</th>
<th>In-service Primary Teachers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>1</td>
<td>Shimla</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>Solan</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>Nahan</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>Kinnaur</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Dharamshala</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>6</td>
<td>Chamba</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>79</td>
<td>101</td>
</tr>
</tbody>
</table>

Table 3.3 showed that total of 180 in-service primary teachers were selected. Out of which 79 were male and 101 were female.

This total sample comprised of Six DIETs, 123 Teacher Educators, 184 Pre-service Teacher Trainees and 180 In-service Primary School Teachers for the present study.

3.3 Instrumentation:

In the course of studying any problem, the researcher may use different types of devices, which in technical language are called ‘tools’ or ‘instruments’ the role of which is best illustrated by Best (1978) as follows:
"Like the tools in carpenter's box, the researchers' tool is appropriate in a given situation to accomplish a particular purpose. Each data gathering device has its own merits and hazards or limitations."

To collect the information of assessing the needs of environmental education in pre-service and in-service teacher training programmes of DIETs in Himachal Pradesh, the following tools were constructed and standardised by the investigator herself for conducting the present study:

(i) Environmental Education Awareness Questionnaire.

(ii) Needs Assessment Questionnaire of EE for the Pre-service Training Programme at DIET level for Teacher Educators.

(iii) Needs Assessment Questionnaire of EE for the In-service Teachers Training Programmes at DIET level for In-Service Primary Teachers.

An outline of development of each tool is given below:

3.3.1 Environmental Education Awareness Questionnaire:

Environment is the vital for the survival of every type of life on this planet. However, with the process of development there is a steep deterioration in the environment. If this process continues our earth will become unfit for our living. It is therefore, important that we should be fully aware about all the facts related to environment. Thus the questionnaire was developed to find out the level of environmental awareness of pre-service and in-service teacher
trainees and teacher educators of the DIETs of Himachal Pradesh. So that the need of environmental education at pre-service and in-service teacher training programmes be assessed. The following process has been followed in constructing and standardising the EE awareness questionnaire.

**Development of the Questionnaire:**

In order to develop a satisfactory questionnaire, the investigator must keep in mind the process that involves planning, preparing, trying out and evaluating it.

The planning of the questionnaire generally involves advance decision about the content and its analysis into units and sub-units. In the present study the investigator analysed the content thoroughly with the help of discussion with the experts in the field of environmental education. The content was divided into four areas such as:

(A) Environment and Environmental Education.

(B) Forest and Environment.

(C) Pollution.

(D) Pollution Control.

Unit (C) Pollution was further divided into five sub-units which are mentioned as below:

(i) Soil Pollution.

(ii) Air Pollution.
(iii) Water Pollution.

(iv) Noise Pollution.

(v) Radioactive Pollution.

**Initial Draft:**

Initial draft of the questionnaire was prepared in view of the above contents. It consisted of 110 items of 'yes', 'no' types. The arrangement of items from simple to complex was followed. The directions for responding the items were given in simple and clear language. The initial draft of the questionnaire thus prepared was administered on a representative sample of ten pre-service teacher trainees, in-service primary teachers and ten teacher educators. All the necessary conditions were ensured for normal administration of the questionnaire. There was no time limit for responding the questionnaire. The investigator herself was supervising and helping the respondents for removing doubts pertaining to the language and misprints in the questionnaire. Such points were noted and considered for revising the preliminary draft.

For scoring the questionnaire a key was prepared and 'one' mark was given to the right response and a score of 'zero' for wrong answer. Thus the tool yielded quantifiable data.

After scoring the questionnaire, the scores were tabulated and classified.

Each item was analysed for its discriminating power (D.P.) and difficulty value (D.V.), the D.P. and D.V. for each item was calculated on the scores of the students on two groups (upper and
The index of discriminating power (D.P.) and index of difficulty value (D.V.) were calculated by the following formula given by Garrett (1979):

\[
D.V. = \frac{R_U + R_L}{N}
\]

\[
D.P. = \frac{R_U + R_L}{0.5N}
\]

\(R_U\) = stands for number of right responses in upper group.

\(R_L\) = stands for number of right responses in the lower group.

\(N\) = stands for total number of students in both groups.

The D.P. and D.V. correspond to each item have been calculated which indicates that D.V. to test items ranged from 0.035 to 0.96 while D.P. ranged from 0.071 to 0.571.

Ebel's (1966) criteria for evaluating the item discrimination indices, which are given below duly considered in this connection:

<table>
<thead>
<tr>
<th>Index of Discrimination</th>
<th>Item Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>.40 and above</td>
<td>Very good item</td>
</tr>
<tr>
<td>.30 to .39</td>
<td>Reasonable good</td>
</tr>
<tr>
<td>.20 to .29</td>
<td>Subject to improvement</td>
</tr>
<tr>
<td>below .19</td>
<td>Poor items to be rejected</td>
</tr>
</tbody>
</table>

For the difficulty value, the range of .25 to .75 was arbitrarily taken as acceptable criterion for selecting an item. Any item having an item D.V. above .75 or below .25 was rejected. Garrett (1979),
however, contends that items with discriminating indices of .20, as a general rule, are satisfactory.

Thus the items with discriminating power .40 and above were accepted and items having discriminating power from .20 to .39 were revised and modified. The items having the discriminating power below .19 in the preliminary draft were rejected and not included in the questionnaire.

After completing the process of item difficulty and item discrimination of the final draft, the reliability and validity was also determined.

Kuder-Richardson formula-21 was used for finding out the reliability coefficient of the questionnaire (Garrett, 1979)

\[ r_a = \frac{n \times (S.D.)^2 - M_i \cdot (n - M_i)}{(n - 1)(S.D.)^2} \]

where

\[ r_a = \text{The coefficient of reliability} \]

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

\[ (S.D.)^2 = \text{The square of the standard deviation} \]

\[ M_i = \text{Mean of the scores} \]

Table 3.4 shows the total number of items, their mean, S.D. and reliability of the test:
Table 3.4

Computation of Reliability Co-efficient of Environmental Awareness Questionnaire

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>S.D.</th>
<th>$M_r$</th>
<th>$r_n$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>91</td>
<td>14.68</td>
<td>52.5</td>
<td>.927</td>
</tr>
</tbody>
</table>

It may be seen from Table 3.4 that the reliability coefficient calculated by the formula KR-21 above was found to be .927. Ebel (1966) suggested that most test constructors are reasonably well satisfied to their tests which yield reliability coefficient in the vicinity of 0.90 per cent. Therefore, the questionnaire was taken as reliable too for measuring awareness of teacher trainees (pre-service and in-service) and teacher educators at DIET level.

The validity of the questionnaire was established by the method of content validity. The content validity is concerned with the adequacy of sampling of a specified universe of content. After preparing the schedule, its content was discussed with three teacher and two experts of the Education Department of H.P. University. Their views were taken and necessary modifications were made. All the three teachers and two experts were in full agreement regarding the content validity of the environmental awareness questionnaire.

After calculating reliability and validity of the questionnaire, the final draft was prepared. Table 3.5 shows the number of items included in the final draft of the questionnaire.

Table 3.5

Number of Items in the Final Draft of Environmental Awareness Questionnaire

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Items in the preliminary draft</th>
<th>Modifications and Revised</th>
<th>Rejection</th>
<th>Items in Final draft</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA Questionnaire</td>
<td>110</td>
<td>29</td>
<td>19</td>
<td>91</td>
</tr>
</tbody>
</table>
Thus the environmental awareness questionnaire for teacher trainees (pre-service and in-service) and teacher educators at DIET level comprised of 91 items which are related to the following units:

Part A: Environment and Environmental Education = 10 items

Part B: Forest and Environment = 11 items

Part C: Pollution consists of 60 items which are further divided into following sub-units:

i) Pollution (General) = 9 items
ii) Soil Pollution = 8 items
iii) Air Pollution = 16 items
iv) Water Pollution = 14 items
v) Noise Pollution = 8 items
vi) Radioactive Pollution = 5 items

Part D: Pollution Control = 10 items

The copy of the same is appended in Appendix A-I.

3.3.2 Needs Assessment Questionnaire of EE for the Pre-service and In-service Teachers Training Programmes at DIET level:

Keeping in view the feasibility of the questionnaire for gathering information in educational research, it was decided to develop questionnaires for pre-service teacher educators of DIETs and In-service Teachers of Primary schools in Himachal Pradesh.
While preparing the questionnaires the following points were kept in view.

- that the questions should be specific and unambiguous.
- that all objectives of the study should be duly covered by the questionnaire.
- that the sequence of questions should be from general to specific.
- that both open-ended and close-ended question should be included.
- that all questions should be framed in as simple language as possible.

Validation of the Questionnaires:

A pilot study was undertaken to validate the questionnaires of the present study. According to Mouley George J (1964) in conducting the pilot study competent persons are asked to fill up the questionnaires and to indicate their reactions to every phase of its organisation. The investigator also followed the same procedure.

The questionnaires were first given to colleagues and teachers. Their views were taken and necessary modifications were made. Thereafter, the questionnaires were shown to the language expert and required improvements were made on the basis of comments given by the expert. When the tentative draft of the questionnaires was completed, it was discussed with four teachers and two experts of the field of research concerned. Their reactions were noted down and improvements were made wherever it was thought necessary. Finally
the questionnaire of Needs Assessment of EE for pre-service teacher training programme at DIET level was given to five teacher educators of Solan & Shimla DIET and Principal of DIET Solan for the purpose of validating the questionnaire. The Needs Assessment questionnaire of EE for in-service teachers was also given to five in-service teachers of feeding primary schools of Solan DIET. Their responses were noted down and modifications were made accordingly. Thus, the final draft of the questionnaires was prepared. Table 3.6 shows the number of items included in the final draft of the questionnaires.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of Questionnaire</th>
<th>Items in the Preliminary Draft</th>
<th>Modifications</th>
<th>Rejections</th>
<th>Items in the final draft</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Needs Assessment of EE for pre-service teacher training programme</td>
<td>103</td>
<td>31</td>
<td>38</td>
<td>65</td>
</tr>
<tr>
<td>2</td>
<td>Needs Assessment of EE for In-service teacher training programmes</td>
<td>37</td>
<td>09</td>
<td>18</td>
<td>19</td>
</tr>
</tbody>
</table>

Structure of the Questionnaires:

The brief description of each questionnaire is given as under:

(i) Needs Assessment Questionnaire of Environmental Education for the Pre-service Teacher Training at DIET level for Teacher Educators:

The questionnaire for the teacher educators of DIETs has been devised to assess the needs of pre-service teacher training in environmental education at DIET level. The questions relating to various aspects of pre-service teacher training at DIET level were
included in the questionnaire, which will help in assessing the needs of EE. The following twelve areas have been selected for assessing the needs of EE at pre-service training programme at DIET level in Himachal Pradesh:

A : Policies, Planning and Development of EE
B : Finances of EE
C : Aims & Objectives of EE
D : Content & Quality of EE courses
E : Curriculum Transaction Methodology
F : Evaluation Techniques
G : Selection & Qualifications of Staff
H : Staff Development & Training
I : Organisation & Management
J : Management Style & Effectiveness
K : Experiences of the Respondents
L : Institutional Environment

The number of items in each area included & its details have been given as under:

A) Policies, Planning and Development of EE:

This part consists of five items dealing with the policies and planning of the EE training programme for pre-service teacher trainees at DIET level. The question of community participation was also included in this part.

B) Finances of EE:

In this part, the questions regarding the sources of funds, cost analysis and management of financial sources were asked in order to seek information of budgetary position of environmental education.
C) **Aims and Objectives of EE:**

Nine questions pertaining to aims and objectives of environmental education were asked to get information whether the various general and specific objectives of pre-service teacher training in EE are realised or not.

D) **Content and Quality of EE-Courses:**

This part of the questionnaire is meant for getting details about content and quality of EE courses provided to the pre-service teacher trainees. Therefore, the twelve questions were asked related to format and content of curricular and syllabus, inclusion of project work, attention given to cognitive, normative & technical application aims, the various tools used, active involvement of the participants, ways of incorporating EE in curriculum, emphasis on basic skills, responses with respect to realisation of objectives, satisfaction towards theory & practical content, learning material and teacher’s guide book etc.

E) **Curriculum Transaction Methodology:**

In this part, the details of curriculum transaction methodology were asked. The items consists of questions relating to methods, approaches, teaching techniques, team-teaching, emphasis on experiences, illustrations from local area, supplementary books & materials, periods given to EE course, various activities organised for EE course, various activities organized for Environmental awareness, audio-visual aids etc. The total items in this part are ten.
F) Evaluation Techniques:

There are four items seeking information regarding the evaluation techniques which are being followed in DIET for evaluating the environmental education component of the curriculum. The items are related to assessment of existing evaluation techniques, continuous as well as periodical tools, needs etc.

G) Selection and Qualification of Staff:

This part of the questionnaire seeks information with regard to the existing staff, their mode of selection and qualification including promotion and availability for assessing the need of staff requirement etc.

H) Staff Development & Training:

To assess the gaps between existing & desired facilities of staff development and training, three questions were formulated to get information regarding satisfaction of the staff development and arrangement for pre-service training in relation to technical competence, teaching methods and management of EE programmes. The third question of this part deals with the need of special training to the staff.

I) Organisation and Management:

Organisation and management component is a very important aspect of training programme in EE. Therefore, four items were prepared to study the existing organisation and management facilities available in the DIET for effective organisation of pre-service and in-service training programmes.
J) Management Style and Effectiveness:

This part comprised of four items relating to the management style and effectiveness of DIET in terms of the perception of the staff with respect to sense of purpose and understanding of environmental objectives, maintenances of disciplines etc.

K) Experiences of the Respondents:

The experiences of the respondents were asked in four items with respect to their interest, experience, participation and professional quality to assess the need in EE.

L) Institutional Environment:

Institutional environment play an important role in the success of any training programme. For studying the existing institutional environment three items were formulated relating to involvement of staff and trainees in EE programmes.

Thus the Need Assessment Questionnaire of Pre-service training at DIET level comprised of 65 items in twelve aspects of EE programmes.

The copy of the questionnaire is appended in Appendix A-II.

3.3.3 Needs Assessment Questionnaire of In-service Training Programmes in EE at DIET level:

The in-service training programmes in EE are to be provided to the primary school teachers who are teaching environmental studies from II nd to V th class in their respective schools. Therefore, needs assessment questionnaire was formulated to assess their needs with
regard to the various aspects of in-service training programmes in EE to be organised/conducted at each DIET for equipping them with necessary skills & competencies to transact the curriculum effectively & efficiently. The questionnaire has been divided into three parts:

a) The first part deals with the bio-data of the in-service primary teachers regarding age, sex, academic & professional qualifications, name of the school etc.

b) The second part deals with the existing status of EE in primary school. It comprises of five items dealing with the status of EE in the school in terms of curricular, extracurricular or others. The second item seeks information regarding time & period devoted to various subjects in the school. The third item asks about the methodologies used in teaching EE whereas the fourth item is related to the content areas covered. Fifth item is related to seek information about the training programme. It has 11 sub-parts related to objectives of EE, type of curriculum, approaches followed in teaching EE, ways of incorporating EE in curriculum at primary stage, main emphasis given to EE while teaching, kind of textbooks, student’s participation and questions on various environmental problems etc. All the questions of this part were closed ended. The teachers were asked to tick the appropriate answer.

c) The third part of the questionnaire related to the In-service training programmes in EE in terms of existing position and future expectations. It comprises of 14 items out of which first three items sought information about type of training i.e. pre-service and in-service training, the teachers have already taken
along with duration & effectiveness of the programme. The remaining items deal with existing facilities for the organisation of in-service training programmes in EE at DIET level in terms of:

- Type of in-service training levels along with number of participants, duration of the programme and frequency of the programme in a year required to be organised by DIET.

- Expectations of attending in-service training programmes in EE.

- The content areas to be undertaken in the training.

- Various activities to be organised during the training.

- Various types of methodologies/teaching techniques to be followed during the training.

- Evaluation Techniques along with evaluation tools.

- Need of assessment of various aspects of the training programme, materials, activities and methods employed etc.

- Need of periodical evaluation of the in-service training programme

- Active involvement of the participants.

- Various skills to be developed during the training.
Thus, the Needs Assessment Questionnaire of In-service training programmes in EE at DIET level comprised of Nineteen items covering all aspects of in-service training.

The copy of the questionnaire is appended in Appendix A-III

3.4 Procedure of Data Collection:

After the selection of the respondents, initial contact was made with the Principals of DIETs through telephone. The purpose of the study was discussed and request was made to them to extend their valuable guidance and help in collecting the data from their teachers and teacher's trainees.

After seeking their ‘yes’, the investigator personally visited six DIETs under study and met the Principals and Teacher Educators who were present on the day of the visit. The Teacher Educators were supplied a set of questionnaires i.e. Environmental Awareness Questionnaire and Needs Assessment for Pre-service Training Programmes of EE at DIET level with a request to fill the forms. The purpose of the study was discussed individually. The instructions were given them to respond each statement in the questionnaires frankly and honestly. They were assured that the information supplied by them would be kept secret and confidential. They were further requested to return the questionnaires duly filled by next day. The Environmental Awareness questionnaire was given to the pre-service teacher trainees in the class. The class in-charge accompanied with the investigator and introduced to the teacher trainees. Investigator discussed the purpose of the study. The instructions were given to them to respond each statement in the questionnaire frankly and honestly. The instructions of filling the forms were given on the
black-board and teacher trainees were assured that the information supplied by them would be kept secret and confidential. The investigator and class in-charge helped the trainees where they are facing the problems in giving the responses. The trainees were requested not to copy from their fellows. Though there was no time limit, however, the trainees took about 40 minutes to respond to the questionnaire. After collecting the questionnaires the investigator thanked the trainees and class in-charge for their help in data collection. Next day the questionnaires given to the teachers educators were collected. The investigator thanked the Principal and teacher-educators of the DIET for the help and cooperation in data collection and procured the list of feeding primary schools.

On the same day investigator visited the feeding primary schools and met the primary teachers. They were supplied a set of questionnaires i.e. Environmental Awareness Questionnaire and Needs Assessment Questionnaire for In-service teachers training programmes in EE at DIET level and requested them to fill the forms. The purpose of the study was discussed individually. They were asked to respond each item in the questionnaires frankly and honestly. They were assured that the information supplied by them will be kept secret and confidential. They were further requested to return the questionnaires duly filled by next day. The investigator thanked the teachers and Head of the school for rendering help and cooperation in data collection. It took six days to collect data from one DIET and feeding primary schools.

The above procedure was followed in all the six DIETs.
Thus, the data were collected from 123 Teacher Educators, 184 Pre-service Teacher Trainees and 180 In-service Primary School Teachers in all.

Data thus collected were scored, by following the specified procedure of the questionnaires as given in the scoring key and scores were tabulated accordingly.

3.5 Statistical Techniques Used:

The obtained data were subjected to necessary statistical computation. The data were mainly analysed in terms of percentages. For determining significant differences in Environmental awareness of teacher-educators, Pre-service teacher trainees and In-service teachers 't'-test was used. Chi-Square test was also used for determining significant differences on the opinion of the respondents for assessing the needs of the training in Environmental Education.

The brief description of 't'-test & \( \chi^2 \)- test are given below:

3.5.1 't'-test:

The 't'-ratios were calculated for finding out significant differences in environmental awareness of three groups of respondents i.e. teacher-educators, pre-service teacher trainees, teacher-educators and in-service teachers, pre-service teacher trainees and in-service teachers.

't' distribution is defined as the differences between means of two samples divided by standard error between means:

\[
t = \frac{M_1 - M_2}{SE_{(M_1 - M_2)}}
\]
Where Standard Error (SE) between means:

\[
SE_{(M_1 - M_2)} = \sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}
\]

To find the level of significance, the calculated t-values are compared with the table-values.

3.5.2 $\chi^2$ test (Chi-Square):

Chi-Square test is non-parametric test. The distribution of it is applicable in experimental situations where we wish to compare observed with theoretical frequencies. The observed frequencies are obtained empirically and the theoretical frequencies are generated on the basis of some hypothesis independent of the data in hand. In case the differences between the observed and theoretical frequencies are significant, the hypothesis rise to theoretical frequencies is rejected. The following is the equation of the Chi-Square test:

\[
\chi^2 = \sum \left[ \frac{(f_0 - f_e)^2}{f_e} \right]
\]

Where

- $f_0 = \text{Observed frequency of occurrence of empirically determined facts.}$
- $f_e = \text{Expected frequency based upon some hypothesis}$

Statistical treatment to the obtained data and interpretation of the results has been presented in the next chapter.