CHAPTER - III

REVIEW OF RELATED LITERATURE

Study of environmental knowledge and environmental attitude is one of the important aspects of the present study. Studies on various dimensions of environmental education also focus on the same point. A brief review of the literature dealing with different aspects of environmental education, therefore, might be of help in developing some insight into the problems which are, otherwise, similar and related.

Environmental education gained momentum as an educational movement in the early 1970s after the UN Conference on Human Environment at Stockholm in 1972. Awareness among general people, educationists, politicians, educational planners and administrators together for a system of education that caters to the present needs, gave tremendous impetus to researches in the field of environmental education. Reseach in this field has two distinct contrasting characteristics. It has tremendous growth and achievement in USA and subsequently in other European countries. At the same time, researches in Asian countries on environmental education are conspicuous by their near total absence. For clarity of reviewing, the investigator has subdivided available literature in the field into five main categories.

- Baseline researches
- Curriculum researches
- Researches dealing with interrelationship among environmental knowledge, environmental attitude and selected variables
- Reseaches on teacher education
- Researches conducted in India

Baseline Studies on Environmental Education

Baseline researches provide the researcher with information which help in planning, designing and implementing environmental education curricula and research projects. The present study being on similar lines, the investigator has tried to get the benefit to some basic information found in researches done elsewhere abroad. Some of the findings are as follows.

Existence of Environmental Crisis Johnston (1974)[1] found that elementary teachers of Mississippi believed in the existence of an environmental crisis and that all school systems should require students to take a course or a major section of the course in environmental education as a means of combating environmental degradation.

Foerstel (1976)[2] supported Johnston's findings. He reported that high school students, their parents and teachers, and environmentalists of Tennessee had identified water pollution, solid waste and air pollution as most serious environmental problems. Soil erosion was the least severe environmental problem. Solution of environmental problems rested on enforcement of existing legislation, public education and information through media.

Richmond and Morgan (1977)[3] found that in England societal problems like overcrowding and crime were more serious national problems than air pollution and water pollution even though English students realised the environmental crisis.

Environmental Knowledge and Environmental Attitude Large scale baseline studies to find out the level of environmental knowledge and environmental attitude have been conducted by Perkes (1974)[4] and Bohl (1977)[5] in the United States, Eyers

(1976)[6] in Australia and Richmond and Morgan (1977)[7] in England. Other studies relating to environmental knowledge and environmental attitude include those conducted by Fleetwood (1973)[8], Baca (1976)[9], Miles (1977)[10], Jones (1977)[11], Nwosu (1983)[12], Maghenda (1986)[13] and Cortes (1987)[14]. A brief description of these studies is given below.

Fleetwood (1973)[15] attempted to develop a valid and reliable instrument capable of measuring knowledge and attitude of high school students of Carolina. Taking ecosystem, natural resources, pollution and environmental decision making as four basic parameters, he developed 'Environmental Science Test' and 'Environmental Attitude Inventory' as valid, reliable and standardised instruments for measuring environmental knowledge and environmental attitude respectively.

Bohl (1977)[16] took a sample of 15,000 students of tenth and twelfth grade from 22 states of USA to measure their cognitive and affective characteristics pertaining to environment. A 40-item inventory containing questions on facts, concepts, principles, beliefs and perceptions regarding, environment was prepared to assess the student characteristics. Data obtained was analysed using factor analysis, correlational and chi-square techniques. Bohl reported that maximum students have low cognitive information and positive attitude.

Eyers (1976)[17] made a survey of aspects of environmental knowledge and beliefs among grade ten students in Australia taking a sample of 30 students each from 174 schools selected on stratified random sampling basis. The instrument contained 29 multiple choice type items of knowledge and 9 belief items.

The belief items were critically examined by a panel of environmentalists and educators to reach a consensus. The knowledge and attitude scores were analysed by using chi-square, analysis of variance (ANOVA) and percentage of correct response to different items. The results revealed a number of areas of knowledge inadequacy among students. But they held positive attitude towards environment.

Richmond and Morgan (1977)[18] analysed the environmental knowledge and attitude of more than 11,000 secondary school students from 91 local education authorities in England. He used a tool similar to one developed by Eyers described above and analysed the scores using analysis of variance, chi-square and percentages. The results indicated that secondary school students have a poor command of factual environmental knowledge. However, they demonstrated greater understanding on environmental concepts and generally expressed positive attitude towards environment.

Baca (1976)[19] developed a Likert-type scale for measuring environmental attitude of Californian adults of four different age-groups. The scale contained items pertaining to population control, air pollution, general pollution, recycling and wild-life protection. Vast majority of the sample of 190 adults expressed positive attitude towards environment.

Melton (1976)[20] carried out a study of environmental knowledge and environmental concern of junior high school students of Philadelphia schools. With a sample of 598 students, he found that students had some understanding of the complexity of environmental dilemmas and suggested their solutions on political and economic basis. Advancement of

science and technology coupled with personal changes in behaviour can solve environmental problems. However, the students did not express much personal concern for environmental problems.

In a study conducted among secondary school teachers and students of Philippines, Cortes (1987)[21] reported that majority of the students were aware of pollution, pesticide, typhoons, dams and volcanic areas but did not know about effects of forest destruction, new techniques of fish culture and total population of Philippines. Their environmental values were inconsistent.

Nwosu (1983)[22] in a study with teacher educators of Nigeria found that they generally possessed favourable perception and moderate knowledge of environmental issues. Miles (1977)[23] reported increased awareness of ecological concepts among black college students of Florida. Jones (1977)[24] found overall environmental education competencies of third grade students and teachers of Michigan to be low. Their affective competencies were significantly lower than their cognitive competencies. "Michigan Environmental Education Competency Measure" was used to assess environmental competencies.

Sources of Environmental Information Eyers (1976)[25] found that the major component of environmental knowledge of Australian school students were derived from sources other than the schools. In a similar manner Melton (1976)[26] reported that junior high school students of Philadelphia did not attain the major part of their environmental information in schools. Media outscored (32 per cent of times) as major source of environmental information. Richmond and Morgan

(1977)[27] found that environmental knowledge of secondary school students has been gained through 'self-education' and media appeared to have played a most important role.

Curriculum Researches on Environmental Education

Studies on curriculum design in environmental education have favoured either interdisciplinary or multidisciplinary approach with a conceptual framework having flexibility to cater to local needs.

Isabell (1973)[28], Johnston (1974)[29], Quinn (1974)[30], Lucas (1974)[31] and Vincent (1976)[32] have conducted research studies on structural organisation and conceptual framework of environmental education. In all these studies topics/content which have been found to be useful in developing environmental awareness and knowledge are : different types of pollution-air, water, thermal, noise etc ; population, litter and solid waste, wild-life, land use, energy-crisis, adaptation and balance of nature.

Roth et al (1970)[33] with co-operation of a national panel representing a number of disciplines developed a taxonomy of environmental education concepts, appropriate for inclusion in areas like environmental management techniques, economics, environmental ecology, socio-culture environment, culture, politics and the family. Stapp(1975)[34] developed an instructional model based on pollution, population, urbanisation, land-use planning, unwise use of natural resources, energy-consumption and food supply. This model later became prototype for curriculum development in environmental education.

Latteri (1978)[35] favoured an infusion approach. In his view, learning involves three dimensions of intellectual awareness ; Factual the basic data type information, i.e. labels, formula, chronology; conceptual the primary relational type information i.e. principles, laws, correlations ; contextual the self-identity type knowing, i.e. beliefs, values, perceptions, attitudes etc, where the information not only affects the individual thinking process, but also affects one's values and expression of those values. Any environmental education curriculum should contain a balance of all the above three types of experience.

Lucas (1976)[36] advocated a curriculum design that catered to education, in, about or for (the preservation of) the environment or any combination of these. Education for and about the environment are distinguished by their goals. Education in environment is a pedagogic technique. While the goal of education for environment, taking the human individual as referent, is to improve the quality of environment that is conducive to individual well-being, education about environment by contrast is intended to produce a knowledgeable individual.

Concepcion (1974)[37] prepared a conceptual framework of environmental education for Philippines based on the ecological theme of space-ship earth. He suggested that science can provide core-elements. A multidisciplinary approach cutting across subject matter divisions, was suggested. Strategies in the curriculum design emphasised experiences outside the classroom, use of community resources, inquiry processes and value orientation.

Macgregor (1979)[38] has successfully worked out a curricular model by using survival paradigms where students

addressed themselves to problems in socio-environmental conflict, involving a range of factors, political, social, technological and environmental.

Interrelationship among Environmental Knowledge, Environmental Attitude and Selected Variables

Studies have indicated relationship between environmental knowledge and environmental attitude, as well as the relationship of these parameters with sex, place of residence, subject background, socio-economic status and other characteristics. These findings have been described below.

Environmental Knowledge and Environmental Attitude Hartung (1974)[39] took a sample of 17 students from seven colleges and universities of Illinois during winterm. Through an one month course designed to provide meaningful experience and understanding of man-nature relationship, he found development of a more positive man-nature relationship and distinct learning transfer as a result of increase in comprehension. He used ANOVA for establishing the relationships.

Richmond and Morgan (1977)[40] reported the existence of a very strong relationship between conceptual knowledge and environmental attitude, with a slightly weaker correlation between factual knowledge and conceptual knowledge. The weakest relationship, he found, was between factual environmental knowledge and environmental attitude. They had taken a sample of more than 11,000 grade X students of England and used 't' test, 'ANOVA' and 'product-moment' correlation for data analysis.

Brock (1978)[41] in her experiment tried to determine the existence of correlation between achievement at three cognitive levels of environment and environmental attitude. The results revealed a trend of negative to low positive correlation at the comprehension and higher level.

Dispoto (1976)[42] using a standardised objective test for environmental knowledge and biographical questionnaire to assess emotionality and values held, concluded that in case of undergraduate students of Rutgers University, emotion, knowledge and action were all interrelated. He used simple and partial correlation to analyse the data.

Jones (1977)[43] found highly significant correlation between affective and cognitive components of environmental competencies in case of Michigan third grade school students and their teachers.

Bohl (1977)[44] found a very low correlation between cognitive information and attitude responses.

Andrew (1977)[45] took a group of 56 sixth grade students at California University and using 'Outdoor Biology Instructional Strategies' aimed at investigating several ecological principles reported the following.

- There is some relationship between environmental knowledge and environmental attitude.
- No significant relationship existed between knowledge of ecoprinciples and involvement in outdoor activities.
- There is more positive relationship between environmental attitude and involvement in outdoor activities.

A few studies have reported no significant relationship between environmental knowledge and environmental attitude. Using a curriculum in environment, Berger (1973)[46] found cognitive gains but was unable to detect changes in attitude towards environmental issues. Westcott (1975)[47] also found no significant correlation between cognitive post-test and attitude post-test scores.

Environmental Knowledge and Sex Perkes (1974)[48] and Richmond and Morgan (1977)[49] found that males scored significantly higher than females on factual environmental knowledge. But while with regard to conceptual environmental knowledge, the same difference was reported by Perkes, Richmond and Morgans' study did not reveal any significant difference among the sexes.

Lawrence (1974)[50] reported significant differences among sexes in environmental knowledge score of eleventh grade pupils in Montana using, 'Syracuss Environmental Awareness Test'.

Eyers (1976)[51] reported significant difference in environmental knowledge scores of school students in Australia with the male students scoring higher than female students.

Brady (1973)[52] found no significant difference in environmental knowledge scores on account of sex. Gross (1978)[53] also found no significant difference in post-test scores of fifth and sixth grade students of Iowa by using field trip as a method to enhance their environmental knowledge.

Environmental Attitude and Sex Brown (1970)[54] reported significant changes in environmental attitude scores among female students, compared to no significant change in attitude of male students after their participation in a conservation oriented biology course.

Wileman (1976)[55] enrolled fourth, fifth, sixth, and eighth grade teachers selected from Prince William County, Virginia in an environmental education project funded by 'National Science Foundation'. Using an environmental semantic differential to measure environmental attitude, he found significant change in environmental attitude of female teachers compared to male teachers. Findings of Baca (1977)[56] and Perkes (1974) also support greater environmental attitude in favour of females.

Brady (1973)[57], Richmond and Morgan (1977)[58], Chitwood (1976)[59], Gross (1978)[60] and Andrew (1978)[61] found no significant difference in environmental attitude related to sex.

Environmental Knowledge, Environmental Attitude and Place of Residence

Lawrence (1974)[62] reported significant difference between mean score on environmental knowledge of eleventh grade students in Montana on the basis of geographical location. Maghenda (1986)[63] found significant differences in environmental concern among form four secondary school children of Kenya depending upon the geographical location of their residence. Dyar (1976)[64] took a sample of 637 eleventh grade students of Virginia and found that rural students were more significantly concerned and active compared to urban

students on environmental issues. He used 4-way ANOVA and Scheffe posthoc comparison for data analysis. Leftridge (1978)[65] corroborated the findings of Dyar with Kansas school students.

Potts (1977)[66] found the just opposite result. He reported in a study involving Kansas public school students that metropolitan groups were most receptive in environmental attitude and rural groups least receptive.

Brown (1970)[67] reported that place of residence had no significant influence on environmental attitude of adults.

Environmental Knowledge and Subject Background Nwosu (1983)[68] found no difference in knowledge and perception of environmental issues possessed by science and non-science oriented college teachers and teacher trainees in Nigeria. He took 45 non-science oriented, 30 science-oriented teacher trainees and 21 college science educators as sample. For analysing the data, Spearman's coefficient of correlation and Mann-Whitney-U-Test was used. Cortes's (1987)[69] findings were in agreement with Nwosu. Philippines' teachers' knowledge, comprehension, responsibility and interest in environmental issues were not affected by subject they taught in schools.

Environmental Knowledge, Environmental Attitude and Socio-economic Status (SES)

Sheldon (1973)[70] evaluated a new summer environmental programme and found that growth in a number of areas was greatest for students coming from high socio-economic background. Zwick (1978)[71] reported just the opposite result in an environmental education programme aimed at changing affective behaviour of fifth grade students in Billings,

Montana. He found that students from low socio-economic background registered significantly greater change in environmental attitude compared to their counterparts from high socio-economic groups. He took a sample of 160 students (80 low SES and 80 high SES) and used Likert type attitude scale. The differences were compared using ANOVA and 't' test.

Gross (1978)[72] from his study could not infer any relationship between environmental knowledge, environmental attitude and perception regarding environment, scores and socio-economic status in Iowa students. Andrew (1978)[73] also inferred that, there seems to be no significant relationship between students' involvement in outdoor environmental activities and socio-economic status.

Researches on Teacher Education in Environmental Education

Unlike the other areas very few studies have been conducted in environmental education pertaining to teacher education. Do Bito Da Fonseca (1985)[74] reported improvement in knowledge, skill and attitude towards environmental education and actual involvement of elementary teacher educators in solving environmental problems in Lisbon area of Portugal as a result of participation in two in-service workshops. Puuback (1985)[75] surveyed opinion of Pensylvanian teachers on environmental education. He came to the conclusion that teachers favoured integration of environmental education material with other subjects for pre-service teacher education. Calcote (1977)[76] made an analysis of teacher perceptions of 54 selected environmental education concepts in the programme of biological science instruction in 28 selected high schools with 64 biology teachers. The

questionnaire for teachers collected data about the status of environmental education in the high schools as well as pre-service and in-service teacher preparation course for biology teachers. Regression analysis was applied to concept opinion data for analysis. The five interaction sources which accounted for much of the variation in perceptions were due to teaching experience, in-service and pre-service training, educational preparation and participation in conferences and workshops.

Researches on Environmental Education in India

With the recent upsurge of interest in environmental issues and the development of environmental education courses abroad, one should expect to find a quite lot of literature and research report on the matter in India. However, the studies in this field are a very few and these are limited in scope. The "Third Survey of Educational Research". (Buch, 1987)[77] records only three studies in the field of environmental education.

Pai (1981)[78] has developed and tried out a curriculum in environmental studies leading to life-long education for +2 students. Taking a sample of 152 students at Coimbatore in a pre-test, post-test experimental design, he has demonstrated that as a result of using the curriculum developed by him +2 students gained overall environmental knowledge, acquired strong positive environmental attitude and sound ecological values for a better environment and developed problem solving skills for solution of problems of the environment.

Gupta, Grewal and Rajput (1987)[79] have identified the components of environment in which children from urban and

rural areas are deficient. They have suggested areas for developing environment based curriculum at the primary school level.

Taking a sample of 115 standard four students in Bhopal (20 rural, 35 urban and 60 from non-formal centres) information pertaining to the sample have been gathered through questionnaire. The questions included source of getting cotton, edible portion of tomato plant, animals for watching the house, direction of sun rise, idea of evaporation, finding out time in a watch, role of skeleton etc. They reported that urban and rural students of formal stream differed significantly in performance and rural students scored higher. Difference in performance between formal and non-formal students from rural areas was not significant.

Manuel (1987)[80] attempted to analyse some worthwhile environmental education models in India and abroad and other relevant materials from the point of view of developing a functional theory in environmental education. He reported that very few genuine environmental education type activities, as understood in the modern developed systems seemed to have been undertaken in primary schools. The national level text-books lacked the higher specifications commonly adopted in modern environmental education procedures and in open-multidisciplinary approach to environmental education. The NCERT's curriculum framework which had obviously guided text-book development gave negative guidelines (what environmental education is not) but distinctive positive guidelines were lacking. The lead paper on environmental education by NCERT was an analysis of conference reports from Stockholm and some generalised theory

but was not a modern environmental education curricula in transition. Work at Vikram Sarabhai Community Science Centre, Ahemedabad, Kerala Sastra Sahitya Parishad and workshops conducted with British council collaboration in Tamil Nadu were instances of functional environmental education, starting from ground environment and in developing sophisticated and useful constructs.

Summary and Implications

Studies pertaining to knowledge, attitude and perception regarding environmental education of students and teachers have been conducted mostly in foreign countries. In these studies students and teachers, in general, have demonstrated poor to moderate knowledge on facts and concepts pertaining to environment. But in most of these studies positive attitude towards environment have been reported. It is also evident that belief in an existing 'environmental crisis' is widespread, although the severity of the environmental problem varies from place to place and country to country. The role of environmental education in helping to combat environmental degradation is universally recognised .. Media play more important role in imparting environmental education compared with education imparted in schools. Curriculum designs for environmental education have been prepared based on either an interdisciplinary model or multidisciplinary model taking into account the factual, conceptual and contextual bases, and with flexibility for local needs and variations.

The nature of relationship among environmental knowledge, environmental attitude and variables like sex, place of residence, subject background, and socio-economic status is inconclusive.

Few researches pertaining to teacher training in environmental education point out to the fact that it is possible to enhance the environmental knowledge of teachers and develop in them positive environmental attitude through appropriate pre-service and in-service courses.

Existence of a very few studies in environmental education in the Indian context bring to the forefront the need for conducting studies on environmental education in India, on any of its dimensions. The text-books and other curricula in environmental education in India have not been updated. Thus, there is a need to conduct studies to explore the empirical basis for such curricular revision by gathering data about factual, conceptual basis of environmental education, as well as on environmental attitude. Dearth of studies involving pre-service and in-service teachers also points out the need for involving Indian teachers and teacher-trainees. The inconclusive nature of relationship among environmental knowledge, environmental attitude, and variables like sex, place of residence, subject orientation, socio-economic status, implies that more studies are needed to explore these relationships. Since environmental education is assuming greater importance in Indian school curricula and it is yet to take a strong root, the perceptions of teachers regarding this area need to be explored, while considering the fact that no such Indian study exists.

Thus, a need has arisen for investigating the environmental knowledge, attitude and perception of in-serivce and pre-service secondary school teachers, regarding environmental education in the Indian context.

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