C H A P T E R - VI

SUMMARY, CONCLUSION AND SUGGESTIONS

Summary

The Present Study

The whole humanity is today confronted with a severe environmental crisis, which threatens its very survival on this globe. The planet's air, water and land are polluted, the life saving ozone-layer cover is thinning out. Ecological disruption has led to extinction of many species of plants and animals. Severe deforestation is leading to bouts of drought, flood and soil erosion. There is global warming-up due to greenhouse effect and apprehensions are there that this may lead to melting of polar ice caps and deluge. There is tremendous pressure on land due to rapid urbanisation. The precious non-renewable resources of the earth like the fossil fuels and minerals are being depleted at an alarming rate. In addition to the above problems, the developing third world countries are also plagued by population explosion, insanitation, hunger and malnutrition, severe poverty and squalor and a host of environmental problems unique to them. Ironically, all these problems are man's own creation. The causes are unbridled application of science and technology, man's quest for supremacy over nature, instead of living in harmony with it and his parasitic lavish life-style. Poverty, ignorance and mismanagement of the biosphere are also to be blamed, especially in the third world countries. Disasters like Bhopal gas leak, and London smog are few examples of the manifestation of environmental crisis.

Men have not sat as silent spectators to these events. International conferences and workshops like International Conference on Human Environment at Stockholm in 1972, Intergovernmental Conference on Environmental Education at Tbilisi in 1977, and many other conferences like these aim at saving the planet. Setting up of the United Nation's Environment Programme (UNEP) and World Commission on Environment and Development, are examples of such global efforts.

The potential of education as an effective instrument in preventing and solving the environmental degradation has been recognised since long. The role of environmental education has been well defined by IUCN Commission of Education (1970). Environmental education is the process of recognising values and clarifying concepts in order to appreciate the interrelatedness among man, his culture and his bio-physical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behaviour about environmental quality. Tbilisi conference called upon member states to incorporate environmental education into their educational system. Many countries have attempted to incorporate environmental education into their school curriculum. Yet, in most of the places the efforts in this direction were somewhat adhoc and consequently incapable of making any perceptible and tangible impact on the prevailing educational scenario. In our country a definite impetus was given to environmental education in the National Policy on Education-1986. For any programme of environmental education to succeed, the teaching community have to be taken into

confidence, for it is the teachers who will translate any innovation in the curriculum at the classroom setting and outside. Hence, updating of pre-service teachers curriculum and continuous orientation of in-service teachers on content and methodology of environmental education is essential. Before designing and implementing any teacher training curriculum on environmental education, it is essential to gather baseline data about the knowledge and attitude of teachers about environment. Their current perception regarding environmental education in the school curriculum is also an index of their present status about environmental education. The nature of environmental knowledge and attitude with reference to sex, place of residence, subject orientation and socio-economic background of teachers also provide an insight about the needs of teachers of different categories about environmental education. The present study is concerned with collecting empirical data on the above parameters of pre-service and in-service secondary school teachers.

Objectives

Following were the objectives of the study :

1. To study the environmental knowledge of pre-service and in-service secondary school teachers.

2. To study the environmental attitude of pre-service and in-service secondary school teachers.

3. To find out the relationship between environmental knowledge and environmental attitude.

4. To determine whether there are significant differences in environmental knowledge of pre-service and in-service secondary school teachers with reference to following variables : sex, place of residence, subject orientation, teaching experience and socio-economic background.

5. To determine whether there are significant differences in environmental attitude of pre-service and in-service secondary school teachers with reference to following variables : sex, place of residence, subject orientation, teaching experience and socio-economic background.

6. To study the perception of pre-service and in-service secondary school teachers regarding environmental education in the school curriculum.

Hypotheses

The following were the hypotheses for the study :

1. There exists no significant relationship among pre-service and in-service secondary school teachers with reference to their :-

   (a) factual environmental knowledge and environmental attitude,

   (b) conceptual environmental knowledge and environmental attitude,

   (c) total environmental knowledge and environmental attitude.

2. In-service and pre-service secondary school teachers do not differ significantly in their factual, conceptual and total environmental knowledge.

3. There is no significant difference between in-service and pre-service secondary school teachers in their environmental attitude.

4. There are no significant differences in factual, conceptual and total environmental knowledge of pre-service and in-service secondary school teachers with reference to their sex, place of residence, subject orientation, socio-economic background, and teaching experience.

5. There are no significant differences in environmental attitude of pre-service and in-service secondary school teachers with reference to their sex, place of residence, subject orientation, socio-economic background and teaching experience.

Sample

The sample for the study consisted of all the 302 in-service teachers serving in 50 secondary schools and all the 416 pre-service teachers (B.Ed trainees) of three teacher training colleges of Puri district. The 50 schools were selected out of 483 schools in Puri district on a stratified random sampling basis.

The Instruments

To collect data regarding environmental knowledge, attitude and perception regarding environmental education the

following instruments were developed.

- Environmental Knowledge Inventory.
- Environmental Attitude Scale.
- Questionnaire on Perception regarding Environmental Education

A personal data-sheet was also developed. The instruments were developed through a thorough study of literature, consultation with experts, pilot study and item analysis. The manner of development of instruments ensured their validity. The test-retest reliability of the instruments yielded near high reliability with reliability coefficients ranging from 0.63 to 0.72. All the instruments were contained in a small booklet (Appendix-II). The English version of the instruments is given in Appendix-I.

Collection of Data

Data from pre-service teachers were collected by administering the instruments in classrooms, after initial briefing by the investigator. The pre-service teachers took about 90 minutes to answer the booklet. The investigator met the heads and other teachers in selected schools, in the staff common room to explain the purpose of the study and directions to answer the instruments. The questionnaires were collected from the in-service teachers after an interval of 7-10 days.

Data Analysis and Interpretation

Responses to factual and conceptual knowledge, items were analysed using percentage analysis item-wise and

interpreting the items in eight areas of environment. The level of factual, conceptual and total knowledge was also determined by finding out the mean factual, conceptual and total environmental knowledge score and interpreting it against the percentage of maximum possible score. The level of environmental knowledge was interpreted as 'low', 'moderate' or 'high' if the average score was less than 50, 50-75 or more than 75 per cent of the maximum possible score respectively. Teachers, in general, were also interpreted as having deficient knowledge about a conceptual/factual item if 60 per cent or more teachers failed to respond to that item correctly. On this basis, knowledge deficiency among teachers was identified. To find out environmental attitude the mean attitude score for the group was calculated using a Likert type scale. This score was interpreted as unfavourable, neutral or favourable attitude depending on whether the mean attitude score was less than, equal to or more than 90 respectively.

The relationship between environmental knowledge and environmental attitude was studied by applying product-moment correlation. The relationship between environmental knowledge, environmental attitude and the relationship of environment knolwedge and attitude with variables like sex, place of residence, subject orientation, socio-economic background and teaching experience were studied by applying 't' test and one-way analysis of variance. The perception regarding environmental education was analysed and interpreted using percentage.

Major Findings

The level of factual and total environmental knowledge of pre-service teachers is 'low'. Their level of conceptual knowledge is 'moderate'. In-service teachers possess 'low' level of factual

environmental knowledge but have 'moderate' level of conceptual and total environmental knowledge.

- In-service teachers possess significantly higher factual and total environmental knowledge than the pre-service teachers. But these two groups do not differ significantly in their conceptual environmental knowledge.

- Deficiency in factual environmental knowledge among both pre-service and in-service teachers have been identified in respect of the following items.

  - Population growth rate
  - Strategies for population control
  - Medical termination of pregnancy
  - Diseases due to polluted water
  - Toxicity of DDT
  - Criterion for water quality
  - Eutrophication of lakes and rivers
  - Threat to Tajmahal due to Mathura refinery
  - Radio-active pollution
  - Minamata tragedy
  - Greenhouse effect
  - Noise pollution
  - Forest cover as per satellite imagery
  - Mining of metallic nodules from sea-bed
  - Meaning of land use
  - Agitation against National Test Range
  - Integrated pest management
  - Red Data Book
  - Symbol of World-wide Fund for Nature

- Deficiency in conceptual environmental knowledge among both pre-service and in-service teachers have been identified in respect of the following items.

  - Concept of zero population growth
  - Greenhouse effect
  - Concept of adaptation
  - Concept of biomagnification
  - Concept of gene-erosion
  - Concept of safe number
  - Concept of bio-gas plant

- Both in-service and pre-service teachers have favourable attitude towards environment. In-service teachers have significantly more favourable environmental attitude compared to the pre-service teachers.

- There is moderate significant positive correlation ranging from 0.32 to 0.47 between factual, conceptual and total environmental knowledge and environmental attitude, of both pre-service and in-service teachers.

- There is no significant difference among in-service teachers at factual environmental knowledge level with reference to their sex,place of residence, subject orientation, socio-economic background and teaching experience. The pre-service teachers also exhibit no significant difference among themselves with reference to their sex and place of residence. Pre-service teachers with science background possess

significantly better factual environmental knowledge compared to the teachers with non-science background. Pre-service teachers from high and middle socio-economic background possess significantly better factual environmental knowledge than their colleagues from middle and low and low socio-economic background respectively.

- In-service teachers with less than five years of teaching experience possess significantly more conceptual environmental knowledge than teachers with 5-10 and more than 10, years of teaching experience. At conceptual environmental knowledge level both pre-service and in-service teachers do not differ among themselves significantly with reference to other variables like sex, place of residence, subject orientation and socio-economic background.

- While the male teachers of pre-service group do not differ significantly from their female counterparts in their total environmental knowledge, this difference is significant in case of in-service group. Urban teachers of both the groups possess significantly more total environmental knowledge compared to their rural counterparts. While pre-service teachers with science background have significantly more total environmental knowledge compared to teachers with non-science background, such a difference is not significant in case of in-service teachers. Pre-service teachers coming from high and middle socio-economic background possess significantly higher total environmental knowledge compared to their counterparts from middle and low, and low socio-economic background respectively. No

significant difference have been observed among in-service teachers of high, middle and low socio-economic background and with different length of teaching experience in their total environmental knowledge.

- Both in-service and pre-service teachers do not differ significantly among themselves in their environmental attitude with reference to variables such as sex, place of residence, subject orientation. Pre-service teachers coming from high socio-economic background have significantly more favourable attitude compared to those teachers coming from low socio-economic background. In-service teachers coming from different socio-economic background and with different length of teaching experience do not differ among themselves in their environmental attitude.

- Teachers realise the existence of environmental crisis, role of environmental education but have not correctly perceived the meaning of 'environment' and 'environmental education'.

- They have identified 'threat of nuclear war', 'population explosion' and 'deforestation' as most serious environmental problem facing world, India and Orissa respectively.

- Philosophy and goal underlying environmental education have been correctly perceived by the teachers.

- There is difference of perception among teachers with regard to status and stage of introduction of environmental education.

- Teachers perceive environmental problem focussed, organisation of content and social sciences based core-curriculum for environmental education as best arrangement.

- Teachers feel, incorporation of environmental education elements in school curriculum as grossly inadequate and its near total absence in pre-service teacher training course. Almost all of them need additional training in environmental education.

- Mass media are the best source of environmental knowledge for teachers. School and college education are not able to contribute meaningfully for enhancement of their environmental knowledge.

- Teachers are able to correctly perceive themes/concepts for environmental education curriculum.

- Inflexible school schedule, public apathy and lack of trained teachers and other resources are major constraints regarding implementation of environmental education programmes.

Discussion

The low level of environmental knowledge of teachers may be ascribed partly to existing status of teachers, their lack-lustre job, engagement in private tuition and other

lucrative activities. But lack of commitment on the part of teachers to improve their academic lot, their isolation from teaching community of universities, resource persons and agencies in the field of environmental education are to be squarely held responsible for this phenomenon. Their lot has to be improved by continuous training and reorientation, breaking isolation from their shells, and augmenting libraries with resource materials. They should shed their resistance to changes in curriculum. Non-existence of difference in environmental knowledge among science and non-science background teachers, young teachers excelling compared to old teachers are further evidence of decadence which has to be halted. The difference in environmental knowledge among socio-economic groups of teachers may be due to capacity to afford reading and other resource material. Urban teachers' greater knowledge may be due to direct experience of environmental problems. The contribution of mass media to environmental knowledge vis-a-vis school and college education, points out to the deficiency of the latter system, which has to be enriched through curricular renewal. Positive environmental attitude of teachers is a good sign and has to be maintained. Teachers' lack of conceptual clarity relating to pedagogic aspects of environmental education may stem from their incomplete understanding of the subject and teachers need to be oriented in this.

Conclusion

Since the Tbilisi Conference (1977) attempts have been made at the national and international level for spreading environmental awareness and environmental ethic and incorporation of environmental education. It is an irony

that even if people are more enlightened, and have positive attitude towards environment, pollution is on the increase, ecological degradation has not halted. The malaise seems to have struck deeper and education is not able to play its part effectively. How else, can one explain the green signals given to Narmada Sagar Project or failure to close down the National Test Range at Baliapal ? Environmental education suffers from what Michael Robinson (1983) calls 'Enlightenment Fallacy' the view that education and knowledge can solve all problems. But solving environmental problems depends upon controlling political and economic problems as well as controlling human behaviour. We have no reasons to hope that political and economic forces and human behaviour will, in the future, be any more susceptible to the effects of enlightenment than has been the case in the past. Hence, educational efforts have to be augmented by economic development and political commitment for fruits of environmental education to accrue.

The low level of environmental knowledge of teacher as revealed in this study is a matter of great concern for the educationists, educational planners and administrators. Since responsible decision-making depends upon one's stock of information, it is vitally important to provide the teachers with up-to-date environmental knowledge, for themselves, as well as for transference to the younger pupils at school. Special crash programmes should be undertaken for the purpose.

Teacher's positive attitude towards environment should not be a matter of complacence. Perkes (1976) concluded that environmental attitude which tends to be broad

in nature and possesses little personal commitment is viewed favourably. However, when these attitudes become more specific and an obvious change in personal action logically follows, individuals tend to remove the dissonance by not making the transfer from general to specific or by changing personal attitudes to correspond to their present action. So, when aiming at inculcation of strong positive environmental attitudes especially with reference to issues involving personal commitment and sacrifice, much effort and research need to be directed to achieve this end. Attitudes to be translated into social behaviour have to be deep-rooted, based on knowledge and conviction and experience rather than be extrinsically motivated.

Deficiencies in knowledge among women teachers and teachers belonging to rural areas and difference among science and non-science teachers need to be taken care of through special efforts.

Suggestions

Based on the findings of this study and the discussion on the previous pages the following suggestions are made.

1. The presence of environmental education elements in the existing curriculum is grossly inadequate at school level. Such elements are almost non-existent in the pre-service teacher education course. No systematic effort for their inclusion has been made so far.

In view of the above findings, it is suggested that systematic efforts aimed at curricular revision for incorporation of environmental education elements at school level and at the pre-service secondary teacher training course should be made without further delay. The first step towards this would be the analysis and review of existing text books and other instructional material and find suitable niches for the purpose.

2. For making environmental education more effective, there is need for continuous orientation of teachers and teacher educators. In-service training programmes may be patterned after the modular packages prepared by UNESCO-UNEP, with suitable modifications to suit local variations. The Institutes of Advanced Study in Education, and Colleges of Teacher Education established under the centrally sponsored scheme of teacher education under National Policy on Education-1986 can serve as nodal agencies in this direction.

3. The study has revealed potential of electronic and print media in generation of environmental awareness. Hence, in-service training programmes as mentioned above should be supported by broadcasts through radio and T.V. at regular intervals.

4. Libraries at schools, colleges and teacher training institutions should be enriched with text-books, reference material, journals and magazines

pertaining to ecology and environmental education. Laboratories in teacher training colleges, and schools have to be augmented by video and audio-cassettes and short films on environment, kits for outdoor activities, measurement of water and air pollution and other accessories.

5. Special training programmes should be organised for women teachers, teachers from rural areas and those belonging to low socio-economic groups in view of their relatively low level of environmental knowledge. Their special characteristics should be kept in mind while designing the programmes.

6. Greater co-operation and co-ordination are required among teachers, teacher-educators, personnel of state Department of Environment and Forests, Pollution Control Board, faculty members of university and members of voluntary agencies in implementation of environmental education programme.

7. The main focus of activities under 'Scheme of Environmental Orientation to School Education' should be the in-service training of teachers.

8. A pool of resource persons from among the teacher educators should be created through their training at NCERT and NIEPA to serve as key persons in implementation of environmental education programmes in the state.

9. Visit of teachers should be arranged to national parks, wild-life sanctuaries, highly industrialised towns, slums, remote-sensing agencies to have a feel of environmental problems.

Suggestions for Further Research

1. The base-line data obtained from the study may be utilised for development and implementation of curriculum in environmental education for pre-service and in-service teachers in Orissa.

2. Each teacher training institution in the state should take up projects to identify environmental problems of the locality in consultation with resource persons and design mass contact programmes for public awareness and action on such problems.

3. The instruments used in this study may be standardised to serve as instruments for measurement of environmental knowledge and attitude of teachers for the entire state.

4. The reasons for low level of environmental knowledge among teachers may be studied further through an indepth analysis of cases in selected schools.

5. Multi-media strategies should be evolved for successful implementation of environmental education programmes from primary to higher education level.

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