

TOPIC 9

ENVIRONMENTAL EDUCATION AND TRAINING

Scope

Unless people become more aware of environmental problems and appreciate their magnitude, they will be unable to participate effectively in decision-making. It is essential to inform, educate, and motivate citizens about the need for preventing degradation of the environment through the proper use of land and natural resources. Since the literacy rate is low in many developing countries, ways and means of reaching the ordinary citizen must be devised; for the most part, the mass media — radio, movies, newspapers, television — are quite effective in this area. Any educational program should also take into consideration the great number of people beyond school age. Curriculum changes in education from the primary grades to the university level will be required, but these alone will not bring about the desired results. Teachers must alter their methodology and undergo retraining in order to look at environmental problems from a proper perspective and to motivate students to respect and appreciate their environment. Environmental education should be made a subject of compulsory study.

Options

Immediate steps must be taken to alter the school syllabus at all educational levels. A curriculum on environmental education might include the following:

Elementary and Secondary Schools

- (1) The stimulation of curiosity; the observation and interpretation of the environment.
- (2) Basic principles of ecology.
- (3) Ecological games and creative activities such as painting and the production of short plays which emphasize proper attitudes toward the environment.
- (4) Guided tours to national parks and reserves, field courses, and summer camps to inculcate habits of observing, enjoying, and respecting nature.
- (5) Discovery-oriented activities which illustrate the interrelationships among environmental components.
- (6) Problem-oriented projects which improve perception of the environment.

Higher learning: Universities and Teacher Training Programs

- (1) General ecology, with special emphasis on human ecology.
- (2) Proper utilization and management of environmental resources (renewable and non-renewable).
- (3) The problems of pollution, e.g., industrial waste.
- (4) Specialization leading to research projects in specific areas.

In order to teach the new curricula, teachers will have to be retrained. This can be accomplished through seminars and special summer institutes which will teach new methodologies as well as environmental subjects; and through in-service institutes. Teacher training colleges should also introduce special courses in the environmental sciences.

Educational materials for the new curricula should also be developed, preferably by scientists knowledgeable in each specific area. Special workshops should be set up for the preparation of those materials (textbooks, laboratory guides, audio-visual aids, and materials such as kits for making ecologically significant measurements). Properly graded, these materials could be used in adult education programs as well as by the general public, administrators, decision-makers, and the media. Many countries have adapted well-known high school texts which have an ecological bias (e.g., Green, BSCS) by including examples of local flora and fauna and other environmental factors; this is a quick and efficient method of acquiring materials. Also, the science education program in Africa has produced excellent manuals which are appropriate for the primary school level. International bodies (UNESCO, UNEP, IUCN) should provide funds for writing texts, pamphlets, and laboratory manuals appropriate to each country, and these publications should be available at reasonable prices.

Guidelines

The consensus of the participants in this symposium is reflected in Recommendations 26-37 of the Canberra Report.

- (26) In many developing countries, not only are the opportunities for education available to the average citizen insufficient, but also the quality of education needs basic reform. These countries have been intent on providing a classical type of education and have given little thought to its social relevance.
- (27) Developing countries are constantly building up and improving their national patterns of education, training, and research. Educators in these countries should now attempt to adapt educational programs to national conditions, with the aim of increasing students' knowledge of the world in which they live, helping them to improve the quality of life, and stimulating their thinking.
- (28) The major problem in most developing countries is the lack of understanding among the population of the role of man in modifying his environment, for better or worse. These countries also suffer from an acute shortage of middle-level technicians skilled in the management of natural resources. To overcome this, modifications should be made at all levels of education.

- (29) High priority should be given to the reform of primary and secondary school curricula to include basic ecological concepts. As far as possible, examples available locally or nationally should be used, and increased emphasis should be placed on field work. The use of national nature reserves for field studies should be encouraged. In order to stimulate the interest of the younger generation, national, regional, and international competitions related to national and global environmental problems could be organized.
- (30) Due attention should be given to updating the knowledge of teachers, and to the preparation of teaching materials. Concise and cheaply produced monographs, including textbooks, should be made available.
- (31) At the university level, all students, including those in engineering, architecture, economics, social sciences, and medicine should be trained to be aware of the effects of development on the environment and of the need for appropriate siting of industrial complexes, roads, dams, and new towns. Environmental scientists should, on the other hand, be made equally aware of the social implications of the application of environmental techniques.
- (32) Action should be taken to remove departmental barriers in the study of environmental problems so as to obtain an interdisciplinary approach with participation of representatives from different departments and even from different institutions.
- (33) The training of research workers in the environmental sciences should be carried out nationally and/or regionally as far as possible. This is the best way to avoid frustration brought about by differences between home conditions and those of the places of training and to ensure that the training is relevant to national problems. To this end, local institutions should be strengthened by:
 - (a) Creation of cooperative links between institutions in developing countries dealing with similar problems.
 - (b) Exchange of scientific personnel and students among developing countries and between developing and industrialized countries.
 - (c) Establishment of regional and inter-regional training courses.
 - (d) Organization of seminars and advanced short courses, with the participation of scientists from industrialized countries.
 - (e) Financial support and scientific assistance from national and international agencies.
- (34) Transnational centers should be established to provide training and research on local and regional problems and to synthesize available knowledge into a coordinated whole. Every effort should be made to raise the standard of excellence in these institutions so that they become effective centers for training.
- (35) Continuing education on environmental subjects should also be provided for scientists and decision-makers.
- (36) Scientists from developing countries should develop avenues for communication and exchange of experiences, perhaps by joint meet-

ings and seminars and the publication of learned journals or newsletters of regional interest. Seminars attended by both scientists and decision-makers should also be encouraged as a means of ensuring closer contact between the two groups and of stimulating awareness among decision-makers of local environmental problems.

- (37) Finally, to improve awareness of the importance of environmental control, short courses should be given to journalists and other mass media workers to ensure that newspaper, radio, and television give effective coverage to events of environmental importance.

It is further recommended:

- (1) That as soon as possible SCOPE organize a working group on environmental education, including specialists in mass education, technologists, representatives of UNESCO, UNEP, IUCN, the ICSU committee on science teaching, and other national, regional, or international agencies: (a) to study existing curricula on environmental education; (b) to prepare model curricula at all levels; and (c) to prepare special model curricula for the training of teachers, decision-makers, and service personnel.
- (2) That SCOPE, assisted by UNESCO, UNEP, IUCN, the ICSU committee on science teaching, etc., establish environmental education coordinating offices on a regional and linguistic basis in order to promote the teaching of environmental sciences. Such offices will assemble and prepare materials needed for environmental education on all levels, will be responsible for organizing seminars and conferences, and will advise governments and agencies on environmental education.
- (3) That existing facilities in the various university science departments, which are highly specialized and unintegrated at present, integrate under a faculty or institute of environmental sciences; multi-institutional collaboration should also be developed within countries.
- (4) That SCOPE explore the possibilities of sending teams of specialists to developing countries to discuss the problems of the environmental sciences with the authorities.

Research

There is an urgent need to encourage basic work in ecology, for which funds should be available from national and international organizations. Research priorities should vary from region to region, but there is a great need almost everywhere in the world for precise quantitative information on basic factors: edaphic, physical, chemical, biotic, social, and economic. It may be wise first to concentrate on gathering the basic data which is so necessary for a proper appreciation of the problem and its solution. Expertise for this research is available in many universities and institutions.