

# Major Requirements for Environmental Education\*

by

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## INTRODUCTION

Improved understanding of our environment is indispensable for its rational management. For on one hand it enables us to comprehend the environment's resilience to Man's actions and, on the other, it helps us to judge the maximum potential which the environment may offer for sustained development of mankind. Such an understanding will also enable us to predict, better than otherwise, the interrelated efforts of some of the major challenges facing the world today. Among these are demographic changes; economic development; availability of food, energy, and raw materials; development and utilization of new technology, rates of inflation, and availability of investment capital. All these issues have significant impacts on the environment, and the environment, in turn, affects developments in those and other areas.

Improved understanding of the environment can only come through environmental education, and this is why environmental education is so vitally important in this present era of increasing human population threatening The Biosphere.

## DEVELOPMENT DURING THE LAST DECADE

During the past decade there have been major changes, in the world as a whole, in people's attitudes to and perceptions of environmental problems. These changes can be discerned in both developed and Third World countries, but the magnitude of these changes—as is to be expected—varies from one country to another.

In developed countries, prior to 1970 public awareness of serious environmental deterioration was primarily limited to 'shock' events. Thus the shocking death of some 4,000 people due to the famous London smog of 1952, and another 800 deaths in New York in 1963 for similar reasons, attracted widespread attention. Slowly-deteriorating environmental conditions—such as in-

creases in water and air pollution, lack of land-use planning, or increasing noise levels—were mostly accepted as the 'price of progress'.

As people became wealthier and the level of education increased, they also became more aware of environmental issues. Publication of such books as *Silent Spring* by Rachel Carson in 1962, and *The Limits to Growth* by Meadows *et al.* in 1972, not only contributed significantly to the ongoing environmental debate but also in some ways intensified it. Irrespective of whether one agreed or disagreed with the theses put forward by these and other similar authors, there is no doubt that such events had a profound influence on the prevailing environmental thinking of the western industrialized countries. This can be demonstrated by comparing the number of articles on environmental issues published in *The New York Times* every year, which increased by slightly over 1,000% during the 10-years' period of 1960 to 1970. Since 1970, however, the number of such articles published has declined, but even then the 1979 figure is more than 300% higher than those published in 1960 (cf. Holdgate *et al.*, 1982). Such trends have been observed in many other countries as well.

So far as the developing countries are concerned, the overall trend was somewhat similar, even though these countries tend to be less homogeneous than the industrialized nations. In 1971, the United States Agency for International Development (A.I.D.) asked its overseas missions in 35 Third World countries to canvass opinions in order to identify the most serious environmental problems facing those countries. A major conclusion of the resulting report (Office of Science and Technology, 1971) was that there was:

'little evidence of awareness of environmental problems among the peoples of developing countries, or among their government administrators ... Many countries are preoccupied with the development of their natural resources, and, to the extent that concern does exist for the environment, there appears to be apprehension that social and economic costs of environmental protection may very well outweigh the benefits'.

The A.I.D. assessment was probably an accurate one, as similar sentiments were expressed by several Third World countries during the preparatory process of the

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\*Based on keynote address to the International Conference on Environmental Education, New Delhi, India, 16–20 December, 1981—see the account by Professor Ramdeo Misra on pp. 167–8 of this issue.—Ed.

UN Conference on the Human Environment, held in Stockholm in 1972. There was a widespread feeling on the part of many such countries that environmental protection might hinder their development process, and thus keep them underdeveloped over a prolonged period of time. This feeling on the part of certain countries was so strong that the Secretary-General of the Stockholm Conference, Mr Maurice F. Strong, convened a meeting of international experts on environment and development at Founex, Switzerland, in 1971. The Founex Report (UNEP, 1981) served its purpose admirably. Many of the fears expressed by Third World countries were soon alleviated even though they were not completely dispelled. Recently we comprehensively reviewed the environmental concerns of developing countries during the last decade and came to these same conclusions (Biswas & Biswas, 1982).

The Founex philosophy was reflected in the final Declaration that was agreed to at Stockholm (UNEP, 1981). Item 4 of this Declaration stated:

'In the developing countries most of the environmental problems are caused by under-development ... Therefore, the developing countries must direct their efforts to development, bearing in mind their priorities and the need to safeguard and improve the environment'.

Since the Stockholm Conference, much of the work on the environment-development interrelationship has been carried out by the United Nations Environment Programme under the leadership of its Executive Director, Dr Mostafa Kamal Tolba. Dr Tolba, who has always taken a keen personal interest in this subject, has made the world accept very widely the general principle that environment and development are practically two sides of the same coin (Tolba, 1980). He has successfully argued that development must be sustainable, and in order for development to be sustainable, environmental issues must be explicitly considered. *Development Without Destruction* has been a major motto of UNEP, and coincidentally is also the title of Dr Tolba's latest book (1982), which clearly outlines the environmental philosophy that has evolved during the past decade.

Whereas, prior to the Stockholm Conference, the real nature and magnitude of the environmental problems facing many of the developing countries were perceived somewhat vaguely, the situation has become clearer as more and more knowledge has become available. Many will now argue that poverty and environmental degradation will continue to co-exist until we can manage, far better than at present, the impacts of a growing population on a limited natural resources-base whose productivity is not increasing commensurately (Biswas & Biswas, 1981).

While the principle of complementarity between environment and development, mentioned earlier, may not still be unanimously accepted all over the world, there is no doubt that the overall attitude has changed significantly in its favour since the Stockholm Conference, and to a great extent this has been achieved by better and more widespread environmental education (defined in its broadest sense).

#### ENVIRONMENTAL EDUCATION AND WHAT IT IS

What is environmental education? It has to be admitted that, like education in any other broad area, there is no precise and universally acceptable definition. The best that can be done is to say simply that it is education about the environment, and to quote from Recommendation No. 1 of the first Intergovernmental Conference on Environmental Education, held at Tbilisi, USSR, in October 1977 (UNESCO, 1980). According to this recommendation:

'A basic aim of environmental education is to succeed in making individuals and communities understand the complex nature of the natural and the built environments resulting from the interaction of their biological, physical, social, economic, and cultural, aspects, and acquire the knowledge, values, attitudes, and practical skills, to participate in a responsible and effective way in anticipating and solving social problems, and in the management of the quality of the environment.

'A further basic aim of environmental education is clearly to show the economic, political, and ecological, interdependence of the modern world, in which decisions and actions by different countries can have international repercussions. Environmental education should, in this regard, help to develop a sense of responsibility and solidarity among countries and regions as the foundation for a new international order which will guarantee the conservation and improvement of the environment'.

Recommendation No. 2 of the Tbilisi Conference (UNESCO, 1980) suggested some guiding principles for environmental education, which should:

'Consider the environment in its totality—natural and built, technological and social (economic, political, cultural—historical, moral, aesthetic);

Be a continuous lifelong process, beginning at the pre-school level and continuing through all formal and non-formal stages;

Be interdisciplinary in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective;

Examine major environmental issues from local, national, regional, and international, points of view, so that students receive insights into environmental conditions in other geographical areas;

Focus on current and potential environmental situations, while taking into account the historical perspective;

Promote the value and necessity of local, national, and international, cooperation in the prevention and solution of environmental problems;

Explicitly consider environmental aspects in plans for development and growth;

Enable learners to have a role in planning their learning experiences, and provide an opportunity for making decisions and accepting their consequences;

Relate environmental sensitivity, knowledge, problem-solving skills, and values clarification, to every age, but with special emphasis on environmental sensitivity to the learners' own community in early years;

Help learners to discover the symptoms and real causes of environmental problems;

Emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills; and

Utilize diverse learning environments and a broad array of educational approaches to teaching/learning about and from the environment, with due stress on practical activities and first-hand experience.'

While the above aims and guidelines give us some idea about environmental education, it has to be admitted that they are somewhat general and broad, with rather poorly-defined boundaries. Accordingly there are major differences of opinion among experts as to what constitutes environmental education, or rather what does not! This should not be surprising, because differences

of opinion are likely to persist in any such new subject as environmental education, which by its very nature of interrelatedness between physical, biological, social, economic, legal, and cultural, factors is likely to remain complex and perhaps to some extent ambiguous for some time to come—until it is properly established.

This state of flexibility, however, could be construed to be a challenge as well as a golden opportunity, because it gives us the freedom to develop new directions for environmental education, new dimensions to the problem, and new courses of action. As an example of a new dimension to pursue, we might cite the campaign for education on The Biosphere as our only life-support system, of which we form an integral part and on which we are totally dependent, but which we are nevertheless jeopardizing by our numbers and actions.

#### MAJOR REQUIREMENTS FOR ENVIRONMENTAL EDUCATION

Within the general framework of environmental education discussed above, there are several major requirements which are likely to contribute to its success. Because of space-limitation, we shall discuss seven major factors, as follows:

1. Interdisciplinarity
2. Interrelatedness
3. Flexibility
4. Non-dogmatism
5. Problem anticipation
6. Emphasis on problem-solving
7. Practise what you preach.

1. *Interdisciplinarity*:—An implicit but principal assumption of many professions and university departments is that individual branches of science, both natural and social, can be interpreted as a basis for reality. Consequently, it is assumed that Nature is organized in the same way as the professions are. Thus one hears discussions of engineering problems, biological problems, environmental problems, social problems, chemical problems, medical problems, etc. In the real world, however, this is scarcely in accordance with the truth. A problem is a problem, and the addition of the professional adjective only indicates our ways of perceiving and analysing the problem. The method of analysis is generally dependent on the analysts' training and experience, and this very often leads to the introduction of significant biases in the resulting analyses, which ultimately affect the decisions taken to solve the problems.

Individuals who have been trained in different disciplines, may look at a common problem to be analysed and solved in somewhat different fashions, depending on their education, background, and experience. The point can be best illustrated by the following story. The manager of an old building once received complaints from his tenants regarding the long waiting-time for elevators. The manager called in his engineers and asked for possible solutions. The engineers suggested three alternatives: add extra elevators, replace old elevators with more efficient new ones, or use a 'banking system'. The manager rejected the first two because they were too expensive for an old building, and the third because it

reduced the waiting-time only marginally. The manager, however, had a friend who was a psychologist and who heard of this dilemma. The psychologist offered a simple solution: install mirrors in the elevator lobbies. This, surprisingly enough, stopped all the complaints. The mirrors gave the ladies waiting for the elevator an opportunity to do some adjustments, and the men could look at the ladies in the mirrors without any embarrassment!

Whether the story is true or not is really unimportant: what is important is the fact that the psychologist saw the same problem that was facing the engineers in an entirely different light. The engineers attempted to reduce the actual waiting time by technological means, but that solution did not occur to the psychologist. His solution was not to reduce the waiting time but to make it *look* as though it had been reduced, and this happened to be an acceptable solution. The point we are trying to make is that it is desirable to have an interdisciplinary team for environmental planning and management, because exponents of different disciplines can perceive the same problem in different lights as a result of their training and background. Without such interdisciplinary approaches, there is a possibility that biases may be introduced into analyses, with a result that they may go unchallenged and undetected. Such a situation is bound to create problems.

2. *Interrelatedness*:—There is often a tendency to consider one issue or topic at any one time without considering its potential impacts on other related issues. The principle of reductionism is widely accepted and used, primarily because it is much easier to handle a problem with fixed boundary conditions.

While the interrelatedness concept is not novel, excessive preoccupation with rapid development and technological advancement has meant that, very often, whatever knowledge of interrelationships was available, tended to be disregarded. However, attempts to solve seemingly technical problems such as desertification, loss of productive soil, or deforestation, have indicated that emphasis should be placed not only on such physical factors as climate, soil type, modes of cultivation, or land-use patterns, but also on diverse factors—including demographic trends, types of technology used, levels and distribution of income among the population, consumption patterns, cultural habits, and educational levels of the inhabitants, etc. Without such a holistic approach, actions taken to solve specific problems may give rise to several other unintended side-effects, the sum total of which could even be worse than the problems initially addressed. This aspect, however, is quite often overlooked, with the result that, in many cases, those who suffer most from the side-effects of improperly balanced development are the poor, inarticulate, and politically weak, sections of society.

It is equally important to stress that the major issues facing a country form a complex system of cause and effect relationships within which the dynamics of the future of the nation will be determined. It is not in any of the issues—though they may be very important individually—but in their interactions, that the future

will be shaped. For example, with increases in population the provision of basic human necessities to each individual would require more and more food, energy, and raw materials; intensifying the supply of food would require more and more land, water, energy, and fertilizers; the energy crisis and higher oil-prices mean less energy available to increase food production, to alleviate fertilizer shortages, or further industrialization; and the common denominator in virtually all responses to these problems must include more capital, more technology, and more trained manpower.

It is here that these concerns inevitably merge with the important issues of war and peace, international monetary and trade relations, and political alignments. Each affects and is affected by the others. This system of relationships is global in scale—which is not to say that all global problems can and should be met with global solutions. There are few global solutions, but they can only be understood and dealt with in a global framework, within which there can be a wide variety of national and regional responses. Such an important consideration is seldom stressed in most educational systems that are practised at present.

3. *Flexibility*:—The increasing complexity and magnitude of environmental problems mean that educational processes must be flexible, and should be capable of producing both generalists and specialists. It is equally important to ensure that both specialists and generalists can work together, with mutual respect and harmony and without rancour.

During the past decade, the complexity of environmental problems has meant new areas of specialization. This has created some problems in terms of decision-making, since a wider spectrum of knowledge than formerly is now essential for policy-making. This means either that decision-makers themselves must have special knowledge in many specialized areas, or that they have at their disposal people who have such expertise. In either case, there is an urgent need for a new kind of professional who can successfully direct multidisciplinary staff handling complex problems. They should be familiar with the techniques and goals of the specialists, understand the technical terms and methodologies used in other disciplines, have a clear view of the breadth of the problem, and realize its importance in the political process.

For lack of an appropriate term to describe this new cadre of professionals, we may call them either 'generalized specialists' or 'specialized generalists'. These are people who may have started as generalists but specialized later, or *vice-versa*. In either case, they are specialized enough to lead a team of specialists, and at the same time generalized enough to realize the impacts of technical decisions on wider physical, social, biological, and political systems. Development of such professionals is not going to be an easy task, but is undoubtedly a crucial one if serious future environmental problems are to be successfully avoided.

4. *Non-dogmatism*:—In recent years there has been a tendency to introduce certain dogmatic ideas into the

process of environmental education. We shall discuss an example here.

There is much controversy at present on the scale of projects that are beneficial to countries. One group preaches that 'small is beautiful', but another strongly asserts that 'big is magnificent'. Any objective person who has worked in the development area in developing countries, or indeed in any country, has to admit that there are a variety of solutions to a specific type of problem. The optimum solution is not identical in all locations: it is a function of several interrelated factors. Thus, small is not always beautiful and big is not necessarily magnificent; indeed, because of differing physical, social, economic, cultural, and political, conditions all over the world, there are no particular solutions that are both optimum and relevant universally.

Another example is the latest bandwagon among the 'in' development specialists on South-South technology transfer or 'sharing of technology'. While technical co-operation among Third World countries makes a great deal of sense, it is naïve to expect that all such transfers will be smooth and present no problems. It is too early yet to draw any finite conclusions, but not all developing countries are by any means the same. They are at different stages of development, and have different social, economic, political, institutional, and cultural, backgrounds. Accordingly, South-South technology transfer would also have to be carefully planned: otherwise, serious problems are likely to surface. Let us consider only one example—an attempt to transfer technology between India and Tanzania for cashew-nut processing.

Most Tanzanian cashew-nuts are processed in India, where the process is highly labour-intensive, though many may call it 'appropriate technology'. A logical extension of this state of affairs was to bring the technology of Tanzania and process the nuts *in situ*. Accordingly, several workshops were started in Tanzania with the assistance of Indian technicians. The results, however, were somewhat disappointing. The work turned out to be dull and dirty. The wages of the workers had to be determined by the world market-price of cashew-nuts, and thus was low. In addition, acids from the nuts started to damage the fingers of the workers. Eventually, the turnover of labour force became so high that the workshops had to be closed.

Why did the technology which worked in India not work in Tanzania? A main reason was that the Tanzanian labour-force had a better alternative: they could go back to their farms, where the income was equal or higher, but the life was certainly more pleasant. In contrast, the Indian workers had no other alternative way to earn a living: they had to work in factories. This is another example of the necessity of environmental education if dogmatic 'solutions' are to be avoided. Thus, environmental education should emphasize the unusual nature or even uniqueness of each situation. As a rule, one should be sceptical of 'universal' solutions.

5. *Problem anticipation*:—Good environmental education should enable people to anticipate the possible development of adverse environmental consequences.

Thus forewarned, appropriate steps should be taken to eliminate completely any adverse impacts; but should their complete elimination be impossible for whatever reasons, attempts must be made to reduce adverse impacts substantially. For example, construction of a large dam is likely to have several adverse environmental impacts. Review of past experiences with similar development projects will clearly indicate what these impacts *could* be (El-Hinnawi & Biswas, 1981), with some indications of their magnitude as well as timing of occurrence.

It is important that experiences accumulated over years of monitoring, research, and analysis of problems from different parts of the world, should be used to the maximum extent possible for problem anticipation. Environmental education can play a very useful role if experiences from past developments can be distilled, and then this knowledge be disseminated to a wider audience. This will ensure that we learn from our past mistakes, and that these are not repeated *ad infinitum* at great cost to our society.

6. *Emphasis on problem-solving*:—Environmental education should emphasize problem-solving, and when once solutions are known and agreed to, people should be encouraged to apply them in the real world. There is a far-too-prevalent tendency to spend months and often years on analyses, and when the theoretical work is complete, many feel they have completed their assignment and have no compulsion or interest to see if the solutions proposed are applied. Thus, too-often one sees what can facilely be termed 'paralysis by analysis'. Admittedly, analyses are essential ingredients for environmental policy formulation; but it must be realized that in such cases it is not the *means* to the end that count—though they are undeniably important and in certain cases may even predetermine the end—so much as the *end itself*. After all, of what use are the analyses if we cannot use them to solve real world problems? We have no objection to people living in 'ivory towers', provided these do not constitute *their only places of residence!*

Attempts to develop a positive, problem-solving attitude through environmental education has to emphasize creating a new mentality among the students—one which we might call the John Roebling type of mentality. For John Roebling had a dream—a great dream, though its effective culmination depended on his ability to spin wire. He never gave up. He designed and built machines to spin wire and, through his son, successfully carried on the construction of the Brooklyn suspension bridge. He died figuratively looking out of the window of his house in Brooklyn while his son was in the process of completing the construction of the bridge.

A problem which we face with environmental sciences is that currently there are not enough people who have the mentality and characteristics of a John Roebling—who are willing to innovate when applying theory to practice, and are quite prepared to get their hands and feet dirty in order to complete the task satisfactorily and usefully.

Furthermore, it is not at all unusual to find that analyses may be more sophisticated than their end-uses warrant. This is especially relevant in the area of mathematical modelling. We know of several cases where the analysts got carried away with the mathematical sophistications, and then went out on theoretical excursions on a detailed simulation of the twentieth-order situations when the zeroth-order situation had been completely controlled by the noise and thus improperly understood. Proper environmental education should be able to prevent this type of situation. One is sometimes reminded of Pooh Bah in *The Mikado*, who, when asked to explain a piece of mendacity for which he was about to be tried, was asked why he told the particular lie, and replied: 'Well, it was merely corroborative detail intended to add verisimilitude to an otherwise bald and unconvincing narrative'.

7. *Practise what you preach*:—It is indeed a major dichotomy in the present world that many people preach one thing but practise another. Their thesis seems to be: do as I say and not what I do'.

We have participated in numerous workshops and training sessions over the years, in which teachers preach sharing of resources, use of appropriate technology, and the need of sacrifice by the more affluent individuals so that the poor can be better off. Yet, in their real lives, they do just the opposite. They stay in the Hiltons or the Intercontinentals, where often the price of the hotel room only for one day is higher than the monthly salary of a new graduate of that country, and dine at Maxim's with champagne and caviar. This champagne-and-caviar-international jet-set, to whom Mahatma Gandhi's term 'armchair socialists' can be aptly applied, want others to sacrifice—but not themselves. In the area of environmental education, this just will not do! It is important, indeed absolutely essential, that the teachers and leaders should set examples by practising what they teach. The Stockholm Conference proclaimed: 'to defend and improve the environment for present and future generations has become an imperative goal of mankind'. This undertaking clearly implies the urgent necessity of disseminating knowledge about the environment to all members of the community, who can then effectively participate in sustainable development, which in turn will contribute to the improvement of the quality of their own and other people's lives. As Tolba (1982) has said elsewhere: 'environmental measures in every country call for active citizen participation, which will only be effective if based on and linked to education for the public at large'\*.

We are of course not suggesting that environmental education alone and by itself will solve all environmental problems. What we are saying is that environmental education, in the broadest sense of the term, is a prerequisite for better environmental management—and probably in the end for saving our world and Nature's.

\*Such environment education of the world's 'public at large' is the primary objective of the World Campaign for The Biosphere, which is stressed in our present issue in the manner presaged in the Editorial on pages 7–8 of its predecessor.—Ed.

## SUMMARY

Environment can be better managed only if people have understanding and appreciation of it. This can be achieved only through environmental education, and that is one reason why environmental education is so important and essential at present. Another is to understand our complete dependence on The Biosphere as our only life-support and safeguard it against increasing population-pressures.

The basic aim of environmental education is to make individuals and communities understand the complex nature of natural and Man-made environments resulting from the interaction of their biological, physical, social, economic, and cultural, aspects. There are several major requirements which are likely to contribute to its success. These are interdisciplinarity, interrelatedness, flexibility, non-dogmatism, problem anticipation, emphasis on problem-solving, and 'practise what you preach'.

Environmental education alone and by itself will not solve all environmental problems, but environmental education is a prerequisite for better environmental management and, ultimately, for safeguarding The Biosphere.

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## Health Aspects of Urban Planning and Environmental Conservation

Special attention should be paid to the health aspects of urban planning from the viewpoint of environmental conservation as well as from the purely medical point of view.

Although health cannot be defined in measurable terms, we approve of the WHO definition expressing physical, mental, and social, well-being. We also feel that health is not a fixed condition but a dynamic potentiality, which is largely dependent upon the physical, chemical, biological, socio-economic, and cultural, environments. The following subjects merit special consideration from the viewpoint of health in urban planning:

1. The necessity of further studies into the effects of the environment on human health and resistance to disease.

2. The need to find useful and appropriate indicators for both positive and negative health of individuals, families, and populations.

3. The safeguarding of water supplies and proper disposal of excreta.

4. The assuring of stable and sufficient supplies of a rich variety of fresh, inexpensive foods, free from biological and chemical contamination.

5. The preservation of quality of air, water, and soil, and the control of noise, vibration, heat, and radiation, pollutions.

6. The planning of efficient health-service and medical-delivery systems.

7. The development of the 'quality of life' concept and the establishment of new environmental criteria in

an effort to encourage the adoption of healthy lifestyles.

With regard to the last subject, we do not feel that high energy-consumption means a high quality of life. We must discover how to raise the quality of life without imprudently undermining and disrupting the processes of Nature. Health should be an essential factor in the quality of life. The dwellers of a well-planned 'health' city with conserved natural environment, would be able to raise their health level, by conscious efforts, above the levels in today's other cities, which are characterized by luxurious life-styles at the expense of the natural environment and health, for which gorgeous hospitals are no compensation! Ecological planning of the city is indispensable for health.

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