

BIO-EDUCATION IS THE KEY TO SURVIVAL

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If the Sumerians had known the physiological ecology of cereal crops, on which their civilisation was based, they would have survived. Modern science claims that if they had irrigated their fields only in even or odd years, salinisation would not have threatened their crops. The conclusion is clear. It was confirmed on the mistakes in the past so many times: those who knew survived, those who did not know disappeared.

Since humans appeared on the Earth, their attitude toward nature has been constantly changing: humans pass from being frightened by natural forces to mastering them unscrupulously. The pollution of the biosphere started with the discovery of fire, it increased by the use of coal in the 18th century, and it has culminated since the exploitation of oil and its derivatives in the late 19th century, and throughout this century. However, the abuse of nuclear energy threatens the very survival of the planet. It is evident that man is the main factor of the increasingly drastic conflict between the development of civilisation and the development of natural systems on the Earth.

Modern civilisation has been developed on the paradigm of constant material growth and on the stimulation of unscrupulous consumption of natural resources. The consequences are well known. Humanity enters the third millennium with great global problems: destruction of the biosphere and its ecosystems; demographic explosion - 12 million inhabitants expected by 2050; global climate changes; depleted natural resources, insuperable quantities of waste; damaged public health. On the one hand, the development of industry improves the living standard of a great many people on Earth, but on the other hand, it affects negatively the quality of the environment and human health.

The basic issues of the environment in Yugoslavia do not differ essentially from those identified at the European or global levels: environmental degradation is one of the most serious social problems, although at the moment it is in the shadow of economic and political questions. Present development has paid too high a price on the environment, and there are only a few regions and activities which have behaved rationally in their use of land and natural resources. Lack of harmony between the environment and human activities has caused the already visible environmental crisis, which is irrevocably universal and global. This was first realised by scientists in developed countries. The survival of human civilisation and the biosphere has been endangered. The general opinion is that the key to survival is the opportune environmental education of all the people of our planet.

Man has finally comprehended that the strategy of a changed attitude towards the environment is the key to the survival of the environment. In essence, the environmental crisis is only an inseparable part of the great events of civilisation: the deep crisis of the methods of production, models of consumption and economic growth, together with the simultaneous loss of basic human values. For example, an American has a 20 times greater influence on the environment than a citizen of India. Such a life-style affects the balance of man and nature and can only be brought back by complete socio-cultural alternatives to the methods of production and consumption. Environmental education for environmental protection should enable the redefinition of our relationship with nature and a change of behaviour: the main condition is to respect the laws of nature.

Nature is the source of life which must be safeguarded. In order to achieve this, we must not disturb its balance, interdependence and diversity, as well as its great power for self-reproduction. All of the organisms which inhabit the biosphere are interrelated and interdependent. This interconnection is not always evident and clear, even among the species of the same habitat/ecosystem. It can be noticed only by persistent, careful and often painstaking observation and research. Humans adapt by their knowledge, because education enables them to adjust their behaviour to the requirements of quality living, or ultimately to mere survival. Environmental education does not include only the knowledge of the natural and social sciences, necessary for the understanding and the resolution of environmental issues and environment pollution; it involves the enhancement of moral principles and the formation of a new system of values regarding nature and the environment: humans can and must be only the users of nature, and not its unrestrained masters. If nothing else, it is for itself that humanity must take care not to destroy its own environment, because otherwise humanity will be destroyed. The earlier anthropocentrism must be replaced by biocentrism.

In the biosphere, everything is interdependent, so the quality of air depends directly on the degree of pollution, forest quality and abundance, and wind direction, both on a regional and on a planetary level. The Rio Declaration points out clearly that all countries share the responsibility to acknowledge that "for the purpose of development, environmental protection is an integral part of development and it cannot be considered separately."

The Earth Summit resulted in the Rio Declaration, the Convention on Climate Change, the Convention on Biological Diversity, and Agenda 21, by which all the countries adopted the following objective: wise management of natural resources, conservation of biodiversity and natural

self-reproduction, energy efficiency, recycling and clean technologies, and measures for environmental protection, in order to satisfy the requirements of present and future generations. The prerequisite for the new attitude towards nature is a new philosophy of life and the prerequisite for the new model of development is environmental awareness and environmental behaviour. In the time of global environmental crises, environmental education, along with opportune and reliable information, legal regulations and environmentally justified investments, is the most important task, as it affects directly the formation of environmental awareness. The basic elements of the theoretically and empirically acquired environmental awareness are: environmental knowledge, the assessment of the environmental situation, and environmental behaviour.

Environmental awareness does not consist only of the knowledge of the relationship between nature and society, the disturbance of the environmental balance and the need for environmental protection. It also includes the consciousness and the readiness of individuals and societal groups to engage in environmental protection and to have a responsible and environmentally justifiable attitude towards the environment in which they live. Environmental education, required by all the inhabitants of the planet, must be a long-term and planned enhancement of interdisciplinary knowledge of the environment throughout human life. The aim is to develop the awareness of the main characteristics of the environment, the relations to it and in it, as the prerequisite of the human trend for its conservation and improvement for the present and future generations.

Therefore it is necessary to pursue an interdisciplinary and multidisciplinary approach to education, so as to understand the essence of the relationships between society, man, and the environment, and to express the universality of ecological, economical, social, technological, cultural and aesthetic aspects. The content, method of presentation, and method of operation must tend to form an individual capable of decision-making in accordance with the principles of sustainable development. This means wise management of natural resources, energy efficiency, and measures for environmental protection to satisfy the requirements of present and future generations.

Environmental education - a strategic priority

With the formation of the Ministry for Environmental Protection, and the creation of a system based on sustainable development in this field, Serbia is determined for the rational utilisation and management of natural resources. This new philosophy of life has been included in the regional plan of Serbia, and it is expected to be included in the recently proposed criteria of water resources management in Serbia. The system of environmental protection is also based on the Program of Priority Activities in this field, adopted by the National Parliament, in April 1990. This program focuses on pollution prevention activities for environmental associations, schools and educational institutions. Environmental education of the general public is one of the strategic decisions and priorities of the Republic of Serbia. These include the Law on Environmental Protection, adopted in October 1991, along with the Article by which public institutions in the fields of education and science stimulate and finance projects, programs and activities which contribute to the elevation of environmental awareness and environmental behaviour.

Science, as well as international practice, show that a universal education for environmental protection does not exist. Modern environmental education must be aimed at definite educational and social structures, and individuals. Environmental education - the acquisition of new knowledge - and environmental training - learning the difference between environmentally good and environmentally bad, and the acceptance of the correct behaviour - start in family life. In their family, children experience the first forms of social relationships and the first models of social behaviour. In this milieu, a series of personal characteristics are formed, which will be expressed in behaviour throughout adult life.

However, the majority of parents today do not have an adequate knowledge in the domain of environmental protection, so they cannot influence their children in this respect. Hence, family is the primary target of environmental education. One of the possibilities is parent education through their children - a positive experience is that of the Experimental Program "Green Roadsigns" for the environmental education of kindergarten children in Belgrade.

Pre-school and primary school curricula and syllabi, as well as primary school textbooks, lack the environmental component to the extent which would result in the correct attitude towards nature. This is the general conclusion of the Expert Group for Environmental Education, formed by the Ministry of Environmental Protection in 1992. The group made the following remarks:

- There is almost no information on the fact that life on Earth has developed through a long process of evolution.
- Man is most frequently treated as nature's master, and accordingly all living beings are classified as useful or harmful.
- There is not enough information on environmental pollution, except for sporadic notes on air and water pollution. There is no reference to the fact that the environment is contaminated not only by industry but, also, by pesticides and household detergents.
- The fact that natural resources are mainly not renewable and that they are already in insufficient quantities is not mentioned; children are not instructed to save energy, water, etc.
- Textbooks for the natural and social sciences are poor and non-inventive, and in the environmental sense, they are often wrong: "A fox has a lengthy body covered with bright yellowish hair; its fur is valuable and it is used for coats and hats." Is it so important to teach children that a fox has valuable fur?"

Environmental principles in education

Based on an analysis of pre-school and primary school curricula, syllabi and textbooks, it was proposed to introduce the environmental approach/principle in the education process, from the kindergarten up to the university level. The introduction of this principle would enable schoolchildren to integrate what they have learned into their way of life. The environmental attitude in schools means that the entire educational process should point to the fact that, in nature, everything is interrelated and interdependent, and that man is only an integral part of nature. The environmental approach also means that the selected examples should not cause a feeling of fear and danger.

There is no discipline or subject through which the love of nature cannot be enhanced. So instead of being instructed about useful and harmful animals, children should be taught that: "Each animal is a part of the food chain on the Earth. Even the smallest insect is equally important for the maintenance of life on the planet, as the huge elephant or the wisest animal." Due to the specificity of these issues, the desirable environmental behaviour can also be evoked through extracurricular activities or through pupils' organisations, and for the youngest, through their play.

Environmental education for younger school-children, in an extra-curricular sense, is very significant and it is characterised by specific projects, such as environmental games, environmental tales, talks with guests, shows, simple theatrical performances, group watching of environmental broadcasts, environmental themes for drawing, singing, writing, and other activities. The type of activities for older children is most often the same as that for adults, but the programs, seminars, journals, publications and expositions should always be adjusted to their young age. The new curricula and syllabi for high schools and secondary vocational schools predict a greater number of issues dealing with environmental protection. In addition to biology, environmental matters are dealt with in geography, chemistry, national defence, and sociology. Out of the twenty four Faculties of Belgrade University, ten Faculties have a special course in this discipline or courses where these issues are addressed. There are altogether seventeen subjects, of which twelve are obligatory and five are optional.

Education for educators

While the environment has become a very competitive field of work, the demand is high but the supply of professional personnel is low. Consequently, quite inexperienced persons often deal with the environment, a condition which is especially evident in education. Environmental education is usually carried out by ecologists as a part-time activity. In Serbia, a professional organisation whose primary job is to assess requirements, elaborate methods, and implement programs for environmental education, does not exist. However, in addition to the Educational Department of the Ministry of Environmental Protection, there is an initial core of a number of ecologists and other experts who could be the protagonists of a special professional/educational organisation.

The role of teachers in the process of environmental education is indispensable. However, the existing teaching staff, especially primary-school teachers and instructors, does not have adequate environmental education, which can be seen through the plans and programs of educational institutions. Even the Teacher Training Faculty's curricula and syllabi do not devote sufficient attention to the natural sciences and environmental protection.

Secondary-school teachers are graduates of the Faculty of Natural Sciences, or the Faculties of Philosophy and Literature, and they did not take any environmental subjects in university, so they cannot incorporate environmental topics into their teaching programs. Consequently, there is a need for a systematic and permanent training of teachers in the field of environmental protection, both because of the ways in which they can transmit the new knowledge, and because of the increasingly important role of school in the formation of a child's personality.

To achieve the adequate qualifications, it is necessary to organise appropriate seminars, lectures classes and field courses. First of all, it is necessary to supply environmental literature and teaching aids. The program for educators must be aimed at the re-direction of the existing subject-matter and not at the introduction of new subjects. The experience from environmental education for primary-school teachers at the Pedagogical Academy of Belgrade, in 1992, has showed that teachers are interested in these problems.

Extra-institutional environmental education

Outside of conventional educational institutions, environmental education is especially significant, because it is available to all the social strata. The mass media should provide far more environmental news, topics and commentaries by the people who are familiar with the subject, because the sensitivity of the general public to environmental problems has increased, especially after the Chernobyl catastrophe. First of all, the state has the obligation to supply quick, true, high-calibre and objective information, which explains the origin of the danger, the degree of risk, methods of protection, and the prognosis of the situation. Environmental information also contains educational components which affect directly the raising of the environmental awareness of citizens. This is the reason why it is necessary for the authorities to regulate laws for environmental protection, since all citizens are entitled to a healthy environment, as one of their basic rights. No information important to human health and the environment is to be considered confidential, and any concealment should be sanctioned with a penalty and imprisonment.

The public character of the work of competent institutions is the starting point for the creative work of journalists in this field. However, previous experience shows that environmental issues were not sufficiently dealt with by the newspapers and they were not presented in an

adequate manner. Also, the prevailing attitude was negative, and the general public was made passive instead of being stimulated to action. In addition, sensationalism often led to misinformation, and the fields of environmental protection and ecology were abused for political purposes and election campaigns.

National parks play a crucial role in the raising of environmental awareness in the scope of environmental education, which is their continuous assignment. Environmental education should not be tackled in an old scholarly way by sporadic actions, campaigns and a declarative acceptance of general and optional slogans. Environmental education must be based on scientific, technical and technological knowledge, on positive experience, and sometimes even on environmental vulgarism, and not on environmental idealism. In fact there are cases of organised action which are directly opposed to the legitimate requirements for nature conservation and protection.

In environmental conservation efforts, the example of National Parks featuring permanent activities for the preparation of educational programs, manuals for trainers and instructors, professional personnel training programs, educational programs for the local population and special programs devoted to National Parks, is particularly noteworthy. Unfortunately, in Yugoslavia, we do not have a special educational program regarding National Parks, except for a few publications. However, the realisation of a project, designed for National Parks by the Expert Group for Environmental Education of the Ministry of Environmental Protection, is currently in progress. The name of the project is "Schools in Nature" and, so far, two "Schools," Tara and Kopaonik, have already been published and Fruska Gora is in progress. Also, the Kopaonik National Park organises the well established "Ecofest."

It is impossible to restrict the development of young people only within the framework of the school, in spite of its potential extension and enrichment. Development must be stimulated by a series of other factors and aspects of the social environment, through which young people can acquire knowledge and information about their environment, and form their attitudes about life and society. A whole series of factors is important: organisations, associations, institutions, non-governmental organisations, clubs, nature conservation clubs, environmental movements, scouting and camps. These contribute, directly or indirectly, to the better understanding of the social background and the environment. The Institute of Nature Conservation, the Museum of Natural Sciences, the Ecological Society of Serbia, the Serbian Biological Society, and the Petnica Research Station also contribute, in their own way, to nature's popularity, and young people can learn about its value through the realisation of projects, seminars and lectures. However, the co-ordination of all these organisations and associations is insufficient in the preparation and realisation of the comprehensive Program of Environmental Education of the Young.

Conclusion

Based on national and international experience, the Ministry of Environmental Protection of the Republic of Serbia has made the strategic decision to prepare and realise the Program of Environmental Education in Serbia. Also, by signing the Rio Declaration and other documents during the UN Conference held in Brazil, Yugoslavia is obliged, in the prescribed period, to adapt its educational processes to the principles of sustainable development.

The strategy for the education of young people, aiming at desirable environmental behaviour, must contain all those elements which will contribute to the creation of environmental thinking and to the knowledge of the multiple and mutual relationships existing in nature and the environment, in order to realise efficient and good-quality actions in environmental protection, restoration and development. The main objectives of the strategic decision for environmental education for the young are to:

- understand the interdependence of environmental, economical, social and cultural aspects in human life
- develop environmental awareness, knowledge, skill and behaviour, in order to contribute to environmental protection, through qualified participation in decision-making, either as private citizens or as decision-makers
- create a behaviour and life style which will be positively oriented toward environmental protection
- develop environmental ethics

Finally, the numerous gatherings - scientific educational, social and political - should be remembered. There was no environmental conference where the question of education was not tackled. We often excelled in papers and discussions and the attitudes of our experts were respected and often included in the official documents of international conferences. However, most often we did not make any progress from the conclusions. If our society and the Government are really ready to face the essence of the problem of environmental education, the following systematic measures must be undertaken:

- Competent Ministries must urgently create a strategy for environmental education, which means changing the curricula and syllabi, publishing the necessary material, and enhancing the methods of work.
- It is necessary to organise a specialised institution for the realisation and co-ordination of environmental education, based on international examples. This institution would create national programs and activities, acquire international information and co-ordinate the activities of different Ministries, professional institutions and non-governmental organisations.
- A National Committee for Environmental Education should be established as the supreme expert and consulting body.
- The creators of the strategy for environmental research have to be qualified for this type of activity. Also, in this kind of education, professionalism is needed.

Ignoring environmental laws will not protect us from our actions and the solution is not in descriptions, statements or conclusions, but only in concrete, justified and permanent action. In the end, no efforts will meet any success if the decisions-makers are not environmentally educated.

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