International Cooperation in Environmental Management and Rational Use of Natural Resources

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Abstract. The progress in technologies is developing towards the unlimited growth of production and consumption, wasteful use of natural resources and biosphere. These problems require adequate response such as international cooperation and integration of the efforts of authorities, scientists, representatives of educational system. Such cooperation is important to ensure the transition to the sustainable, ecologically-oriented practices of natural resources rational use. This is impossible without establishing a new environmental management system based upon formation of ecological competence of all scientific and technological progress participants among which the higher school scholars must play a leading role.

1. Introduction

The globalization processes of political, economic, technological, human life actively taking place today are caused by such problems, challenges and risks as uneven economic and social development of the regions of the world, demographic problems, international terrorism and the threat of large-scale military conflict. In the second half of the XX century the most important - environmental problems of mankind - become global, and therefore the question of saving civilization, the survival of the world as a result of human-induced destruction of biological balance became really important.

2. Material and Method

The first United Nations Conference devoted to the Environment (Stockholm, 1972) drew the attention of the Heads of States and Governments, the international community to the impossibility of further economic growth without taking into account the environmental and social and economic consequences [1]. The International Commission for Environment and Development in the report "Our Common Future" (1987) proposed the concept of sustainable development as a strategic solution to this problem. In its basis - the balancing of the natural biosphere opportunities and social and economic development for human needs without damaging the living conditions of future generations [2]. Conservation and sustainable reproduction of life on the Earth is understood as a specific function of human biosphere.

The Second United Nations Conference devoted to the Environment and Development (Rio de Janeiro, 1992) declared in the outcome document "Agenda 21" the program of the implementation of
sustainable development, which was confirmed at the Sustainable Development World Summit (Johannesburg, 2002) [3]. In its materials it is emphasized that the most important mechanism for ensuring the sustainable development of nature and society is education. The United Nations declared the decade 2005-2014 years as the Decade of Education for Sustainable Development, which aims to promote public understanding of the importance of education for sustainable development [4].

The European Economic Commission adopted a "Strategy for Education for Sustainable Development" (Vilnius, 2005). Its main objective is to contribute to sustainable development and the inclusion of education in sustainable development of nature and society, in the national systems of formal and informal education [5]. What is fundamentally important, the strategy provides the conceptual, information and organizational expansion of environmental education as an educational base for sustainable development of nature and society.

In Russia the idea of sustainable development are reflected in the "Concept of the Russian Federation transition to sustainable development" (1996) [6] and "The Russian Federation National Security Strategy" (2009) [7]. The role of education in the solution of sustainable development problem is reflected in the concept of modernization of Russian education for the period up to 2010 and earlier - in the "Principles of the Russian system of universal, comprehensive and continuous environmental education and training" (2002).

It should be noted that in Europe the extensive work on the introduction into the educational process of sustainable development courses in higher education in all countries of "Bologna area" is carried out. For example, in 50% of universities in Scandinavia and in 96% of higher schools in the UK and Sweden the lectures on Sustainable Development are delivered [8-10]. Almost at all leading universities in the US and Canada educational programs in the field of sustainable development in a variety of forms (lectures, research) are implemented.

However, today in Russia the most educational problems listed in the documents above have not been solved yet. The existing system of environmental education does not give the desired result for a number of reasons. They are:

- **Regulatory and strategic** - the lack of comprehensive government regulations, organizational and methodical documents in the field of education for sustainable development [11-13]. In the standards of higher professional education (2010), approved by the Ministry of Education of the Russian Federation and in the content of the educational programs the aspects of sustainable development are not included;

- **Social and economic** – the lack of effectiveness of environmental education in environmental issues (especially on air and water pollution [14-19], using mining equipment [20-28], despite all the evidence of its crucial role. As a result the ecological aspect of education is considered as "rudimentary", the number of environmentally oriented and creative public associations is being reduced;

- **Methodological** - a priority in the environmental educational process is given to a professional function of environmental education (the student is given the required level of knowledge, skills, competences). As a result, the formation of ecological outlook (moral and environmental imperatives in the human mind, when the latter gets an environmentally-centric orientation) suffers.

The higher school plays the most important role in the realization of the idea of nature and society sustainable development, in the becoming of this kind of personality. It forms the basis of environmentally oriented professional world outlook, establishes value-semantic sphere of the person, and helps to develop in practice environmental standards and requirements. One of the most important problems of environmental education in the higher education institution, which is rather relevant today, is creating a culture of acceptance of environmentally sound management decisions, personal involvement in solving environmental problems in order to improve environmental quality.

As a result, it is necessary to develop the environmentally oriented professional, capable and ready to solve the problems of sustainable development. At the same time environmental competence as developing personal characteristic can and should become an indicator of the formation of such
characteristics of environmentally oriented person as an environmentally-centric consciousness (and its central component – ecologically oriented world outlook) and environmental culture.

Conceptual bases of realization of environmental education for sustainable development at the university level are not fully developed. Despite the wide range of the terms "education for sustainable development", "sustainable development of the education system", the available studies on the higher school level focus on individual, narrow span issues of environmental education for sustainable development.

Thus, at the present time the problem solution of the development of the concept of environmental education for sustainable development in general and its implementation in higher education in particular is at the preliminary stage of the analysis, the description of specific situations, their classification, highlighting the relationships and regularities.

At the same time there is a shortage of professionals able to carry out professional activities taking into account the environmental viability of decisions, i.e. professionals with environmentally-oriented consciousness, capable of implementing the concept of sustainable development in their professional activities.

3. Results and Discussion

We believe that the system of environmental education for sustainable development at universities can be implemented in case of the theoretical development of its conceptual basis and practical actualization in the sphere of innovation activity of environmentally-oriented higher education institution.

The essential features of environmental education for sustainable development include the following:

- **Categorical** - a process based on the integration of natural sciences, social and human, environmental and cultural knowledge. Environmentally-oriented values should be formed on their basis as an integral part of universal human values, ecologically-oriented world outlook. The principles of the process should become eco-centrism, ecological culture, active approach to solving the problems of sustainable development at local and regional levels, as well as responsible behavior in the environment not violating the interests of the future generations;

- **Targeting** – grounding the objective of including in all formal and informal education the ideas and principles of sustainable development to provide students with knowledge, specialized skills, competencies, values and beliefs in the field of environment and sustainable development. This knowledge, values and competencies will increase their ecological awareness and self-confidence, and give them an opportunity to lead a healthy and productive life in harmony with nature, to follow environmental protection in their behavior;

- **Structural and content** - include the following components:

  a) natural science block with the fundamentals of ecology, environmental management, biodiversity conservation, and technological principles of the interaction between man, nature and society in terms of escalating ecological crisis; cultural and ethical aspects of education and formation eco-centric world outlook;

  b) moral and legal block, considering the human rights for a dignified life and the responsibility for the wellbeing of the people living today and the future generations; gender equality as a means of solving demographic problems and the elimination of illiteracy and poverty; corporate responsibility;

  c) social and economic block, comprising the formation of consumer culture, the development of rural and urban settlements; the formation of culture of peace and non-violence in resolving territorial, ethnic and religious problems.

The result of the implementation of the essential features of environmental education in modern higher education should become the formation of the ecological competence of the individual [29]. It must be considered in the following forms:

- as a link in the system of the most important education of environmentally-oriented person (environmentally-oriented world outlook, environmental awareness, environmental culture). This link
appears in the ecology-oriented activities and carries out ideological, methodological, environmental, value, predictive, social, cultural, professional functions;
- as one of the most important kinds of professional competence, actually having inter-professional, and ideally - over-professional nature. Also, the environmental competence of the person is an inherent component of the high level of professionalism, which allows to judge matters of professional activity sphere taking into account the environmental aspect, as well as the quality of the individual, making it possible to carry out professional activities with regard to its environmental viability;
- as a form of personal integration, reflecting the ability of acquiring environmental knowledge and skills, methods of their use in various kinds of practical activity, readiness for implementation of environmental activities. It also includes the experience in preserving the surrounding natural world and solving environmental problems. In the system of an ecology-centric person his competence is the result of acquiring other key competencies - general culture; values and cognitive; competence of personal self-improvement.

The conditions of formation of ecological competence of a person include the following:
- **Macro-social** - the demand for specialists who are ready to the environmentally-oriented professional activity and making environmentally sound management decisions [30];
- **Social and psychological** - the development in specific professional and educational environment a single content knowledge, skills, professionally important individual, personal and subjective qualities of ecologically-oriented specialist as a basis of pedagogical influence on the student;
- **Didactic** - expansion of teachers’ methodical techniques of educational influence on students; the development and use of technologies for creating situations of personal importance of ecologically-oriented values for sustainable development of nature and society, and regulation ways aimed at the nature activity in cooperation with it, and the other person as a part of it. Equally important is the continuity of ecological and educational process and the appropriate distribution of its content in the course of higher school training [30-31]; the organization of students practical implementation of ecologically-oriented activities and its projecting in cooperation with teachers. Also the organization of diverse opportunities for the acquisition and improvement of students and teachers personal experience of practical ecologically-oriented activities is in demand. It is strongly recommended for studying geotechnical science and mineral resource extraction [32-36]. Obtaining the knowledge of designing mining machines, constructing of mining objects, the future engineers must learn how to estimate ecological consequences of their implementation [37-39].

The principles of environmental education for sustainable development are:
1. **the principle of comprehensiveness and continuity**, which consists in the fact that based on the fundamental ecological knowledge, ethical standards set forth at school environmental education at higher school is subdivided into the following types of training:
   - Classical university (which gives special professional education with the basis of scientific research);
   - Education in the humanities and technical higher schools for non-ecological specialties;
   - Education at higher educational institutions in the field of environmental (natural-resource) profile and associated with it special interdisciplinary education (Environmental law, Ecopolitology, Ecopsychology, Environmental linguistics, Industrial ecology, Health and safety and environmental protection, etc.).

   The continuity of environmental education by courses as a part of educational programs in these types of higher education institutions is characterized by a multiplicity of targets, objectives and content of environmental knowledge, skills and competences;
2. **the principle of differentiated approach** to students, which consists in the fact that on the basis of a certain level of self-education and self-improvement motives and incentives should be developed, the ways to enhance the process of self-education and self-improvement of ecological values should be outlined;
3. **The principle of theory and practice correlation**, according to which the efficiency of training the ecologically-oriented person depends on his involvement in the relevant work and is
determined by the content, views, forms, and the orientation of the latter. In other words, the more perfect the system of labor and productive activity of students, in which the correlation between theory and practice is realized, the higher the quality of their training, the more successful their adaptation to modern conditions of the professional activity.

4. Conclusion

Environmental education for sustainable development plays a fundamental role in the formation of ecological competence of the individual, which is a part of the integration of psychological and pedagogical and akmeological knowledge. We have considered it in the system of ecologically-oriented person: as a result of acquiring by the individual in the process of formation the key competencies (general culture, values and meaning, competent personal self-improvement), as his integral feature performing ideological, methodological, environmental, value, prognostic, social, cultural, professional functions, and a system-link of his education (environmentally-oriented world outlook, ecological consciousness, ecological culture).

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