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Education for Sustainable Development: Experiences of the Department of Environmental Management of the Lomonosov Moscow State University

Abstract. Today, education is as a key factor of sustainable development. The fundamental concept of the Department of Environmental Management, a unit of the Faculty of Geography, is the fact that the Earth is the only place known to sustain life. Education for sustainable development at the Department of Environmental Management is based on Faculty traditions and incorporates elements of both physical and human geography. The educational program reflects rapid development of the world – it becomes more complex and technologically advanced. Traditional and innovative aspects of education for sustainable development implemented at the Department of Environmental Management are considered in this article.

Keywords: high school, education, sustainable development, environmental management, interdisciplinary learning

1. Introduction

Education is a crucial factor on a way towards sustainable development. The growing importance of education for sustainable development (hereafter referred to as SD) was highlighted by the Declaration of the UNESCO World Conference on Education for Sustainable Development (hereafter referred to as ESD) held in November 2014 in Aichi-Nagoya (Japan). The call for "urgent action to further strengthen and scale Education for Sustainable Development" mentioned in the Declaration (Aichi-Nagoya Declaration... 2014), reflects successful results of the Decade of ESD (2005-2014) and the role of education as a decisive factor of changes.

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The national education system of Russia was among the first to respond to the UN initiative to promote ESD. The first ESD projects in Russian were launched in the late 20th century. Following the UN sustainable development initiatives, the first Russian Department of Environmental Management (hereafter referred to as DEM) was established in 1987 at the Faculty of Geography of the Lomonosov Moscow State University (MSU). It is based on a synergy of a classical geographical science and ecological and SD agenda. This bi-component educational system is aimed to respond to the global changes we have been observing.

2. Drivers of the educational system of the Department

Achievements of the Russian Higher Education Institutions (hereafter referred to as HEIs) in defining the fundamentals of ESD, as well as their contribution to an educational process, are based on world known scientific and educational principles, which have much in common with SD. One of these principles is ecological/environmental component of geographical education introduced in 1977 following the World Conference on Environmental Education (Tbilisi, Georgia). These traditions formed the basis of the educational system implemented at the DEM.

Summing up, the educational system at the DEM includes the following components: traditions of ecological (environmental) education of the Russian Higher School and innovations and achievements of international science related to SD education [Mazurov & Pakina 2014: 64-75].

The introduction of ecological education and – later – education for sustainable development at the curriculum of the Faculty of Geography is a remarkable milestone for the Russian Higher School. Apart from many European countries Russian geography science employs the concept of "universal geography" which does not consider physical and human separately. According to V. Anuchin, geography explores fundamental laws of interaction between Nature and Society [Anuchin 1982: 12-36] and this thesis a backbone of Russian geography school.

Nature Management is the main object of research at the DEM. Historically, scholars defined Nature Management (hereafter referred to as NM) as an interdisciplinary study and complex practical activity consisting of two main parts: Nature Use and Nature Protection (Fig. 1).

With the new educational standards introduced in 2011, the department now offers Bachelor and Master programs in Ecology and Nature Management (4 and

2 years respectively). Additionally, the DEM has "Economic, social, political and recreational geography" and "Geo-ecology" programs for post-graduate students.

The DEM offers students theoretical and practical basics of NM with field studies to put theory into practice. Following the interdisciplinary approach, we have prepared and introduced versatile courses to cover different aspects and meet challenges of NM, as: develop a wide range of studies and researches in such fields as:

- remote sensing methods and GIS technologies,
- mapping,
- environmental monitoring,
- ecological economics,
- landscape planning and design and others.

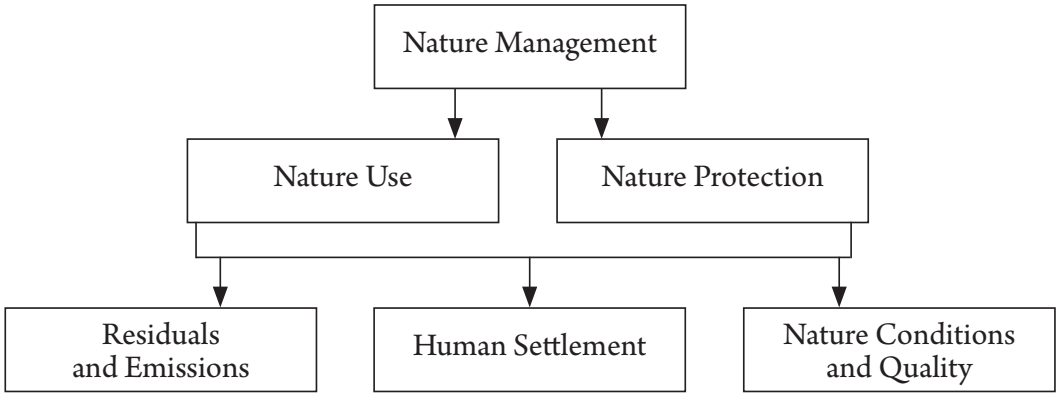

Figure 1. General structure of Nature Management

Source: Mazurov & Pakina 2014.

The obligatory courses Geo-ecological monitoring, Bases of Environmental Management, Environmental Economics, Environmental Impact Assessment, Industrial Ecology and Technogenic Risk, Sustainable Development, etc. and optional Environmental Management, Waste Management, Innovative Technologies and Resource Efficiency, etc. are directly related to SD.

The DEM's staff traditionally is engaged in both teaching and scientific activities, which enables to update courses and develop new ones. The DEM's research areas include assessment of ecosystem services, urban environment, natural protected areas etc. covering Russia and foreign countries. Noteworthy, many of them focuses on the Russian Arctic and the Baikal area.

For example, several important research projects on ecosystems conditions and natural heritage state of the Russian Arctic were conducted at the Taimyr peninsula – one of the biggest in the world. One of them is the joint Russian-Dutch expedition "Save ecosystems of the Russian Arctic" organized in 2002-

2008 in cooperation with the Alterra institute (Wageningen University and Research Center, the Netherlands), D.S. Likhachev Russian Research Institute for Cultural and Natural Heritage (Moscow, Russia) and the Great Arctic Reserve (Dudinka, Russia). Some of the expedition's goals were:

– assessment of natural conditions of local species habitats,
– natural landscape fluctuations caused by climate changes,
– prospects of ecotourism as one of the most efficient forms of sustainable use of the pristine nature of the area [Henkens, Mazurov, Pakin, Pakina & Pedroli 2005: 55-97].

Prospects of green development were explored in the Republic of Buryatia, a region located in the Baikal area. The area is rich in mineral resources, has a huge territory, harsh climatic conditions and is underpopulated. The core of the area – Lake Baikal – is globally known for its ecological value, pristine wilderness and a great supply of fresh water with unique hydro-chemical characteristics. Due to these features, the lake with its surrounding territories has a status of the World Heritage Site. Projected economic development of the territory threatens its environment. Current situation and prospects of green economic development we examined during the expeditions between 2011 and 2014 (Photo 1).

Photo 1. Field training of the Department's students at the Republic of Buryatia (Baikal area), February 2011 (http://rpp-msu.ru).

The next DEM's research area is an urban environment. The implemented research methods and equipment include measurement of physical contamination, remote sensing, and GIS technologies. The research also relies on traditional methods as mapping of the Earth's surface with its natural, economic, cultural and social features. The most significant results of urban environment research are being integrated into DEM's and the faculty's educational programs. DEM's students are allowed to participate in the research process and to use the data obtained in their own projects.

The most important component of 'traditional' education at the Faculty of Geography of MSU is a summer field training. This is an obligatory part of the educational process as well as lectures and seminars. Summer field trainings ("practices") take place at the Faculty's facilities 150 km from Moscow where 1st year students spent 9 weeks studying biogeography, geomorphology, meteorology etc. 2nd year students put theory into practice in different regions of Russia and abroad.

However, sustainable development framework is not adopted by all the 15 departments of the Faculty at the same level. The Cryolithology and Glaciology Department has courses on field and laboratory methods of studying frozen soils, ice and snow, modelling of permafrost-glacial processes and indicators of permafrost, glaciers, avalanches and debris flows and their mutations caused by economic activity in Arctic and mountain areas. Students of the Department of Economic and Social Geography of Russia study differentiation of social and economic processes at the regional level (geography of investments, migration processes, urban studies, political geography, etc.).

In contrast, the DEM focuses on environmental impact of economic activity and land use. In this regard, we conduct research at the field stations in several regions, differing in natural conditions and type of human impact on natural landscape: Krasnovidovo station in the Moscow region, stations in the Crimea Republic and Kola Peninsula. The main objectives of this 3-stage field practice are:

1) to examine the quality of the water at the Mozhaiskoe reservoir and test corresponding field methods (Krasnovidovo station; supervisor ass. prof. D. Badyukov);

2) to study the land use and technogenic pressure on the Crimea peninsula, socio-ecological aspects of urbanization with the assessment of its recreational potential (Crimea peninsula; supervisor ass. prof. T. Vorobieva);

3) to study the industrial impact on a fragile environment of the Arctic and monitor changes in various components of ecosystems caused by mining (in particular, apatite-nepheline and copper-nickel ores) (Kola Peninsula; supervisor prof. A. Evseev).

The 3rd year students have individual practice plans reflecting their own scientific interests. Each year field practice is obligatory and "costs" 12 credits.

Thus, the establishment of the Department was initially aimed at introduction of environmental problems into the educational program. Today, these issues are regularly updated to meet modern challenges. All the activities described above are considered to be traditional components of the educational process, updated according to the modern requirements. At the same time, we develop new approaches to eliminate drawbacks of the existing system.

3. New ideas in education for sustainable future

One of the pioneer documents on ESD agenda in Russia is the Project of the National Strategy of Education for Sustainable Education. It was introduced in 2006 by the group of researchers headed by the then dean of the Faculty academician N.S. Kasimov [2008: 12-23]. The Strategy highlighted the importance of moving towards interdisciplinarity across all educational programs (Fig. 2).

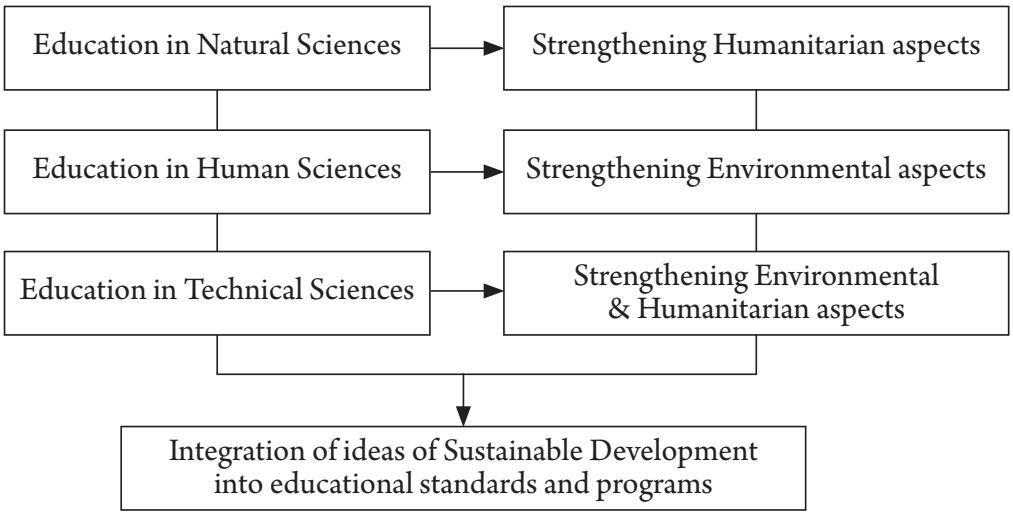

Figure 2. Principal changes in Russian HEI's educational programs

Source: own elaboration.

Further, the Plan of Actions for ESD was prepared by the specialists of the Faculty. The ultimate goal of the Plan is "to establish robust educational system serving sustainable development of Russia".

The main objectives of the Plan are outlined below:

– objective 1. To assist the popularization of sustainable development principles among Russians,

– objective 2. To re-think the role of education as a key element of a long-term strategy of the country's development,

– objective 3. To establish institutional framework for ESD in Russia,

– objective 4. To develop scientific and methodic framework for integration of sustainable development principles at all levels of general, professional and non-formal education in Russia,

– objective 5. To provide state support for material and technical basis of ESD,

– objective 6. To guarantee involvement of qualified teachers in ESD agenda.

The conditions we move towards sustainable development in are varying. Today we face new challenges differing from those of the 20th century. We live in the highly competitive world and modernization of national educational systems faces the following challenges:

– New Environment: physical and informational,

– New Society: significant disproportions in living standards across the world which are also applicable for environmental conditions,

– New Student: a high level of mobility and information consumption,

– New Geography: from description to forecasting.

Thus, the new SD principles should meet the following requirements:

1) to be quite flexible, perceiving and reflecting ever-changing trends of social, scientific and technological development;

2) to provide robust scientific fundamentals and interdisciplinary approach.

The Figure 3 presents the changes in curriculum and teaching process at the modern phase of ESD development.

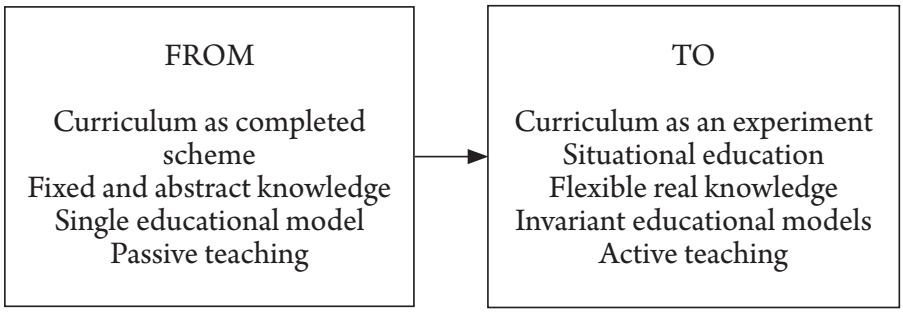

Figure 3. Changes in a curriculum and in a content of the teaching process during the transition to ESD implementation

Source: Kasimov et al. 2005: 38-49.

Adopting innovative methods and educational principles the Department has launched two programs of distance education, namely "Ecology and environmental management" and "Aesthetics and design of landscape." Description of these programs is available on the web-site of the Center of distance educa-

tion of the Moscow State University (http://de.msu.ru). Educational programs were designed to strengthen professional skills in the corresponding areas and are available for people from any region of Russia – from Kaliningrad to Vladivostok, as well as for people from neighboring countries (Belarus, Kazakhstan, etc.). Graduates obtain a certificate of completion.

Another important direction of modernization – development of international relations. The geography of scientific cooperation stretches from UK, Sweden, Germany, the Netherlands to Japan. Russian-Swedish project on ESD conducted between 2008 and 2013 is the case of successful international cooperation. The project was launched by the Russian Ministry of Nature Resources, which was interested in borrowing Swedish experience in Education for Sustainable Development. The Swedish Agency on Environmental Protection supported the initiative and the project was launched in September 2008. The list of participants included MSU, the Russian Academy of Public Administration under the President of the Russian Federation and three Swedish universities (Lund, Uppsala and Luleo).

The main objective of the project was to share experience in education for sustainable development, to set new goals and design new approaches to train Russian state officials for sustainable environmental management [Alekseeva,

Photo 2. Participants of the 1st Russian-Japanese Collaboration Seminar on Sustainable Environment, Moscow, MSU, 2013 (http://rpp-msu.ru/).

Kasimov, Mazurov, Osterlund, Pakina & Plepys 2011: 86-103]. Nine joint Russian-Swedish ESD seminars for state officials and policy makers of the Russian Federation were held during the 1st and 2nd phases of the project. The programs of the seminars were designed by professors from Sweden and Russia. The seminars were held in Moscow, Vladimir, Voronezh, Syktyvkar and Ukhta (Russia). The seminars were highly appreciated by participants.

Sharing of ESD experience and adaptation of global best practices in the educational process are among the main goals of the DEM. A number of seminars on Sustainable Environment with support from colleagues from the Tokyo university are scheduled (Photo 2). The 2nd seminar was held on 23-25 of March 2015 in Tokyo. It's another significant milestone in DEM's activity.

A response to actual challenges is a key goal of the educational process at the Department of Environmental Management. Taking into account the new 17 Goals of Sustainable Development, described in Agenda 2030, the educational system is changing moving towards complex, multi- and interdisciplinary approach reflecting diversity and complexity of the contemporary world.

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Edukacja dla zrównoważonego rozwoju: doświadczenia Katedry Zarządzania Środowiskiem Moskiewskiego Uniwersytetu Państwowego im. Łomonosowa

Streszczenie. Edukacja i oświata stały się obecnie kluczowymi czynnikami zrównoważonego rozwoju. Zasadnicza idea, która przyświecała Katedrze Zarządzania Środowiskiem, będącej jednostką Wydziału Geografii, wiąże się z faktem, że Ziemia jest jedynym znanym nam miejscem, na którym istnieje życie. W Katedrze Zarządzania Środowiskiem edukacja na rzecz zrównoważonego rozwoju opiera się na tradycji Wydziału i zawiera zarówno elementy geografii fizycznej, jak i społeczno-ekonomicznej. Program kształcenia podąża za szybkim tempem zmian zachodzących we współczesnym świecie – staje się coraz bardziej złożony i technicznie zaawansowany. Artykuł przybliża zarówno tradycyjne, jak i innowacyjne aspekty kształcenia na rzecz zrównoważonego rozwoju realizowanego w Katedrze Zarządzania Środowiskiem.

Słowa kluczowe: szkoła wyższa, edukacja, zrównoważony rozwój, zarządzanie środowiskiem, nauczanie interdyscyplinarne