

# Integration of Economic Aspects into the Teaching System for Disciplines in the Field of Natural Resource Management and Environmental Protection

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## Abstract

The paper deals with the basic aspects of the integration of environmental, economic, and managerial knowledge in the development of science and education. Disadvantages of existing education programs in the field of natural resource management and environmental protection are noted. The main disadvantage is the low level of development of economic, organization and management issues, as well as Russian and international law. The paper presents and describes an approach to teaching Economics and Management unit for students majoring in "Ecology and Natural Resource Management", which corresponds to modern trends of industry and science development. The approach offered by authors includes four main sections which are of professional interest to future experts in the field of environmental protection: the general theoretical paradigm of environmental economics, questions related to the state environmental protection policy, questions of management as reaction to obligatory statutory requirements and corporate environmental management systems.

**Keywords:** Environmental Management, Educational Standards, Economics and Management

## INTRODUCTION

In the modern world, special attention is paid to the degradation of the environment, which is caused by rapid population growth and industrial development, which are ahead of development in the field of environmental innovations. Human activities often have a negative impact on all natural systems, which leads to a deterioration of living conditions of not only animals and plants, but including the people themselves. We should also note the influence of the mineral complex: the extraction of mineral resources, its processing and use.

In resolving the problems of environmental protection, a special place is given to the existing deficit of highly qualified personnel. There is a shortage of engineers, economists and lawyers in the field of ecology.

In the existing environmental problems in mineral resource complex energy sector plays a key role and oil and gas complex occupies a leading position. Russian fuel and energy

complex makes about 50-60% of the total volume of emissions into the air, and over 20% of discharges into surface waters [1].

Determination of the degree of influence of business operations on such problems as climate change, degradation of nature, depletion of resources, etc. causes the need to modernize production processes. Also, regular tightening of environmental regulations and standards along with state import substitution policy force this need. Frequent environmental legislation reforms lead to reduction in the quality of planning at the enterprises and the need for constant updating of medium-term and long-term plans.

The solution of critical environmental problems is possible only with the mutual cooperation of the state, industry, science and education in the development and implementation of innovative technologies in the field of restriction of negative influence on the environment and elimination of arising consequences.

Available experts in ecology science often do not possess the knowledge in the field of economics, management, and the basics of law to the desired degree, which leads to an increase in development time of high technology projects and their subsequent implementation. Focusing on technical features and manufacturing processes leads to a lack of knowledge in related areas, and hence to the remoteness of the future experts from the real multifaceted practice. It should also be noted that future professionals must possess not only a basic knowledge of economics and management, but also modern scientific approaches in these areas.

## MATERIALS AND METHODS

Russia has extensive experience in the development of education and science in the field of environmental protection. The basis of higher education are state educational standards. Standards developed for bachelor degree course [2] and specialist programme [3] in areas of environmental protection are fundamental for training of professional ecologists.

The main attention in the state educational standards in the field of training for Ecology and Natural Resource Management is paid to ecological aspects of business activity, which is quite logical, but at the same time questions of the

government legislation, economics, organization and management remain insufficiently deeply worked out.

Within training of specialists in the field of environment protection, professional standards provide mastering competences, which include only the basics of economic and legal knowledge and also skills of planning and organization of exclusively field and cameral works.

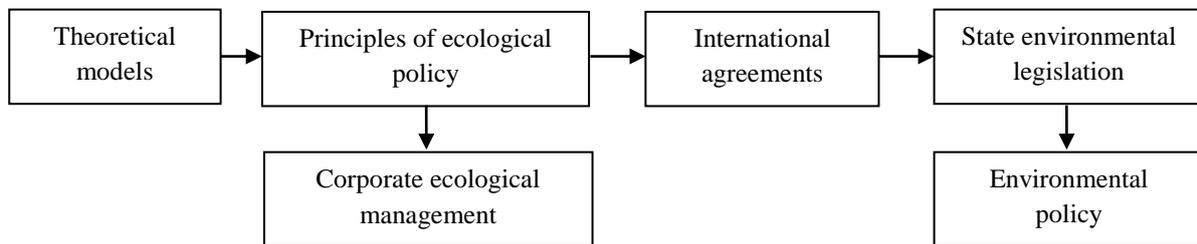
Graduates of a specialist programme, which remained in Russia today, by results of tutoring also have to be able to carry out an economic analysis of technological processes and production in general [3]. The designated skills and abilities do not allow to cover all requirements which are imposed by the enterprises to specialists at employment.

For successful realization of the professional duties the graduate needs to possess not only engineering knowledge, but also knowledge in the field of economics, organization,

management and law. Requirements for training of students in the field of environmental protection and management of natural resources change rapidly which is caused by development of the industry and science. Companies demand graduates capable to analyze and assess the economic situation, as well as those who possess managerial skills. Economic knowledge enables engineers to solve professional problems at any level in a competitive environment.

## RESULTS AND DISCUSSION

For the best understanding of the process and logic of the decision-making on economic issues in the field of environmental protection, an integrated approach to teaching the disciplines of economic and administrative unit is required (Fig. 1).



**Figure 1.** The offered approach for teaching disciplines of economic and management unit for students majoring in "Ecology and Natural Resource Management"

In the presented model at the first stage students master theoretical prerequisites of management decision-making and implementation of environmental requirements through public policy tools. The second stage deals with general international principles of environmental policy, which are based on theoretical models. The implementation of the requirements of international and national legislation is the next step from theory to practice, where specific instruments, such as taxes, fees, the pricing mechanism used in the framework of environmental management in enterprises. Corporate environmental management as a tool, not related to mandatory, and not based on national legislation in this scheme is considered separately, and its study involves a separate course or a section within the framework of environmental economics.

It is possible to distinguish four main sections which are of professional interest to future experts in the field of environmental protection.

The first - the general theoretical paradigm of environmental economics, including:

- basic concepts, classification of natural resources from the point of view of depletion and competition in consumption, as well as their development; presentation of the different types of economic development – technological and sustainable as "weak sustainability", and as "strong sustainability";

- basic principles of modern environmental policy: the polluter-pays principle, principle of sustainable development, the precautionary principle, etc.;
- theoretical models underlying the applicable environmental regulatory mechanisms - the concept of externalities and their internalization, market failures, Pigou taxes, the concept of an optimal level of pollution reduction, Pareto optimum, the Coase theorem, and so forth.

The international mechanisms of environmental regulation are also very important. In particular, the mechanism of purchase and sale of the rights for pollution within the Kyoto protocol and the Parisian agreement, and also system of "green accounts" – environmentally adapted gross domestic product, the indicator of "the genuine savings", "an ecological footprint". It should be noted that within teaching discipline "economy" for technical specialties the emphasis on ecologically adapted macroeconomic indicators is not provided.

The second section includes questions related to the state environmental protection policy. It includes such questions as:

- the main instruments of environmental protection, including the analysis of mechanisms of command and administrative measures and economic methods of environment protection;

- environmental legislation, structure and powers of the executive authorities in the field of environmental protection and nature resource management environmental management;
- environmental regulation;
- management and planning framework;
- implementation of public administration methods and tools of environmental (ecological monitoring, assessment, evaluation of the impact on the environment).

The third section is of special interest for experts in application areas of economics within environmental management, it is devoted to questions of management as reaction to obligatory statutory requirements. It may be referred as operational environmental management. Unlike the strategic environmental management, which is a voluntary instrument, the operational environmental management, or tactical management is aimed at compliance with the mandatory requirements of environmental legislation. Structure of section includes:

- specific features of environmental accounting and reporting in Russian companies
- calculation of economic assessment of natural resources
- calculation of environmental charges (for air pollution, water and waste disposal);
- calculation of prevented environmental damage;
- economic assessment of the damage caused by environmental pollution
- calculation of the severance tax;
- technical and economic analysis and assessment of the effectiveness of environmental protection measures;
- general analysis of financial and economic activity of enterprises.

The fourth section is a review of voluntary tools used in enterprises in order to improve environmental and economic performance of their activities. In the Russian-language and foreign literature, these tools are known as corporate environmental management systems (EMS).

Due to the wide spread of corporate management standards, such as ISO 14000, ISO 50000, OHSAS 18000, ISO 9000 [4], the specialists in the field of environmental protection faces the task not only to ensure the adoption of rational economic decision, but also to understand all functional features of enterprise management systems in relation with all subsystems in an integrated strategic management.

This section usually includes such issues as:

- environmental management system as part of a process-oriented international standards, such as ISO 14000 / GOST R ISO 14000 and EMAS;

- problem-oriented environmental management - a model of cleaner production (Norwegian model), inter-organizational approaches;
- assessment of a product's life cycle;
- ecolabeling;
- auditing of management systems

The reviewed block of disciplines has pronounced cross-disciplinary character (Table 1) that proves the necessity of integrated teaching approach. It has to cover all aspects of activity of the enterprises which, on the one hand, make negative impact on a environment, and, on another, give the considerable opportunities for the domestic companies to increase their ecological and economic efficiency.

**Table 1.** The relationship within the disciplines of economics and environmental management

Section	Economics	Management	Law
Theoretical basis of environmental economics	+	+	+
State environmental legislation and policy		+	+
Operational (tactical) environmental management	+	+	+
Corporate Strategic Environmental Management	+	+	

Environmental management systems, economic instruments of stimulating environmental management, advanced foreign approaches of solving environmental problems by streamlining and reducing resource and energy dependence are the basis on which we should build a modern education in the field of environmental protection and rational nature management.

## CONCLUSION

Particular importance of the issue of integration of economic knowledge in the development of engineering education follows from a number of factors. Among them - the rapidly changing Russian legislation in the field of nature protection, attempts to adopt foreign experience, lead to the transition of Russian industry on the principles of best available technologies, as well as focus on the stimulating of import substitution.

Thus, we can conclude that it is necessary to build a coherent system of teaching the disciplines unit of economics, management and law for the natural resources management and environmental protection specialists and bachelors that meets the advanced trends in the development of legislation and scientific-and-technological progress. So, namely the primary training of specialists in higher educational institutions, focused on a comprehensive understanding of the processes and logic of management and economic decision-making will help to turn the Russian economy on the path of sustainable development.

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