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THE SYSTEM OF THE BIOLOGICAL WASTE MANAGEMENT IMPROVEMENT ON THE BASIS OF STATE-PRIVATE PARTNERSHIP AND ECOLOGICAL INSURANCE MECHANISMS

Abstract. Introduction. The problem of ecological and economic efficiency in terms of the biological waste management is largely owing to the insufficient usage of modern market instruments.

Purpose. In this connection it is necessary to develop a mechanism to create economic incentives for the parties involved into the treatment of biological waste, and to more careful attitude towards the environment.

Results. Basically, the problem is considered from the standpoint of administrative regulation using the compensation mechanism of environmental economics that is the reason of the biological waste management inefficiency. Prerequisite of such negative situation is lack of stimulating mechanisms applying in environmental economics. It is proposed in the article to manage the biological waste handling system through effective economic instruments, such as environmental insurance and public and private partnerships that allow employing stimulating approach. Stimulating mechanism of environmental economics assumes setting the stage for mutual concernment of parties, involved in the biological waste handling system, for the purpose of improvement of ecological and economic efficiency of the process. These methods include assessment of the biological waste management project risks, management of ecological and economic risks based at their optimum redistribution, stimulation of activities under setting the stage for mutual concernment of parties, connected to the biological waste, and preventive impact on the natural resources.

Conclusions. The mechanism of effective the biological waste management is based on the creation of a scheme that will allow rising private investors participation due to the possibility of high returns and additional guarantees from the government, as well as the combination of market and governmental instruments. The result of these proposed measures will be the investment attractiveness of the biological waste management projects increasing, usage of insurance functions to the full extent (preventive function and restitution). As consequence, in future, stimulating mechanism will have become major and reduce negative ecological impacts.

Keywords: biological waste; risks; state-private partnership; ecological insurance; concession.

JEL Classification: A12, G22, O13, Q20

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СОВЕРШЕНСТВОВАНИЕ СИСТЕМЫ УПРАВЛЕНИЯ БИОЛОГИЧЕСКИМИ ОТХОДАМИ НА ОСНОВЕ МЕХАНИЗМОВ ГОСУДАРСТВЕННО-ЧАСТНОГО ПАРТНЕРСТВА И ЭКОЛОГИЧЕСКОГО СТРАХОВАНИЯ

Аннотация. Проблема эколого-экономической эффективности в области управления биологическими отходами во многом связана с недостаточным использованием современных рыночных инструментов. В статье предлагается управление системой обращения с биологическими отходами на основе таких эффективных экономических инструментов, как государственно-частное партнерство и экологическое страхование, позволяющих создать стимулы для потенциальных природопользователей бережно относиться к окружающей среде. В результате внедрения предложенных авторами механизмов государственно-частного партнерства (концессии) и экологического страхования повысится инвестиционная привлекательность проектов в сфере управления биологическими отходами, усилится влияние страховых функций (превентивная, возмещение ущерба) по защите окружающей среды, снизится негативное воздействие биологических отходов на экологическое равновесие.

Ключевые слова: биологические отходы; риски; государственно-частное партнерство; экологическое страхование; концессия.

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УДОСКОНАЛЕННЯ СИСТЕМИ УПРАВЛІННЯ БІОЛОГІЧНИМИ ВІДХОДАМИ НА ОСНОВІ МЕХАНІЗМІВ ДЕРЖАВНО-ПРИВАТНОГО ПАРТНЕРСТВА ТА ЕКОЛОГІЧНОГО СТРАХУВАННЯ

Анотація. Проблема еколого-економічної ефективності в галузі управління біологічними відходами здебільшого пов'язана з недостатнім використанням сучасних ринкових інструментів. У статті пропонується управління системою поводження із біологічними відходами на основі таких ефективних економічних інструментів, як екологічне страхування і державно-приватне партнерство, що дозволяють повною мірою задіяти стимулюючий підхід. У результаті впровадження запропонованих автором механізмів державно-приватного партнерства (концесії) та екологічного страхування підвищиться інвестиційна привабливість проектів у сфері управління біологічними відходами, зросте роль страхових функцій (превентивна, відшкодування збитку) щодо захисту довкілля, знизиться негативний вплив на екологічну рівновагу.

Ключові слова: біологічні відходи; ризики; державно-приватне партнерство; екологічне страхування; концесія.

Introduction. Annually in the Russian Federation more than 4 billion tons of the household, agricultural, industrial and other types of waste are formed. The volume of the solid household waste formation in settlements of the Russian Federation makes 150 million m³ (30 million tons) a year. The main part of waste is stored on ranges of various type and numerous dumps that brings huge ecological, economic and social damage [1].

Negative impacts of waste are shown also in increase of incidence of people, deterioration of their vital conditions, and decrease in efficiency of natural resources. Pollution of soils and waters generates 47% of diseases of respiratory organs, 16% – of endocrine system, 2.5% – of cancer diseases among people at the age of 30-34 and 11% – among people at the age of 55-59 years. Even more often are situations when symptoms of the specific pathologies caused by chronic action of small concentration of technogeneous pollutants are found. This action is related with the transfer of harmful substances from waste dumps into the environment with a more or less prolonged some of these substances delay and their gradual accumulation [1; 2].

Brief Literature Review. Solution of ecological problems through economic instruments was engaged by such scholars as S. N. Bobylev, G. A. Motkin, K. V. Papenov. In particular, Professor Bobylev [4; 5; 15] considered such notions as «market failure» and «failures of the state» in ecology and on their basis he proposed distribution functions of the state and market sectors through public-private partnerships. Professor G. A. Motkin, examining the problem of waste management in terms of risk minimization, proposed to use the tools of insurance that minimize damage to the environment and increase the responsibility of the nature users.

Purpose. In order to solve problems in the field of the biological waste treatment, it is necessary to develop mechanisms that will create economic incentives for the parties involved in the biological waste treatment to a more careful attitude towards the environment and increase the investment attractiveness of the sector.

Results. The biological waste has once been materials, substances, the remains (garbage) of animal and the genesis, formed as a result of animals death, medical and veterinary practice, scientific activity and experiments with live organisms and biological fabrics, and also arising during the work of the agro-industrial enterprises, the warehouse and processing enterprises of the food industry, the food markets, the enterprises of municipal economy, a services sector and public catering have special negative impact [3].

It should be noted that in Russia, at the moment there is no sole law related to the address with the biological waste. However, according to the Federal Law from June 24, 1998 No. 89-FZ «On production and consumption wastes», this type of waste can be attributed to dangerous as the uncontrollable activity connected with the biological waste can constitutes direct or potential danger to surrounding environment and health of a person independently or at the introduction in contact with other substances [1].

Many questions about the address with the biological waste arise to the processing industry enterprises in the agrarian and industrial complex sphere, and in particular to the meat-processing enterprises. Let us consider the situation in Saratov, which is the largest city in Volga area with a population of over 2.4 million people. In average, in Saratov region about 2.5 thousand tons of the biological waste a year, among which about 660 thousand corpses of animals, are formed. A large number of wastes are not always neutralized properly that finally leads to substantial negative ecological effects. At present, there are three main ways of utilization of the biological waste. They are as follow: burial on the places of dead cattle and ranges of solid household waste, processing and natural utilization. Weakening of control from supervisory authorities allows detecting ecological, veterinary, sanitary and epidemiologic violations in due time. Capacities for the biological waste utilization are usually loaded not in full. It increases the costs of utilization process. So, the average cost of neutralization of waste of the meat-processing enterprises ranges within 60-80 dollars per ton. Only the large enterprises observe all standards of safety in their waste processing. Unfortunately, in this sphere a large number of the small enterprises work also, and their activity isn't always under control of appropriate authorities that leads to adverse ecological implications. However, these enterprises can significantly reduce utilization cost, and an enterprise-processor would prefer to deliver waste to these enterprises.

In this law, economic mechanisms of impact on the potential user of nature provide more measures of stimulating character, in difference to the existing at present compensatory ones. In particular, it provides budgetary credits, subsidies and subventions to the legal entities and individual entrepreneurs carrying out at the enterprises adoption of effective low-waste technologies and using the biological waste in the activity. Adoption of these measures will stimulate processors to minimize waste during their activity and to process waste by their own means.

It should be noted that the law provided establishment of the lowered coefficient to rent rates for the earth to the legal entities and individual entrepreneurs who are carrying out processing, usage and neutralization of waste. This measure is very topical, since the enterprises will be able to significantly reduce their costs [4; 5].

Ways of the biological waste adverse ecological implications minimization on environment are presented in Figure 1. Considering high ecological danger at the address with the biological waste, carrying out a number of actions, on the basis of administrative and market instruments which would promote decrease in environmental risks and stimulation of nature users to the effective address with the biological waste, is necessary.

Considering the sphere of the address with the biological waste from economic positions, it becomes obvious that at the correct approach to this problem, extraction of considerable profit is possible. However, to extract profit in this sphere, there are necessary significant financial investments by a large number of investors who will be interested in the investments. It

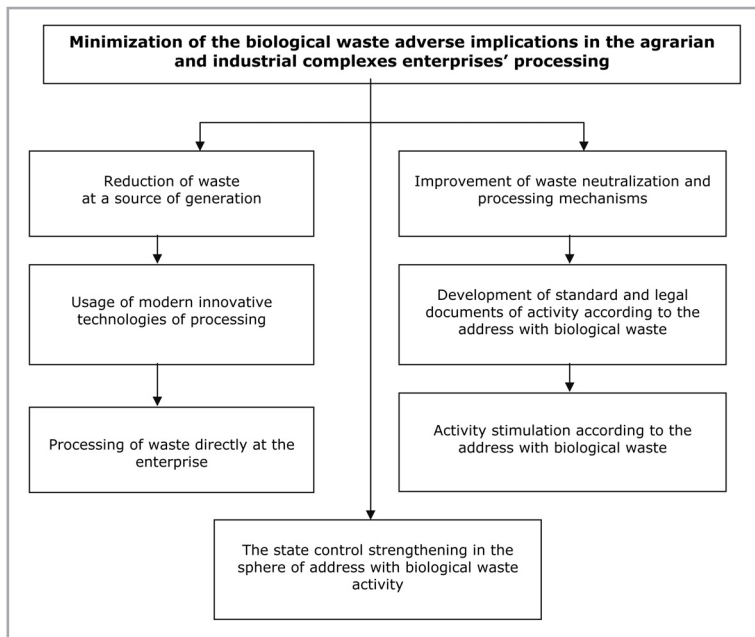


Fig. 1: The ways of the biological waste adverse implications on environment minimization

Source: Own research

should be mentioned that for the adoption of environmentally friendly technologies on consumer waste recycling, necessary financial investments and state support are vital. Authorities usually refer to the lack of financial means in budgets of all levels that is often true. Nevertheless, funds can be invested in forms of natural resources (and the concession plays an important role in the process) [6; 8].

Concession is a long-term form of implementation of the investments, based at a permission by the state to deploy renewable and non-renewable natural resources, and to carry out other types of economic activity on the terms of long-term rent [5; 7]. Under the contract of commercial concession one party (owner) undertakes to provide to other party (user) for remuneration for term or without the indication of term the right to use in business activity a complex of sole rights rested in an owner, including the right to a trade name or commercial designation, to protected commercial information, and also to other objects of exclusive rights provided by the contract [9; 10].

Considering concession tools alternatively privatizations, their main advantage is that the public expenses are sharply cut down for creation and infrastructure maintenance as the main financial burden lays down on the consumer. At the same time, unlike privatization, private investors are attracted without property alienation in favor of the private investor.

In the sphere of the address with the biological waste of consumption, objects of transfer to concession can act both the enterprises, and territories, for example for construction and arrangement of ranges for their warehousing.

Management of the address with the biological waste of consumption system is connected with a large number of risks, and efficiency of the concession relations directly depends on a solution of the problem of their division [11; 12]. Because the concession contract is directed on attraction of investment resources from the private sector in state property development, and also increase of commercial effectiveness of management by state property and represents one of forms of partnership, it is obvious that the individual and the state bear a certain joint liability before each other, and also before society at the conclusion of a concession contract. The full accounting of risks will allow dividing them between partners so that their assignment was conducted by the principle of the smallest impact on the participant.

By means of detailed risk analysis, there is possible to structure the project, develop techno-economic justification,

carry out measures to minimize risks and improve viability of the project. Risk analysis allows defining a partnership form, a role of each partner, his participation, contract obligations and the financing scheme. For example, at definition of a way of waste neutralization, it is necessary to consider the size of environmental risks for each object. In this regard, at the conclusion of a concession contract it is necessary to consider this fact as the main, and at a choice of the concessionaire take into consideration what organization will carry out neutralization of the biological waste with the smallest environmental risks.

The major problem at environmental risk assessment in the field of the address with the biological waste is definition of possible damages affecting economic and social, ecological and other spheres of activity of the person [13]. For example, neutralization of this type of waste with violation of technological norms can lead to serious ecological damage and sanitary infection of territories and people. One of effective instruments of decrease in risks is, as we know, insurance. Insurance is a way of the indemnification of damage, sustained by the physical and legal entity, by means of their distribution between many persons. Indemnification is made from means of the insurance fund being in introduction of insurance company.

Responsibility insurance is an insurance branch where the object is liability to third parties (physical and legal) by people to whom the damage (harm) owing to any action or inaction of the insurer can be done. By insurance of responsibility insurance protection of economic interests against possible trespasser is realized [11].

Being one of the economic mechanisms of activity in the sphere of the address with the biological waste regulation, ecological insurance carries out the main functions peculiar to all types of insurance. Decrease in environmental risks is one of the main objectives in activities for the address with waste as it can lead to is connected with significant economic sanctions in case of causing damage. In this case, two main functions of insurance will be involved:

- function of compensation of damage in case of loss occurrence, or compensation function;
- preventive or precautionary function which consists in carrying out actions for prevention of possibility of a loss occurrence.

Estimating compensation function of ecological insurance in the sphere of the address with the biological waste, it must be kept in mind that it is in a close interrelation with other mechanisms of indemnification, such as self-insurance, a mutual insurance, payments from special ecological funds, bank and other financial non-state guarantees, the state guarantees and other sources of loss cover.

This type of insurance is based on existing rules of the nature protection legislation of the states. The main objective of this insurance consists in a covering to the insurer of the losses connected with need to compensate to the third parties of damage which they suffered as a result of the environmental pollution which was a consequence of activity of the insurer. Insurers in this case can be both legal, and individuals, and into the sum of an insurance covering can enter both direct, and the indirect losses connected with infliction of harm to health and property of the third parties, excepting cases of the planned or deliberate environmental pollution.

The economic essence of ecological insurance consists in accumulation of money in funds of insurance companies or in specially created insurance (ecological, nature protection, etc.) funds and in redistribution of the money between the third parties for compensation of the losses caused to them at loss occurrence [14].

The mechanism of ecological insurance is constructed on the basic principles of insurance, namely probabilistic distribu-

tion of casual events. The main complexity at ecological insurance is that at present it is very difficult to simulate an emergency ecological situation and a cost of the caused damage, because of the absence of a little reliable and even approximate statistical information.

Typical conditions for insurance of liability for damage caused as a result of environmental contamination by the biological waste are as follows:

- explicit evaluation of the risk degree at the conclusion of an insurance agreement;
- insurance compensation to an involved in the industries where is particularly high degree of risk, but subject to their obligations under the compliance with the measures on risk reducing and on losses prevention that are provided in an agreement;
- except from the agreement perils of liability for damage caused by persistent or recurrent cases of emergency, as well as emissions of pollutants within the rules and regulations established by law, or at the level of the relevant departments;
- aggregation on liability (insurance amounts) according to the possible types of contamination.

Unfortunately, in Russia there is no obligatory ecological insurance in relation to the sphere of the address with consumption waste. The insurance mechanism isn't stated in the Federal Law «On production and consumption waste» even partially. All this aggravates a situation in the sphere of the address with the biological waste. Thus, even feeling like participating in insurance process at the address with waste, insurers and insureds can't develop the accurate plans of action. Generally a large number of problems arises at the choice of the organization which will act as the insurer. It is obvious that producers of waste have to assume the main share of loading, and the contract of insurance needs to be signed with them as it becomes in many foreign countries with high rates of ecological efficiency. As for the insurance premium paid to insurance company, options, depending on certain conditions are possible. For example, as a stimulating measure, from local and federal budgets subsidizing of part of an insurance premium as it becomes in agriculture can be carried out, and it will be effective support of the sphere of the address with the biological waste. In a general view the scheme of ecological insurance of process of the address with the biological waste can look as follows (Figure 2).

Unfortunately, nowadays there are difficulties for universal introduction of ecological insurance. The reasons of this fact are as follows:

- this type of insurance can be carried out by insurers as at their own expense, and at the expense of interested persons, however obligatory insurance of responsibility for the account of the budget isn't provided;
- ecological insurance is regulated in the legislation both directly, and indirectly, i.e. in a context of insurance of a civil liability for causing any harm;

- legal regulation of ecological insurance is carried out fragmentary, i.e. concerning one types of ecologically dangerous activity such insurance is fixed, and concerning others isn't present.
- existing norms have mainly redirect character: in them links to the special law regulating conditions and an order of ecological insurance prevail, thus, any existing statutory act, unfortunately, doesn't carry out legal regulation in a volume, sufficient for practical introduction of obligatory ecological insurance.

Conclusion. As it was noted above, difficulties in definition of risk degree and the insurance tariff size cause need of special approach of the insurer to ensure financial stability of insurance transactions under agreement of this type of insurance. The insurer has to form additional insurance reserves for performance of obligations under agreements of ecological insurance, considering a reserve of unprofitability fluctuations, a reserve of accidents, etc. In this regard, at implementation of ecological insurance, in particular in the sphere of the address with waste, it is necessary to use the reinsurance mechanism which essence is in risk transfer to other insurance companies that promotes its decrease. Basic purpose of reinsurance is the guarantee of solvency of the insurer, the guaranteed insurance payment to the insurer at a loss occurrence.

Thus, despite obvious difficulties in the solution of managerial problems in the sphere of the address with the biological waste, usage of state-private partnership mechanisms and ecological insurance will allow in essential degree to mitigate risks by their redistribution and effective management; increase investment attractiveness of the sphere of the address with the biological waste; decrease cost loading on budgets of all levels; and, the main thing, it will significantly reduce negative sanitary and ecological impact on the person and environment. The proposed mechanisms will reduce the amount of the areas, contaminated with biological waste (in the Saratov region it is about 100 hectares) and also to attract additional investments in this sector in the region of \$10-15 million.

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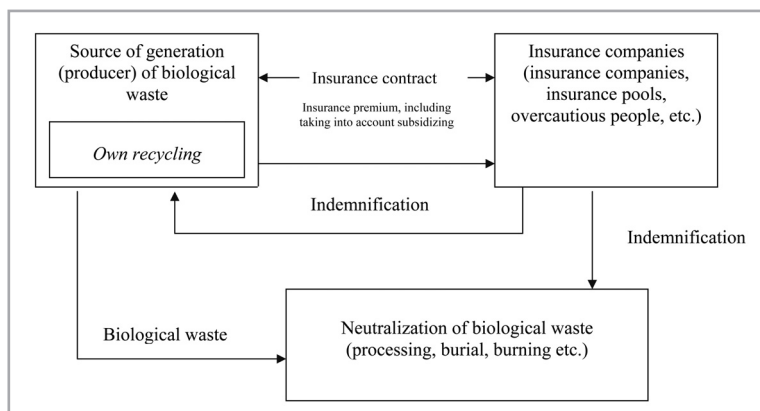


Fig. 2: A scheme of address with the biological waste on the basis of ecological insurance

Source: Own research

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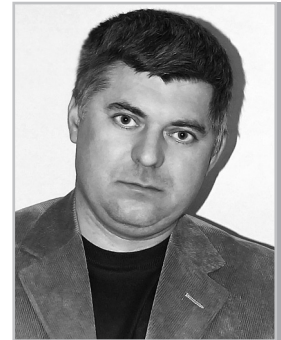
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ЕВОЛЮЦІЯ ТЕОРІЙ ПРИРОДОКОРИСТУВАННЯ ТА ЇХ РОЛЬ У СИСТЕМІ ВИКОРИСТАННЯ ВІДНОВЛЮВАНИХ ПРИРОДНИХ РЕСУРСІВ

Анотація. Розглянуто еволюцію теорій природокористування, виокремлено основні ознаки, що їх формують. Обґрунтовано місце теорій природокористування у системі використання відновлюваних природних ресурсів. Представлено авторське бачення концепції збалансованого природокористування, яка передбачає забезпечення балансу між потребами у природних ресурсах, що зростають, і наявними обсягами таких ресурсів, досягнення сталого розвитку природних ресурсів через реалізацію соціальної, економічної та екологічної функцій держави у сфері природокористування й охорони навколишнього середовища. Виділено постулати і принципи, які закладено в основу концепції збалансованого природокористування.

Ключові слова: природні ресурси; відновлювані ресурси; збалансоване природокористування; охорона довкілля.

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THE ENVIRONMENTAL MANAGEMENT THEORIES EVOLUTION AND THEIR ROLE IN THE SYSTEM OF RENEWABLE NATURAL RESOURCES USAGE

Abstract. The evolution of the environmental management theories has been considered in the paper. Approaches towards environmental management in different economic and environmental theories have been studied as follows. The theories of pre-classical and classical periods: the labor theory of property; elite; exploitation; social division of labor; the state and the economic role of the state; property rights, the government regulation; mercantilism; as well as the theories of neoclassical period: the marginal utility theory, the theory of value; and theories of the modern period: geographical determinism, technological determinism, economic growth, consumption theory, and the theory of sustainable development.

The conceptual characteristics being the basis for each of the theories have been pointed out. The position of the theories of environmental management in the system of renewable natural resources usage has been grounded. The author view of the sustainable environmental management concept has been presented in the paper. The main idea of the concept has been determined as ensuring the balance between the growing needs for natural resources and the available amount of such resources. The postulates of the sustainable environmental management concept have been distinguished, namely: cost-effectiveness and efficiency ensuring in the allocation and usage of natural resources; a simple and expanded reproduction of the natural resources forming; safe usage of natural resources and food safety; the environment protection.

The principles of sustainable environmental management have been determined, which are: equality in the natural resources usage and consumption; free access to the natural resources; ensuring the effectiveness and productivity of the natural resources utilization; protection of natural resources and the environment from the threats and dangers.

Keywords: natural resources; renewable resources; sustainable environmental management; environmental protection.

JEL Classification: Q1, Q2, Q5