

ECONOMICS OF UKRAINE'S BIODIVERSITY

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Summary. In the article the analysis of economical state and local management systems of the Ukrainian biodiversity has been done. The biodiversity conservation functions analysis and classification have been carried out. The economic effect of biodiversity functioning has been estimated using forests and swamps ecosystems as an example. The necessity of biodiversity in the GDP of the state has been justified. The study of the concept of sustainable development as the most promising in terms of biodiversity has been investigated. The main methods and tools of biodiversity conservation, the best practices of biodiversity conservation have been learned. The basic measures improving governance biodiversity of Ukraine in accordance with the concept of sustainable development have been ordered. The study was conducted on the basis of a systematic method. Scientific and practical interest in the work is the proposed funding mechanism for biodiversity conservation in the current economic climate of Ukraine. The organizational structure of government biodiversity conservation of Ukraine has been investigated. The effectiveness of government biodiversity conservation has been investigated. The functions of the Ministry of Ecology and Natural Resources of Ukraine as a central body of executive power in the field of biodiversity conservation have been studied and analyzed. The best foreign practices of biodiversity conservation and recommendations for its implementation in Ukraine have been ordered.

Keywords: ecosystems, biodiversity, conservation, economic.

ЕКОНОМІКА БІОРІЗНОМАНІТТЯ УКРАЇНИ

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Анотація. У статті проведено аналіз економічного стану та системи управління збереженням біорізноманіття України. Здійснено класифікацію екосистемних функцій збереження біорізноманіття та подано їх узагальнений економічний аналіз. Розраховано економічний ефект від функціонування біорізноманіття на прикладі лісових і болотних екосистем. Підтверджено необхідність врахування економічної ефективності функціонування компонентів біорізноманіття України у ВВП держави. Проведено дослідження концепції сталого розвитку як найбільш перспективної з точки зору збереження біорізноманіття. Основні методи та інструменти збереження біорізноманіття, кращі практики збереження біорізноманіття були розглянуті. Розроблено комплекс заходів щодо покращання управління збереженням біорізноманіття України відповідно до концепції сталого розвитку. Дослідження було проведено на основі системного методу. Науково-практичний інтерес в роботі становить запропонований механізм фінансування збереження біорізноманіття в умовах нинішнього економічного клімату України. Організаційна структура збереження державної біорізноманіття України була запропонована, досліджено ефективність управління збереженням біорізноманіття. Функції Міністерства екології та природних ресурсів України як центрального органу виконавчої влади в галузі збереження біорізноманіття були вивчені і проаналізовані. Запропоновані кращі зарубіжні практики збереження біорізноманіття та розроблені рекомендації щодо їх реалізації в Україні.

Ключові слова: екосистеми, біорізноманіття, збереження, економіка.

Problem setting. According to the figures of National Ecological Centre, Ukraine, covering only 6 % of the total area of Europe, has 35% of its biodiversity (Biodiversity, 2014). Biodiversity is one of the key components of sustainable development, environmental policy of EU countries and in the world, so we need a clear effective management system of biological diversity. It is necessary to improve the actual organizational structure and necessity of the national biodiversity conservation led to this research.

The recent studies analysis concerning a given problem. Biodiversity creates a safe and healthy environment, provides the population with food, medicines, raw materials for indus-

try. It also supports the ecosystems functioning, including circulation and purification of natural waters, soil conservation and climate stability. That is why biodiversity is studied in a number of scientific papers, including T. Andrienko (2007), Fabijanski P. (2003), Tishkov A. (2009), Brink B. (2000), Vololoshinova N. (2007).

Remaining components of the overall problem. The real economic assessment of biodiversity should be obtained and later be reflected in the national accounts of each country for efficient storage and accounting functioning. All theses determine the purpose, the subject and the object of this study.

Setting the purposes of the article. The main aim of this paper is the conduction of biodiversity functioning economic evaluation on the example of forest and wetland ecosystems and consideration it in the state national accounts of Ukraine.

The main material research. In Ukraine, as forest conservation care of the State Agency of Forest Resources. Forest management at the local level state enterprise that are managed by the State Agency of Forest Resources of Ukraine and coordinated by its appropriate regional authority (Reskomlis Crimea, 24 regional departments of forestry and hunting). The economic evaluation of Ukraine forest and wetland ecosystems effectiveness was carried out in this research due to the fact that forested and open wetlands cover about 20 % of Ukraine (Table 1).

Table 1 - The Comparison of Forest in Poland and Ukraine

Country	Area of forests, thousand ha	Share of forest, %	Area of Nature Protection Fund (NPF), thousand ha	Share of NPF from the total territory, %	Specific indexes			
					Forest on a one ha territory	Area of NPF on a one ha territory	Forest per one person, ha/person	NRF, per one person, ha/person
Poland	8890	28,5	7130,4	22,8	0,284	0,228	0,233	0,187
Ukraine	10400	15,9	3670,5	5,4	0,173	0,06	0,23	0,07

Although Ukraine has a larger area of the territory which is occupied by forests than Poland, but the proportion of the total territory is of nearly half.

Today, Ukraine cannot stay away from the prevailing world market ecosystem services due to the threat of global ecological crisis. The national economy formation delay leads to the annual loses of foreign investment in the environmental performance development. The generalization of domestic and international experience, presented in experts work (Economy Saving Biodiversity, 2002) allowed to differentiate six approaches to economic evaluation of biodiversity functioning (economic assessment based on the final national economy results, socio-economic assessment, experts review, costly techniques, rental approach and the total economic value concept). The most promising is the total economic value concept, as it provides a comprehensive approach to assessing biodiversity (Theory and practice of biodiversity (the methodology of wildlife in Russia)). The calculation of economic efficiency of Ukraine forest and wetland ecosystems was carried out on the basis of the developed methods, which are based on the concept of total economic value. The results are shown in table 2. So, as calculations show, an annual economic impact of Ukraine wetlands wastewater treatment is about \$86 million. The total mass oxygen deposition from forests and swamps is about 60 million tons, which allows ensuring the livelihoods of 147 million people, which is three times more than the population of Ukraine (Voloshynova, 2007; Yakymchuk, 2014).

The economic impact of clean air (absorption of carbon dioxide) is about 1795 million. The total economic impact of forest and wetland ecosystems functioning was estimated at 1880 million. Annual economic impact of forest ecosystems is \$150, and wetlands is 316 as per 1 ha. The share of natural capital in the structure of Ukraine state budget was calculated to about 5 % that's 2 % – in the structure of GDP.

Table 2 - Economic efficiency calculation of biodiversity in Ukraine

№	Indicator	Calculation results		Total
		Forest Ecosystems	Wetland ecosystems	
1.	The economic effect of savings on the purchase of industrial wastewater treatment plants due to natural water purification, million dollars	-	85,8	85,8
2.	The oxygen production million tons	52,78	7,05	59,83
3.	The number of people whose livelihoods ensured by oxygen, million persons	130	17	147
4.	The economic impact of clean air, million dollars	1583,4	211,5	1794,9
5.	The total economic impact on the natural functioning of ecosystems million dollars	-	-	1880,7
6.	The economic operation effect per 1 ha, dollars	150	316,3	466,3
7.	The share of natural capital in comparison with the state budget (2013),%	4,4	0,6	3,01

The annual economic performance of the Ukraine forest and wetland ecosystems equals to 12 budgets of Rivne region (Yakymchuk, 2014). This indicator must be significant for preservation investment. Estimation of biodiversity components economic efficiency is the basic tool to prove the necessary of annual fund increasing. One of the innovative tools to attract foreign investment in Ukraine is the implementation of the Kyoto Protocol. Economic grounding allows coming to the conclusion that Ukraine forest ecosystems efficiency occupies the second place after Russia. Ukraine forest ecosystems are able to provide livelihoods to population up to 63 million people and be the second after Poland. As carbon recipient countries, Moldova and Belarus should compensate Ukraine for these effects on forest preservation. This would allow Ukraine to restructure its external debt (Brink, 2000). This comparison showed that the forest and wetland ecosystems efficiency is more than 9 times higher (research – in 5572 times, nature reserves – in 226 times, in more than 1000 times in national ecological networks) than the total budgetary investment in environmental protection in 2009. This is a definite argument for fund increasing (The Convention on Biological Diversity; Tishkov, 2009; Yakymchuk, 2014).

Conclusion and scientific innovation. In the process of research authors have come to such conclusions and suggests such recommendations:

1) Biodiversity should receive adequate economic assessment to reflect the GDP as national wealth. According to calculations economic evaluation of Ukraine forests and wetlands functioning is more than 1.88 billion. United States (2 % of GDP and 5 % of the State Budget of Ukraine 2009 level; 3 % of the State Budget of Ukraine 2013 level). The economic account of these functions of biodiversity in GDP will allow to form in Ukraine the market of ecosystem services and to attract foreign investments for nature protection activity realization.

2) Display of biodiversity cost-effectiveness in the state national accounts and ecosystem services will allow restructuring Ukraine's foreign debt (104 billion dollars.) over 15-20 years.

3) It is necessary to support functioning of forest and swamp arrays of Ukraine in the natural state. Occupying only 19,1 % territories of the state one hectare of swamps brings profit for society in a size over 316 dollars, forest – 150 dollars (does not take into account collection of by-products and medical plants).

4) Analysis of the actual annual funding revealed the discrepancy between the real ecosystems value (value or productivity) and public investment for their maintenance. The economic impact of ecosystems at least 9.4 times greater than the total annual state budget investment in nature conservation. The costs of biodiversity should be allocated by a separate line in the state budget.

5) The total economic value concept in terms of the direct and indirect functions of the biodiversity components is the most appropriate for the economic evaluation. Methods of economic evaluation of biodiversity by law developed by this research should be introduced. This will take account of biodiversity functions such as: wetlands water purification functions, forests and swamps oxygen production, health effects of recreational activities. The economic record of biodiversity functions in GDP will generate ecosystem services market in Ukraine and attract foreign investment into the environmental activities implementation.

6) Implementation of the Kyoto Protocol is a real opportunity for Ukraine to receive

funding of \$ 7.5 billion for internal environmental policy and the health of the population. Moldova and Belarus, as recipient countries emissions under the Kyoto Protocol should compensate Ukraine the forest ecosystems maintenance and invest into their development.

7) It is necessary to maintain swamps ecosystems in their natural state. It is an important function of wetland ecosystem to be a natural water filter. As society even doesn't assume that due to swamps it annually saves \$ 85 million on water treatment plants installation. Moreover, it is impossible to consider all environmental economic and social functions of forest and wetland ecosystems, especially in fish recreation, sport hunting, leisure, recreation, gathering medicinal plants and by-products, etc. This is a powerful argument in the reflection environmental and socio-economic value of forest and wetland ecosystems functioning in the national state accounts confirmed by the developed countries experience.

8) Operation of forest and wetland ecosystems annually provides livelihoods of such number of people that were three times greater than its own population of Ukraine (147 million people). It has great social value that cannot be expressed by any valuation and calculations.

9) Economic efficiency calculation of the biodiversity components is the basic tool of evidence necessary to increase in annual funding.

10) Biodiversity preservation in Ukraine has a complex hierarchical structure of government and is characterized by some non-systematic, unclear division of roles and responsibilities. Only 4% of the total number of regions of Ukraine the function of biodiversity preservation is reflected in the organizational structure of state environment authority. The largest share (56%) belongs to regions with combined functions of state administration in the field of biodiversity conservation. All this requires further scientific study and improvement of organizational management structure preserving biodiversity in Ukraine.

11) In order to improve management of biodiversity preservation we will use Poland experience, concerning the taxation of land preservation, involvement of local authorities (communes) to address issues of biodiversity preservation management at the community and state authorized territory.

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