

# **ВОДНІ БІОРЕСУРСИ**

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**UDC 336.226.44:504.062**

**DOI <https://doi.org/10.32851/wba.2021.2.1>**

## **FISCAL INSTRUMENTS OF ECOLOGICAL AND ECONOMIC STIMULATION OF COMBATING CLIMATE CHANGE AND PROTECTION OF WATER RESOURCES**

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The article focuses on environmental taxation as a tool for ecological and economic incentives to combat climate change and ensure the ecological safety of water bodies. It is established, that the negative impact of climate change, the main result of which is global warming, shows as an increase in the number of destructive natural phenomena and the corresponding losses of the world economy. In the terms of climate change the quantitative and qualitative state of water resources worsens, their volumes are reduced, which causes the problem of water shortage. That is why the issue of finding and applying the most effective tools of environmental and economic incentives to ensure ecological safety and environmental protection is relevant. Environmental taxes are investigated as such instruments. Peculiarities of ecological taxation in the EU countries are researched. The main groups and structure of environmental taxes are described, countries with maximum and minimum amounts of collected environmental taxes are identified. It is established, that the main functions of environmental taxation are regulatory and fiscal. The correlation between the volumes of the formed harmful atmospheric emissions and the collected ecological taxes is analyzed. It is proved, that environmental taxation is an effective fiscal tool to reduce the environmental pollution, including the protection of water bodies. The main problems of the current state of the environmental taxation system in Ukraine are described, among them: low rate of environmental tax, irrational structure of environmental taxes, insufficiently effective system of state regulation, irrational use of funds raised. Prospects of modernization of the environmental taxation system in Ukraine are defined, in particular: increase of the environmental tax rate, differentiation of environmental taxes, implementation of certain tax benefits and discounts for green production, improvement of the Tax Code of Ukraine, formation of communication mechanisms for environmental inspections and fiscal services. Accordingly, environmental taxation stimulates the neutralization of the consequences of climate changes and rational consumption of natural resources, including water ones.

Keywords: climate change, ecological and economic incentives, water resources, water bodies, environmental taxation, environmental tax, ecological safety.

**Formulation of the problem.** Environmental issue is one of the most pressing challenges of our time. The consequence of the annual anti-environmental actions of mankind (air and water pollution, deforestation, etc.) shows in global climate change. Global warming as the main manifestation of climate change has led to the destruction of water resources, an increase in the number of catastrophic atmospheric phenomena, the destruction of biosphere reserves. It is necessary to explore the main tools for stopping or at least slowing down the climate change. The article examines the features and effectiveness of the fiscal instrument of environmental taxation, which will stimulate the reduction of harmful emissions into the atmosphere and, as a result, the slowdown of global warming.

**Analysis of recent research and publications.** The works of a significant number of researchers are devoted to the problem of economic consequences of climate change and the main economic instruments of its termination, among them: N.P. Yavorskaya, S.O. Nikola, V.S. Pekkoiev, V.O. Mandryk, V.P. Novak, S.M. Kozmenko, T.V. Volkovets, O.E. Naidenko, A.E. Naidenko, I.V. Shevchenko, O.I. Oliynyk, N.V. Novitska, B. Bosquet, J. Hoerner, A. Bovenberg, B. Heijdra, S. Felder, R. Schleiniger and others.

**Setting objectives.** Given the urgency of the problem of climate change, it is necessary to investigate its projected effects on various ecological components of the environment. Environmental taxation is one of the possible economic tools to solve the problem of climate change. Thus, it is necessary to analyze the effectiveness of the implementation of this instrument in foreign countries and to define core ways to modernize environmental taxation in Ukraine.

**Methods of research.** To determine the main theoretical and practical features of the environmental taxation, a conceptual and methodological analysis of the experience of its use in developed countries was carried out. The data of Eurostat statistics on environmental taxation in EU countries, as well as on greenhouse gas emissions in these countries, were analyzed. The research of the effectiveness of environmental taxes was carried out by comparing trend ratios and establishing a correlation between the amount of environmental taxes collected and greenhouse gas emissions for the period 2014-2018. The prospects of the modernization of environmental taxation in Ukraine were defined using general scientific theoretical research methods.

**Presentation of the main research material.** The impact of climate change can reflect on various components of the environment, in particular on the atmosphere. First of all, it shows in a constant increase in the average annual temperature of the Earth. In The record annual average air temperature for the entire history of mankind refers to 2020 (14.9°C). Such an increase in temperature leads to a steady redistribution of air masses and a corresponding increase in the number of threatening atmospheric phenomena such as cyclones, hurricanes and more. The number of hurricanes in the Atlantic has doubled in the

last century [1]. Accordingly, the number of victims and the amount of material losses after the devastating hurricanes is growing.

Water resources are also affected by climate change. The greatest impact on water is also exerted by the annual increase in average air temperature on Earth. The results of the previous research show, that the impacts of annual temperature rise on water resources reflect in the following aspects [2]:

- redistribution of water resources in area and time (for example, the destruction of water resources of the steppe is predicted in Ukraine by the middle of the XXI century);
- deterioration of the oxygen regime of water resources (as a result, oil products decompose several times slower);
- acceleration of the decomposition of hazardous chemicals (phenols and others);
- changing the conditions for the formation of runoff;
- destruction of habitual ecological cycles of bionts of water bodies.

These consequences are quite serious and pose a threat to both the economies of individual countries and the global economy. Thus, the problem of climate change needs urgent approaches to solve it. Eco-taxes are one of the effective methods of the influence of the problem of climate change. Scientists Nikola S. and Gusev A. give the following definition of environmental taxation: “environmental taxation is a set of payments (taxes and fees) levied on legal entities and individuals, which are aimed at stimulating the rational use of nature by collecting a certain amount of money in proportion to the negative impact on the environment...” [3].

Depending on the type of tax base, environmental taxes are divided into the following groups [4]:

- energy taxes: the tax base is the energy products used (various forms of fuel), as well as harmful emissions (including CO<sub>2</sub>) caused by the combustion of these products;
- transport taxes: the tax base is the purchase and sale, import-export, insurance for most vehicles (except environmentally friendly), as well as the use of roads;
- taxes on environmental pollution: the tax base is emissions of harmful compounds (except for combustion products of energy resources) into the atmosphere and hydrosphere;
- taxes on extraction and use of natural resources: the tax base is economic operations on extraction and further use of limited natural resources (minerals, fresh water, wood etc.).

According to Eurostat data [5], the largest share in the EU refers to energy taxes (300880.68 million euros in 2019), the smallest refers to taxes on pollution and resource taxes (11985.45 million euros in 2019). The leading countries in

terms of environmental taxes in 2019 include such European countries, as Germany (61111.00 million euros), the United Kingdom (58829.76 million euros), Italy (58701.00 million euros), France (€ 56,207.00 million), the Netherlands (€ 27,439.00 million). The countries with the smallest amount of environmental taxes are Malta (€ 345.68 million), Iceland (€ 442.78 million), and Cyprus (€ 578.40 million) [5].

The environmental taxation in the EU countries has two main functions:

- regulatory and incentive;
- fiscal.

The regulatory and incentive function is to sanction business operations related to environmental pollution, as well as to encourage the implementation of innovative technologies by enterprises in order to limit the harmful impact on the environment and save the released environmental tax money. The fiscal function is to provide the state with an additional, significant amount of funds that can be used in the future (and are used in most developed countries) for the needs of environmentally friendly projects. It should be noted, that both functions are successfully achieved in the EU countries.

Let's investigate the effectiveness of the implementation of environmental taxation for combating the negative influence on the environment. Determining the effectiveness of the use of the environmental tax was carried out by calculating the correlation coefficient between the resultative attribute of greenhouse gas emissions and the factor attribute of the volume of collected environmental taxes. The Eurostat data for the calculation are taken for the period 2014-2018 [5-6]. The results of the calculation are presented in the Table 1.

The results of the calculation show, that in most cases the correlation coefficient is negative, which means a negative relationship between factor and result (the higher the amount of environmental taxes, the lower the amount of greenhouse gas emissions). For most countries with a negative correlation, the value of the indicator is in the range [-0.3; -0.6], which indicates the medium strength of the connection. However, for some countries (with the great volume of collected environmental taxes) the indicator is approaching to “-1”, which indicates a significant strength of the correlation: Germany (“-0.91”), the United Kingdom (“-0.68”), Italy (“-0.78”), France (“-0.63”), the Netherlands (“-0.76”). For some countries the value of the correlation coefficient was positive. Countries with small populations (Cyprus, Iceland) experience distortions in greenhouse gas emissions per capita indicator, which affects the direction and strength of the correlation. An integrated evaluation of the effectiveness of the environmental tax was made by calculating the slope of the trend lines for the collected environmental taxes and greenhouse gas emissions for each country, and further assessing the strength and direction of the correlation between the formed coefficient values. This approach allowed to assess the effectiveness of

the concept of environmental taxation itself, without reference to specific implementation. The columns ‘Trend<sub>1</sub>’ and ‘Trend<sub>2</sub>’ of the Table 1 show the calculated values of the trend coefficients of the trend lines for the volumes of collected environmental taxes and the volumes of greenhouse gas emissions respectively. According to the results of the correlation analysis, the value of the correlation coefficient refers to “-0.73”. This value characterizes a strong negative correlation and confirms the principle: “the higher the amount of environmental taxes, the lower the amount of greenhouse gas emissions”. Let’s pay attention to the case of Turkey. During the period 2014-2019, there was a gradual slowdown and further sharp decline in the amount of collected environmental taxes (from 23839.13 million euros in 2014 to 15204.31 million euros in 2019). In parallel, there was a gradual increase in emissions. Accordingly, the value of the correlation coefficient still remained negative. This case confirms the inverse principle: “the lower the amount of environmental taxes, the higher the amount of greenhouse gas emissions”.

**Table 1. The correlation between the volume of collected environmental taxes and greenhouse gas emissions in foreign countries\***

Country / Parameter	Koef	Trend <sub>1</sub>	Trend <sub>2</sub>	Country / Parameter	Koef	Trend <sub>1</sub>	Trend <sub>2</sub>
Belgium	-0,14	569,67	-0,02	Malta	-0,74	19,711	-0,44
Bulgaria	-0,31	94,978	-0,03	Netherlands	-0,76	903,2	-0,6
Czechia	0,10	198,401	0,01	Austria	-0,45	240,281	-0,3
Denmark	-0,40	58,445	-0,15	Poland	-0,23	693,488	-0,4
Germany	-0,91	406,1	-0,16	Portugal	0,28	338,693	0,15
Estonia	0,17	46,969	-0,01	Romania	-0,35	58,043	-0,2
Ireland	0,26	113,082	0,09	Slovenia	0,27	30,868	0,1
Greece	0,12	77	-0,07	Slovakia	0,32	69,219	0,11
Spain	-0,42	601,2	-0,05	Finland	-0,24	235,7	-0,08
France	-0,63	3020,7	-0,06	Sweden	-0,45	88,803	-0,45
Croatia	0,41	117,301	0,1	Iceland	0,99	50,941	0,36
Italy	-0,78	286,6	-0,5	Liechtenstein	-0,13	0,368	-0,14
Cyprus	0,52	24,76	0,23	Norway	-0,58	129,156	-0,2
Latvia	-0,23	46,713	-0,12	Switzerland	-0,69	272,703	-0,12
Lithuania	0,34	64,768	0,13	United Kingdom	-0,68	611,871	-0,3
Luxembourg	-0,35	9,579	-0,28	Turkey	-0,49	-1781	0,13
Hungary	0,72	138,395	0,18		x		

*\*it is calculated based on data [5; 6].*

Both functions of eco-taxation are not fully implemented in Ukraine. Firstly, the tax rate for CO<sub>2</sub> emissions is low in Ukraine. Accordingly, under such conditions it is not a question of stimulating enterprises to integrate more

valuable “green” technologies. Secondly, there is an irrational structure of environmental taxes. Taxes on pollution and use of natural resources are of leading importance in Ukraine, the system of energy and transport taxes is not developed. Thirdly, the efficiency of the system of state regulation of environmental tax collection is insufficient. The funds received from the collection of environmental taxes should be used for the implementation of environmental programs, projects, research works. At the same time a small proportion of funds received goes to the relevant needs [7]. Thus, the system of environmental taxation in Ukraine is currently inefficient and needs modernization.

Regarding the low rate of environmental tax in Ukraine, certain steps are already being taken to solve the problem. The Ministry of Finance of Ukraine has proposed to increase the environmental tax on CO<sub>2</sub> emissions by 3 times [8]. Differentiation of the environmental tax, the introduction of certain tax benefits and discounts for “green” production is also an effective mechanism. Tax benefits are especially often used in transport taxes. To change the irrational structure of environmental taxes, it is necessary to review the regulations of the Tax Code of Ukraine. For today the ecological tax is defined as “national mandatory payment, which is based on the actual volume of emissions into the atmosphere, discharges of pollutants into water bodies, waste disposal, the actual amount of radioactive waste temporarily stored by their producers, the actual amount of generated radioactive waste and the actual amount of radioactive waste accumulated before April 1, 2009” [9]. Accordingly, it is necessary to expand the concept of “ecological tax”, to correlate it with the generally accepted concept of “environmental tax”. Specific energy and transport taxes should be proposed, and an environmental tax on CO<sub>2</sub> emissions should be included in energy taxes. Similar steps can be taken during the unification of national and European legislation on environmental issues. The system of environmental taxation can be effective only with a developed system of state regulation. At present, there are no mechanisms for communication between fiscal services and environmental inspections. Such communication channels should be formed and proposed by government institutions. Reports of environmental inspections of economic entities should be processed by fiscal services. National legislation provides for the use of funds received from the collection of environmental tax in the needs of environmental projects and research. Therefore, the solution to the problem of misuse of funds is, first of all, not to change the national legislation, but to ensure the transparency of the functioning of state bodies. This approach will ensure the use of funds for their intended purpose.

**Conclusions and suggestions.** The effects of climate change (primarily, the increase in average annual air temperature) are visible in every component of the environment. For the atmosphere, these consequences are an increase in the number of destructive atmospheric phenomena (cyclones, hurricanes). For the hydrosphere they show in reducing and changing the structure of return runoff, reducing

the total amount of water resources. This impact of climate change is associated with threats and losses to the economies of both individual countries and the global economy. Environmental taxes are taxes, the base of which are certain agents that have a proven negative impact on the environment. The largest weight in Europe is occupied by energy and transport taxes, in Ukraine – by taxes on pollution and use of limited resources. The carried-out correlation analysis confirmed that the environmental taxation can lead to reduction of environmental pollution.

The environmental taxation system in Ukraine is not efficient enough and needs to be improved. The core problems of the environmental taxation system are the low environmental tax rate, irrational structure of environmental taxes, weak system of state regulation, misuse of funds raised. The Ministry of Finance is already developing projects to solve the first problem. Regarding other issues, the following ways to improve the environmental taxation system are proposed: revision of tax legislation in order to harmonize the structure of environmental taxes, development of communication mechanisms for tax services and environmental inspections, transparent mechanism for allocating funds to finance “green” projects etc.

## **ФІСКАЛЬНІ ІНСТРУМЕНТИ ЕКОЛОГІЧНО-ЕКОНОМІЧНОГО СТИМУЛЮВАННЯ ПРОТИДІЇ ЗМІНИ КЛІМАТУ ТА ЗАХИСТУ ВОДНИХ РЕСУРСІВ**

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У статті досліджується екологічне оподаткування як інструмент еколого-економічного стимулювання протидії зміні клімату та забезпечення екологічної безпеки водних об'єктів. Встановлено, що негативний вплив зміни клімату, основним проявом якого є глобальне потепління, полягає, в першу чергу, в збільшенні кількості руйнівних природних явищ та відповідних втрат світової економіки. В умовах змін клімату погіршується кількісний та якісний стан водних ресурсів, скорочуються їх обсяги, що спричиняє проблему дефіциту води. Саме тому актуальним та своєчасним є питання пошуку та застосування найбільш ефективних інструментів еколого-економічного стимулювання задля забезпечення екологічної безпеки та охорони навколишнього середовища. В якості таких інструментів розглянуто екологічні податки. Досліджено особливості системи екологічного оподаткування у країнах ЄС. Окреслено основні групи та структуру екологічних податків, визначено країни з максимальними та мінімальними обсягами зібраних екологічних податків. Встановлено, що основними функціями екологічного оподаткування є регулятивна та фіскальна. Проаналізовано кореляційний зв'язок між обсягами утворених шкідливих атмосферних викидів

та зібраними екологічними податками. Доведено, що екологічне оподаткування є ефективним фіскальним інструментом зниження забруднення навколишнього середовища, у тому числі захисту водних об'єктів. Розглянуто основні проблеми сучасного стану системи екологічного оподаткування в Україні, серед них: низька ставка екологічного податку, нераціональна структура екологічних податків, недостатньо ефективна система державного регулювання, нераціональне використання зібраних коштів. Визначено перспективи модернізації системи екологічного оподаткування в Україні, зокрема: збільшення ставки екологічного податку, його диференціацію, запровадження певних податкових пільг та знижок «зеленим» виробництвам, вдосконалення положень Податкового Кодексу України, розвиток механізмів комунікації екологічних інспекцій та фіскальних служб. Таким чином, екологічне оподаткування стимулює нейтралізацію наслідків зміни клімату та раціональне споживання природних ресурсів, у тому числі водних.

Ключові слова: зміна клімату, еколого-економічне стимулювання, водні ресурси, водні об'єкти, екологічне оподаткування, екологічний податок, екологічна безпека.

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