UDC 330.3.502.131.1

IMPROVEMENT OF REGULATION INSTRUMENTS OF SUSTAINABLE ECOLOGICAL-ECONOMIC REGIONAL DEVELOPMENT (DNIPROPETROVSK REGION EXAMPLE)

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У статті проаналізовані проблеми функціонування регіональних систем за характером еколого-економічних протиріч. Окреслено основні аспекти соціо-еколого-економічного розвитку регіону (на прикладі Дніпропетровської області). Обґрунтовано необхідність формування нової інституційної моделі регулюванням сталим еколого-економічним розвитком. Запропоновано вдосконалення механізму розподілення екологічного податку до Державного та регіонального бюджетів. Проведено прогнозування зміни екологічно скоригованого валового регіонального продукту Дніпропетровської області на середньостроковий період.

Ключові слова: сталий розвиток, регіон, екологічний податок, екологічно скоригований валовий регіональний продукт, екологічний слід

In the article the problems of regional systems functioning by nature of ecological and economic contradictions are analyzed. The main aspects of the socio-ecological-economic development (on Dnipropetrovs'k region example) are outlined. The necessity of forming a new institutional model of regulating sustainable ecologic and economic development is explained. A mechanism for improving the distribution of environmental tax to the state and regional budgets is proposed. Dnipropetrovs'k region ecologically adjusted gross regional product in the medium term is forecast.

Keywords: Sustainable development, Region, Ecologic tax, Ecologically adjusted gross regional product, Ecological footprint

Introduction. Social development includes components and levels, which integrate in different combinations and create the path of improvement. The socio-economic problems are connected closely to ecological ones, thus requiring the acceptance of a rational approach to solving them by the society. The uncertainty of the existing approaches to both the theoretical basis for sustainable development and the practical instruments of implementation allows integrating the achievements of different disciplines according to the targets. Greening of civic development requires achieving a consensus in the

interaction of social development subjects. In order to do so, a set up dialogue, clear setting of criteria and objectives, strategic planning, transparency in the allocation of funds and monitoring of the results is necessary.

Analysis of the scientific research. Outstanding foreign and native scientists have devoted their research to different aspects of regulating sustainable ecological-economic development. Among these are: Z. Herasimchuk, Yu. Orlovska, L. Melnik, Ye. Khlobystov, S. Kharichkov, O. Veklych, M. Zhurovskiy, B. Danylyshyn, T. Uskova, Ye. Kuklina, Ye. Riumina, E. Барбіер, H. Daly, M. Wakernagel, J. Stiglits, S. Bobyl'ov, O. Shkarupa, L. Brown, R. Costanza, M. Khvesyk, L. Hryniv, L. Maslovs'ka, Ye. Khlobystov, T. Halushkina. However, we should notice, that the issue of improving the regulation instruments for the sake of ensuring their systematic nature within the context of sustainable development needs further research.

The purpose of this article is to develop the scientific and practical recommendations for improving environmental and economic instruments of the sustainable development regulation mechanism.

The main part of research. The transition to sustainable development provides guaranteed coherent solutions to ecological problems without stemming economic development. Traditional old-industrial regions, such as Dnipropetrovs'k one, require applying specific approaches in order to form regulation mechanisms of sustainable ecological-economic development. It is significant that the implementation of sustainable development principles is not included within the key projects according to the region's development strategy by 2015.

The region is one of the leading and economically developed ones, but the development basis is represented mostly by primary industries (mining-metallurgical, fuel and energy, chemical) and an extensive transport infrastructure. The material and technical equipment of the greater part of the companies is morally and physically obsolete, and energy consumption rates are among the highest in Ukraine (annual energy consumption is 27,04 million tones in oil equivalent) [1, c. 218]. Correspondently, there are many environmental problems, which require forming capable safety management system.

Among the advantages of region is the development potential, caused by the significant amount of scientific personnel, presence of high-tech industries (rocket

production, professional equipment), service sector, and, of course, natural resources. Furthermore, at this stage image of the region is formed: participation in the investment forums, the involvement of international organizations, foreign companies etc., as well as developing a brand and a slogan («proactive-productive-promising»). The region is also extensively cooperating with international monetary institutions to attract financial and technical assistance for socio-economic development on the same level as Vinnytsya, Donets'k, Zhytomyr, Ivano-Frankivs'k and Kharkiv regions [2].

The analysis of the socio-ecological-economic state of the region illustrated noticeable nature-exploitative orientation of the economy (table 1).

Table 1. Consolidated indicators of socio-ecolog

№	Indicator/year	2007	2008	2009	2010	2011
1	Gross regional product (GRP) per capita, UAH.	20868	30918	27737	34709	41966
2	Ecologically adjusted gross regional product (EGRP) per capita, UAH.	20370	30378	27292	34261	41384
3	Ecological footprint per capita/ Biological potential per capita, global hectares	1,7/ 0,91	1,92/ 0,92	1,79/ 0,92	1,89/ 0,93	1,9/ 0,93
4	Range of realized services per capita, UAH.	692	870	877	1013	1131
5	Average monthly nominal wage employee, UAH.	1455	1876	1963	2369	2790
6	Volume of foreign trade					
	Export, mln. dol. USA / share in the total export, %	9819,2 / 19,92	13163 ,5 / 19,66	5199,3 / 13,1	8010,4 / 15,58	10363 ,2 / 15,15
	Import, mln. dol. USA / share in the total import, %	5309,9 / 10,15	8684,9 / 10,15	3587 ,1 / 7,9	5387 ,7 / 8,87	6717 ,2 / 8,14

Note: points 4-6 [3]

Foreign trade balance indicates export-oriented economy. The gap between export and import is growing year after year, with an overweight of export (main export items – mineral products, products of the chemical and related to it industries).

The range of realized services has increased by more than four times during the period from 2002 to 2011 years, which indicates a positive tendency in the development of the non-material part of the economy. The level of wages is one of the highest in Ukraine. The average monthly nominal wage has increased by almost a half within the last five years.

EGRP per capita values reflect the destructive character of development – the gap between the traditional and the adjusted indicators is growing.

EGRP of Dnipropetrovs'k region exceeds the average Ukrainian level by approximately 1.5 times (Fig. 1).

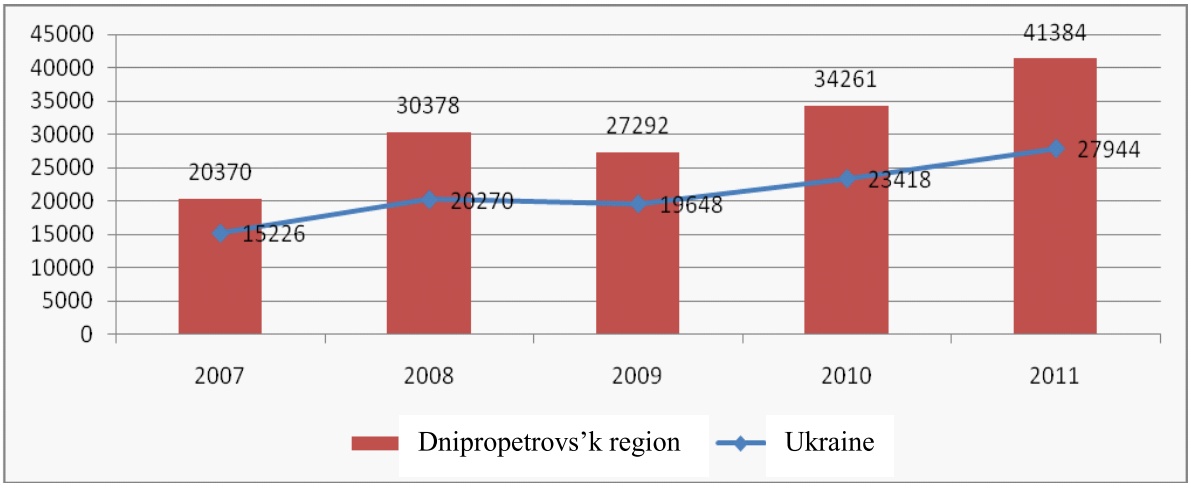

Fig. 1. *Comparison of the dynamics of ecologically adjusted gross regional product per capita, 2007-2011years, UAH*

The value of the ecological footprint is also significant enough, which means that environmental stress is growing, while the carrying capacity remains constant, which leads to a destabilization (Fig. 2).

Fig. 2. *Dynamics of ecological footprint in Dnipropetrovsk region, 2001-2011 years., global hectars*

Therefore, the ecological footprint (the pressure on the environment) is also rising (the rate of growth is about 48 %). As a result, the environmental status of the region is unsatisfactory, despite the annual economic growth. The situation demands immediate decisions and definitive intervention by the state and regional authorities, attracting foreign investors and international

organizations.

We have to analyze the character of externalities (negative effects), their impact on the population and the economy, taking into consideration the environmental degradation.

The main environmental problems are connected with: industries (mining, metallurgy, fuel and energy, chemicals) – the biggest pollutants, from which the water resources suffer (especially - the Dnipro, the Saksagan), depletion of land resources (in most areas of Kryvyi Rig, Dniprodzerzhins'k, Dnipropetrovs'k, Pavlograd), polluted atmosphere; industrial waste (by latest data - about 9 billion tonnes) and household rubbish (about 1 million tones annually) [4]. The amount of generated waste of danger levels I-II per capita significantly decreased (269,6 kg in 2000, 45,9 kg in 2011) according to the statistical investigations. However, the amount of chemical production waste increased (not every kind of impact is fundamentally investigated in Ukraine, the most striking example is phosphates, which in unlimited quantities fall into the water because of their content in detergent powders).

The problem of nuclear waste will be considered while forming the mechanism of sustainable development regulation of Dnipropetrovs'k region, because it constitutes a threat for population and the region's economy. There are two territories with increased radioactivity – Zhovti Vody and Dniprodzerzhins'k. The situation is expected to improve due to transporting waste which produces ionization radiation of the «Electron-Gas» plant in Zhovti Vody to the newly built repositories of state corporation «Radon». However, the problem of Prydniprovs'k chemical plant's tailings' dumps (Dniprodzerzhins'k) is not solved yet (five sludge depositories; nine tailings dumps). The ecological passport of the region doesn't give the necessary attention to radio-ecological problems (no available data; the issue is not mentioned among the environmental problems).

Therefore, the main issues are the implementation of environmental and economic standards, improving the efficiency of the organizational structure, innovations and investment in education and science. In my opinion, in order to regulate the sustainable development processes it is necessary to perfect the management system of these processes and to implement a systematical approach. (fig. 3).

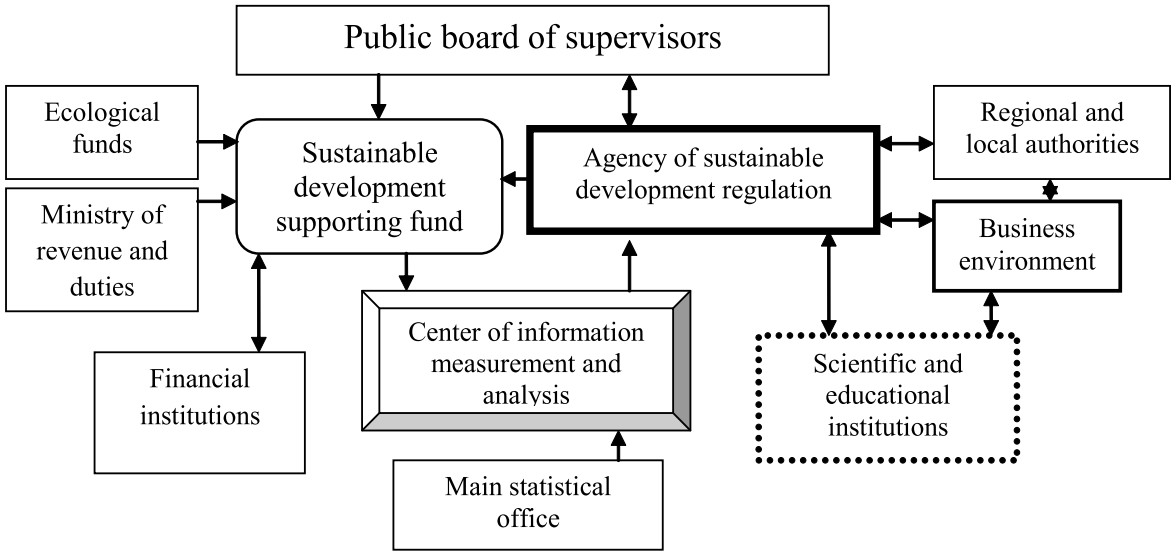

Fig. 3. *Institutional supporting of Dnipropetrovs'k region sustainable development*

The main tasks of the Agency of sustainable development regulation should be: forming a perception of the region's future in the context of a sustainable development paradigm, working out a system of indicators, defining instruments for achieving strategic and tactical goals. The procedure should be based on the following algorithm: the institutions – resources – choosing projects – determining the implementation time – monitoring and analysis of the finished projects (figure 4).

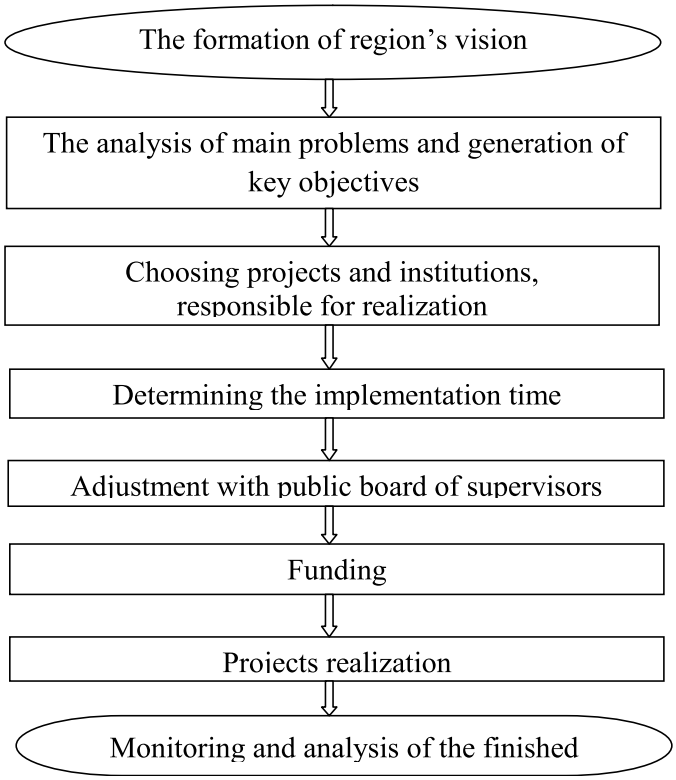

Fig. 4. *The algorithm of sustainable development goals realization*

In our opinion, the funded areas should be: educational projects, scientific research, energy-saving technologies, and a waste management system.

General economic criteria for sustainable development are: transparent mechanisms for financial receipts and an efficient tax system; ecological: reduction of harmful emissions into the atmosphere and the water resources of the region, and social – improving living standards and stabilizing the demographic situation.

Increasing the tax burden on the economic system is inappropriate amid the recession and downfall of purchasing power. A more efficient mechanism for redistribution of tax revenues is another way to increase the income part of the regional budget. In particular, we propose the next: 65% – regional budget / 35 % – state for mobilizing the resources for manufacturing equipment, reconstruction of pollution control facilities, and adoption of energy-efficient technologies.

We have estimated the system of redistribution of ecological tax in 2 ways for 2014: current and offered mechanisms. The basis for the calculation was: statistical data, data of Dnipropetrovs'k region state treasury service, the Budget Code of Ukraine, information of the Ministry of revenue and duties about the tax increase rate in average in 7,9% (table 2).

Table 2. Calculation of Dnipropetrovs'k region ecological tax distribut

	2011 p.	2012 p.	2013 p.	2014 p.*	2014 p. **
Ecological tax, thousand UAH	165602,7	299575,9	323242,4	348778,55	348778,55
Revenues to the State Budget, thousand UAH	49680,81	89872,77	171318,47	226706,05	122072,49
Revenues to the Regional Budget, thousand UAH	115921,9	209703,13	106669,99	122072,49	226706,05

Note: * - current mechanism, ** - offered mechanism.

The offered mechanism gives an opportunity to solve ecological-economic problems autonomously. The budget replenishment will be nearly 10 million UAH.

The implementation of the proposed recommendations should be verified. The predicted level of EGRP is proposed to be determined by the Delphi method (expert judgment). Information accumulation was conducted by using questionnaires. Key target group took part in the survey: scientists, regional

and local authorities, economists specializing in forecasting macroeconomic trends, regional economics, environmental economics and ecology. The pipeline was identified: forecasting indicators, preparing necessary information for experts, questionnaire construction, time between the first and the second rounds of interviews. The task lied in determining the annual average rate of growth of gross regional product and the components of ecologically adjusted product for the period of the years 2013 through 2017. The prognostics have some conditions, which are the implementation of: the environmental tax redistribution system, a set of regulation instruments (effective waste management, taxation, green crediting, ecological audit, environmental management, environmental insurance, environmental education).

The first round has shown a low degree of coherence of expert opinions, thus creating the necessity of a second round. Analyzing the answers identified the average annual growth rate, according to which the indicators for 2013-2017 years have been predicted and the trend of EGRP has been constructed (fig. 5).

According to the experts' forecast, the levels of EGRP growth will slow down (by an average of 2.5% per year) during the period of 2013-2015, which can be linked to the negative prognosis of economic system development, the instability of the national currency, and the decline of production. Acceleration of growth is expected from 2016 due to the stabilization of the socio-political situation and the implementation of ecological and economic instruments.

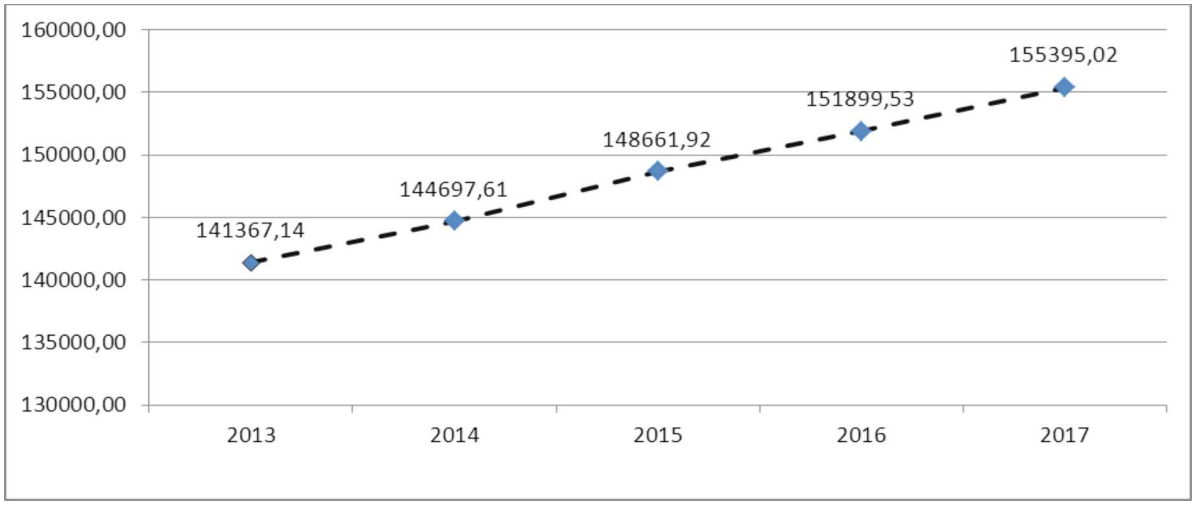

Fig. 5. *Forecast of Dnipropetrovs'k region's EGRP growth*

Conclusions. The results of implementing EGRP and redistribution system of the ecological taxes are calculated. It is determined that the stimulation of

sustainable ecological and economic development is possible by proving the efficiency of environmental protection in regional economy (calculating losses from passivity and effects of active policy) For improving the distribution of financial resources it is proposed to change it through the ecological tax, which will give some regional budget of approximately 10 million UAH for the polluting objects' modernization. The EGRP growth is forecasted by using the Delphi method. The propositions allow to improve Dnipropetrovs'k region sustainable development mechanism on the grounds of ecological safety.

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