34. Глущенко В.В. Риски инновационной и инвестиционной деятельности в условиях глобализации.- г. Железнодорожный, Московская область: ООО НПЦ Крылья, 2006. – 230 с.

35. Глущенко В.В., Глущенко И.И. Анализ факторов риска, влияющих на финансовый результат инновационного проекта в высокотехнологичном машиностроении// Проблемы машиностроения и автоматизации, 2014, № 4, с. 12- 17.

36. Глущенко В.В., Глущенко И.И. Методические проблемы развития инновационного предпринимательства в высокотехнологичном машиностроении в России в условиях глобального кризиса// Проблемы машиностроения и автоматизации, 2015, № 1, с. 25-33

37. Глущенко В.В. Формирование инновационных проектов в период развития восьмого технологического уклада // Современные научные исследования и инновации. 2021. № 10 [Электронный ресурс].
URL: https://web.snauka.ru/issues/2021/10/96750 (дата обращения: 22.10.2021).

38. Глущенко В.В. Нейрогеополитикология и методологические аспекты стратегического управления геополитическим риском // Современные научные исследования и инновации. 2020. № 4 (108), с. 34 [Электронный ресурс]. URL:http://web.snauka.ru/issues/2020/04/91886 (дата обращения: 19.04.2020).

DEVELOPMENT THE INDICATORS OF ECONOMY GREENING

Blaga N.
Candidate of Economic Sciences, Associate Professor,
Associate Professor of Management Department
Lviv State University of Internal Affairs, Lviv
Hobela V.
Candidate of Economic Sciences, Associate Professor,
Associate Professor of Management Department
Lviv State University of Internal Affairs, Lviv
Svatiuk O.
Candidate of Economic Sciences, Associate Professor,
Associate Professor of Department of Human Resource Management and Administration,
Polytechnic National University, Lviv

Abstract

The study was aimed at selecting the most optimal indicators for assessing the greening and environmental safety of the state. To do this, several literature sources and the majority of indicators for assessing the environment and environmental efficiency of economic activity were analyzed. The most optimal system of greening indicators was singled out. The analysis of pressure – state – reaction model indicators was carried out, its main advantages and disadvantages are determined. Based on research results study proposed to modify the pressure-state-reaction model, which will allow renewing the assessment of state's environmental safety.

Keywords: indicator, security, environment, greening, sustainable development.

Introduction. The safe state of the environment is one of the priority tasks nowadays, due to the right to reproduce normal natural living conditions. The starting point for comparison is the level of economic prosperity and economic security and the state of the environment. However, the relationship between these two criteria is not always inverse. For example, increasing the level of meeting the needs of society and its well-being will not always mean a worsening of the environmental situation, as well as reducing the level of meeting the needs of society will not always contribute to increasing environmental safety and improving the environment. Often there is another problem – reducing the use of resources does not improve the environmental situation and does not reduce the level of anthropogenic pressure on the environment, as such measures are mostly largely formal and indicative, as they are used to improve "environmental" reporting as government organizations and private. Reducing the consumption of natural resources through the use of inefficient technologies is not considered a way to ensure environmental safety.

It should be noted that achieving the appropriate level of economic well-being may be the result of extensive use of resources, will not involve the improvement of existing production technologies and the introduction of new resource- and energy-saving technologies. This path of development of the economy is dangerous for the development of future generations, can be an impetus for causing environmental damage due to economic unreasonableness and inefficiency.

To sum it up, it should be noted that the formation of a system of greening indicators is an important element in ensuring environmentally healthy economic development and combating global environmental problems.

Results and discussions. There are many indicators and indicators of economic security, environmental

security, environmental and economic security and sustainable development in general. In particular, there are about 3,000 environmental safety indicators.

In general, the development of relevant indicators and indicators should be carried out in two aspects: as an integrated indicator of sustainable development; as separate indicators and indicators of constituent elements of ecologically safe development [10].

We consider greening as a tool to combat environmental threats to improve the economic security of the state. Accordingly, indicators of sustainable development are indicators of the effectiveness of greening. That is why it seems appropriate to consider the indicators of sustainable development proposed by various international institutional units for their analysis and comparison. The most important of them are World Bank indicators (short green guide) [12]; OECD sustainable development indicators [4]; indicators of sustainable development of the European Environment Agency; system of indicators of the UN Commission on Sustainable Development [8; 9]; indicators of SECCA countries (Eastern Europe, Caucasus and Central Asia); IAEA energy indicators of sustainable development [3].

Development indicators according to the World Bank calculation method were formed on the relevant topics [12]: General information about the country (3 indicators); Agriculture (4 indicators); Forests and biodiversity (7 indicators); Oceans (4 + 2 indicators); Energy and emissions (6 indicators); Water and sanitation (4 + 5 indicators); Environment and health (5 indicators); National consolidated indicators (9 indicators). In particular, the general information about the country includes the following indicators: GDP per capita; ecologically adjusted national income per capita; percentage of the urban population [12]. An important indicator is environmentally adjusted gross product (ESP) and savings.

The indicator system of the UN Commission on Sustainable Development is one of the largest in terms of capacity. It combines indicators in the following areas: indicators of social aspects of sustainable development; indicators of economic aspects of sustainable development; indicators of environmental aspects of sustainable development; indicators of institutional aspects of sustainable development. The indicators were grouped by relevant topics: poverty; land; management; oceans, seas and coasts; health; drinking water; education; biodiversity; demography; economic development; natural hazards; global economic cooperation; atmosphere; consumption and production. The indicators reflect three categories: driving forces, state, response [8].

The OECD indicators of sustainable development are based on the model: pressure - state - reaction. As a result of human activity, the anthropogenic load is created; therefore the pressure is created on ecosystems. As a result of appropriate actions at all levels of government and in all spheres of life, response measures are taken, which are manifested in the reaction [4].

Indicators of sustainable development (European Environment Agency). The Ministry of Energy and Environmental Protection of Ukraine recommends this methodology for determining and assessing the state of the environment [4]. The system of indicators was based on the model: driving forces – pressure – state – influence – response.

Table 1

Evaluation model "pressure - state - reaction".

PRESSURE	STATE	REACTION
1. Emissions of pollutants into the atmosphere, thousand tons	1. Comprehensive index of air pollution	1. Current costs of environmental protection, UAH million
2. Water abstraction from water bodies, million m3	2. Standard index	2. Investments in fixed environmental capital, UAH million
3. Volume of wastewater discharge into surface water bodies, million m3	3. The level of air pollution	3. Violations of the requirements of the legislation in the field of environmental protection, thousand units were revealed.
4. Use of fresh water, million m3	4. Quality of drinking water in the water supply network,% of samples that do not meet hygienic standards	4. Bringing to administrative responsibility for violations of environmental legislation, units.
5. Change in land structure, thousand hectares	5. Area of soils affected by negative anthropogenic impact, million hectares	5. The amount of fines imposed for violations of environmental legislation, UAH million.
6. Reforestation Fund, thousand hectares	6. Area of disturbed lands, thousand hectares	6. The share of contaminated wastewater in the total discharge of wastewater,%:
7. Waste generation, thousand tons	7. The average humus content in soils,%	7. Exported solid waste and liquid waste, thousand m3
8. The area occupied by storage of industrial and solid household waste, ha	8. Area of lands of specially protected natural territories, thousand hectares	8. Reforestation, ha
9. Volume of fertile soil layer, thousand m3	9. Total forest area, thousand hectares	9. Land reclamation, ha

10. Extraction of resources	10. Number of forest fires, units	10. Creation of protective forest plantations, ha
	11. Natural population growth rate, per 1 thousand population	11. Environmental organizations, units.
	12. Number of emergencies and disasters	
	13. Inflicted material damage from emergencies and catastrophes, thousand UAH	
	14. Human Development Index	

Source: adopted by author from [4].

We consider that it is quite difficult to assess the state of the environment in terms of driving forces, as the factors that cause the deterioration of the ecological and economic system are quite debatable. If we use the ecological state of the territory as a reference point, then there is a conflict of goals within the ecological and economic system. The producers that are the biggest polluters can be the biggest generators of GDP, so reducing production can improve the state of the ecological system and at the same time push for negative consequences for the economic system. From the point of view of such an approach, it is quite difficult to solve the general environmental damage and environmental costs from various activities (for example, limiting the consumption of livestock products or reducing production in the metallurgical industry, etc.).

IAEA Sustainable Energy Indicators – a system of indicators that reflect: the share of farms without electricity, commercial energy; the share of household profits spent on fuel and electricity; energy use in farms; the number of fatal accidents per unit of energy produced; use and production; energy use per capita; energy use per unit of GDP etc. [3].

Table 2

Components of the calculation of the aggregate index of sustainable development.

SUBSYSTEM	TYPE OF AGGREGATE INDICATOR	COMPONENTS
Economic	Ik-index of competitiveness	3 indicators 47 data sets
	I es - index of economic freedom	10 indicators 50 data sets
Ecological	ESI - index of environmental sustainability	21 indicator 76 data sets
Social	IaB - index of quality and safety of life	9 indicators
	HDI is an index of human development	3 indicators
	ICS is an index of a knowledge-based society	3 indicators of 15 data sets

Source: adopted by author from [4; 8].

Even though there are a large number of approaches and methods for calculating indicators and indicators of greening, there is an urgent need to apply a single calculation method for all international institutions and states, as standardization of economic security indicators will allow a realistic assessment of the planet's ecosystem. Therefore, it is expedient to create and declare a single methodology and system for assessing economic and environmental safety indicators for all countries. Accordingly, this process should be carried out by UN structures or organizations operating under the auspices of the UN.

To form a system of greening indicators, we consider the most optimal system of indicators, proposed by the UN. However, we consider it appropriate to assess sustainable development in terms of three components – society, environment and economy. We consider it expedient to remove the fourth area – institutional indicators – because the impact of most indicators in this area on sustainable development is insignificant or reflects other indicators (table 2).

Table 3

The indicators of sustainable development.

SUBJECT	SUBTOPIC	INDICATOR
Social		
Equality	Poverty	1. The share of the population below the poverty line 2. Gini index of income inequality 3. Unemployment rate
Health	Food	Nutritional status of children
	Mortality	1. Infant mortality 2. Predicted life expectancy
	Sanitary conditions	The share of the population provided with sewerage
	Drinking water	Population provided with drinking water
	Healthcare	1. Provision of medical care 2. The level of childhood vaccination 3. The prevalence of contraceptives

Education	Educational level	1. Children receiving primary education 2. Adults with complete secondary education
	Literacy	Adult literacy
Dwelling	Accommodation	Living space per capita
Security	Crime rate	The number of crimes per 100,000 population
Population	Population change	1. Population growth 2. The share of urban population
Environment		
Atmosphere	Climate change	Greenhouse gas emissions
	Ozone Layer	Consumption of ozone-depleting compounds
	Air quality	Concentration of air pollutants in cities
Land	Agriculture	1. Area of arable and permanently cultivated lands 2. Use of fertilizers 3. Use of pesticides
	Forests	1. Forest cover 2. Growing forests
	Desertification	Area of lands that have been deserted
Oceans, seas and coasts	Coastal zone	1. Concentration of pollutants 2. The share of the population in the coastal zone
	Fishing	Annual catch of major fish species
Fresh water	The amount of water	The share of annual consumption of groundwater and surface water
	Water quality	1. Biochemical oxygen consumption of water 2. Concentration of fecal emissions in fresh water
Biodiversity	Ecosystems	1. Area of key ecosystems 2. The share of protected areas
	Types	A wealth of key species
Economy		
The structure of the economy	Economic indicators	1. GDP per capita 2. The share of investment in GDP
	Trade	Trade balance for goods and services
	Financial status	1. Debt in% to gross GDP 2. Official development assistance in% of GDP
Consumption and production	Consumption of materi-als	Intensity of use of materials
	Energy use	1. Annual energy consumption per capita 2. The share of renewable energy consumption 3. Intensity of energy use
	Waste production and management	1. Production of municipal and industrial solid waste 2. Production of hazardous waste 3. Production of radioactive waste 4. Use of recycled waste
	Transport	Distance of movement per capita

Source: adopted by author from [4; 8; 9].

In particular, the number of Internet users per 1,000 inhabitants and telephone lines per 1,000 inhabitants. Such indicators are a characteristic of the development of regional and state infrastructure. We believe that they are directly dependent on the level of infrastructure development and, accordingly, the indicators presented in the society block (percentage of sewerage, drinking water, medical care, etc.). For example, the probability that settlements are not provided with sewerage, drinking water, or medical care, but with network access to the Internet or telephone networks is very low. Indicators of the implementation of global agreements reflect the ratio of ratified agreements on sustainable development and their total number. The low number of ratified agreements on the transition to a sustainable development model is not always the cause of a crisis in the environment or the economic system. The political will of the country's leadership or the prevailing social paradigm is a guarantee of the transition to environmentally safe development. The initiative to green the economy and social development does not always come "from outside", many countries show this initiative on their own (Bhutan, UAE, New Zealand). On the other hand, the existence of ratified agreements on sustainable development does not guarantee their implementation (Moldova, Ukraine, third world countries). This is especially true for countries with high levels of corruption and abuse of power. Therefore, this indicator is also unreliable. We believe that research and development expenditures as a percentage of GDP are also not directly related to sustainable development. The high level of international technology transfer, the concentration of innovation and science and technology centers in several developed

countries (USA, South Korea, Japan, Germany, and Sweden) are the factors that confirm this assumption. For example, the country's limited resources and, as a result, the inability to finance research are not the cause of the crisis in the ecological and economic system, as there remains the possibility of cooperation in international environmental projects (including the Kyoto Protocol), financial infusions, new technologies to improve the environment and strengthening the level of economic security.

Conclusions. The study found that the most optimal is the system of indicators for assessing sustainable development, proposed by the UN Commission on Sustainable Development, which is carried out on the model of pressure – state – response. It is proposed to improve this model by removing several institutional indicators, which optimizes and simplifies the calculations for this model. The study recommends the formation of indicators of the economic, environmental and social system at all levels – global, national, regional, local. As already mentioned, the standardization of approaches to the formation of indicators for assessing sustainable development plays a rather powerful role. Unified indicators make it possible to consider the economic systems of different countries as a single system and compare the environmental and economic efficiency of these systems, as well as individual industries or industries. This will make it possible to build a new model of both international relations, including the theory of international trade, and the model of social development and the international division of labor, taking into account the factor of environmental feasibility.

REFERENCES:

1. Arroyo, P., & Molinos-Senante, M. (2018). Selecting appropriate wastewater treatment technologies using a choosing-by-advantages approach. *Science of The Total Environment*, 625, 819–827. doi:10.1016/j.scitotenv.2017.12.3
2. Cossio, C., Norrman, J., McConville, J., Mercado, A., Rauch, S. (2020). Indicators for sustainability assessment of small-scale wastewater treatment plants in low and lower-middle income countries, *Environmental and Sustainability Indicators*, 6.
3. Energy indicators for sustainable development: guidelines and methodologies. (2005). Vienna: International Atomic Energy Agency.
4. Environmental indicators. (1994). OECD Core Set. Paris : Cedex.
5. Gobela, V. (2019). Structural and functional characterization of greening as an object of theoretical analysis. *Modern science – Moderní věda,* 5. 5–11. https://doi.org/10.1016/j.indic.2020.100028.
6. Hobela, V. Teoretychnyi analiz ekolohizatsii yak suspilno-ekonomichnoho fenomenu [Theoretical analysis of greening as a socio-economic phenomenon]. *Efficient economy*, 6. Retrieved from: http://www.economy. nayka.com.ua/pdf/6_2019/44.pdf.
7. Hobela, V., Blikhar, M., Syrovackyi, V., Maraieva, U., & Dudiuk, V. (2021). Economic and legal measures for ensuring the economy greening in the post-pandemic period. *Amazonia Investiga*, 10(44), 252-260. https://doi.org/10.34069/AI/2021.44.08.24
8. *Indicators of Sustainable Development*. (2001). New York : United Nations Sales Publication.
9. *Indicators of Sustainable Development: Guidelines and Methodologies*. (2007). Third Edition. New York : United Nations Sales Publication, 2007. 93 p.
10. Karaieva N. V., Levchenko L. O., Trokhymenko Ya. M. (2011). Analiz pidkhodiv do formuvannia system indykatoriv staloho rozvytku. [Analysis of approaches to the formation of indicators of indicators of sustainable development]. *Management of complex systems development*, 7, 126–131.
11. Rasoolimanesh, S. M., Ramakrishna, S., Hall, C. M., Esfandiar, K., & Seyfi, S. (2020). A systematic scoping review of sustainable tourism indicators in relation to the sustainable development goals. *Journal of Sustainable Tourism, 1–21*. doi:10.1080/09669582.2020.1775621
12. The little green data book. (2007). World development indicators. Washington, DC : World Bank. Retrieved from: http://documents.worldbank.org/curated/en/9662 6146 8148179728/The-little-green-data-book-2007.