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COMPREHENSIVE EVALUATION OF REGIONAL DEVELOPMENT AS A COMPONENT OF GREEN ECONOMY IMPLEMENTATION

The article reviews the issues of "green economy" implementation in Ukraine. Comprehensive assessment of Kharkiv and Poltava regions development is carried out. Measures to optimize socioeconomic and environmental state of the studied areas are determined.

Keywords: *green economy; socioeconomic and environmental state; aggregate indicators; integrated indicators.*

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КОМПЛЕКСНЕ ОЦІНЮВАННЯ РОЗВИТКУ ОБЛАСТІ ЯК СКЛАДОВА ВПРОВАДЖЕННЯ ЗЕЛЕНОЇ ЕКОНОМІКИ

У статті розглянуто питання впровадження «зеленої економіки» в Україні. Проведено комплексне оцінювання розвитку районів Харківської та Полтавської областей. Визначено заходи з оптимізації соціо-економіко-екологічного стану районів дослідження.

Ключові слова: *зелена економіка; соціо-економіко-екологічний стан; агреговані показники; інтегровані показники.*

Форм. 3. Табл. 1. Літ. 10.

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КОМПЛЕКСНАЯ ОЦЕНКА РАЗВИТИЯ ОБЛАСТИ КАК СОСТАВЛЯЮЩАЯ ВНЕДРЕНИЯ ЗЕЛЕНОЙ ЭКОНОМИКИ

В статье рассмотрены вопросы внедрения «зеленой экономики» в Украине. Проведена комплексная оценка развития районов Харьковской и Полтавской областей. Определены меры по оптимизации социо-экономико-экологического состояния районов исследования.

Ключевые слова: *зеленая экономики; социо-экономико-экологическое состояние; агрегированные показатели; интегрированные показатели.*

Problem setting. Promoting economic development in a region is closely connected to the issues of pollution and degradation of the environment, depletion of natural resources, imbalances in the biosphere, climate changes – all leading to deterioration in health and limiting opportunities for further advancement. Therefore, a necessary factor in changing approaches to natural resources use is the transition to "green economy", based on efficient utilization of available natural resources on the basis of interregional and transnational cooperation and mutual indemnification of losses incurred (The Green Economy, 2011).

Recent research and publications analysis. To assess the state of society in implementing green economy certain indicators are reguired. It is possible to estimate the level of region's development and predict its future state (social, economic, environmental) with their use (Danilov-Danilyan and Losev, 2000).

Until recently, Ukraine lacked practical implementation of the green economy, only some researches are known on planning and forecasting of socioeconomic development (Gerasymchuk, 2001; Kovalska, 2007). These works indicate that it is

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important to realize this principle that the direction and scale of development in a particular region does not exceed the capabilities of its ecosystem.

Practical environmental aspects that form the basis for specific local plans on the environment protection are reflected in the works of A.N. Adamenko (2003), N.A. Klimenko and L.V. Klimenko (2010). With respect to the ecological system of indicators under development I.V. Andel (2010), A.G. Shapar (2009) identify the following priority ones: space objects protected fund agricultural land, total greenhouse gases (GHG) emissions, total GHG emissions from industrial facilities, polluted emissions into atmosphere, the total water intake, water consumption for industrial needs, the presence of toxic industrial waste in storage and warehousing organized at enterprises, the production of new waste.

The most favorable among the existing tools for our research method is comprehensive assessment of socioeconomic and environmental (SEE) state of the region (Pryshchepa and Klimenko, 2009), based on structuring the parameters from lower levels to the higher ones.

The research purpose. The aim of this paper is to assess the development of Ukrainian regions as a part of implementation of green economy on the example of Kharkiv and Poltava regions and identify further measures on the optimization of the SEE states.

Key research findings. The most common definition of "green economy" is considered to be as following: "green is the economy which leads to people well-being incensement and strengthening of social justice while reducing risks to the environment and the shortage of ecological resources" (The Green Economy, 2011). The concept of "green economy" is considered in the context of reducing emissions of carbon compounds, more efficient use of resources, development of SEE system under public interest.

Literature analysis has led to the conclusion that the most successful method is the comprehensive and integrated assessment of SEE offered by amplitude modulation (AM) by A.M. Pryshchepa and L.V. Klimenko (2009), which we use in our study.

According to the integrated SEE assessment methods, the calculation algorithm involves 4 levels of evaluation and the aggregation of indicators:

- evaluation of statistical baseline (SB) that characterizes the state of SEE subsystem of environment;
- assessment of aggregate indicators (AI), which characterizes the state related group (macroindicators) of the studied subsystems;
- evaluation of integrated indicators (II) that characterizes the state of SEE subsystem;
- integrated territorial SEE development index (ITSEEDI), which describes the state of SEE subsystems.

The assessment divides the indicators into 2 types: positive (increase in the quantitative values of indicators causes the growth of integrated assessment of the lower level) and negative (increase in its quantitative values leads to deterioration of lower-level blocks).

Taking to account the presence of positive and negative types of indicators the basic indicators are given in the standard form and the aggregate indicators are defined as the geometric mean of basic indicators:

$$AI = \sqrt[n]{SB_1 \times SB_2 \times \ldots \times SB_n}, \quad (1)$$

where AI – the aggregate value indicator; SB_1, SB_2, …, SB_n – the standardized values of the relevant basic indicators.

The values of aggregate indicators are used for calculating the integrated index of SEE area (I_i) as the geometric average value of a set of aggregated indicators:

$$Ii = \sqrt[n]{AI_1 \times AI_2 \times \ldots \times AI_n}, \quad (2)$$

where I_i – the integrated index of territory; AI_n – the calculated aggregate indicators (1 to 0).

The study analyzes the dynamics of performance SEE districts of Kharkiv and Poltava regions for the period 2000–2010 and the classification of their condition.

Analysis of social sphere (SS) in Kharkiv and Poltava regions is performed using the AI that includes the indicators of living standards protection (PLS), demographic (D), morbidity (M), housing provision (HP) of population and of social development I_i (SDI_i).

Past studies on SS have shown the following results for Kharkiv region (Kharkivskiy, Shevchenkivskiy and Chuguivskyi districts) AI PLS equal to 0.01, 0.79, 0.91; D – 0.05, 0.51, 0.41; M – 0.2, 0.67, 0.48; HP 0.34, 0.52, 0.51; SDI_i – 0.08, 0.61, 0.55, respectively. For Poltava region (Kremenchugskiy, Lokhvytskiy and Myrgorodskyi districts) AI PLS is 0.019, 0.78, 0.96; D – 0.04, 0.54, 0.46; M – 0.29, 0.57, 0.49; HP 0.39, 0.58, 0.56; SDI_i – 0.09, 0.66, 0.51, respectively. SS state in accordance with the standardized scale has showed that the critical exponent belongs to Kharkivskyi and Kremenchugskyi; favorable – Chuguivskyi and Lokhvytskiy; satisfactory – Shevchenkivskyi and Myrgorodskyi districts.

In determining the state of economic subsystem (ES) the range of AI are taken into account, describing the level of industrial and economic development (IED), income (I) and unemployment rate (UR) and economic development I_i (EDI_i).

Condition of ES in the regions has showed that for the Kharkiv region AI IED is 0.93, 0.15, 0.04; I – 0.32, 0.32, 0.23; UR – 0.73, 0.49, 0.96; EDI_i – 0.60, 0.28, 0.21, respectively. For Poltava region AI IED is 0.89, 0.12, 0.9; I – 0.34, 0.28, 0.26; UR – 0.61, 0.71, 0.65; EDI_i– 0.62, 0.24, 0.23, respectively. State of ES by the standardized scale has showed favorable indicator for Kharkivskyi and Kremenchugskyi districts, threatening – for Chuguivskyi, Lokhvytskyi, Shevchenkivskyi and Myrgorodskyi districts.

The environmental condition (EC) of the territory included the AI state of atmospheric air (SAA), agroecological condition (AC), water usage (WU), waste management (WM) and Environmental Development I_i (IDI_i).

State of EC in the regions is: for Kharkiv region AI SAA is 0.39, 0.83, 0.96; AC – 0.44, 0.51, 0.55; WU – 0.66, 0.08, 1.00; WM – 0.58, 0.07, 0.21; IDI_i – 0.50, 0.21, 0.58, respectively. For Poltava region AI SAA is 0.83, 0.96, 029; AC – 0.41, 0.44, 0.31; WU – 0.69, 0.38, 1.00; WM – 0.69, 0.31, 0.06; IDI_i – 0.57, 0.41, 0.54, respectively. Favorable state is in Myrgorodskyi; satisfactory – in Kharkivskyi and Shevchenkivskyi, threatening – in Chuguivskyi, Kremenchugskyi and Lokhvytskyi districts.

Based on the calculated integral parameters index of SEE integrated territorial SEE development the index (*ITSEEDI*) is calculated as follows:

$$ITSEEDI = \sqrt[3]{SDI_i \times EDI_i \times IDI_i}. \quad (3)$$

The index *ITSEEDI* allows considering the nature of the relationships between the studied environment subsystems on the basis of the integrated approach and helps to reflect objectively the impact of human activity on natural components.

SEE assessment for the subsystems of Kharkiv and Poltava regions was conducted using the standardized scale (Pryshchepa and Klimenko, 2009): 0.8–1.0 – benchmark condition; 0.6–0.8 – favorable; 0.4–0.6 – satisfactory; 0.2–0.4 – threatening; 0–0.2 – critical.

Calculation results for *ITSEEDI* in Kharkiv and Poltava regions are presented in Table 1.

Table 1. **ITSEEDI calculation results for Kharkiv and Poltava regions,** *authors' development*

Results	Index SEE of region's development	SEE state
Kharkivskiy	0.29	Threatening
Chuguivskyi	0.33	Threatening
Shevchenkivskyi	0.40	Threatening
Kremenchugskyi	0.28	Threatening
Myrgorodskyi	0.7	Favorable
Lokhvytskiy	0.25	Threatening

Conclusions. SEE ratings of Kharkiv and Poltava regions allow proposing measures to ensure the highest quality of life through the introduction of green economy in these regions:

- improving the demographic situation and cluster development in healthcare;
- reduction of income differentiation based on reforms in the social security system;
- improve the quality of housing services and reforms in housing and municipal economy;
- recover the cluster for production and processing of agricultural products and food production; gradual transition to alternative sources of energy; reducing the accumulation of wastes due to complex utilization and recovery;
- optimization through the implementation of comprehensive programs on environmental protection of Kharkiv and Poltava regions until 2020.

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