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**International economic relations
and sustainable development**

Monograph

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Monograph is devoted to the research of theoretical and practical aspects of the sustainable development at the present stage of international economic relations. Innovative methodic approaches and economic mechanisms to provide sustainable development at the regional, national and international levels are considered. Scientifically grounded recommendations to achieve economic, social and ecological aims of the sustainable development through the strengthening of integration processes and international cooperation between countries of the world are given.

Key words: sustainable development, international economic relations, international trade, innovations, investment, integration, ecological management, marketing, ecological safety, economic mechanisms, “green” economy, renewable energy, energy efficiency.

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4.1 METHODOLOGY OF THE REGIONAL ENVIRONMENTAL AND ECONOMIC SECURITY IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT REGULARITIES

Taking into account a significant factor for introduction of the sustainable development regularities, the economic, environmental and financial security plays an important role for regions in the country. It provides a possibility of active control on the part of regional authorities concerning an effective use of resources, economic growth, environmental stabilization and citizens' welfare ensuring. The investigation of technique to evaluate and to generalize current approaches to the existing methods, which consider sustainable development regularities, is urgent to study security thoroughly and to estimate it.

The regional economic and social development strategy defines aims and priorities and determines directions of the economic security monitoring, where evaluation has to be an important link.

Theoretical and methodological aspects of the economic security evaluation technique for Ukraine were studied by the following native scientists: V.I. Hrushko, V.S. Sidak, V.H. Alkema, V.V. Kuzmenko and others. Specialists focus their attention on the national level of the state security, leaving aside regional peculiarities and three constituent of the sustainable development. There are interesting investigations of V.K. Antoshkin, who suggested principles of the regional economic security, based on regional economy development degrees. At the same time, scientists proposed criteria to evaluate economic security, which include: parameters of the economic growth (dynamics and structure of the national production and income, indexes of industrial production amounts and rates, capital investment etc; indexes of the natural and resource, productive, scientific and technical potential of the country; indexes of dynamism and economic mechanism adaptiveness and its dependence on external factors and indexes of people's quality of life [1] Observing these criteria it is reasonable to mention that they are all based on indexes, which define national, but not regional level. That is why, we suppose that it is irrelevantly to use them without proper correcting.

Kovalska L. and Savosh L. [2] suggested determining level of regional security on technique of real data comparison with indicators of the destabilizers level. Therefore indicators are observed as "guiding points of development, which define a negative processes limit, setting a signal to market participants about possible unfavorable spheres, decrease of the national security global level, and allow to evaluate quantitatively and to signalize about future danger, to carry out a number of program-focused measures concerning situation stabilization" [2, p. 91].

A generalized analysis of special literature lets to conform that regional development is defined, on the one hand, by resources potential, and on the other hand, on the activity efficiency. Level of the regional development is characterized by two blocks of indexes:

- 1) economic indexes, which define conditions and level of economy management;
- 2) environmental indexes, which outline results of the economic and vital activity.

The first block includes indexes which are relevantly to be divided into such factorial groups: natural, historical, demographic, social and economic, material and technical, political and legislative-regulatory. The second block includes indexes, which show the condition of environment, people's health, standards and norms. According to the above it concerns the determination of the environmental & economic security, which is observed as a state's protection from existing or potential possible economic and environmental threats [3, p.79].

Modern environmental crisis threatens the possibility of social sustainable development. Further degradation of the natural resources leads to the loss of its ability to support a necessary level of the environment. It is clear that introduction of the "mechanic" levers is impossible under modern conditions, that is why in order to prevent from the existing situation it is possible only to form the interconnections between people and nature, oriented to stabilize ecological situation, using environmental security regulations. Nowadays there is a stable tendency of consequences number and severity, caused by natural and technogenic situations, which comprise Ukrainian regions. It can lead to irreversible changes of the environment and has a negative impact on the economy and security of regions and country in general. That is why without necessary measures to activate and to improve regional environmental policy in the near future, the country's economy will not be able to cover all cost.

During the long time "environmental security" was understood as preservation and revival of environment. However, today's peculiarities have made essential corrections to conditions and directions in the given definition development, where economic factor is given a prior place. Today there are conceptual approaches to the profound interpretation of the concept "environmental security". They are reasonable to be united into the following ones:

1. Balanced approach. It is based on the objectives of the ecological balance support, which provides parity development of the environment and a human. M.F. Reimers and T.A. Khoruzhaya support this approach.
2. Protective approach is based on society's awareness of catastrophic situation with the formed type of economy development. It will cause increase of the load on environmental systems and assists necessity to introduce urgent measures concerning environmental protection. P.R. Kondratyev, L.O. Dobryanska, P.V. Shelest. D. Hutson are supporters of this approach.

3. Predictable and modelling approach, oriented to investigate special optimal criteria, which provide environmental efficiency to use the territory. Founders of this approach are L.H. Melnyk and L.M. Cherchyk. Z.V. Herasymchyuk suggests to observe organizational providing of the environmental security in the region as “interconnected essence of aims, principles, functions, methods and tools, which allow to organize, regulate and coordinate the process to achieve and to support optimally necessary level of the environmental security in balance with its economic and social development” [4, p. 98].

The research and analysis of the current approaches to render the observed definition allowed to give personal understanding of the existing ones. To our minds, the environmental security consists in the complete functioning and further development of any social and economic system with balanced use of its internal and external factors and setting of the favorable conditions for its living elements.

The most significant problem of the environmental security is recreation areas activity, which mostly responds to those activities, which are able to worsen its recreation peculiarities preservation and renewal conditions. According to the Russian scientists’ calculations, the recreational territories investing is characterized by the economic effect growth 3.71-4.26 units [5, p. 89].

Recreational territories are characterized by wide exploration, which includes richness with elements of natural objects. Using this criterion it is reasonable to carry out functional structuring of the recreational territories distinguishing a rank by each type. Later an average value of the weight rating was defined, and it allowed distinguishing separate regions in the country, which have maximum, provide the recreational territories development (Tab. 4.1).

Table 4.1

Functional structure of the health and recreational lands in Ukraine

Region	Health and recreational lands, ha/rating				
	Nature preserve	Health	Recreational	Historical and cultural	Average rating
Donetsk	142.70/5	0.50/8	9.41/4	2.30/6	5.75
Prydniprovsky	93.3/7	1.57/5	6.62/5	1.01/8	6.25
Eastern	430.86/5	1.60/4	6.09/7	3.47/5	5.25
Polissya	477.51/3	0.94/7	6.31/6	14.11/1	4.25
Central	57.63/8	1.53/6	5.56/8	8.06/2	6.0
Podillya	444.58/4	1.88/3	18.17/3	3.51/4	3.5
Black Sea region	570.82/1	10.99/1	29.08/1	6.04/3	1.5
Carpathian	526.90/2	4.89/2	25.66/2	1.80/7	3.25
Total	2744.30	23.90	106.9	40.3	

Note: rating evaluation has reverse calculation.

The given data show reasonability to distinguish three regions, which have maximal rating: Black Sea region, Carpathian and Podillya. They have great health and recreational resources.

Odessa region, which is included to the Black Sea region, was chosen for research. It is divided according to the regional principle into the following constituents: Northern region (Ananiyevka region, Baltsky region, Kodymsky region, Kotovsky region, Savransky region), North-eastern region (Mykolayivsky region, Lyubashivsky region), North-western (Krasnoyoknyansky region), Eastern region (Berezivsky region), Western region (Velykomykhaylivsky region, Tarutynsky region, Frunzivsky region, Bolgradsky region), Central region (Bilyayivsky region, Kominternivsky region, Ivanivsky region, Ovidiopolsky region, Rozdilnyansky region, Shyryayivsky region), South region (Izmayilsky region. Tatarbunarsky region), South-western region (Bilgorod-Dnistrovsky, Artsyzsky region, Reniysky region, Saratsky region), South-eastern region (Kiliysky region) (Tab. 4.2).

Table 4.2

Functional structure of the recreational resources of Odessa region

Region	Health and recreational lands, thousand ha/rating		
	Resort and recreational	Tourist	Average rating
North	0.95/6	0.07/6	6.0
North-Eastern	0.03/8	0.01/8	8.0
North-Western	0.05/7	0.01/7	7.0
Eastern	0.32/7	0.78/4	5.5
Western	1.93/3	0.06/7	5.0
Central	4.43/1	1.98/1	1.0
Southern	1.33/5	0.21/5	5.0
South-Western	2.03/2	0.24/2	2.0
South-Eastern	1.65/4	0.87/3	3.5
Total	12.7	5.23	

Note: rating evaluation has reverse calculation.

There was a rating of health and recreational lands for the distinguished regions. It proves the existence of valuable recreational resources and possibility to use and to reactivate them. The largest rating was given to Central (1.0), South-western (2.0) and South-eastern (3.5) regions. In order to calculate it, the weight index was chosen for every region, particularly an area of health and recreational lands and was divided into a medium rating, the least and the largest ratings 8.0, 1.0 accordingly.

The recreational territories development gives an opportunity to influence the process of capital accumulation in the resort and recreation sphere that is possible while using such

economic instrument as budgeting. It is reasonable to reduce tax burden and to increase state budget cost to support service sphere, particularly – resort and recreational sector and tourism [6, p. 12].

Development of the recreational territories depends on demand for service, which is proposed to potential tourists. Stable growing of demand leads to the constant economic growth. However therefore there is degradation of ecological situation, connected with anthropogenic pressure on the territory. According to technique, proposed by the native scientist P.V.Hudzem, evaluation of pressure while using tourists’ distinguishing density index was carried out. The results of this evaluation are shown in the Tab. 4.3.

Table 4.3

Density of tourists’ distinguishing in Odessa region, persons/km²

Year	Regions								
	North	North-Eastern	North-Western	Eastern	Western	Central	Southern	South-Western	South-Eastern
2001	57.22	0.10	0.11	55.35	13.95	697.12	20.53	203.25	170.15
2005	61.22	0.13	0.15	57.60	15.05	712.35	24.02	208.65	176.85
2010	68.17	0.18	0.19	61.8	17.75	747.82	25.47	212.73	185.71
2012	68.91	0.18	0.20	63.57	18.23	756.11	26.31	213.92	186.85
2013	69.02	0.18	0.21	64.62	20.25	827.16	28.35	246.18	192.31
2016	69.8	0.18	0.22	70.85	58.91	1802.12	95.23	586.52	318.66

The given data prove the fact that main burden is put on the central and southern regions and tourists are concentrated in the small territory. It negatively influences the ecological situation. Besides, recreational territories are located under the influence of the non-stationary polluting sources, number of which is increased 3-4 times during the holiday season. We calculated economic loss, yielded by the recreational territories of Odessa region, that is 30.73 mln UAH and consists of: vehicle emissions (68.9 %), wastes, left by tourists (16.64 %), dust emission (14.46 %).

Thus, the recreational territories development depends on stabilization of economic and environmental constituents. The current organizational and economic mechanism does not provide solving of environmental problems. That is why, there is a necessity to investigate, to justify and to use market-oriented economic tools, which correspond to the today’s economic situation.

Nowadays there are various approaches to form technique to evaluate environmental security. One of them was chosen for further research, investigated by Crimean scientist, and is based on comparison of the environmental capacity and anthropogenic pressure on the environment [7, p. 193]. Tourists' impact on the components of the recreational territories environment during the holiday season, which leads to changes of their qualitative state, was chosen as an anthropogenic pressure. Therefore environmental capacity is observed from position of the distinguished environmental component state and changeability of the environmentally significant parameters.

According to the chosen technique environmental security of the recreational territories is evaluated in two stages. During the first stage individual indexes in six components of the environment (air, surface water, sea water, burden of tourists and recreational territories, flora and fauna) are defined. The ratio of environmental capacity and anthropogenic burden allow to determine coefficient of danger for every component and to distinguish that one, which will receive maximum negative impact and demands realization of situation normalization measures. During the second stage environmental security complex index is defined, involving qualimetry, which preconditions possibility to observe different indexes, which characterize components state, and to put together proper indexes.

Thus, in order to calculate initial indicator, the following formula was used:

$$ES = \sqrt{ES_a \cdot ES_{sw} \cdot ES_{sw} \cdot ES_{tb} \cdot ES_{flora} \cdot ES_{fauna}}, \quad (4.1)$$

where ES_a , ES_{sw} , ES_{sw} , ES_{tb} , ES_{flora} , ES_{fauna} – environmental security according to the six components of the environment.

Owing to the total calculations it is possible to define level of the recreational territories environmental security and to have objective ideas about real ecological situation and to investigate ways to improve the existing situation.

Recreational territories accept the tourists' anthropogenic burden owing to irregular distribution during the year of natural and climatic conditions distinguishing [8, p. 28]. Maximum negative impact is made during the holiday season – April – September (Tab. 4.4).

Table 4.4

Anthropogenic burden on the recreational territories

Region	Anthropogenic burden, persons/km ²					
	IV	V	VI	VII	VIII	IX
North	956	1835	2570	3672	2081	1224
North-Eastern	27.7	15.2	21.1	121.1	68.4	40.7
North-Western	25.3	14.2	19.8	120.5	66.8	39.9
Eastern	1351	2897	4065	5080	2081	1224
Western	1961	4202	5883	8404	4762	2801
Central	9535	8692	27759	39656	22471	13219
Southern	2096	4492	6289	8985	5092	2999
South-Western	6296	13493	18891	26988	15292	8995
South-Eastern	7185	15399	21559	30800	17452	10266

The given data show that anthropogenic burden is distinguished with further deployment and achievement of peak values practically in all recreational territories of Odessa region.

The carried out calculations showed that component “sea water” is a dominant component for recreational territories. It provides reproducing of maximum oxygen amount that helps to reproduce environment and at the same time to stimulate tourists’ arrivals.

Thus, as a result of methodic provision approbation to evaluate environmental security of the recreational territories, character of ecological situation changes by the selected components of the environment is defined. A research of environmental security index dynamics proves its irregular distinguishing and underlines lack of positive factors to stop the process of ecological situation worsening in recreational territories.

The recreational territories sustainable development approach justification as innovation to provide environmental protection and further social and economic functioning is connected with environmentally dangerous and economically oriented activity achievements and is oriented to keep the current regions structure. Recreational territories are related to those, which are intensively developed, and it makes positive impact on social, economic and environmental problems solving of the Crimean region. Improvement and development of the market economy forms makes demands for economic stimulating of the recreational territories nature management, where special attention is reasonable to pay to new economic instruments investigation. Marketing of resorts is suggested, the aim of which is to create, support and measure tourists’ relations and behavior on the proper territory. It is based on price differentiation of the tourist’s service to redistribute tourists’ flow and to decrease anthropogenic pressure on the recreational territories.

In order to define actual equivalent evaluation of the concrete results in economic activity in the region, unfortunately there is no adequate statistic measurer. In general, one can suppose that methodological and methodic instrument, which is mostly adapted to determination of the resource potential final effectiveness, is extending system of the UNO national account considering population welfare evaluation. It is necessary to observe this problem, because at the regional level of regional development indicators evaluation, which are based on national account elements.

Stability of the social and economic system provides sustainable development of the country's economy, and in this way it influences the territorial formations development constituents. The leading factor of stability is public and political situation, which affects open access to information, decisions making, interregional and international economic relations establishment. The next significant factor of the regional sustainable development is an environmental security, which is based on support at the optimal level of the resource potential both within region and outside it; providing of balance between resources use and their consumption; environmental protection and as a result people's health. Socially oriented factor plays an important role. It is main element of any economic system development and includes educational part of the labor resources, knowledge, intellectual and managerial labor tools, which runs the social interconnection mechanism. Economic factors include capital, general economic knowledge and competition, which provide creation of effective mechanisms and tools owing to the flexible taxing system, financial and credit policy, using of state control methods and support, will lead to active investment and innovative activity. Complex action of all macroeconomic factors will provide environmental security, the living standards increase, the internal market development and successful cooperation with neighbor regions at the level of country or global space.

In order to build the regional economic & environmental evaluation model considering macroeconomic factors, Kalman-Bucy method was used, which takes into account either evaluation results (useful signal plus random barrier) or features of the investigated system via introduction of the system dynamics equation to the filter equation. Besides, Kalman-Bucy method gives possibility to: 1) receive minimum dispersion linear evaluations, based on known statistic characteristics of the income variables and barriers; 2) elaborate evaluations to the extent of their incomings, that allows to use method in real time; 3) receive practically realized structure of the optimal filter, solve tasks of multidimensional dynamic systems synthesis; 4) keep structure of algorithm with joint solving of tasks concerning optimal filtration and optimal management [9, p. 29]. Choice of the given method is caused by its specific nature, particularly:

with absence or small information about internal state of the system (in our case region) determination is performed on the basis of calculations of external constituent evaluations.

The proposed models are realized on the example of statistic data elaboration in Odessa region during 2012-2016. As a result of the carried out economic activity analysis macroeconomic factors are defined, which greatly influence general state of the regional development and its potential. They include (according to the significance degree): public and political situation, black (shadow) economy, intrasectoral competition, scientific and technical progress, consumers' economic interests, social state, irregularity in the economic complex structure, ecology, economic crisis.

The given model implementation provides environmental and economic evaluation of the region and revealing of environmental & economic evaluation dependency degree on macroeconomic factors in the region. As a result it was defined that Odessa region development as a border region, based on sustainability grounds, is possible while considering macroeconomic factors, which greatly influence some sectors (transport, industrial, processing and others).

In order to provide regional environmental & economic security, several measures have to be realized, which will help to solve existing social and economic problems, initiations of the economic entities' entrepreneurial activity, to increase amounts of the competitive service, which are able to satisfy people's demands, to extend dynamic development of separate regions with territorial environmental security providing and their development owing to own resource potential. In order to stimulate an effective use of the existing resources in the region, it is relevant to increase the intersectoral production level, to provide competitiveness and innovativeness in different types of natural and economic territorial systems, to outline their further development perspectives, based on the average- and long-term prognostications. As a result one can receive an economic effect from prudent use of the resource potential, social and environmental result from living standards and people's lives improvement.

Thus, the question of economic & environmental evaluation of regions' security has an important value to find real situational picture and to outline further spheres for their development and competitiveness degree growth. The macroeconomic factors significance to analyze and evaluate region, is based on the conceptual approaches of the economic theory, therefore, investigation of these factors is not always shown while building the regional formations development model.

Under modern conditions of the economy decentralization the key moment to provide regions' development is to investigate ways for their functioning, taking into account external environment, that is possible, based on stability and through evaluation of the existing resource

potential and provision of environmental & economic security, based on the sustainable development principles and regulations.

1. Antoshkin V.K. (2014), *Metody otsinky ekonomichnoi bezpeky rehioniv Ukrainy* [Methods of assessing the economic security of the regions of Ukraine], Kyiv: State University of Telecommunications, p. 155–163 [in Ukrainian].

2. Kovalska L., Savosh L. (2014), *Ekonomichna bezpeka rehionu: otsinka ta mekhanizmy zabezpechennia* [Economic security of the region: assessment and mechanisms of provision]. *Ekonomichnyi forum – Economic forum*, 4, p. 89–95 [in Ukrainian].

3. Hryniv L. S, Kichurchak M. V. (2008), *Natsionalna ekonomika* [National economy], «Mahnoliia 2006», 464 p. [in Ukrainian].

4. Herasymchuk Z.V. (2001), *Rehionalna polityka staloho rozvytku: metodolohiia formuvannia, mekhanizmy realizatsii* [Regional policy of sustainable development: methodology of formation, mechanisms of implementation], Lutsk: «Nadstyr'ia», 528 p. [in Ukrainian].

5. Samsonov S.T. (2012), *Investitsionnyiye potentsial turistsheskoy industrii Rossii* [Investment potential of the Russian tourism industry], Sochi [in Russian].

6. Cherchyk L.M. (2006), *Formuvannia rynkovykh vidnosyn u rekreatsiinomu pryrodokorystuvanni* [Formation of market relations in recreational nature management], Lutsk: LDUU, 352 p. [in Ukrainian].

7. Pashentseva H.V. (2011), *Osoblyvosti balansovoho pidkhodu zabezpechennia ekolohichnoi bezpeky rekreatsiinykh terytorii* [Features of the balance approach of ensuring environmental safety of recreational territories], Simferopol: NAPKS [in Ukrainian].

8. Fomenko N.V. (2007), *Рекреаційні ресурси та курортологія* [in Ukrainian], Київ: Центр навчальної літератури, 312 p. [in Ukrainian].

9. Brammer L. (1982), *Filtr Kalmana-Byusi* [Kalman-Buschy filter], Moscow: Nauka, 199 p. [in Russian].

4.2 COMPREHENSIVE APPROACH TO THE GLOBAL ECONOMIC SYSTEMS ENVIRONMENTAL SECURITY MANAGEMENT*

Irrational use of natural resources during many years, structural changes, occurred in the economical complex of the state, and also low level of the ecological society consciousness lead to great environment degradation. The main reason of the mentioned negative changes became

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