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ECOLOGICAL ASPECTS OF THE ECONOMIC DEVELOPMENT OF THE BLACK SEA REGION OF THE REPUBLIC OF BULGARIA

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Abstract

The article considers the main parameters of the sustainable development of the urban and rural environment as a basis for ecological development of the Bulgarian Black Sea region. Based on the problems of urbanization in the post-totalitarian transition in Bulgaria, conclusions and findings are made about the nature and the parameters of the implementation of the second pillar "Green Bulgaria" of the Plan for Recovery and Sustainability of the Republic of Bulgaria. The thesis is defended that the future development of Bulgarian Black Sea region should be based on environmental friendliness and sustainability. An attempt has been made to highlight the positive and negative changes in the ecological development of the Bulgarian Black Sea region over the last three decades. The main guidelines for the necessary changes in the regulatory aspect are presented. They should ensure the protection of the air, soil, water and nature of the Bulgarian Black Sea region.

Key words: *sustainable development, maritime economy, problems of urbanization, coastal zone, ecology*

INTRODUCTION

The problems in the development, ecology and infrastructural improvement of the settlements on the Bulgarian Black Sea coast are many and varied. Urbanization in the conditions of the socialist totalitarian system still influences the formation of urban and rural communities in the post-totalitarian period of the development of the Republic of Bulgaria. It is imperative that the future development of Bulgarian Black Sea towns and villages be based on environmental friendliness and sustainability. They should strive for coastal centring and location, with a transition from one imitation urban environment to another, with a panorama of tourist- adjusted and adapted area that combines environmental aspects of work and living environment and architecture with the challenges of modern industrial and agricultural technologies. One of the goals of the exhibition is to emphasize the positive and negative changes in the development of the Black Sea area of the Republic of Bulgaria during the last three decades. The changes in the legislation in the Republic of Bulgaria in unison with the Directives and the legislation of the EU aim to ensure the protection of the air, soil, water and nature of the Black Sea region.

In the conditions of established market relations in the Bulgarian national economy, the need for a comprehensive reassessment and reorientation of regional policy on a national scale comes to the fore. Such reorientation is especially necessary for the cities and villages of the Black Sea region, due to their role in strategic for the development of the Bulgarian economy industries such as water transport, tourism, construction, trade, extraction of marine resources and in general due to their position as centres for development of modern Bulgarian maritime economy.

Both of the largest Black Sea cities of the Republic of Bulgaria - Varna and Burgas - grew significantly during the socialist period - after September 9, 1944 Varna was the city with the largest mechanical growth in the Republic of Bulgaria. On September 9, 1944 the population of the city of Varna was 45,000 people. In 2007, when the Republic of Bulgaria became a member of the EU, the city of Varna officially numbered 710,000 people. This is an increase in city residents more than

15 times. The growth rates of the city of Burgas are similar, which for the period from 1944 to the beginning of the Millennium became the fourth largest city in Bulgaria, after Sofia, Varna and Plovdiv.

MATERIALS AND METHODS

The first step of the study is a literature review in order to define theoretical and methodological determinants of the report and identify a broader set of indicators and criteria for environmental priorities in the development of the Black Sea region of the Republic of Bulgaria. The second step was the expert evaluation of the identified indicators in order to select the most significant projects and present more illustrative examples. Data from various sources of information were used, and above all data from the Regional Centers for Environmental Protection and Water in the main Black Sea cities of Burgas and Varna. The third step is related to the selection of various examples illustrating the positive and negative changes in the process of transition to a market-oriented economy. An important methodological point is the summarizing of the activities for sustainable development and the ecological orientation for the development of the Black Sea towns and settlements in the coastal region.

The main documents used for the conceptual assessments of the ecological aspects of the development of the Black Sea region of the Republic of Bulgaria are the National Development Program Bulgaria 2030, as well as the Plan for Reconstruction and Sustainability of the Republic of Bulgaria from February 2021 and the EU Framework Programs for Regional Development.

RESULTS AND DISCUSSIONS

Positive changes in the Black Sea region during the transition to a market economy

The past period of over three decades since the beginning of the democratic changes in Bulgaria has radically changed the realities in the Bulgarian Black Sea cities. Historically, they were formed under different conditions and have different natural and demographic features. The common thing that unites them is their location in the coastal strip of the Bulgarian Black Sea coast and their connection with the sea and the Black Sea ecosystem.

The changes that have taken place in the context of the transition to a market economy have both positive and negative dimensions.

At the present stage, the positive changes are relatively small and have little effect in the direction of improving the environmental situation.

The most significant positive change in the ecological situation on the Bulgarian Black Sea coast is the drastic reduction of industrial production, mainly in the northern Black Sea cities and the utmost in the Varna-Devnya industrial agglomeration. The liquidation of entire structurally defining industries for the region, such as shipbuilding, production of internal combustion engines, radio electronics, heavy chemicals, as well as limiting electricity production to a minimum volume needed to cover the peak moments in the load of the country's energy system, lead to natural results: reduction of pollution of river and sea waters; to less harmful emissions into the air and to reduction of soil pollution.

In Dobrich region, which is represented by several small towns and villages on the Black Sea coast, one of the last eco-projects is the one launched on November 19, 2019. project for closure and reclamation of the landfill for municipal waste in the municipality of Shabla. The investment amounts to BGN 2,284,235, incl. BGN 2,192,211 for technical reclamation, which are provided by the Enterprise for Management of Environmental Protection Activities (EMEPA), and BGN 92,024 for biological reclamation, which are at the expense of the Municipality of Shabla [7].

As a positive fact for the Bulgarian economy can be assessed the fact that cities such as Burgas and Pomorie retain to some extent the industrial production, incl. and the production related to the extraction of marine resources (the Black Sea salt pans in Pomorie and Burgas). In Burgas, oil refining, machine building, metallurgy, ore mining and shipbuilding are the main pollutants of the

ecosystem, including the waters of the Burgas Bay, as well as the lakes: Atanasovsko Lake, Mandre Lake and Lake Vaya.

"One of the industrial giants of heavy chemistry in the Republic of Bulgaria - Lukoil Neftochim" - Burgas has invested over $ 35 million in treatment plants since 2014, which reduce harmful emissions into the air. Reconstruction and modernization of an existing boiler have been carried out in the plant, and a filtering system has been installed. The technology is of a new generation in the field of oil refining and this is one of its first applications within the EU. It reduces emissions from catalyst dust several times compared to the equipment used so far."[4].

One of the last investments in improving the ecological environment in the Burgas region is from March 19, 2020. When a project for reclamation of a landfill for solid waste in the town of Obzor, Nessebar municipality in the Burgas region started. The project has a total value of BGN 1,254,410.89, of which BGN 1,066,249.26 is a grant from the European Regional Development Fund (ERDF) and BGN 188,161.63 is national co-financing.

The purpose of this eco-investment is to carry out technical reclamation of the decommissioned landfill for solid waste in the land of Obzor. The implementation of the project will provide an opportunity for the subsequent improvement of the landscape and for the restoration of the suitability of the terrains for agricultural or forest use [8].

Another positive effect of overcoming the limitations of the totalitarian economy is the opportunity to release the initiative and entrepreneurial potential of the people of the Black Sea region for the development of private initiative and private business. In a short time, all major tourist infrastructure objects in big Bulgarian Black Sea resorts and holiday villages have been privatized. The hotels and the entertainment base have been modernized and renovated. Many new hotels and restaurants have been built. The construction of the Bulgarian Black Sea coast is carried out at a fast and dynamic pace. For about two decades after the beginning of the democratic processes in the Republic of Bulgaria, almost all established resort settlements have been rebuilt. The development and construction of the few remaining undeveloped remote and exotic beaches near Irakli, Aleppo, Otmanli, Durankulak and others has begun. The main Black Sea resorts on the Bulgarian Black Sea coast - Golden Sands and Sunny Beach - are extremely developing and expanding with new hotels and entertainment sites. New modern complexes appear such as Kamchia, Saint Vlas; Ravda; Pomorie. All this creates a good basis for the development of maritime tourism. While the industry is preserved and developed mainly in the southern Black Sea region, the tourism business is in the process of renewal and adaptation along the entire Bulgarian Black Sea coast, including in cities such as Tsarevo and Ahtopol, which in the recent past fell into the forbidden border area.

As Angela Botezatu points out: "Mini vacations" in rural areas are very appreciated by tourists. Tourism development in rural areas should be supported by the state, local authorities, local creativity and initiative and not at least by tourists themselves." [2].

To some extent, the effect of various agribusiness development programs (SAPARD), socio-economic development (PHARE), transport corridors and high technology development (INSA), the EU Framework Programs for Regional Development can be assessed as positive for regional development. All these programs supporting the integration processes in Central and Eastern European countries. Most importantly, that these programs provide financial resources that can be used to solve various environmental and socio-economic problems in the Black Sea region.

Table 1 presents the ecological potential of the parameters of sustainability in the development of the urban environment. As Professor Stella Todorova notes:

"The main considerations when using the indicators for sustainable development are aimed at:

-Setting specific goals;

-Data collection through monitoring;

-Achieving efficiency;

-Reporting on global development;

-Improving the relationship between society and the environment;
-Taking into account the following factors - geographical location, people, culture and institutions." [14].

Table 1. Ecological potential of the parameters of sustainability in the development of the environment on the Black Sea region

Parameters of sustainability	**Changing the ecological indicators of the environment on the Black Sea region**
1. The reduction of input materials used.	Saving of primary raw materials. Reducing the human footprint on the planet.
2. Waste reduction.	Reducing the harmful effects of waste processing and storage.
3. Reducing the emission of harmful substances along the value chain.	Improving the urban eco-environment.
4. Encouraging the reuse of packaging, containers, capacities, pallets and other logistics aspects of production and transport activities.	Reducing the number of pollutants and the degree of pollution of the urban environment.
5. The recycling of resources.	Development of responsible eco-behavior for future generations.
6.Substitution of resources.	Saving resources and raw materials and minimizing the environmental consequences of the extraction of primary resources.
7. The use of alternative energy sources.	Reducing the yield of non-renewable resources.
8.Production of energy from renewable energy sources.	Reduction of harmful emissions.
9. The promotion of ecologically clean and resource efficient productions.	Saving energy and natural resources. Reducing the eco-footprint of urban communities.
10.Development of technological solutions for waste-free technologies in production.	Minimizing the eco-impact of production and economic activities in the urban environment.
11.Innovative solutions aimed at extending the life cycle of products.	Imposition of eco-standards in everyday consumption.
12. Introduction of alternative productions using waste as raw material.	Saving primary resources and responsible for future generations urban consumption.
13. Generating "green" demand for environmentally friendly products and services	Introduction of mass eco-behavior and various ecological practices in the consumption of the urban population.
14. Implementation of intelligent systems for administration and support of the market of recyclable raw materials.	Use of high technologies in supporting environmental business and management decisions.
15.Development and implementation of modern polymeric substitute materials in the production of products, after the use of which widespread waste is formed.	Saving natural raw materials such as wood, natural fibers (cotton, flax, hemp, jute, etc.), ore and non-ore minerals, etc.
16. Achieving market equality of environmental products and services and their equivalents.	The imposition of environmental practices as normal production and consumer standards in urban conditions.
17.Impact on markets through economic instruments to internalize external costs (related to environmental protection) through the polluter pays principle.	The introduction as a legal norm of sanctions for environmental damage and violations by citizens.
18.Promoting green public procurement and green jobs.	Increasing employment in the eco-industry.
19.Development of sustainable forms of tourism (cultural, eco-, balneo / spa, etc.).	Rescue, protection and care of unique natural phenomena in the urban environment as tourist sites.
20. Production of second generation biofuels based on the processing of waste biomass.	Saving of agricultural land used for extraction of first generation biofuels - areas sown rapeseed, corn, sunflower. Utilization of waste biomass. Saving energy and non-renewable energy sources.
21.Reproduction of urban park areas, which includes the activities for the creation of new parks and gardens, conducting breeding, sanitary and regenerative felling.	Direct environmental impact by increasing the "lungs" of cities.
22.Energy certification of the city building and infrastructure fund - survey for energy efficiency of buildings and industrial systems in order to determine the level of energy consumption.	Saving energy and non-renewable energy sources.
23.Checking for energy efficiency of hot water boilers and air conditioning systems in buildings - energy efficiency management in buildings and industrial systems - energy management.	Increasing the environmental efficiency of the operation of energy facilities in the urban environment.
24.Extraction of secondary raw materials and energy from waste from the city park economy (fruit growing, floriculture and gardening).	Reduction of part of the urban waste and more efficient use of the resources of the city parks and gardens.
25.Management of specific waste streams - recycling, reuse of waste from wood processing and production of panels and furniture, sludge from wastewater treatment, obsolete electrical and electronic equipment, batteries and accumulators, biodegradable waste and much more	Activities with a direct environmental impact - conservation of resources, conservation of ecosystems and reduction of the human footprint on the global, and in particular, on the urban environment.

Source: own elaboration.

The predominant part of the sustainability practices presented in the tables are applied in the large Bulgarian Black Sea cities - Varna and Burgas. In general, the tendency towards sustainability in the development of the two large traditional centres in Eastern Bulgaria is more and more noticeable and more and more visible.

Four priority areas are identified in the National Plan for Reconstruction and Sustainability of Bulgaria. These are "Innovative", "Green", "Connected" and

"Fair" Bulgaria. This is the name of the four pillars of the National Recovery and Sustainability Plan, which allocates € 16.7 billion from the next multiannual financial framework for the period 2020-2027 and € 12.2 billion from the Next Generation European Union instrument. Under the second main pillar - "Green Bulgaria" will be invested the most significant part of the resources of the plan - 37% of all planned funds in the National Plan for Recovery and Sustainability. A priority part of these investments will be directed to the Black Sea region, as the main tourist, agricultural and demographic zone of the country [3].

Another important environmental priority of the Black Sea region is to achieve a symbiosis between industrial and agricultural production within the concept of a "circular economy". "The circular economy is a form and a paradigm of the green economy, involving the reuse or recycling of material resources used in products whose life has come to an end or which have lost their usefulness, to construct new objects, of the same quality or even better." [9].

Negative changes in the Black Sea region during the transition to a market economy

Unfortunately, the negative effects of the transition from a centrally managed economy to a market economy are much greater.

The accelerated development of industry in the 70s and 80s of the last century in the Black Sea cities of Bulgaria and especially in the region of Varna and Burgas (electrical production, heavy chemical industry, petrochemical engineering, shipbuilding, electrical industry, cement industry, locomotive production and wagons, etc.), has led to a sharp rise in water consumption and the formation, as a logical consequence, of huge volumes of polluted water. In this regard, the complex and rational use of groundwater and surface resources, as well as the fight against pollution of water bodies and marine waters, is becoming important.

In the Varna region, which is controlled by the Regional Inspectorate for Environmental Protection and Water (RIEW) - Varna, 464 sites have been built and are functioning, which are potential and active sources of air pollution. Atmospheric air treatment facilities operate in only 163 of the above-mentioned sites. 329 autonomously operating facilities purifying the differentiated gas streams have been installed in these sites. Of these 329 facilities, only 304 operate effectively. The remaining facilities are characterized by an unsatisfactory cleaning effect. Reconstruction and modernization, as well as complete replacement are needed for the air purification facilities in TPP Varna, a large part of the electrostatic precipitators of the enterprise "Deven" AD, the facilities of the production association "Agropolichim" AD in the town of Devnya, the furnaces for incineration of hospital waste of the university hospital. "St. Anna", the hospital "St. Marina" and the hospital in Dobrich, the treatment facilities of the plant for microproducts "Kaolin" AD in the village of Ignatievo and the asphalt bases of the enterprises: "Road Construction" AD Dobrich; Roads and Bridges AD Varna and Roads and Bridges AD Provadia.

Table 2 presents the main pollutants in the region of the northern Bulgarian Black Sea coast.

Table 2. Main industrial sources of air pollution in Devnya

Enterprise	**Pollutant**					
Solvay Sodi AD	NH3	Dust	CO	CO_2	NOx	
Deven AD	Dust: coal, fly ash	SO_2	NOx	CO	CO_2	
Agropoli chim AD	NO	NO_2	NH_3	F_2	CO_2	mineral fertilizer powder, phosphorrite
Polymers AD	NO	NO_2	NH_3	F_2	CO_2	
	Cl	HCl	Dichloro ethane	Ethylene	Etan	
"Devnya cement"	Cement powder	SO_2	NOx	CO	CO_2	
TPP "Varna" (from a nearby area)	Dust: coal, fly ash	SO_2	NOx	CO	CO_2	

Source: [13].

They were generated by the industrial enterprises in the agglomeration Varna-Devnya.

Serious polluters of air, water and soil in the Black Sea region are the chemical companies in the region of Povelyanovo, Devnya and the port of Varna-West. The cement plant in Devnya is also one of the major polluters in the region.

One specific danger of pollution of the largest water basin touched by the Republic of Bulgaria - the Black Sea - is oil. The research of the Specialized Laboratory of the Oceanological Institute of the Bulgarian Academy of Sciences found that only 30 grams of gas oil are completely sufficient to destroy 300 units of plankton per 1 cubic meter of water. Statistics show that 10% of the oil that is extracted from the water and 1% of the oil and petroleum products that are transported by sea fall into sea and river waters. In this way, these pollutants degrade water quality, pollute a huge area of the sea area and the coastline and at the same time cause irreparable damage to marine and river flora and fauna.

The negative consequences of pollution (dusting or contamination) of the environment can be inherently reversible and irreversible. Therefore, an important socio-economic criterion in planning and managing the cleanliness of the environment should be the decisive fight to prevent exceedances of maximum permissible concentrations (MPCs) of pollution. A modern solution for strengthening the control in this direction is the creation of an automated system for control and management of the state of the environment [1].

Activities ensuring the sustainable development of the coastal region

The deindustrialization of the northern Black Sea region frees large masses of people from the industrial sector. The service sector and the tourism business are unable to compensate for rising unemployment. People are looking for an opportunity to get their land back and work that land as small farmers and tenants. Lack of experience in agricultural production makes their efforts ineffective. For the first two years of the SAPARD program, for example for the agricultural sector, only 6% of the funds have been used and only 29 projects have been launched. With the accumulation of experience in design, the situation in the agricultural sector tends to improve, but the industry is still far from optimal in the absorption of EU funds.

High unemployment creates demographic and social problems, especially in small northern Black Sea towns such as Shabla, Kavarna and Balchik.

Since totalitarian times, the practice of large municipalities, which already have higher revenues from local taxes and fees, to receive a larger state subsidy than the small Black Sea municipalities has been preserved. The end result is an ongoing and growing asymmetry in development and in the ability of municipalities to solve important and priority problems.

As the famous architect Jan Geel notes, “there are differences between the needs and opportunities of rich and poor cities. It is important for developed countries to pay more attention to social sustainability as a key element of a well-functioning and attractive city.

In low-income societies (such as Bulgarian society - MT) the problems are much more urgent, as the gap between rich and poor is huge, and widespread poverty limits the opportunities of marginalized groups. Solving the problems in these societies requires a reallocation of resources, visionary urban policies and capable leadership."[10].

In a very difficult situation are the small Black Sea towns such as Byala, Obzor and others. Their remoteness from large urban centres and their underdeveloped urban and resort infrastructure limits their ability to compete successfully with established resorts such as Balchik, Nessebar, Pomorie and Sozopol. The lack of developed transport infrastructure is the main obstacle to the lack of promising investments in this region, regardless of its potential for combining sea and mountain tourism and for year-round use of the tourist base. Despite the obstacles and problems of infrastructural and administrative nature, giant hotel complexes have been built in these areas as well, trying to offer

competitive tourist services, despite the underdeveloped infrastructure and the lack of sufficient treatment facilities on the Black Sea coast. As Ivaylo Dichev notes, "the Bulgarian city is again in a 'transition' - from a static place of privileges and national pedagogy to fluidity, cultural collage, multiple scenographies of desire." [5]. Palaces, towers, barn castles, amusement centres, water parks and other highlights of this "scenography of desire" have sprung up along our Black Sea coast.

A rural area does not end within its administrative boundaries in reality. It actively interacts with neighbouring, rural or urban sites and adjacent areas. Its development must be in harmony with its surroundings. It is logical to establish mutually beneficial relations between the rural and urban population, without the rural environment being stereotypically perceived as a service provider for urban areas [15].

"A housing system, to be considered as a whole, will not be viable without ensuring the viability of all its elements, from large cities to small villages." [6].

In general, the current development strategies implemented by the Bulgarian Black Sea cities can be assessed as survival strategies. It relies mainly on the inherited and modernized tourist base. Unfortunately, it is oriented towards a predominantly communal tourism and manages to attract mainly insolvent tourists from the upper age groups, who do not go beyond the tourist package agreed with the tour operators. The small number of companies (52 companies working with the resources of the region) from the Bulgarian maritime economy, which are trying to extract marine biological and mineral resources. They have modest capital opportunities and do not receive serious support from local authorities. There is also a lack of synergies between entrepreneurs in the maritime economy system.

CONCLUSIONS

In the conditions of the fast and dynamic development of the urban environment in the second half of the XX century and at the beginning of the XXI century, sustainability in Black Sea region is practically absent as a priority. The negative consequences on the urban environment are caused by a complex of different in nature and dynamics processes. The most significant of them are: urbanization (mass relocation of the population from rural areas and small towns to large urban centres and industrial agglomerations); industrialization; the development of urban and interurban infrastructure; extraction of various resources in suburban areas (drinking water, inert building materials, logging, food production); problems with municipal waste management; the need for wastewater treatment; pollution and dust in the city air from car traffic. The Bulgarian Black Sea region has great potential, especially when the sustainable development of cities and towns is combined with the necessary environmental activities to protect the air, water and soil. More than half a century of research into public space and urban life since Jane Jacobs's 1961 book, Death and Life in America's Big Cities, "made people who use cities visible to politicians and designers." It is now possible to plan an active increase in urban activities or at least to ensure that public space is usable and pleasant for urban dwellers. Once neglected, urban life is already an established and recognized field, which has a great impact on the attractiveness of cities."[11]. This statement by Jan Geel and Brigitte Sware has its full force for the Bulgarian Black Sea towns and villages.

In the future, it is expected that the National Development Program Bulgaria 2030, as well as the Plan for Reconstruction and Sustainability of the Republic of Bulgaria from February 2021 [12], will give a new impetus to the environmental aspects of development of the Black Sea region of Bulgaria.

The planned funds under the Green Bulgaria – one of the pillars of the Recovery and Sustainability Plan are more than a one third, which is a guarantee for the importance and significance of this priority for achieving sustainable development of all regions and the country as a whole.

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