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Spatial planning of ecological networks under the conditions of significant anthropogenic fragmentation

Abstract: The features of the nowadays stage of transformation methodology spatial planning in Ukraine and the peculiarities of the formation mechanisms of environmental planning schemes in the regon is shows. Possible reserves of the eco-nets creation are identify and regional potential of eco-nets creation, possibilities of its realization are characterized. Determined by which land can form regional ecological network and outlines the main features and approaches of environmental policies and spatial planning ecological networks in regions with high anthropogenic transformation of landscapes.

Keywords: territorial planning, land use, anthropogenic transformation of landscapes, ecological networks, regional potentsial ecological network

Nowadays in the Ukrainian sphere of social changes the “center of gravity” in solving of a lot of tasks is transferring from the state level to regional and local ones. The role of separate territories and territorial communities increasably grows in coordinated governmental and local administrative action making, realization of social rights and population guarantees. Numerous researches in the sphere of town-building and rayon planning, geography, regionalstics, urbanistics, landscape

planning, are dedicated to the problems of territorial planning in Ukraine. Among those who laid the conceptual foundations for this important scientific and practical direction are Kolosovskiy M., M. Baranskiy, E. Pertsyk, F. Listenhurt, G. Lappo, D. Bogorad, B. Davidovich, A. Izrailevych, V. Nudelman and many other professionals. A significant contribution to the theory and practice of regional planning made architects- urbanist V. Vladimirov, I. Fomin, Y. Belokon and other. The defining of the eco-net in researches and study of the current biodiversity of individual elements began in the 1990-s. The fundamental aspects of the formation and development of ecological networks one can find in the scientific works by Y.R.Shelyah-Sosonka (1999), P.H. Shyschenka, M.D. Hrodzynskoho (2001), V.A. Baranovskoho (2001), T.L. Andriyenko (1991), S.M. Stoyka (1995, 2004), K.M. Sytnyka (1995), M.A. Holubtsya (1997). An important contribution to the development of the conceptual bases of ecological networks in line with international strategy development, the study of geographical aspects of their formation are worked out by L.H. Rudenko (1999, 2001), I.O. Horlenko (2001) N.R. Malyshevoyi, V.I. Oleschenka (2001), V.M. Paschenka (2000) Topchieva O.H. (1993 - 2007).

The searching of the methodology and forming tools of ecological safety basses reflects in numerous projects in the spheres of geography, regional planning, town-building and land organization [1, 3, 4-6 etc.]. In geography the geoplanning paradigm is clearly defined by Topchiev O.G., Malchykova D.S. [5]. It is emphasized that geoplanning will allow substantiating the rational territorial organization in context of proving the ecological territorial balance and making the productive functions of vital importance and, as a result, will support the growing of living quality in the region.

The potential spatial resources of eco-nets development are clearly noted in Ukraine legislation (table 1). It is important, that while including the territories to the eco-nets the form of owning and category of land do not change. Besides, owners and users of these territories have an opportunity to take the public funding for wild life safety. The basis of eco-net – are the reservation units, but actually all

units, with differently saved natural landscapes, may become the elements of eco-net. The next research [2] stage presupposes the identification of regional potential for forming an eco-net, its structure, regional peculiarities, problems and prospects of usage.

Tab. 1. Structural elements of eco-net and their components, defined by the current legislation of Ukraine *.

	Structural elements and their functions	List of territories and eco-net objects	Possible components of the structural elements of the eco-net
Structural elements of the econet	***The key ones (preservation of the most valuable and typical for the region component of landscape and biodiversity)***	territories and objects of protected areas, wetlands of international importance, other territories within which preserved the most valuable natural complexes	• areas and objects of nature reserve fund • ground water resources • (employed seas, rivers, lakes, reservoirs, other water bodies, swamps and islands, coastal protection strips along seas, rivers and around ponds, hydraulic, water facilities and other channels, as well as land allocated for the easement for them; coastal strips of waterways) • • forest lands • • shelter belts and other protective plantings that are not classified as forest land • Land for health improvement on the basis of its natural resources • recreational land used for the organization of mass recreation and tourism and sport events • areas of steppe vegetation, pasture, hay, stone deposits, sand, salt marshes, land, within which are the natural objects of particular natural value • land on which growth of natural plant communities listed in the Green Book of Ukraine and territories that are homebound or growth of species of flora and fauna listed in the Red Book of Ukraine • part of extensive agricultural land use - pastures, meadows, grasslands, etc. • contaminated lands that is not used and are subject to a separate protected as natural areas with separate status
	The joining ones (combine together key areas, providing migration of animals and exchange of genetic material)	areas that provide connections between key areas and eco-net integrity	
	The buffer ones (providing protection and connecting key areas of external influences)	the area around the key areas of the eco-net that prevent the negative impact of economic activities in adjacent areas	
	The renewable ones (ensuring the formation of spatial integrity of the eco-net, which should be implemented immediate measures to reproduce the initial state of nature)	areas that are disturbed land, degraded and unproductive lands and lands affected by the negative processes and natural phenomena, other areas are important in terms of the formation of spatial integrity of the eco-net	

* Compiled according to the Law of Ukraine "On eco-nets of Ukraine", the Water Code of Ukraine, the Forest Code of Ukraine.

Systematization of materials by the distribution of land fund (according to the conventional form 6-lem in Ukraine) gave the opportunity to identify possible reserves and regional potential of the eco-net's creation, to describe its structure (fig. 1). Prepared computations show that land part of eco-net in Kherson oblast comprises almost 34% of the territory (from 5.8% to 67.6% in separate areas of the region).

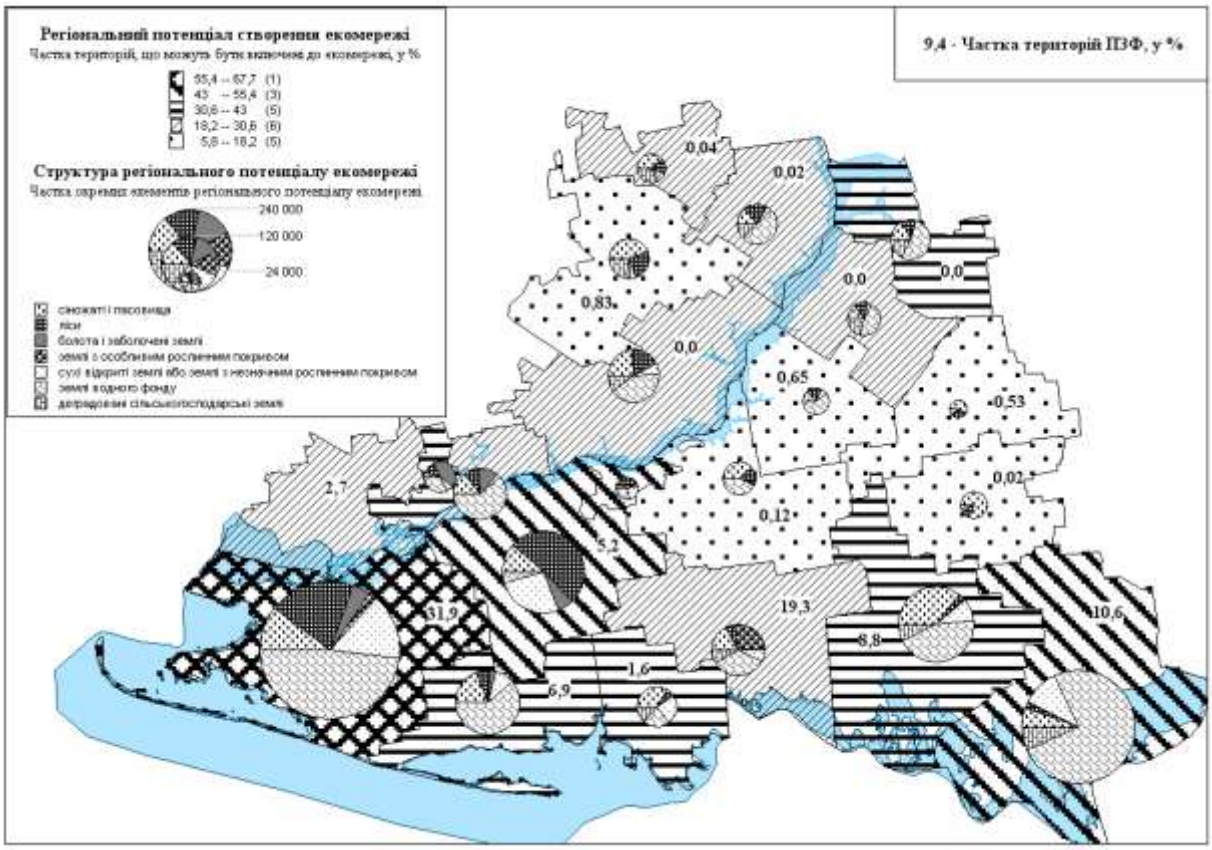

Fig. 1. The structure of regional potential of econet in Kherson Oblast

Systematization of materials by the distribution of Land Fund (according to the conventional form 6-zem in Ukraine) gave the opportunity to identify possible reserves of the eco-nets creation and to characterize regional potential of eco-nets creation, possibilities of its realization.

1) Firstly, these lands belong to natural-reserved Fund (NRF) which can become the nuclei of eco-net. In Ukraine established a norm of land areas NRF at

the level of 5% of the territory. Within the arid, dry areas of Kherson, this standard should be increased to 7 – 10%. The current system of natural-reserved Fund is insufficient not only by the area, but also by the representativeness. It does not cover even all the typical zonal cenosis, types of plant, most of rare cenosis, most of old species diversity. Only 35% of rare plant kinds are located in preserved areas. Kherson oblast is one of the richest areas in Ukraine for its specific structure of living organisms. In the area are 40% of living organisms, which are known in Ukraine. Also noticeably that irregularity and ambiguity of objects location in natural-reserved fund on the territory: any preserved object in 2 regions, only about 1 in five areas.

2) To the part of eco-net should be included forest lands (forests of first group) and recreational areas.

3) The main problem is the legally uncertain in many cases, the status of recreational areas. For example, considerable area land of Black and Azov Seas, Kakhovka reservoir used for purposes of "unorganized" recreation on places not adapted for this type of activity. The main component of the eco-nets future should be lands of water fund, a special status which already defined on the usage of Land and Water codes of Ukraine. New categories of lands (water protective zones, coastal protective strips) which are statutory in the 1990s has not selected on districts and on land usage plan. Special land-designed work, appropriate organizational measures and significant resources are required.

4) The considerable reserve for forming eco-net is underproductive agricultural lands. Parts of truncated saline lands of Kherson oblast are unacceptably high. However, questions of its inventory and output from agricultural cultivation are problematic, "canning" and rotating to the condition of natural lands- pastures, bushes, forests, and wetlands.

It is impossible not to note that such simple and optimistic calculations in real life are complicated by a significant number of undefined and problematic issues, including:

1) According to the legislation, territories of NRF must become as regional key areas and national eco-net. The high complexity and cost of works concerning

the output of borders caused a situation, where in most cases there is no real border of territories NRF on a district (lands NRF "blurred" among the lands of the forest, water fund for agricultural purpose), a significant number of conflicts between land users is present here.

2) Some of the objects and territories NRF of the local level are not marked on the map and it is difficult to define (for example, hydrological memorial of nature "Spring of Shilov Balka") on the district.

3) Separated areas NRF due to the presence of errors and contradictions in the legal -normative base are actively been dividing. We cannot talk about the full implementation by such territories NRF, which stabilize the environmental functions.

5) Within the Kherson, Mykolaiv oblasts and AR Crimea are located areas of wetlands, but its actual distribution by regions is absent and legislative status is uncertain.

This list can be continued, and in particular the uncertainty of such important environmental territorial elements as water protected zones and coastal protective strips, land areas, where natural plant grouping grows and which belong to the Green Book of Ukraine and the territory, which are places of stay or the growth of animal species and plant world listed in the Red Book of Ukraine, etc.

In this context it will be better to mention a comprehensive analysis of problems in eco-nets creation at national, regional and local levels, which conducted by the National Institute of strategic researches. Its analysts offer to generalize eco-nets problems [3]:

1. Methodological. It is based on the amorphism and the absence of a consensus understanding of the purpose and structure of the eco-net. The incorrect understanding of the nature and objectives of the establishment and eco-nets development is negatively affects on an efficiency of management structures and agency that controls the process. Without a clear understanding and articulating of tasks an effective program of eco-nets creation on regional and local level cannot be designed.

2. Legislative. The disparity of Ukrainian law "about the nature reserved fund" to existing realities of the modern environment in part of the interpretation of "naturalness" of those or other territories. This and other laws are based on the principle of dividing territories and objects of natural and unnatural (modified) and conceptually aimed at preserving nature, and not at the optimization of nature management.

3. Management. It is consisted on the institutional weakness of regional structures, which have dealt with the issues of creation and eco-nets development. Considering the systemic nature of the formation's problem of the national eco-net, structural subdivision of oblast State administration should care for this problem, and not a structural unit of the regional public administration of environmental protection. Concerning the eco-nets creation one should accent on not only an environmental problems, but it affects a lot of socio-economic and internal relations. Managing problems also related to methodological principles of eco-nets building.

4. Mental:

-heads of governmental agencies and organizations in their activities are oriented to departmental interests, while eco-net's creation involves the need to care about national benefit;

-mentality of private commercial structures aimed at obtaining economic benefit, and not the environmental effect. Therefore, as a rule, there is strong opposition from the (visible or hidden) land users when it comes to granting permission to create an object NRF;

-mentality of the population in terms of land privatization and restoration of instinct landowner is not conducive to land set under the elements of the eco-net. In addition, the mass of the population has a steady distrust to any government, including and to the environmental bodies; people have a fear of losing acquired property and means of existence.

5. Financial. Financing of new and existing protected areas is insufficient. It is not provided with proper financing of environmental activities, scientific

research, environmental and educational, recreational and tourism activities of national natural parks and reserves. Practically no funds are allocated for capital expenditures.

6. Scientific research. The quantity and quality of scientific developments related to economic evaluation of biodiversity and social benefits from balanced usage of biodiversity, is insufficient. Missing mechanisms and methodologies for the calculation of the real monetary value of natural objects, which do not permit to count up damages for biodiversity harm, and to determine the degree of responsibility for violations of environmental legislation.

On the basis of the research there are highlighted basic features and approaches of developing the strategies of environment and spatial planning of eco-nets in regions with high levels of anthropogenic transformation in landscapes:

1) By the criteria of selection of structural elements of the regional eco-nets [1] within each of the regional eco-centre should be allocated the most important for the administration of eco-centers functions of natural nucleus-with high environmental status. In the structure of the regional eco-corridors, especially of archipelago form, to ensure the functional connectivity of this structural element of the eco-net it is to mark the key areas that will be environmental centers of the local level. For regional eco-centers it must be such territories NRF, nature protected and water protected areas, which has enough areas for the preservation of ecosystems, minimum viable population-500 hectares in the steppe regions, 1000 hectares in the forest. For local eco-centers the area of natural zones should be more than 50 hectares.

2) Under the conditions of significant anthropogenic fragmentation of natural landscapes a role of pointed objects (for example, barrows, which are located in the middle of the field and not ploughed), which are able to fulfill the role of the local centers of biodiversity, is still growing. But the same eco-elements can fulfill the various functions, or become multifunctional: protecting forest belts in case of areas delimitation of intensive agriculture play a role of eco-corridors in

the case of location around the nuclei of eco-net (preserves, sanctuaries) it is belong to the role of buffer zones.

In the conditions of significant anthropogenic load most of the econets elements must be integrated with the elements of the frame of technogenic load – in particular,-protecting forest belts often forms a single structure of transport infrastructure, power lines without significant losses of its environmental functions.

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