

Cartographic Modelling of the Assessment of Ukrainian Natural Regions According to Nature Resources Potential

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Abstract: Among the important regularities, disclosed in the process of study of the integral NRP (Nature resource potential) economic productivity we can note the exceedingly clear strips of lowered values of evaluation indices on the borders of natural countries and zones, and even some provinces. As a rule, the integral NRP economic productivity increases from the periphery to the center (nucleus) of physic-geographical countries and zones, including separate provinces.

Key words: cartographic modeling, Ukraine, nature resources potential

Cartographic models of nature resources potential (NRP) of Ukrainian natural (physic-geographical) regions, that are characterized by and proceed from the results of its (NRP) quantitative analysis, were for the first time published in 2001 (Rudenko, V. P., Vatsaba, V.Y., Solovey, T.V., 2001). NRP economic productivity is calculated as its value per inhabitant (average index is 100 for Ukraine); NRP territorial productivity – its value – per square unit (average index for Ukraine is 100).

Among the important regularities, disclosed in the process of study of the integral NRP economic productivity we can note the exceedingly clear strips of lowered values of evaluation indices on the borders of natural countries and zones, and even some provinces. As a rule, the integral NRP economic productivity increases from the periphery to the centre (nucleus) of physic-geographical countries and zones, including separate provinces. This territorial peculiarity is vividly expressed on the borderline between East-European plain and the Ukrainian Carpathians, East-European plain and the Crimean mountains, the zone of Mixed forest and Forest-steppe zone, between Forest-steppe and Steppe zones, Dnistrovsko–Dniprovka forest–steppe and Livoberezhno–Dniprovka forest-steppe, Dnistrovsko-Dniprovka northern steppe and Livoberezhno-Dniprovsko-Pryazovska northern steppe provinces.

The following observations prove the fact: the lowered values of the integral NRP economic productivity indices are fixed, in the zone between the Ukrainian Carpathians and the East-European plain, in 9/10 of all physic-geographical regions; between the East-European plain and the Crimean mountains – in S of all regions; the zone of Mixed forest and Forest-steppe zone – in 2/3 of the regions; Forest-steppe and Steppe zones – in 3/5 regions, between Dnistrovsko-Dniprovka forest-steppe and Livoberezhno-Dniprovka forest–steppe, Dnistrovsko-Dniprovka northern steppe and Livoberezhno-Dniprovsko-Pryazovska northern steppe provinces – in 3/5 and nearly 9/10 out of all adjoining physic-geographical regions correspondingly. The trend has proved to be characteristic for almost 70% of regions of stated physic-geographical countries, zones and provinces.

Significant increase of evaluation indices of the integral NRP economic productivity in central parts of physic-geographical regions is especially vivid in the Ukrainian Carpathians, Poliska province, Livoberezhno-Dniprovka forest-steppe, Livoberezhno-Dniprovsko-Pryazovska northern steppe and Prychornomorsko-Pryazovska dry steppe provinces.

Judging on the whole, mountainous regions – the Ukrainian Carpathians and the Crimean mountains – possess significantly bigger territorial productivity of the integral nature resources potential than that of the whole East-European plain. The zone of Mixed forest is, on the contrary, the region of low territorial productivity (density) of the total NRP. The following geographical peculiarities are here clearly expressed:

1. High territorial productivity of the integral NRP in mountainous regions is the result of combined performance of highly efficient, in the first place, water, forest and natural recreational resources. For instance, only 6% out of 36 physic-geographical regions within the Ukrainian Carpathians are characterized with NRP productivity below the average NRP productivity; 36% - with the average productivity, and 3/5 (58%) of all these regions possess high NRP productivity (index - over 100). 4/5 of the regions within the Crimean mountains comprise the regions with average NRP productivity. At the same time, nearly 50% of all regions of East-European plain are characterized with low and

below the average NRP productivity, whereas only 1/5 of them possess high (over 100) nature resources potential productivity.

2. Beside the Ukrainian Carpathians and the Crimean mountains, we can on the whole clearly outline more regions of increased NRP territorial productivity: a) West-Ukrainian forest-steppe province (9/10 of all regions are highly- and average-productive); b) Dnistrovsko-Dniprovsk forest-steppe province (2/3 of the regions possess high and average productivity); c) Livoberezhno-Dniprovsko-Pryazovska northern steppe, and d) Donetsk northern steppe provinces, where only one (3,6%) out of 28 physic-geographical regions is distinguished for NRP productivity, that is lower than the average, 1/5 of these are characterized with the average productivity, whereas the rest of the regions – out of 28 regions – possess high productivity (absolute maximum for Ukrainian provinces). The main reason for this is the interaction of powerful land and mineral resources.
3. Low territorial NRP density within Poliska province, in particular, in Volynske, Zhytomyrske and Novgorod-Siverske Polissia, as well as in Dnistrovsko-Dniprovsk forest-steppe and Livoberezhno-Dniprovsk forest-steppe provinces. 60 out of its 80 physic-geographical regions can be characterized as possessing low and below the average integral NRP productivity. This is in the first place connected with the absence (Pivdenno-Prydniprovsk declivity-hill oblast (region) is a small exception) of significant fossil deposits, as well as lower soil fertility (*Fig. 1, 2*).

The following peculiarities can be observed within the most important types of regional nature resources:

When Ukrainian population provision with **mineral resources** in physic-geographical countries is compared, it is clearly vivid that East-European plain 4 times exceeds the Crimean mountains and the Ukrainian Carpathians. Similar geographical regularity is also characteristic for distribution of mineral potential by the indices of its territorial productivity, though, their contrast between separate regions is even higher. The maximal territorial productivity of mineral potential is observed in Donetsk northern steppe province, whereas minimal – in Prychornomorsko-Pryazovska dry steppe province.

The influence of much more even distribution of population density indices if compared to allocation of fossil deposits results in somewhat smoothened levels of mineral potential economic productivity between separate physic-geographical provinces. This dependence is explained by the fact that appearance of these or those settlements was in the historical aspect connected with assimilation of the whole scope of regional natural resources, this having a continual nature of the development.

Unlike mineral potential, that possesses clearly expressed discrete nature of allocation, cartographic analysis shows that the influence of three basic factors is characteristic for **water resources potential** of Ukrainian physic-geographical regions, the potential being distinguished for its continual indices of distribution of both economic and territorial productivity of water wealth. First, the use of transitional Dnieper flow in southern regions of the state, which are poor in water, is defining. Paradoxically enough, for the first glance, but in this connection exactly the Crimean steppe province, Dry steppe sub-zone and Prychornomorsko-Pryazovska dry steppe province, which suffer the deficit of local water resources, are the Ukrainian leaders in both economic and territorial productivity of water potential.

The influence of high-altitude zoning is the second weighty factor of water potential productivity differentiation. Thus, mountainous systems – the Ukrainian Carpathians and the Crimean mountains – take the first and the fifth places among physic-geographical regions as far as territorial productivity is concerned, and the fourth and the twentieth places correspondingly when population provision with water potential is analysed (*Fig. 1, 2*).

And, at last, the third powerful factor, that defines the indices of Ukrainian water potential productivity is, undoubtedly, the width zoning. The zone of Mixed forest (Poliska province), West-Ukrainian forest-steppe province, Forest-steppe zone, Mid-Russian forest-steppe and Zdonetsko-Donska forest-steppe provinces are the bright examples. It is much greater extent revealed at the level of physic-geographical regions and districts.

Cartographic models of **land potential**, that deal with the analysis of its economic and territorial productivity, disclose the leadership of, first of all, Dnistrovsko-Dniprovsk forest-steppe, Livoberezhno-Dniprovsk forest-steppe and the Crimean steppe provinces, Forest-steppe zone, Dry steppe sub-zone, Prychornomorsko-Pryazovska dry steppe and Livoberezhno-Dniprovsk-Pryazovska provinces. The lowest indices of land potential return is observed in the Ukrainian Carpathians, Donetsk northern steppe and Poliska provinces, the zone of Mixed forest, Northern steppe sub-zone, Zdonetsko-Donska northern steppe and Mid-Russian forest-steppe provinces.

Undoubtedly, the present state of land potential development bases in the first place upon the best natural-climatic and economic conditions, which formed for the given type of nature resources

in the regions of Forest-steppe. The heightened indices of land potential return in Dry steppe sub-zone and the Crimean steppe province are the effect of systematic irrigation measures.

The analysis of map schemes of **forest potential** economic and territorial productivity evaluation in the aspect of Ukrainian physic-geographical regions affords grounds to state that they have very much in common with those of land potential. Except for such regions as the Ukrainian Carpathians, the Crimean mountains, the zone of Mixed forest (Poliska province), which are the leaders in forest potential return, the following regions come close as far as higher indices of economic and territorial potential productivity are concerned: Dnistrovsko-Dniprovska forest-steppe, Livoberezhno-Dniprovska forest-steppe provinces, Forest-steppe zone, West-Ukrainian forest-steppe province and the East-European plain on the whole. Like in the case of land potential, the lower indices of forest potential economic and territorial productivity for Ukrainian physic-geographical regions are characteristic for Prychornomorska mid-steppe, Dnistrovsko-Dniprovska northern steppe and Zadonetsko-Donska northern steppe sub-zones, and Steppe zone.

Cartographic evaluation of Ukrainian **natural recreational potential** is a vivid example of, by the indices of its economic and territorial productivity, the leadership such physic-geographical regions as the Crimean mountains, the Ukrainian Carpathians, the Crimean steppe province, Dry steppe sub-zone, Zadonetsko-Donska northern steppe, Mid-Russian forest-steppe, Prychornomorsko-Pryazovska dry steppe, Livoberezhno-Dniprovsko-Pryazovska dry steppe provinces, and Steppe zone.

This is first of all connected, on the one hand, with much higher richness with recreational objects within these regions, i.e., medicinal mud, mineral water, natural recreational lands, and, on the other hand, with more intensive nature of recreational assimilation of suburban territories, which are located within the zone of the so called "routes of the off day".

To summarize all stated above, we can conclude that Ukrainian natural regions' NRP cartographic evaluation serves as an instrument of scientific analysis of natural productive forces, possessing at the same time an important applied significance.

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Kartografické modelovanie hodnotenia potenciálu prírodných zdrojov v prírodných regiónoch Ukrajiny

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***Zhrnutie:** K dôležitým zisteniam, ktoré odhaľuje proces štúdia ukazovateľov ekonomickej produktivity potenciálu prírodných zdrojov, patria zreteľné pásma nižších hodnôt hodnotených indexov na hraniciach prírodných krajín a zón v niektorých oblastiach. Môžeme považovať za pravidlo, že ekonomicke produktivity potenciálu prírodných zdrojov vzrastá od periférie k centru (jadru) fyzicko-geografických oblastí a zón. Územné osobitosti sú zreteľne viditeľné na hraniciach medzi Východoeurópskou nížinou a Ukrajinskými Karpatmi, Východoeurópskou nížinou a Krymskými vrchmi, medzi zónou zmiešaného lesa a lesostepnou zónou, medzi lesostepnou zónou a stepnou zónou, medzi Dnestersko-Dneperskou lesostepou a Lavobrežno-Dneperskou lesostepou, Dnestersko-Dneperskou severnou stepou a Lavobrežno-Dnepersko-Priazovskou severnou stepou.*

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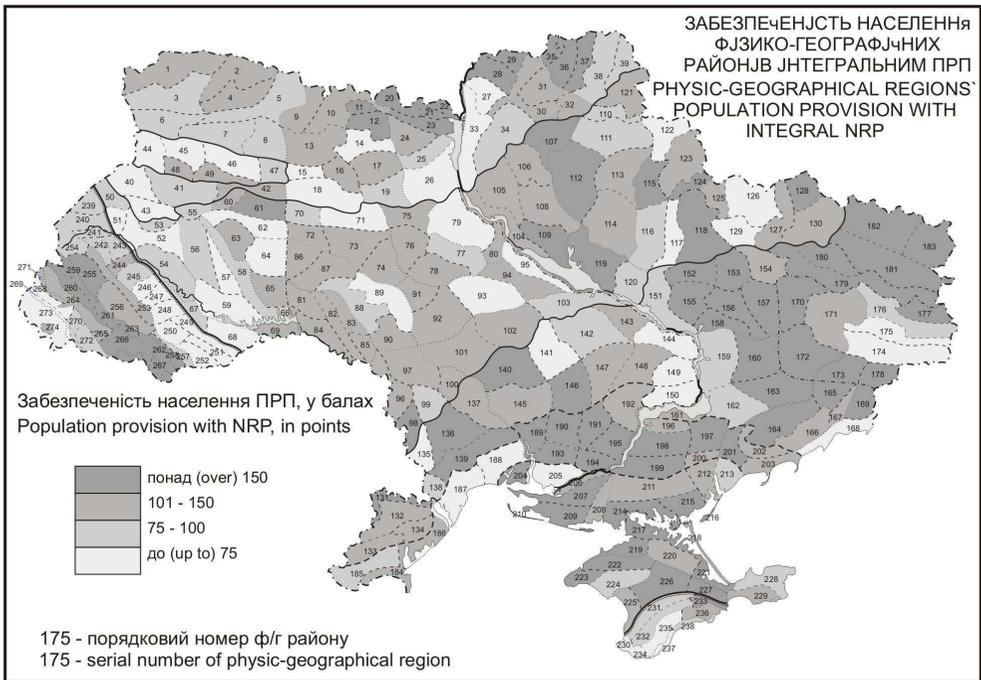


Fig.1: Physic – geographical regions' population provision with integral NP

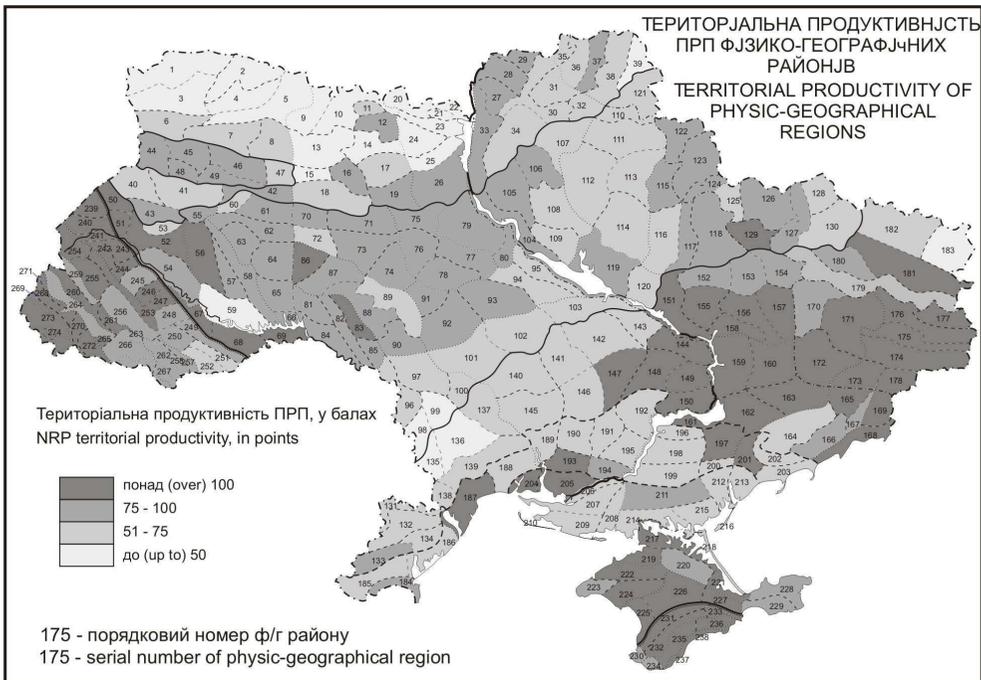


Fig.2: Territorial productivity of physic – geographical regions