THE CONCEPT OF INTEGRATED NETWORK IN TERRITORIAL ARRANGEMENT - THE MUREŞ COUNTY MODEL -

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ABSTRACT. – The Concept of Integrated Network in Territorial Arrangement - The Mureş County Model. The concepts of the driving lines, of convergence areas and points, constitute a basic operational component within territorial arrangement as well as vectors for delimitating and establishing the location of different categories of existing or developing geographic territorial systems, either natural or human. The history of this concept was under the influence of some theories and reference models meant to encourage the way of thinking, of understanding and construction of territorial structures. The models can be divided into two important categories: classic models, represented by those of Von Thunen, Weber, W. Christaller, V. J. Reilly and contemporary models, developed by J. Forrester, B. Rodoman, B. Mandelbrot etc. The contemporary specialists took the classical ideas regarding the modelling of the territorial structures (exclusively the man-made ones) adapting them through the modern theories (the systems theory, the fractals theory, the polarized space theory, synergetics, the chorems theory), with the purpose of modelling the geographical systems in their complexity derived from the superposition of the man-made systems over the natural ones. This concept was developed in the Romanian literature by the following authors: G. Gusti (1974), A. Molnar, A. Maier, N. Cianga (1975) and recently I. Ianoş (1987, 2000). They tried to apply the concept to national areas. The above-mentioned authores considered only the man-made systems without analysing their relations with the natural ones and their territorial disposal.

INTRODUCTION

This paper is intended to unify the two main categories of territorial systems (natural and man-made) within the modelling of the complex territorial disposal, the Mures County being the applying area. Through analogy, the model to be analysed can be extended to the whole national territory, being considered the operational basis of its organization in order to identify the best locations for the development of man-made systems, without neglecting the natural structures (especially the ecosystems) which are the most affected by the economic development.

THE MAN-MADE SYSTEMS

The territorial organization of the man-made systems can be achieved through the valorification of the various categories of developing potential (natural or man-made) in the best locations according the energetic principle mini-maximum. The spatial spreading is vector zed by those fields having a maximum potential of development. The tendency of the man-made systems to congest in certain locations and their reduced density in others explains their tendency to develop continuously in order to facilitate the so necessary transfer of substance and energy. The man-made systems have the tendency to migrate towards the neighbouring areas only in case of over congestion and multilayer development. According to this fact, the development of the man –made systems, represented by human settlements, industrial areas, means of transportation, intensively exploited agricultural fields, is more intense in over congested areas, while their periphery is characterized by a sporadic presence of this category of systems. Beyond the man-made landscapes lies the so-called “open fields” where natural systems are present in their complexity. At the same time, we can’t speak about the natural systems extinction in areas where the man-made component reaches its climax, they are only highly transformed or some of their subsystems may disappear (especially those with underground development). The development of the man-made systems in optimal locations leads to their pointable and dispersed spreading. Transit corridors facilitating the transfer between man-made systems connect these. These corridors function as transportation axes, constituting the “driving/strength lines”, leading us to the conclusion that the development and the territorial spreading of man-made systems may be analysed as a unique network containing areas with different levels of systems density. The man-made system network also consists of “junction points/nodes”- where human settlements are located -, “belts” associated to transportation systems and to intensive land use (especially agricultural systems) and “spots”

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(natural areas), representing those territories located at the periphery of the man-made systems, mainly occupied by more or less equilibrated natural systems corresponding to the extensive agricultural use.

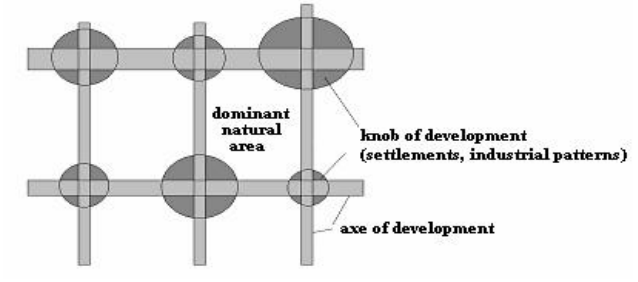


Fig. 1. The territorial model of a reticular network in the man-made system (G. Gusti, 1974).

Within the "junction points/nodes" settlements with various "geographical dimensions" and special hierarchies functioning as territorial "attraction poles" develop.

These settlements generate flows of substance and energy along the belts.

According to the dimension and the rank of the settlements between which these belts develop, some of them could be considered as "development corridors" with major economic importance in the territorial arrangement, becoming the most "hunted" location for various human activities. The best located settlements, with a high quality and stable demographic potential, become real "increasing poles" which vectorize, sustain and coordinate the development of the man-made systems and of their adjacent territorial network.

THE NATURAL TERRITORIAL MATRIX

The natural matrix of a territory consists of geosystems of different ranks, their undisturbed spatial and temporal interaction leading to a long-lasting equilibrium, the system being, in this case, able to face human impact. The excessive overtaking of the tolerance threshold, characterized mainly by the breaking up of the existing connections, both horizontally (between systems of the same rank) and vertically (within the hierarchy), determines increasing destructive processes- *geographical risks*. If not controlled, these phenomena may put the opportunity of territorial development into danger, the reconstruction of these systems equilibrium being possible only through sustained human interventions.

In ideal conditions, the network of protected areas is meant to assure not only the conservation of biological and landscape diversity (including the biotopes, the flora, the fauna, as well as the landscape structures), but also their functional characteristics (including the coming back to the previous natural conditions and the annihilation of the perturbation factors) in a given region and for a long period of time. But, getting experience, one can notice the impossibility of the "classical" network (with its main conceptual weak points, such as the "isolationism", the orientation towards protection and conservation of "exceptional" areas neglecting the rest of them) to put into practice all this imperatives. More than that, within the context of the environmental policy, the network of protected areas has been always considered in accordance with the "residual principle", never being considered an environmental priority.

The solution would be the working out of the **ecological network (matrix)** (R. Noss, 1992, A. Tiscov, 1995, A. van Opstal, 1999 etc.), according to the principles of a hierarchised, unitary, integrated, open geosystem, capable of sustaining the spatial and temporal dynamic processes that characterise all ecosystems, at micro- or macro-territorial level. According to the type of their manifestation, the processes can be divided into: regulate migrations of animals; the continuous shift of individuals within the territorial mega populations; the continuous (undisturbed by the human impact) transfer of substance and energy within the landscape (the biogeochemical cycle) etc.

Some of the basic elements of such a network have been distinguished as follows: the ecologic junction, the ecologic corridors, the multifunctional ecologic modules, pointable objectives, without referring to a certain territory, and areas of ecologic reconstruction.

"The ecologic junctions" can be constituted of at least two types of natural areas that are little anthropised. The first case refers to protected areas declared on the basis of international conventions that Romania joined, or on the basis of national and local administrative decisions. As regarding the second case, the areas don't have this status but they function within the limits of some special conventions (areas of health protection, strategic objectives of public interest such as water sources, forests etc.). These ecologic junctions sustain the functioning of the ecosystems within the spontaneous dynamics and also the populations of rare and main species (typical or of economic interest), having environmental and systemic stability.

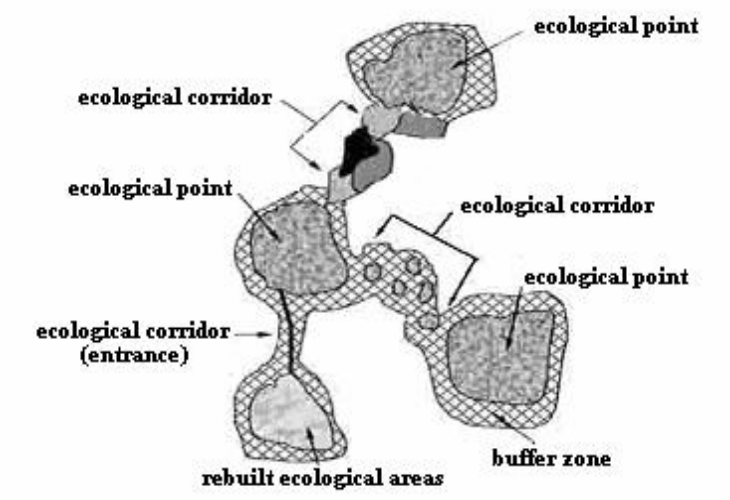


Fig. 2. The conceptual model of an ecologic network. (by I. M. Bouwma, Ed., ECNC, 2001).

"The ecologic corridors" offer most favourable conditions to populate or repopulate the territory, to hibernate or to reproduce (including the areas for rest/repose), the genotypic change. They also maintain the connections between the ecologic junctions, the best biogeochemical change in the landscape etc. Such entities are the meadows. Because of their intense humanization they reduced this function. In a way, it may be replaced by less affected interfluves, or by some green protection strips of human origin. According to their appearance they can be: linear (the marginal biotopes, or the so-called 'ecotones'), or in strips (including the integral biotopes). There must be a territorial and functional continuity within the "eco-space" (ecologic space).

Multifunctional eco-modules (multifunctional natural reserve). Unlike the first category, this one has an internal stratification based on areas with a very strict protection –absolutely reserved, buffer zones or ecologic catenae (in which access and usage of resources are restricted, areas for leisure activities etc.).

Pointable objectives with no reference to a certain territory include the so-called 'monuments of nature', which have small dimensions and different informational and sometimes emotional charge. We may also include in this category the small spots of spontaneous flora within humanized areas that function as ecologic refuges.

"Areas of ecologic reconstruction" consist of some areas that are affected by human intervention, being subject to the restoration of the ecosystem (areas affected by erosion, abandoned quarries etc.).

THE CONCEPT OF POLARIZED LANDSCAPE

Relying on the new trend of ecologic movements and warning reports, B. Rodoman (1974) suggested a report in order to preserve nature, which was considered an utopia at the time. This concept is known in literature as "*the model of the polarized landscape"*. Natural areas that haven't been modified yet are declared as natural reserves and will be interconnected through the 'green corridors' in one network that will cover the region, the country and finally the whole continent. For this purpose, the protection strips, the inbuilt areas and the restored quarries, the river meadows, the extinct landforms that resulted due to linear erosion, the marshes and the interfluves may be used. The means of transportation that passes through these corridors will be elevated by *estacade* or will be penetrated by tunnels.

As a result the human network, which is composed by corridors and nuclei of development that exists on the means of transportation, and animals' pathways from the reserves will cross. The functional areas/sites will 'graft' on this networks. A third network will interfere between them, namely the leisure network, which consists of routes, roads, sights, leisure areas.

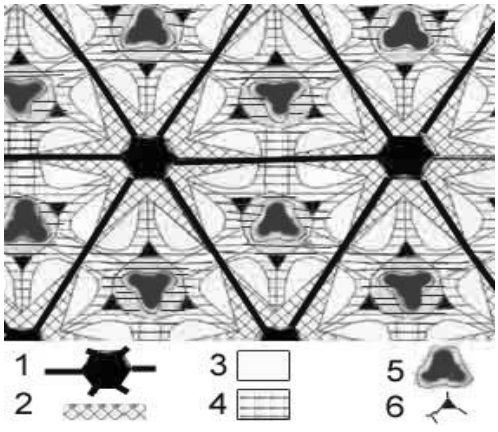


Fig. 3. The Conceptual model of the polarized landscape (by Rodoman, 1974)*: 1. Increase/growing poles and development corridors; 2. Residential areas, ecologic industry; 3. Intensive and quasi intensive agricultural areas, resource exploitation; 4. Periurban parks, sights and agro sights, extensive agricultural areas; 5. Natural reserve, buffer areas, ecologic corridors; 6. Resorts and spas, touring routes.*

The cultural (humanized) and the "wild" areas have an equilibrate contribution to the building up of the ideal landscape, but, considered to be "weaker", the natural network is given priority, while the demographical and economical ones are shaded.

As a consequence, the man-made systems are organically connected with the natural ones, leading to well functionally structured territorial networks. Such an approach of the territory allows the clear identification of the function of each territorial segment and the establishing of a tree type (fractal) hierarchy of natural and man-made systems.

The territorial implementation of such a network permits an optimal development of the two main categories of systems, establishing a long-lasting territorial equilibrium. Otherwise, the over enhancement and intense development of the man-made systems can generate extreme phenomena, uncontrolled at human scale. Accepting the rules deriving from this territorial structuring, the belts and the nodes are meant to sustain human development, while the networks' spots are the preserved areas, necessary for the establishing of a territorial harmonization. They consist of the elements of the ecological network, as well as areas with excessive human exploitation. Different ranks of corridors of development also containing nodes of settlement networks can be identified within the belts. The main role of these corridors of development is to concentrate the transportation infrastructure and the intensively exploited economical components (the built part of settlements, ware-houses, industrial platforms, airports etc.). They form an organic territorial network meant as a "dam" against the development of the ecological systems. The spatial models resulting from the parallel development of the two categories of networks leads to territorial dysfunctions, especially regarding the ecological networks. *The strong combination between natural and man-made networks at different level determines a "permeable juncture" which allows the flow of substance and energy inside the two networks.* As a result, territorial hipernetworks, with high complexity and capacity of jointing similar networks in other territories, will be developed.

THE CHOREMIC MODEL OF THE MURES COUNTY

The above analysed conceptual aspects have been applied to the territory of the Mures County, in a study of territorial arrangement (PATJ Mures, 1999) that established the configuration of the human network (plate 1), of the natural network (plate 2), by combining them, the territorial integrated network resulted (plate 3).

Analysing the choremic model, we conclude as follows:

- The administrative territory of the county has well-established utilities. The areas in which the developing potential is rather high are given human utilities, while those with low potential are the perfect "host" for the developing of the ecosystems.
- This is meant to avoid the superposition of the man-made systems with the natural ones (the ecosystems).
- The intersection of the two categories of network is well shaped, in these territory special activities of organization and arrangement being needed.
- Defines the areas intended for the future human development and the buffer areas meant to reduce the human impact upon ecosystems.

Plate 1. The anthropical network of the Mureş county

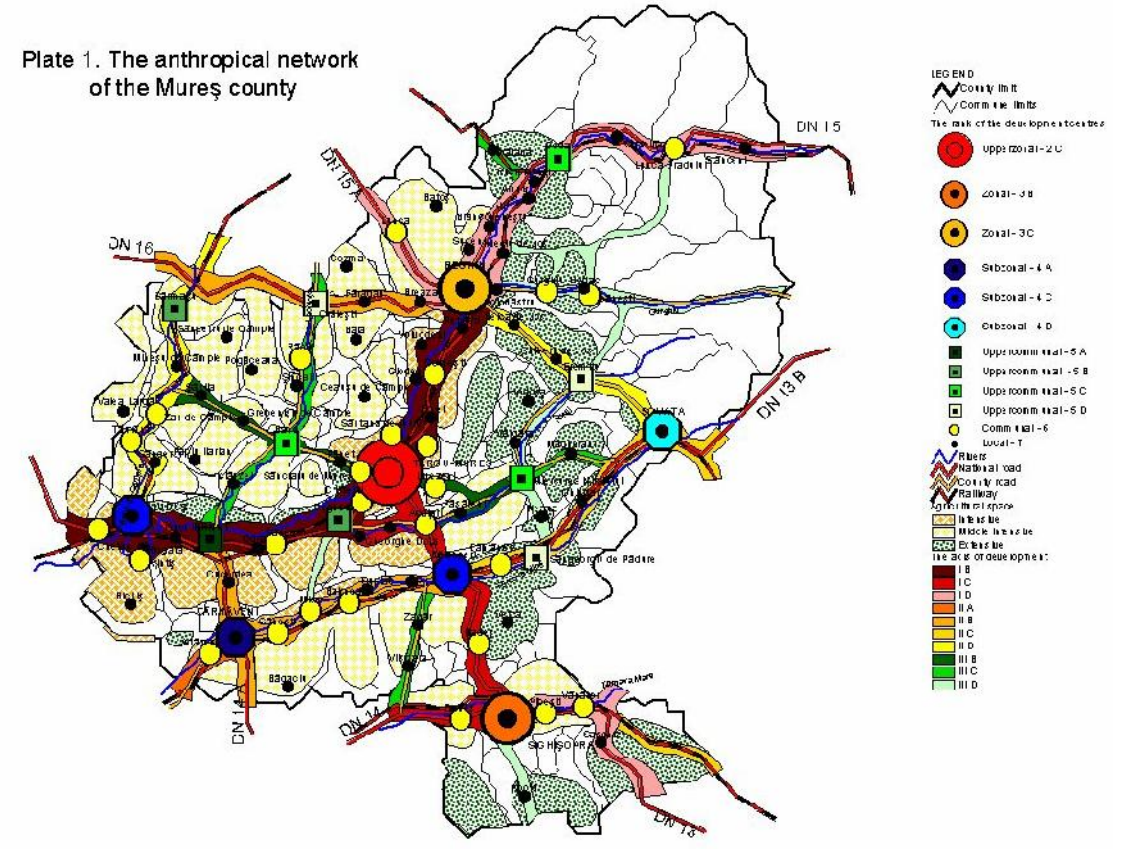
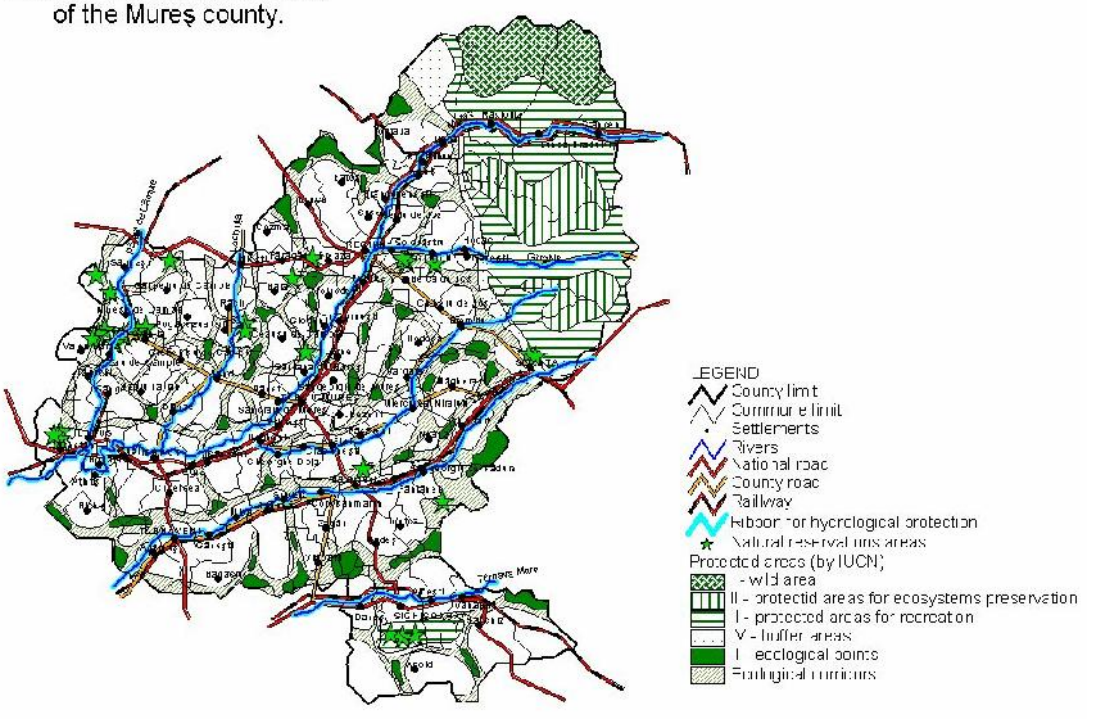
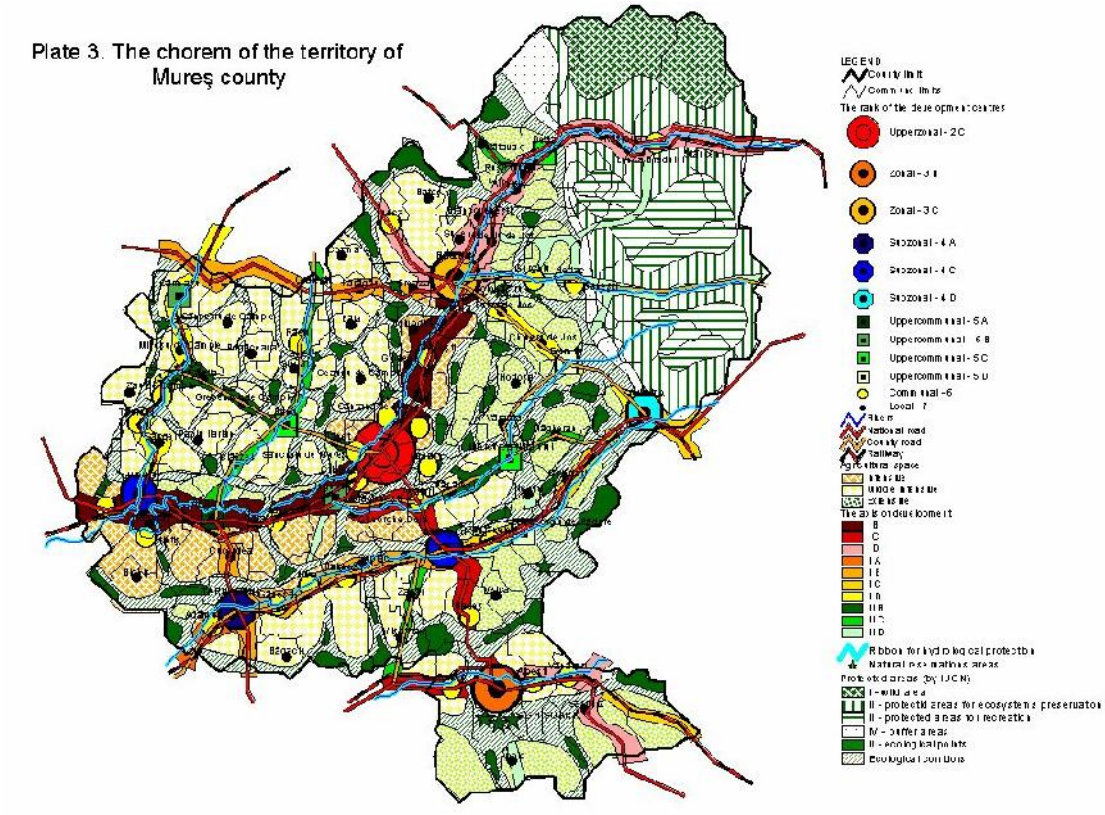


Plate 2. The natural network of the Mureş county.





- Analyse the developing corridors on different levels and the increasing poles according to their developing potential, becoming, in this way, an useful tool in the process of determining the locations for new investments in the territory.
- Through analogy, the model can be extrapolated to other administrative territories.
- Stipulates the way of connection of the insular ecologic areas in order to elaborate the ecological network.
- The model represents a possible structure of organizing the territory by applying the principles of shaping and organizing the network.

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