

## CREATION OF ECOLOGICALLY AGRARIAN LANDSCAPE

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**Abstract:** In this work, questions of modelling the functioning of agrarian landscape complexes are considered. The scheme of the agrarian landscape functioning is achievable, whereas the optimization of research methods is adapted for application.

**Keywords:** agrarian landscape, anthropogenous influence, balance, model, substance.

### Introduction:

Long-term crop steppes, destruction of woods, reduction of meadows and pastures have led to infringement of interrelations between the components of the natural systems, have changed a parity between them and led to the loss of their stability that has, in turn, caused the system reorganization for balance achievement. And this reorganization is expressed, as a rule, in the development of such adverse phenomena as drying, erosion, chemical and physical degradation of the grounds, non-characteristic invasion kinds, flooding etc. Yet it needs to be highlighted the fact that this occurs on a background of fluctuations of a climate which is also capable of causing the above detailed phenomena.

### Materials and methods:

The optimization of the nature - society interaction – a problem of global type. Its final decision demands essential

advancements in the development of science as a whole and, hence, it is connected with essential expenses of time. The current situation requires reaching a series of optimum decision. The analysis of the structure of the nature - society interaction shows that, at the present stage of the scientific development, there is an opportunity regarding the practical decision on problems of "minimization" of negative consequences of technical development.

### Results and discussion:

The basic preconditions currently allow to create a model for the ecologically balanced anthropogenous steady natural complexes, as follows:

- the presence of quantity indicators of landscapes' dynamics (a drain, deposits, quantity of wood, an arable land etc.);
- a level of development of mathematical sciences so as to satisfy a task in view of creating patterns;
- concepts of interaction of elements within a natural complex in the topological plan are fulfilled comprehensively enough.

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There opens a question on the influence of economic activities. Owing to the tremendous work of the huge number of experts, the concept of the environment preservation has aimed at the decrease of the negative consequences of anthropogenous influences and has developed basic principles of its attainment. Such principles concern:

- the preventive approach for the protection of natural resources, for the elimination of the causes of pollution instead of the prevailing struggle against consequences;
- normalization of anthropogenous loadings in three directions: ecological, sanitary-hygienic, as well as scientific and technical;
- submission in an economic part of a water cycle, an exchange of biogenic elements for the natural process of return to their ground aimed at maintaining its high fertility and their most effective neutralization;
- switching of the basic branch enterprises of the water-capacious industry of the closed non-waste turnaround water supply with secondary use of the substances contained in used water; the basis of such measure is the local regeneration of the water fulfilled in one industrial line that provides the fullest extraction from it one kind of pollution;
- improvement of technology of those industrial enterprises, for example, pulp-and-paper manufacture in which the local principle cannot give the necessary effect;
- translation into the closed cycle of cooling by water of thermal power stations and the industrial enterprises similar to them, use for this purpose of sea water and transition to air cooling;
- application of a soil-protective water-security system of agriculture etc.

All experience of mankind testifies that failures and miscalculations of wildlife management result from the ongoing ignorance of the interrelation and interconditionality of its various aspects, i.e. the causes of failures – absence of an integrated approach or prevalence of only some aspects regarding nature, both in an economic practice and in scientific researches.

The agrarian landscape is natural-anthropogenous systems with the dominance of certain types of plants cultivated by people, but the ecological niches in these systems are not fully occupied, which reduces both their productivity and protection against negative influences (erosion, phytophagous insects etc.).

As it is known, for natural ecosystems and agroecosystems, a number of differences in the features of biogeochemical circulations have been observed.

The circulation of substances within the natural systems is almost closed due to fact that the amount of elements resulted from precipitations and deposit of plants decay is almost equal with the biological absorption of elements by plants. The isolation of a cycle is also caused by the presence of biological barriers of green mosses which prevents removal of surface water drainage outside the ecosystem.

In agrosystems, the circulation of substances is better characterized by a more pronounced open-cycle as compared to the natural systems, which is due by:

- imbalance of receipt and carrying out of substances;
- formation of stocks of insoluble connections once mineral fertilizers interact with the ground which leads to low operating ratios of nutrients from fertilizers.

Besides, in agrosystems the carrying out of substances with waters of a superficial drain increases essentially, mainly at the development of the erosion that is connected with the absence of a biological barriers system. There is a great variety of substances in agrosystems, since they depend on the

efficiency of agroecosystems, a level of ground processing and application of fertilizers.

In comparison, it shows that the functioning of natural ecosystems, their inner organization of tropic communications by many criteria considerably surpass agroecosystems, are created and adjusted by man.

The scheme of the functioning of the agrarian landscape model should include entrance and target parameters, ensuring that the parameters are represented in a natural and anthropogenous way (a climate, a relief, ground, system of agriculture, the agricultural technician, agrochemistry etc.).

A target parameters are a result of work of model: the characteristics providing the equation of agriculture according to climatic features of territory (on a water and thermal mode) are the preservation of soil fertility, selection of cultures for cultivation, the natural caused organization of territory of land tenure, forecasting and programming of crops and finally - high efficiency agrarian landscape.

For maintenance of such a wide range of activity, the model should consist of the several criteria functions providing an optimum of listed functions of model, leaning on the most typical processes causing their action, i.e. the whole spectrum of models and processes here should be involved. So, proceeding from the principles of functioning agrarian landscapes, their functional model should consist of several optimizing blocks:

- a drain of water;
- a drain of deposits;
- an ionic drain;
- productivity of agricultural crops etc.

Everyone optimization the block consists of criteria function and system of the restrictions, allowing to consider resources of territory, ecological conditions and needs of managing. With regard to the model of agrarian landscapes functioning, it generally contains a number of functional criteria (a drain of water, a drain of deposits, a drain of ions, productivity), allowing finally to

receive highly productive a natural-balanced ecologically steady agrarian landscape; furthermore, the system of restrictions represents as well a number of the blocks, allowing to optimize this or that component of the general model. The system of restrictions comprises conditions of equation and programmed, since the change of conditions alters values of variables and size of the criteria function. Restrictions represent levels of "measure" at transition through which quantity turns into quality. Apparently, in the development and purposeful functioning, an important role streams of substance and the energy, structures of system providing integrity, and among them play a drain of water and deposits which primary part is slope the flow and erosion soils.

Criteria functions are convenient for being represented in the form of balance parities.

The description of functioning of separate components of natural systems, creation of mathematical models from these systems, allowing to predict their change eventually or with change of parameters entering them, it is an issue demanded, both in manufacture, and in various allied industries of a science as allows to simplify the decision of the problems put before them. The application of balance parities in the decision of some problems has justified itself as in the definition of evaporation (one of the most exact methods), descriptions of processes of soil formation, modelling of efficiency agrosystems, modelling of geosystems etc. And, at modelling efficiency agrosystems the system of the equations of radiating, thermal, water balances and balance of a biomass (carbon and nitrogen) in a vegetative cover is used.

With the purpose of modelling of functioning agrarian landscapes complexes, the system of the balance equations is necessary for complicating. As modelling of functioning of nature-anthropogenous complexes process is a lot of levels, and as the most convenient form of optimization of such system, the system of the equations of

balance of substance and energy is recommended.

The system of restrictions of the balance substance (biomass) includes characteristics of a climate (warmly, evaporation, deposits etc.), a sufficient biodiversity (the control of phytosanitary conditions), qualities of production (ecological norms), a competition for resources etc. In the nature over the centuries-old period have developed stable biogeochemical cycles of substance and energy. The activity of the person leads to their reorganization, breaks equation of cycles withdrawal or entering of separate components of circulation. In agrosystems, this withdrawal of a commodity is part of production and entering of substance and energy in the form of fertilizers, agrotechnical receptions etc.

The water balance provides an equation of gain and loss of water resources area including allowable drain values for economic needs. It is a link between the balance of biomass and radiation and thermal balances through evaporation, which is defined by natural features of the water inflow and heat on specific territory.

The thermal balance defines the security of a territory, an opportunity to have resources of water and a biomass for the creation of new production.

The radiating balance defines resources of energy for photosynthesis and heatings of surfaces that starts the mechanisms of carrying the substance and energy as on a terrestrial surface, and transformations of a matter into different forms.

Restrictions in balance systems are defined by parities and interrelations between separate components, biological and not biological, of agrarian landscapes and can be presented by empirical interrelations between them. The accumulation of empirical data allows passing from empirical-statistical representations characteristic for specific territories and situations, to more general empirical laws levelling or generalizing local distinctions.

It is necessary to consider, that the best conditions for growth of plants arise there

where conditions for an expenditure of the formed organic substance are created, instead of its accumulation, in optimum conditions, the arrival of the organic substance should correspond to its charge, the accumulation of substance will lead to the reorganization of system and decrease in its efficiency. The positive balance of nutrients is admissible only occasionally, for example, at strong erosion of a surface where the natural soil cover is washed practically off. The system of restrictions should include conditions of the ecological character, allowing adjusting negative effects of application of fertilizers etc.

### Conclusions:

The presented system of the balance equations can be realized in the form of many levels of the model, allowing defining the first turn of measures on equation of wildlife management in the agrarian sector, its ecological stability and high efficiency. A wide spectrum of the questions necessary for construction of such a model are already studied by a science, it shows that on a modern level of development of a science there is a real opportunity to realize the given scheme.

Problems and the contradictions connected with the elimination of ecological consequences of human activity in the nature are inevitable and in the future by virtue of dialectic character of the social development having a quantity of alternative variants of succession of events. It is necessary for considering modelling global structures and processes, revealing and the analysis of possible alternatives of development of agrarian landscapes.

### Rezumat:

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În această lucrare este abordată problema modelării funcționării complexelor de ecosisteme agrare. Schema de funcționare a unui mediu geografic agrar ecologic este realizabilă, întrucât optimizarea metodelor de cercetare este adaptată pentru aplicare.