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**THEORETICAL BACKGROUND OF MODELING LIFE SUPPORT
SYSTEM OF RURAL POPULATION**

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Abstract

The article presents a theoretical model of the life support system in rural areas, which allow us to determine changes in the standard of living depending on given parameters and to develop scenarios for rural areas development. The purpose of the research is theoretical underpinning of the model of life support system of population in rural areas. The subject of the research is economic and social relations, which determine the principles and patterns of modeling the life support system of population in rural areas. The main research methods are the methods of systemic and structural-functional analysis, cognitive one and other methods of economic research. Thus, the research shows that at present time forecasting socio-economic processes in rural areas and implementing the proposed directions in practice are impossible without appropriate tools usage. Such tools can be cognitive technologies that have become widespread in the research and modeling of weakly structured socio-economic problems, one of which is life support for rural population. The presented cognitive model of life support of rural population will allow us to determine changes in the standard of living depending on the given parameters, to develop scenarios for rural areas development as well as to forecast population's life support in rural areas of the region with a different extrapolation horizon

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1. Introduction

In recent decades significant changes have been taking place in rural areas connected with increased state's attention to creation of a favorable living environment and conditions in rural area, which provide a decent living standards and smooth human development. At the same time the transition process to sustainable development of rural areas is more slowly than that in other countries and there are still problems that limit the possibilities of improving the life support of the rural population of Russia. The prevailing conditions of everyday life and routine, availability of social infrastructure facilities, access to information and cultural values, the level of wages and the income differentiation of population led to a lack of opportunities for the fulfillment of the most important human needs: physiological, socio-economic, environmental and spiritual ones. Still there is social exclusion in the rural area characterized by the lack of universal accessibility and acceptable quality of basic social services, the passiveness and unpreparedness of the population for serious changes in their life and the rural community life, lack of faith in the reforms effectiveness and loss of the need for work as a natural source of income. Due to the aforementioned a de-intellectualization of the rural population takes a place. In this regard in solving these problems the most important place is given to the creation of a full-rate life support system for population, which would contribute to the comprehensive satisfaction of rural residents' needs, their potential realization, increasing of labor prestige in agriculture and ensure well-being with maximum preservation of health and environment.

2. Problem Statement

Despite the fact that national and foreign theory and practice have a significant number of methods and techniques for life quality assessment; at present time there is no single conceptual and methodological approach to the life support of the rural population, to methodology development for its research. Still debatable and poorly studied issues are those related to profound inquiry from the standpoint of a systematic approach of criteria and principles for a comprehensive assessment of life support. They predict the parameters of its functioning based on the use of formalized methods for identifying patterns and key trends in the development of rural areas, developing models and life-support management mechanisms.

3. Research Questions

The subject of the research are:
economic and social relations, which determine the principles and patterns of modeling the life support system of population in rural areas;
rural territories.

4. Purpose of the Study

The purpose of the research is theoretical underpinning of the model of life support system of population in rural areas, quality of life.

5. Research Methods

The main research methods are the methods of systemic and structural-functional analysis, cognitive one and other methods of economic research.

6. Findings

In modeling of the life support system of the rural population as a complex, multifaceted and full-fledged object one used in current research the cognitive modeling methodology, which is based on the use of a variety of cognitive tools focused on presentation and targeted interpretation of new knowledge about the subject of research. Therefore, the construction of life support model for the rural population is a process of formalization of knowledge obtained at the stage of cognitive structuring taking into account the specifics of rural areas. In this regard, the proposed model should contain system characteristics and should be presented as a set of elements, which ensure the preservation of system integrity on the one hand and the achievement of the set modeling goals on the other hand.

F. Roberts is recognized as the founder of the method of cognitive modeling and the theoretical basis of the model was the foundations of cognitive modeling developed by R. Axelrod, which include the methodology of structuring the situation under research and directly methods of case study (Kulinich, 2016).

The proposed cognitive model demonstrates the causative-consecutive consecution "goals – structure – functions – functioning – result" and takes into account the cyclical nature of negative influences and peculiarities of responses stratified by hierarchical levels and it is based on the dynamic unity of the functioning processes of its components under the external environment influence, which allows us to form its contour characteristics.

Obviously that it is impossible to research and model life support outside the rural areas with their direct connection with environment and related resources (land, forest, water, etc.) and the conditions that distinguish them from the urban area. Rural territories are social environment characterized by its conditions and life style, rural society that has formed this environment, a settlement network, an industrial complex, engineering and social infrastructure and a territorial community (Merenkova et al., 2020). The life support of rural population should be formed around these constituents of rural areas.

The research of existing approaches to the problem of life support made it possible to develop the author's approach implemented in the form of a cognitive model, which includes three main blocks, which is shown in Figure 1:

- structural-functional block, which consists of the main structural modules: structure, functions and factors affecting life support;

- object-subject block, which contains the object subsystem (complex of economic entities, population, resources, infrastructure) and a subject subsystem (institutional structures, organizational and formal institutions);
- cognitive block as a theoretical and methodological basis for perception of the rural population's life support, combining interrelated modules in the form of modeling and forecasting life support of rural population.

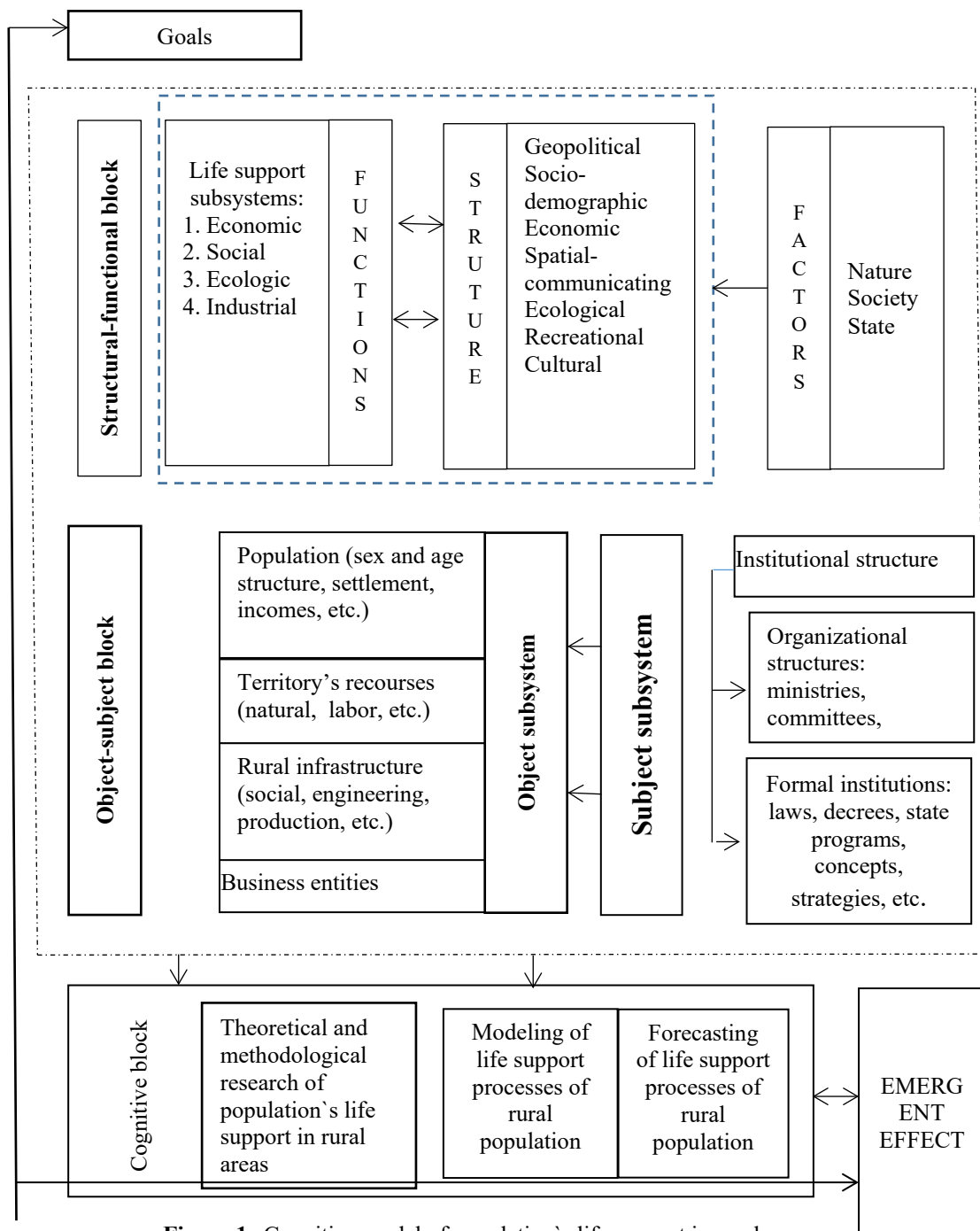


Figure 1. Cognitive model of population's life support in rural areas

The structural-functional block includes the structure, functions and factors, which influence population's life support in rural areas. Its basis consists in identifying the structural elements of the object under research and determining their role (functions). It is elements and connections between them that build up the object's structure. Moreover, each element fulfils a specific function. The more complex structural structure is, the more functions it performs. In view of this fact, it can be assumed that the life support system has a complex structure and, accordingly, performs several functions (Petrosov et al., 2018; Slinkova et al., 2018). First of all, we are talking about their decisive role in life support (food production), life-sustaining activity (providing of conditions and a sufficient life quality of rural population), and environment (development, environment protection).

Therefore, in the light of the structural - functional target approach the following theoretical and methodological stipulations were taken into account: the structure of life support is interconnected with the functions implemented in rural areas; different structures can serve the same functions; environment's changes lead to functions' change of rural areas respectively and life support leads to its improvement.

The result of application of mentioned above approach is to obtain an emergent effect due to implementation of target settings within each functional target cycle. The emergent effect including natural, social and economic components is expressed in life support effectiveness.

The important factors in the cognitive model are environment and society, which include a complex of resources and needs. Nature as one of the model's factors is a natural habitat - a set of soil-climatic and other natural conditions, which allows ones to use them for direct and indirect consumption, maintaining the conditions of human existence and improving life quality of rural population. Society is a special system of the social environment of a rural man, in which citizens, family, public organizations and state interact between each others. In rural areas society is often correlated with a rural community (association of rural residents and organizations operating in different spheres of life), which is reproduced in the natural landscape and social environment by attracting material, human, information and other resources. The rural community is a determinative social unit of rural areas, which embraces all indiscriminately, who live in rural areas regardless of what sphere of production and services they are employed in (Bozchenko, 2013; Khudobina, 2017).

The main element of society (rural community) according to Nechiporenko (2009) is territorial groups of population, social ties and living environment, which, in turn, is divided into natural environment (climatic conditions, land, water and other natural resources) and artificial environment created by human labor (material and tangible living conditions).

The priority component of the state life support policy of rural population is economic policy aimed at enhancing production and economic activity. Any type of activity is considered from the point of view of necessity to create in rural areas an economic environment, which contributes to reproduction of population, while the potential of various sectors of the rural economics should be assessed under the lens of its competitiveness and profitability (Kolesnikov et al., 2019; Zdorovets & Goncharenko, 2016). The main goal of the rural employment policy is to expand the sphere of employment in the countryside. The purpose of social policy is to improve the spiritual and socio-cultural development of rural population, increasing their life level and quality. The top-priority directions of demographic policy include: healthy lifestyle modeling for rural youth, family support, improvement of migration policy, creation of

conditions for youth consolidation in the countryside (Polukhina, 2019). The purpose of ethnopolitics is to harmonize relations between ethnic groups and authority, between the titular ethnic group, original people and national minorities as well as within each ethnic community. The goal of the environmental policy is to develop and implement a strategy for the rational use of natural resources and to protect environment to ensure normal living conditions for rural population.

The object-subject block combines two subsystems: object and subject ones.

The object subsystem of the model is represented by a complex of economic entities, population (sex and age structure, settlement, income, etc.), territory's resources (natural, land, labor, financial, etc.) and rural infrastructure (social, industrial, transport, engineering) within rural municipalities.

The central element of the object subsystem of the life support model is population that is heterogeneous in age, level of education and professional training. On the one hand, rural residents are the main labor force for business entities and on the other hand they are consumers of goods and services produced and provided in rural areas and then again they are resources users in rural areas.

Resources include not only those that are already involved in the processes of production and social development, but also those that can be used for sustainable development of rural areas (natural, labor, production, financial, scientific, intellectual, information resources, territory itself as an interaction field of social and natural components including its location).

Natural resources play a key role in defining the functions of rural areas and in life support system modeling. Land resources are also used as a spatial basis for the placement of economic and socio-cultural facilities, infrastructure and provincial migration.

An important place and role in the system of factors affecting the life support of rural population belong to the social and engineering infrastructure, which ensures the efficient functioning of all institutions in social sphere in order to meet the diverse needs of rural population. The assignment of the social, industrial, engineering and transport infrastructure to the structural elements of rural areas in their systemic-factor conditionality (geographical, historical, economic, ethnic, social, cultural) is a sign of comprehensive idea development of population life support. The set of relationships between rural population, business entities, organizations of all infrastructure types, based on the use of natural resource potential, forms life level and style of people in rural areas (Akupian, 2017; Epifantsev, 2019).

In consideration of the subject subsystem of the model one should understand that it has a multi-level hierarchical structure. At the macro level there are institutional structures - organizational and formal institutions (regulatory legal documents of federal significant) focused on the development and implementation of state policy and legal regulation in the field of rural development.

At the regional level the actions of similar structures are aimed at the implementation of federal state policy and legal regulation in the development of rural areas of the respective republics, territories and regions taking into account regional specifics.

At the municipal level (district and settlement) the main organizational structures include local self-government bodies and formal institutions include legal acts of municipal districts and rural settlements (statutes; decisions of deputies councils; statutory orders of the head and administration of a municipal entity; accepted forms of population's participation in the realization of local self-government).

In terms of the complexity and variety of connections and relationships between the elements of the object subsystem, the subject subsystem of the model must give signals through a set of norms and rules, which are formal institutions (laws, decrees, governmental regulations, concepts, programs and different other normative documents) reflecting and fulfilling the goals of agricultural policy, through which the type of budget support and other parameters of the model are determined (Anichin et al., 2020).

The cognitive block of the model includes a theoretical and methodological basis for the research of diversified development of rural areas (Nechiporenko, 2009; Zolotareva & Zolotarev, 2016). The information and analytical component of the cognitive model unites the modules “Modeling of life support processes” and “Forecasting of life support processes”, which allows purposefully forming the parameters of the necessary emergent effect for the rural area.

7. Conclusion

Thus, the research shows that at present time forecasting socio-economic processes in rural areas and implementing the proposed directions in practice are impossible without appropriate tools usage. Such tools can be cognitive technologies that have become widespread in the research and modeling of weakly structured socio-economic problems, one of which is life support for rural population.

The presented cognitive model of life support of rural population will allow us to determine changes in the standard of living depending on the given parameters, to develop scenarios for rural areas development as well as to forecast population's life support in rural areas of the region with a different extrapolation horizon.

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