

Eco-settlements as development factor for rural territories: experience from Southern Russia

Eco-asentamientos como factor de desarrollo para territorios rurales: experiencia del sur de Rusia

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ABSTRACT:

Modern rural territories in Russia is as yet a traditional phenomenon, but it still remains unresearched. The rural type of territories are a representative group of settlements, which are a kind of "counterweight" of another large group of territorial formations, notably urbanized localities. The aim of this research was to identify perspectives of development for rural territories, based on alternative techniques of resettlement and provision of expanded opportunities for self-employment and self-realization for the rural population.

Keywords: Rural territories, socio-economic development, agriculture, eco-settlements.

RESUMEN:

Los territorios rurales modernos en Rusia todavía son un fenómeno tradicional, pero aún no se han investigado. Los territorios de tipo rural son un grupo representativo de asentamientos, que son una especie de "contrapeso" de otro gran grupo de formaciones territoriales, en particular las localidades urbanizadas. El objetivo de esta investigación fue identificar perspectivas de desarrollo para los territorios rurales, basadas en técnicas alternativas de reasentamiento y la provisión de oportunidades ampliadas para el autoempleo y la autorrealización de la población rural.

Palabras clave: Territorios rurales, desarrollo socioeconómico, agricultura, eco-asentamientos.

1. Introduction

Rural territories, as the most important component of agricultural and socio-economic sphere, have passed through certain stages on their development. Over the last nearly three decades, changes in conditions and factors, impacting the type (quality) and nature (dynamics) of rural territorial development, were extensive and largely radical in nature, which was bound to have an effect on their essential characteristics (Koghuashvili & Ramishvili, 2016; Shucksmit, 2018; Marsden, 1998). Therefore,

consideration of rural territories in isolation from the "general background" of the development would be methodologically incorrect.

From this standpoint, the purpose of the research was to analyze conceptual elements of rural territorial development from positions of searching for its factors and directions (Menconi, Grohmann, & Mancinelli, 2017). This will, in turn, enable to determine the prospects for further rural development.

2. Methodology

2.1. Conceptual framework of methodological approach

The current diversity of conceptual approaches to the research about rural territories is attributable to cross-objectivity of the spheres of their functioning. First of all, rural areas are analyzed in the context of the territorial organization of society and resettlement systems (Songa & Liu, 2014; Mamdouh, Hanan, & Elsayed, 2018) . Secondly, modern rural territories are areas of agricultural production as a part of the industrial economy (Li, Westlundb, & Liu, 2019; Karlsson, 2018) . Furthermore, they constitute a structural element of the socio-economic regional system in accordance with the provisions of municipal and regional economies (Sørensen, 2018; Faggio & Silva, 2014). The concepts of the general theory of territorial management define rural localities as a controlled subject with complex characteristics, properties, and functions.

In this work, we use the research data that enables identifying alternative forms of resettlement and livelihood organization in rural areas such as "eco-settlements" and "villages of the future" (Mamdouh, Hanan, & Elsayed, 2018; Xue, 2014). The current scientific and methodological groundwork provides an opportunity to consider causes and factors for developing new types of settlements, to trace their socio-economic role in terms of specific territories (Pynyaev , 2010; Sukhinina , 2013; Tysiachniouk , Pchelkina , & Kulasova , 1999).

In developing a methodical approach, the authors took into account the current state of rural settlements, their social role and economic sustainability, as well as the prospects for maintaining the existing resettlement model. In the first stage, using official statistics we conducted a general analysis of trends in the socio-economic development of rural areas in the region. The next stage includes the results of expeditionary observations carried out from 2016 to 2018 with the main purpose to find and identify in the field the alternative forms of rural resettlement as well as to interview local residents on topical issues of the research. This allowed designing a cluster of socio-economic effects that are forming during the creation and development of eco-settlements in the specific region.

The final stage of the methodological approach implements predicting the size of the population that can be potentially attracted by alternative rural settlements thus maintaining the rural lifestyle and the territorial identity in the long term.

It is worth mentioning that the analysis of rural territories through a single approach can lead to one-sided conclusions, whereas their excessive "overlapping" and combining is a way to the discrepancy of the initial conceptual provisions. Therefore, for our research we have primarily followed mainly systemic, functional, institutional, retrospective-genetic, and command-and-control approaches (Bańsk & Mazur; Gorbenkova, Shcherbina, & Belal, 2018) .

2.2. Factors of rural territorial development

Concepts of "factor" and "complexity" are linked in one of the most recent fundamental researches on rural territorial development and agriculture, proposing a private hypothesis about the factors' combination effect on the intensity degree of the complex development of rural territories. The author, Yu. N. Krivokora (2014) marks the following groups of factors: demographic, ecological, natural-resource, social, economic, and infrastructural.

In the context of our research, we assume that the integrated development of rural territories also depends on a complex set of factors. In this regard, we propose the following classification grounds for their systematizing: factors for expanding a functional load for rural territories and factors for its "narrowing". This research approach can link the reasons for strengthening or weakening the multifunctional nature of rural development (fig. 1).

We propose to analyze the development of rural territories exactly from the standpoint of the functional approach. Contrary to the "sustainable development" approach, this one is based on the following provisions:

-First, consideration of the functional array of tasks carried out by rural territories will allow to understand their general "integration", not only in the territorial grid of resettlement and administrative structure, but also its inclusion on the division of labor, formation of social and ecological capital, fulfillment of spatial-economic and socio-cultural problems processes (Krivokora, 2014).

-Secondly, the identification of "missing", ill-defined or incompletely executed functions is an integral part of system diagnostics of socio-economic development of rural territories, and a subsequent "pulling up" of separate functions will balance rural development processes.

-Thirdly, there is a process of increasing complexity and inversions in the implementation of regular functions as well as incrementing new ones. Consequently, their detailed consideration with the description of characteristics, properties and indication mode will help to form adequate scientific-methodological approaches to the improvement of organizational and economic mechanisms of multifunctional development of rural-type territories.

-Fourthly, understanding the chronological (temporal) manifestation of functions and their nature (immanent or acquired) will allow further planning of activities and developing facilities for the fullest functional disclosure of rural territories and utilization of their capacity.

Figure 1

Species composition for groups of factors influencing the development functionality of rural territories.

Factors extending functionality

- 1. Economic** (realization of food import substitution programs, sectoral diversification of business sphere, development of agricultural holdings, digitalization of economy).
- 2. Social** (attractiveness of rural lifestyle, built-up activity development for urban residents in villages, creative environment forming, downshifting to the countryside).
- 3. Ecological** (redefining natural factors of life activity, development of rural tourism, eco-products and recreation trends).
- 4. Market** (insertion of market on-line technologies, integration with urban market space, development of Internet, digitalization).
- 5. Spatial** (development of road and transport infrastructure, reduction of "economic distance" between city and village, inclusion of rural territories in resettlement systems and skeletons).

Factors "narrowing" functionality

- 1. Economic** (bankruptcy of agricultural enterprises, small business shifting to informal sector, fall of real incomes of population, general "cool down" of economy, archaization of production, sequestering of programs)
- 2. Social** (general ageing of population, reduction of social mobility, deficiency of social infrastructure, social unattractiveness of rural areas)
- 3. Managerial** (optimization of municipal management mechanisms, reduction of municipal services, corruption)
- 4. Market** (absorption of local market by federal networks, reduction of population purchasing power)
- 5. Spatial** ("shrinkage" of economic space, its centralization in favour of urban areas, "hollowing-out" of economic resources)
- 6. Demographic** (general ageing of population, urbanization, minimum return migration, decline in birth rate)

3. Results

3.1. Analysis of trends in socio-economic development of rural territories of southern Russia

Socio-economic profile of a territory is a complex concept involving the analytics of a wide range of indicators to identify the strategic determinants of the territorial development as a whole, as well as its constituent parts. However, in the research of "problematic areas", it is reasonable to divide social and economic types of analytics to obtain more detailed characteristics.

In terms of demographic parameters, we note the low level of natural population growth per 10.000 people. Since 2013, there is an increase in the rate of + 0.3 followed by the growth to + 0.6. However, the region is attractive due to migration flows (table 1).

Indicators of changes in population
size of Krasnodar territory.

Year	Population size (thousand people)	Natural population growth rate (for 10000 people)	Population growth resulting from migration (for 10000 people)	Changes in population size (%)
1.990	4.677	-0,1	81	0,8
1.995	4.984	-5,3	133	0,8
2.000	4.999	-6,2	57	-0,1
2.001	4.988	-6,3	48	-0,2
2.002	5.120	-5,8	23	-0,4
2.003	5.106	-5,4	27	-0,3
2.005	5.127	-5,4	70	0,2
2.010	5.230	-1,3	44	0,3
2.012	5.330	-0,2	87	0,9
2.013	5.404	+0,3	135	1,4
2.014	5.454	+0,6	84	0,9
2.015	5.514	+0,5	105	1,1
2.016	5.571	+0,3	101	1,0

Source: (Krasnodar region in numbers-2016. Statistical collection, 2017)

At the end of 2010, there were 19 rural settlements without population, as well as more than 50 ones with a population less than 10 people registered within the Krasnodar territory. As a rule, these were farmsteads or settlements, which during Soviet period were a structural subdivision of large state farms and collective farms serving as a link, as well as a place of residence and labour. In general, the age structure of these settlements was represented by people of older retirement age, causing constant reduction of numbers due to the growth of natural population decline. These settlements are at risk of desertification due to their ultra-low headcount and low capacity to reproduce the population. Also, most of settlements with a small population of 51-100 people are usually remote localities without general educational and medical institutions (table 2).

Table 2
Rural settlements of Krasnodar
region by population size.

Indicator	Year 2.010
Number of rural settlements (total)	1.725

Without population (from the previous)	19
Population size (people): Up to 10	51
From 11-50	144
From 51-100	151
From 101-500	595
From 501-1.000	222
From 1.001-2.000	253
From 2.001-3.000	88
From 3.001-4.000	57
From 4.001-5.000	24
From 5.001-6.000	29
From 6.001-7.000	21
More than 7.000	70

Source: (Krasnodar region in numbers-2017. Statistical collection . , 2018).

The majority of settlements are localities with a permanent population of 101-500 people (595 units). This group can be called a "skeleton" of the rural area. Small rural settlements shape a profile of rural territories of the Krasnodar region, comprising farmsteads or villages located near district administrative centers, stable transportation with neighboring settlements, availability of infrastructure housing and communal facilities (water supply, gas supply), stable employment (mostly agricultural production), where the average age of population is 45 years (i.e. all age groups are present). Livelihoods and survivability of such villages directly depend on the presence of strong agricultural holdings being the main source of population employment or providing an additional income for renting lands of agricultural designation. (Ministry of economy of Krasnodar region, 2018)

Employment of the population is an economic indicator enabling to estimate the economic environment capacity of the territory. It should be noted that there was a reduction in the number of employed working in agriculture by 30% in 2016, compared to 2010, as well as an increase of the "fishing, fish farming" activity by 27.8%. (Ministry of economy of Krasnodar region, 2018)

Table 3 represents data on the status of the labour market. The level of the economically active population in rural areas is lower compared to the urban ones. The same situation happens with the level of unemployment. However, this rate for the period under research decreased by 12 % in rural areas (Ministry of economy of Krasnodar region, 2018).

At the same time, the average monthly salary in the context of endemic activities was lower than the average regional level. The minimum value was registered for "fishing, fish farming" activity, whereas the maximum is for "manufacturing".

Table 3
Labour market indicators

	2010	2011	2012	2013	2014	2016	2016 vs. 2010 (%)
Level of economically active population (% total):	64,5	64,2	65,2	64,8	64,8	67,4	104,5
-In urban areas	65,1	65,3	66,5	66,2	66,4	69,1	106,1
-In rural areas	63,8	63,0	63,6	63,2	62,8	65,4	102,5
Unemployment rate (% total):	6,7	5,9	5,6	5,8	5,7	5,8	86,6
-In urban areas	5,5	4,5	4,4	4,6	4,7	5,1	92,7
-In rural areas	7,6	7,2	6,9	7,0	6,9	6,7	88,2
Average monthly gross salary (rubles, total):	16.330	20.605	21.409	24.063	25.777	28.734	175,9
-Agriculture, hunting and forestry	13.376	14.783	16.617	18.296	20.031	25.591	191,3
-Fishing, fish farming	11.408	13.764	15.113	15.347	14.012	17.792	155,9
-Manufacturing	15.369	16.387	19.465	21.519	22.706	26.472	172,2
-Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	14.686	15.839	17.880	18.994	20.435	24.547	167,1

Source: (Krasnodar region in numbers-2017. Statistical collection . , 2018) .

As of 2016, agriculture is a strategically important activity field in the structure of the regional domestic product, both for the economy of rural areas and the region as a whole. Food security preservation of the region and surrounding territories is a general objective of agricultural branches of the Krasnodar territory (Ministry of economy of Krasnodar region, 2018).

At the present stage, agricultural production is systematically important for rural areas. Rural settlements were inherited from the Soviet economy, their placement was implemented according to the production purposes and necessity, and resettlement was centralized and obligatory. (Ministry of economy of Krasnodar region, 2018)

Crop industry products constitute the basis of production (75%), whereas agricultural organizations make the 62%, while the rest 38% are provided by people's households and family farms. (Ministry of economy of Krasnodar region, 2018) We note the positive tendency of increasing production indicators in relation to all categories of farms during the analyzed period. This raise shapes the positive competitive advantages of agricultural branches and accumulates the investment potential.

Research of general trends in rural territories was conducted through the prism of life

quality assessment of the rural population. Considered as a model region, the Krasnodar territory is among the top ten subjects leading in the life quality level. This fact leads to the increased competitiveness of the region from different perspectives. First of all, this is attractiveness for the population from climatically disadvantaged regions. Secondly, these are favourable conditions for economic development, and therefore, a growth of social indicators. However, the rural areas of the Krasnodar territory have a number of socio-economic problems significantly reducing the overall positive socio-economic profile of the region. And the most acute problems are ones concerning the functional capacity reduction of rural territories and the population outflow from them.

3.2. Alternative forms of settlement as a stabilizing factor in rural development

In the context of implementing the concept of functional expansion of rural territories, specifically in the organization and development of new resettlement types and schemes, it is appropriate to define prospective territorial forms of "villages of the future" organization. In this aspect, the development of alternative types of resettlement on the basis of "green technologies", and environmentally friendly approaches to the livelihoods of the population, constitutes a promising direction (Pynyaev , 2010). According to these principles, one of the territorial forms of rural areas' organization are eco-settlements, representing a type of rural locality focusing on environmentally friendly unconventional methods of the territorial resource consumption. The primary employment of the eco-settlement inhabitants is handicraft agricultural production, agritourism, niche products' manufacturing, various creative and event industries connected to the utilization of historical, cultural, and resource-recreational potential, and various types of remote activities like "distant office".

Analyzing eco-settlements from the position of the group of their initiators, it is possible to highlight the following essential features:

- Eco-settlements are both a place of residence and a place of employment without clearly defined production areas.
- Qualitative composition of the population is represented mainly by urban inhabitants, migrated due to deteriorating "life quality" in urban areas as well as settlers from regions with severe natural and climatic conditions.
- Orientation towards ecologically clean products, and eco-friendly energy sources for the preservation of health and environment.
- Denial of the consumer behavior doctrine, promotion of harmony between man and nature (man as a part of noosphere).

According to administrative-territorial and socio-economic aspects, eco-settlements have the following positive and negative features:

- These settlements are often of illegal spontaneous nature, without registering new administrative-territorial units, as well as without agreeing the housing construction processes according to the legal regulations in effect.
- There are difficulties in monitoring the population and living conditions due to the autarchy of communities.
- Shadowed (informal) entrepreneurship dominates as the economic base.

But at the same time:

- Alternative resettlement types reduce the disunity of rural territories, form a road and spatial-economic network.
- Ability to solve supply and employment issues independently, reduce social tensions.
- New types of agrarian entrepreneurial activity are developed.
- Rural life allows poor families and those with many children to improve their living conditions and "life quality".

- Promotes a healthy lifestyle and the labour education of the younger generation, shaping the image of "the village of the future" (Mamdouh, Hanan, & Elsayed, 2018).

Conflict situations between eco-settlement inhabitants and local authorities are caused by the absence of normative and legal documentation to consider the peculiarity of such settlements. On this regard, it can be concluded that the status of rural eco-settlements should be legitimated as a new territorial form of population organization.

However, despite the existing problems, particularly of the legal and regulatory character, there are at the moment a whole array of eco-settlements in the Krasnodar territory varying in form and activity profile but having identical organizational goals.

The following entities may initiate organizational processes for eco-settlements:

- Individuals based on personal initiatives.
- Groups of like-minded people and activists to attract new members of communities and investors.
- State regional and federal authorities for the formulation of projects about "development of alternative eco-settlements", "restoration of abandoned villages", and addressing institutional and organizational issues.
- Agro-entrepreneurs and family farms' communities for the employment provision to inhabitants of eco-settlements at the initial stages.
- Academic institutions for education and retraining of the population in agritechology.

The organization of eco-settlements and their populating is a voluntary activity, based on personal initiatives, allowing to accomplish all the diversity of functions of traditional rural settlements and get a set of intended effects (table 4).

Table 4
Effects from the eco-settlement organization in Krasnodar territory

Social effects	Spatial effects
<ul style="list-style-type: none"> - Life quality improvement of population through comfort life-support environment - Demographic growth - Increase of regional attractiveness for external positive migration - Labor Education of children (patriotic education) - Self-employment of the population and food self-sufficiency 	<ul style="list-style-type: none"> - Strengthening of territorial control - Involvement of vacant lots in regional spatial system - Development of regional transport and logistics network
Economic effects	Effects on entrepreneurial sector
<ul style="list-style-type: none"> - Increase of tax revenues to municipal and regional budget - Additional employment - Impetus to growth of unpopular categories of agricultural production (horticulture, nuciculture, pomiculture) - Formation of additional regional competitive advantages - Increase of regional investment attractiveness - Unemployment reduction 	<ul style="list-style-type: none"> - Production diversification through development of niche agricultural activities and agritourism - Contribution to implementation of food import substitution - Increasing competition in eco-production - Active use of alternative clean technologies and energy sources

3.3. Forecasting of socio-economic development prospects for rural territories of southern Russia

To evaluate prospects for eco-settlements' creation we apply a predictive instrument. Prediction of eco-settlements' number in the Krasnodar territory is possible, under certain conditions:

-Availability of information, in our case, from electronic sources (forums, chats, articles and sites of active settlements).

-Target indicators to create a simulation model for the development of alternative settlements.

When reviewing Internet sources, we have used content analysis techniques: query statistics for the research subject, indirect mentions, archival and active records, number of participants in thematic groups(Krasnodar region in numbers-2017. Statistical collection . , 2018) (Krasnodar region in numbers-2016. Statistical collection, 2017).

Our observations during the object search allowed to formulate certain facts concerning promoting alternative forms of resettlement in the public information space. For example, the first mentions of eco-settlements as existing objects were recorded in the Krasnodar territory in 2005. In 2011 the highest interest rate of Internet users to the topic of alternative settlements was recorded with the most frequent questions in thematic forums being "cost and availability of land lots", "the most favorable and picturesque places for resettlement in the Krasnodar territory", "domestic problems of settlers", "potential income from selling agricultural products". Since 2010, the first official sites of eco-settlements appeared providing information to interested persons. During the period from 2014 to 2017, exact coordinates of eco-settlements and road routes to get to them were included in the Internet maps.

In accordance with the information received, we made a prediction of the eco-settlements' number and the population figures based on linear trends.

In table 5, there are trend equations presented as well as the approximation coefficient, calculated allowing to determine the degree of calculation accuracy for subsequent forecasting. As forecasting functions, we selected linear due to the simplicity of their usage and approximation coefficient of high level.

Table 5
Drawing up trend function of eco-settlements' number and their population figures in Krasnodar territory.

Trend line functions	Number of eco-settlements	Approximation coefficient	Population of eco-settlements	Approximation coefficient
Linear	$y = 2,255x + 3,757$	$R^2 = 0,984$	$y = 98,45x - 4,954$	$R^2 = 0,942$
Logarithmic	$y = 10,38\ln(x) + 1,116$	$R^2 = 0,917$	$y = 431,0\ln(x) - 82,89$	$R^2 = 0,794$
Polynomial (2nd degree)	$y = -0,037x^2 + 2,745x + 2,613$	$R^2 = 0,986$	$y = 4,874x^2 + 35,08x + 142,9$	$R^2 = 0,964$
Exponential	$y = 4,8x^{0,734}$	$R^2 = 0,984$	$y = 115,7x^{0,909}$	$R^2 = 0,974$

The forecast results are indicated in table 6. Thus, under the optimistic scenario, it is possible to rise the number of eco-settlements up to 63 in this region, with a total population of 2661 people.

Table 6
Forecasting eco-settlements' number and their population figures in Krasnodar territory until the year 2026.

Years	Realistic scenario		Optimistic scenario	
	Number of eco-settlements	Population of eco-settlements	Number of eco-settlements	Population of eco-settlements
2.020	42	1.570	45	2.020
2.021	45	1.669	51	2.569
2.022	48	1.767	57	3.117
2.023	50	1.866	56	2.516
2.024	53	1.964	58	2.464
2.025	55	2.062	60	2.562
2.026	58	2.161	63	2.661

The indicated practical idea of the development of eco-settlements in the Krasnodar territory can be applied in many regions with favorable natural and climatic conditions that determine prospects for using this form of rural settlements' organization, expanding their functional objectives and shaping the image of "the village of the future".

4. Conclusions

As an effective tool for the development and expansion of socio-economic functions of rural areas, we have analyzed and substantiated the possibility of organizing new forms of localities – eco-settlements. Eco-settlements are the territorial form of the rural area organization focusing on unconventional methods of territorial resource consumption and effective economic activities. The main sphere of employment for eco-settlements' inhabitants is handicraft agricultural production, agritourism, niche products' manufacturing, various creative and event industries, etc. Starting in 2000, there was the precedent experience on the establishment of such settlements in the Krasnodar territory. Since 2011, the interest of the migrating population to alternative settlements has increased, primarily due to the combination of residence and employment within the same area. We reviewed potential techniques for creating eco-settlements in the Krasnodar territory without violating the legislation. In this case, the author's version of the eco-settlement organization relies on increasing the quantity of "new villages" with the implementation of the newly described functions enabling upgrading the traditional rural livelihoods. In addition, we propose to intensify activities to rehabilitate the deserted rural areas of the Krasnodar territory that will provide opportunities to increase numbers of rural settlements and their residents.

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