

PAPER • OPEN ACCESS

## The development of social services in the transition to a diversified rural economy

To cite this article: I Merenkova *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **274** 012091

View the [article online](#) for updates and enhancements.



**IOP | ebooks™**

Bringing you innovative digital publishing with leading voices to create your essential collection of books in STEM research.

Start exploring the collection - download the first chapter of every title for free.

# The development of social services in the transition to a diversified rural economy

I Merenkova<sup>1\*</sup>, and E Kusmagambetova<sup>1</sup>, I Novikova<sup>1</sup>

<sup>1</sup> Research Institute of Economics and Organization of the Agro-Industrial Complex of the Central Black Earth Region of the Russian Federation, 26a Serafimovich str., Voronezh 394042 Russia

E-mail: upr-nii@yandex.ru

**Abstract.** Diversified development of rural areas now depends on the state of the service sector and the quality of social services provided, which, on the one hand, are aimed at meeting the social needs of rural residents and improving the infrastructure provision of territories, and, on the other, they contribute to the creation of new jobs in the countryside, increasing incomes and improving the quality of life for villagers. The purpose of this scientific work is to justify the need to restructure the rural economy with a focus on the development of the social services sector. The study used general scientific methods and techniques of a systematic approach, deduction and induction, analogy, statistical analysis. The study shows the increasing role of the service sector in the rural economy and presents, on the basis of expert evaluation, the results of providing the rural population with social services in the main sectors: education, health, culture, sports, personal services, catering, and trade. To create comfortable living conditions in rural areas, opportunities for diversified development of the social services sector in the following areas have been identified: activities, products, and technologies. The implementation of the designated diversification areas affecting all branches of the service sector will expand the range of services provided and modernize the forms and methods used to serve the rural population.

## 1. Introduction

At present, in the strategic planning documents of the federal level, an important role is assigned to diversification as an effective tool for ensuring the sustainable development of territories. In this regard, one of the priority areas of rural development in Russia is the economic diversification, focused on the creation in rural areas of various economic forms and activities.

In fact, the policy of diversifying the rural economy, outlined in state documents, is inherently declarative. Until now, the availability of financial resources is not ensured, and the level of state support for non-agricultural types of entrepreneurial activity in rural areas remains low. It is precisely because of the lack of financial resources that the service sector is in a crisis state, which has led not only to serious problems with the implementation of investment activities (updating the material and technical base, introducing new capacities), but also covering the current costs of enterprises and institutions.

However, the diversification of the rural economy on the basis of the functioning of the social services sector is now extremely important, because it gives impetus to the development of service industries, creates conditions for meeting the needs of rural residents in providing employment,



professional self-realization, increasing the accessibility of social and cultural services, which ultimately helps to improve the quality of life of the villagers.

For the theoretical substantiation of the findings in the process of research were reviewed scientific papers devoted to the study of the functioning of the services sector and the diversified development of rural areas.

The study of a wide range of problems in rural areas was carried out in the works of such scholars as R. Kh. Adukov, V. M. Bautin, L. V. Bondarenko, A. G. Granberg, I. B. Zagaytov, A. I. Kostyaev, K. S. Ternovykh, V. V. Patsiorkovskiy, P. M. Pershukevich, A. V. Petrikov, I. G. Ushachev, I. F. Khitskov, A. V. Chayanov, and others.

A significant contribution to the development of ideas about diversification as an instrument of socio-economic development was made by M. A. Kerashev, I. V. Lipsits, A. A. Polydi, and others. The problem of diversified development of the rural economy is reflected in the scientific publications of N. I. Antonova, V. A. Kundius, V. D. Menshikova, L. I. Rudenko, T. I. Sorokina, V. I. Trofimova, A. I. Firsova, N. Sh. Shakirova, and others.

At the same time, the problems and ways of their solution being studied by modern authors require further generalization and systematization. In the context of the transition from a sectoral to a territorial model of organization of rural areas, issues of diversification of the rural economy, which are aimed at the development of non-agricultural activities, including in the field of social services, remain insufficiently studied.

The purpose of the research is to analyze diversification directions for developing the whole range of social services in rural areas, which is predetermined by the need to restructure the rural economy, increase the availability of social services, as well as employment and incomes of rural residents.

The objectives of the study include the consideration of the economic essence of the social services sector and the foreign experience of its development in rural areas; analysis of the current state of the service sector; expert assessment of the provision of rural residents with social services; identifying opportunities for the development of diversification processes in the field of social services in rural areas.

## **2. Methods**

In the process of research, general scientific methods of theoretical and empirical cognition were used: dialectical, abstract logical, monographic, decomposition, method of expert assessments, as well as economic and statistical methods.

## **3. Results**

Following the principles of system analysis and considering the rural territory as a complex hierarchical structure, the basis of which is the rural economy, focused on the effective use of the resource potential, the development of the social sphere and the improvement of the quality of life of rural residents, it is necessary to make a transition to a diversified development model based on a social approach. The mobilization of internal potential and the creation in rural areas of the fullest possible variety of various economic forms and activities depend in no small measure on the functioning of the social services sector, which is an activity organized by society aimed at meeting the physical, social and spiritual needs of the population and ensuring the realization of human reproduction and accumulation capital.

The main structural components of the social services sector are the objects of social services (people and groups of people who have needs, interests in solving their vital needs) and social service providers (specialists and social organizations that implement professional interests and (or) function in the field of social services) [1]. The state is also the subject of providing services to the population and guarantees them a certain minimum for all categories of citizens. In addition, social standards and

norms, technologies, and forms of service provision, resources (property, financial, personnel, managerial), social relations, and relations between the object and the subject of interaction, their material and spiritual culture, and the result of services (their quality). The criterion for the development of social services is the availability and quality of social services.

In the scientific literature there are several basic approaches to understanding the essence of social services: (a) broad, involving the assignment to this category of any services aimed at changing the social status of a person in society and related to his social adaptation or rehabilitation; (b) reproduction, in which social services are seen as aimed at meeting the vital, priority needs of people for the reproduction of society, both simple and advanced; and (c) alarmist (or socially responsible), meaning by social services only those that are intended to meet the needs of certain socially vulnerable groups of the population (persons with disabilities, orphans, the elderly, etc.) [2, 3, 4].

Based on the above, the study will adhere to the reproductive approach and consider social services that contribute to meeting the needs of people and their social reproduction. Therefore, we will highlight the following main sectors of the service sector: education, health care, social support, physical education, sport, culture, leisure, recreation, insurance, finance, housing and communal services, communications, retail trade, public catering, etc.

As world experience shows, the sphere of social services has a significant diversification potential for the organization of new types of economic activity in rural areas [5]. Thus, in the developed European countries, problems of development of this sphere in the village are solved in the framework of two directions:

1. Sustainable rural livelihoods (SRL), focused on the rational use of internal resources and the various possibilities of the territory, the creation of a system of integrated social, domestic, recreational and cultural, and health services, ensuring a high level of economic activity of the population.
2. Sustainable rural development (SRD), associated with the integrated development of rural areas and in terms of social orientation, focused on the improvement of the village, support of local initiatives for the implementation of non-agricultural activities [6].

In the European Union countries, diversification processes in the countryside are widespread and stimulated by new reforms of the Common Agrarian Policy (EAP) of the EU, which provide favorable conditions for granting loans for the formation of starting capital for rural small enterprises; providing information and consulting services on issues of lending, business planning and selection of the best options for its placement; fulfillment of warranty obligations; tax exemption for diversified farms; organization of business trainings for rural entrepreneurs; training of specialists in non-agricultural activities.

In fact, the implementation of the labor diversification program in rural areas, in which new jobs were created in rural areas, contributed to the intensive development of various service industries in rural areas (catering, hotel business, personal services, other leisure activities), including the rural tourism [7, 8, 9].

Therefore, at present, in the EU countries, a substantial proportion of farms located in rural areas (more than 30%) have alternative sources of income to agriculture. In particular, as of 2016, the share of diversified farms in the overall structure was from 20.8 to 30.1% in Greece, France, Italy, Portugal, Poland, Belgium; from 35.4 to 37.7% in Latvia, Hungary, Austria, Slovakia; from 41.5 to 50.8% in Denmark, the Czech Republic, Estonia, Germany, Belgium, Ireland, Great Britain; 62.1% in Sweden [10, 11, 12].

The EU-25 countries stand out in particular, where, starting in 2006, almost 90% of the rural population is associated with non-agricultural activities, in which more than 95% of the additional value of products is produced. At the same time, the bulk of the employment is in the manufacturing, construction, and services sectors [6].

Thus, the policy of actively supporting diversification processes in rural areas, including in social services, in the European countries helped to bring the village to a new level of development and

improve the quality of life there. At the same time, it is confirmed once again by the fact that it is impossible to develop the scope of social services in rural areas only through the action of a spontaneous market mechanism, and it is necessary to develop measures of substantial support at the state level.

Returning to the modern Russian reality, we note that some measures have already been taken to develop the alternative types of agriculture in the countryside. In particular, subsidiary support is provided for lending non-agricultural activities for all enterprises and organizations that create jobs and register their activities in rural areas; introduction of tax holidays for newly created small businesses with a main activity outside the agricultural sector (for a period of up to five years); vocational training of unemployed villagers in employment services for other activities.

However, as practice shows, these measures are not enough to increase the diversification of the rural economy and, in particular, in the field of social services. Thus, for the period from 2010 to 2016, the share of the population engaged in non-agricultural activities in the countryside increased by only 3.9 percentage points. And this is despite the release of workers due to the proliferation in rural areas of large business structures and the intensive development of integrated agro-industrial formations of a holding type, focused on the use of modern technologies and implying a significant reduction in staffing needs.

At the same time, the share of rural residents involved in social services (education, health care, culture, sports, social insurance, wholesale and retail trade, repair work, maintenance of hotels, communication and transport services, rent and others) for 2010-2016 increased by only 1.3 percentage points. And in the near future, no significant changes are foreseen because of the policy of "optimizing" the network of socially significant facilities, the number of pre-school, general educational, medical, cultural, leisure and other socially significant institutions funded from the state budget in the rural areas of Russia. At the same time, commercial organizations, mainly operating in the field of trade and consumer services, create a small number of jobs in the countryside.

It should be noted that the state of the social services sector in the rural areas of the country is characterized by a number of features indicating its underdevelopment and a clear lack of compliance with the needs of society. Among them are: low volumes of free services in connection with the reduction of state funding; the establishment of monopoly prices for many socially significant, non-price elastic services (housing, transportation, educational, medical, etc.); a lack of or unreasonable understatement of social service standards.

In addition, in the field of social services in rural areas, there is a shortage of investments, management and marketing do not meet modern requirements, the workforce is characterized by insufficient competence, only in certain areas (education, healthcare) they are upgraded [13, 14]. Another problem is a significant excess of the depreciation of fixed assets of institutions, as well as their insufficient material and technical base. Therefore, the rural population often receives social services out of time, the quality of services remains low, and the volume and range of services provided are insufficient. In addition, a significant gap between the city and the village in the provision of the population with social infrastructure objects forms a significant differentiation in the availability of social services [15].

However, in recent years, some positive trends have emerged in the social services sector, related to the measures taken by the state and, in particular, with the increase in spending on social and cultural events, which led to a slight expansion of the range of commercial services provided and a slight increase in the share of employed in the service sector in the general structure of rural employment.

When analyzing diversification directions for the development of social services in rural areas, it is important to know not only the general conditions for the functioning of the rural economy, but also to take into account the regional specifics of this process. To determine the provision of the rural population with social services, the Voronezh Region was chosen as a region characterized by a high level of development and relatively stable general economic conditions.

According to Table 1, in 2010-2016 in the Voronezh region, the provision of rural population with the services of pre-school educational institutions improved (by 15.1 percentage points), the systematic use of sports facilities increased (by 14.8 percentage points). During the same period, the level of hospitalization of the population (by 5.5%) increased in the region, which indicates not only the increased needs of villagers for inpatient medical care, but also the presence of hospital beds in hospitals. Attendance by 1 resident per year was reduced. The volume of library services for the villagers has slightly decreased.

**Table 1.** Provision of the rural population of the Voronezh region with social services.

Indicators	Years							Off in 2016 from 2010
	2010	2011	2012	2013	2014	2015	2016	
I. Education								
Children of 1-6 years of age receive pre-school educational services (percentage of children)	23,7	24,5	26,6	29,1	33,9	37,6	38,8	15,1 п.п.
II. Health care								
Hospitalization for 100 people, rural population (people)	25,4	26,1	26,7	26,6	26,2	26,4	26,8	105,5%
Visiting doctors per 1 inhabitant per year (units)	1,9	1,8	1,7	1,8	1,8	1,7	1,8	94,7%
III. Culture, leisure, and sport								
Issued copies of the library fund on average per user (pcs.)	22,1	22,1	21,5	21,4	21,2	21,5	21,6	97,7 %
Systematic use of sports facilities (%)	14,6	17,3	19,1	22,4	25,1	27,6	29,4	14,8 п.п.

Since the further development of social services in rural areas directly depends on the strategic vision and actions of government officials and managers of business entities, as well as on the initiative and civic position of rural residents, to identify their opinions and intentions regarding the prospects and the need to develop the activities in this field in the Voronezh region, an expert survey was conducted. It included the respondents from the Department of Agrarian Policy (10 people), rural municipal districts – heads of administrations of districts (31 people), heads of administrations of rural settlements (31 people), heads of agricultural organizations (31 people), heads of farms (31 people), individual entrepreneurs in the field of non-agricultural business in the village (31 people), as well as highly qualified researchers in the field of the economy of the agro-industrial sector and rural areas of the city of Voronezh from the Voronezh State Agrarian University named after Emperor Peter I and the Research Institute of Economics and Organization of the Agro-industrial Complex of the Central Black Earth Region of the Russian Federation (10 people). Experts were asked to answer a series of questions.

On the first question (“How can unemployment be reduced and rural incomes be raised?”), the experts could choose several answer options for each of the points, which resulted in the following answers from respondents:

- Organizing new jobs in agricultural organizations through investment projects (51.7%);
- Producing diversification: 51.9% in the agricultural sector; 13.9% in non-farm economic sectors;
- Adopting additional support measures: 36.7% in peasant farms; 13.7% in all small and medium-sized businesses in the countryside;
- Organizing new enterprises in the field of storage, transportation, marketing of agricultural products – 19.6%;

- Creating conditions for non-agricultural activities in rural areas, including: 30.8% in consumer services; 25.5% in housing and communal services, 23.8% in public catering; 18.3% in construction; 11.3% in tourism and rural hotel business; 9.6% in subsidiary industrial organizations and handicrafts.

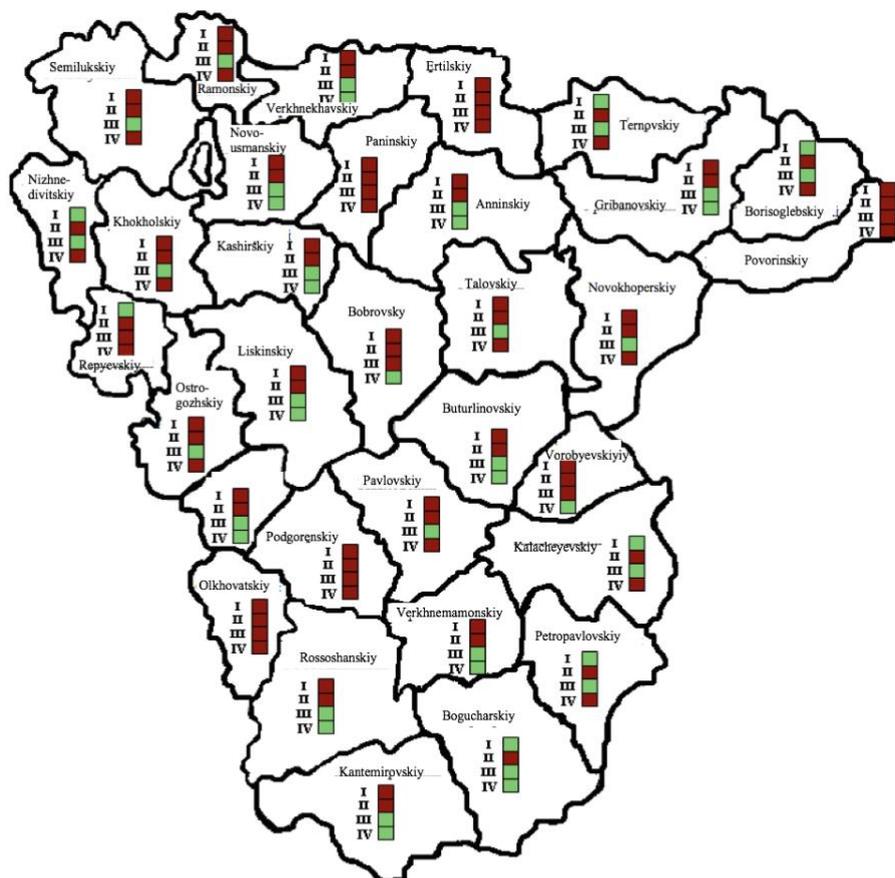
On the second question (“How do you think it is important to pay attention to the development of non-agricultural activities in the countryside?”), the respondents’ answers were distributed as follows: very important (28.6%); important (34.8%); it does not matter (17.6%); not important (11.1%); hard to answer (7.9%). In addition, the experts provided answers to the clarifying open-ended question (“If yes, for what purposes”): in order to overcome the seasonality of production (32.3%); to secure young people in the village (28.7%); in order to increase incomes of the population (18.2%); for the integrated development of rural areas (15.6%); other answers (5.2%).

It should be said that only 11.1% of experts share the position of restricting employment of the rural population solely by agricultural production (mainly, they are representatives of the authorities). At the same time, they reservedly assessed the prospects for the development of activities in rural areas that are alternative to agrarian production, and most of all supporters of this direction are among the administrations of rural settlements, educators and scientists, representatives of the rural business community.

And the last question was the following: “Is the rural population provided with social services in the main sectors (education, health, culture, sports, domestic services, catering, trade)?”. The answers to this question (“yes”, “no”) at the district level were given specifically by the district in which they live or work, while employees of the Voronezh Oblast Department of Agrarian Policy, as well as representatives of education and science, answered the question evaluated the situation in each of the areas.

According to the surveyed experts, the provision of the rural population with social services in the field of trade and public catering in all districts is satisfactory, household services are provided to the population of 22 districts (68.8% of the total number of districts), cultural and leisure – 24 districts (75.0%), sports – 18 districts (56.3%), medical – 27 districts (84.4%). Rural residents are not provided with the necessary volume of educational services, which is due to the low availability of services of pre-school institutions.

The results of the expert assessment as a whole allowed us to determine the insufficient provision of the rural population of the municipal districts of the Voronezh region with services in the service sector (Figure 1), which indicates the need for significant changes in it [16].



**Provision of rural population with social services**

Services industry	Sufficiency	
	enough	not enough
I Health service		
II Education		
III Culture		
IV Sport		

**Figure 1.** The development of social services in rural areas of the Voronezh region.

Considering the importance of restructuring the rural economy and the significant potential opportunities that the social services sector possesses, the following main diversification areas are highlighted, which allow expanding the range of services provided and modernizing the forms and methods of services used, focusing on the needs of the rural population:

- Types of activity: developing the existing or new types of economic activity in a municipal entity;
- Manufactured products: expanding the list of services provided by dividing them into basic and related; creating new types of services; conducting modernization of services associated with the reorientation to an increased number of consumers;
- Technologies: using new managerial, technological, financial, personnel, marketing, and other tools; methods and ways of organizing the work of institutions and enterprises in the service sector [17, 18].

To achieve the greatest economic and social effect for the development of rural areas, it is necessary that the diversification of the social services sector takes place simultaneously in three designated areas and affects all the service sectors of the rural population (Fig. 2).

The implementation of the above areas of diversified development of social services can have a positive impact on the socio-economic condition of rural areas, which will result in increased employment, self-employment, and higher incomes of villagers. But this requires deep structural changes, implying that "... production and business processes serve services" [13].

In our opinion, the development of recreational services, in particular, rural tourism, has the greatest potential in this area, since this type of activity activates many key sectors of the rural economy, as in the production sector and in public services.

Since the further development of social services in rural areas should be based on the principles of ensuring a balance between building up the diversification potential of the rural economy and creating comfortable living conditions for villagers, so important role in this process belongs to the state, called to ensure a decent life for the population, level social inequality, ensure universal accessibility and quality of the most important social services [19, 20].

That is why, it is important to pursue a policy of attracting investments in the social sphere of the village, which can be expressed in granting various preferences to socially responsible representatives of the business community. For this, it is necessary to form an effective mechanism of financial support for organized small and medium-sized businesses, which allow using modern service technologies to provide villagers with high quality services in full.

		<b>POSSIBLE DIVERSIFICATION DIRECTIONS</b>		
		<i>By type of activity</i>	<i>By products (services rendered)</i>	<i>By technology</i>
<b>SERVICE SECTOR</b>	<i>Healthcare</i>	Development of mobile types of medical care. The introduction of general practice.	Prophylactic (immunization, medical examinations) and hospital-replacing services.	Modern technologies of diagnosis and treatment of diseases. ICT application.
	<i>Education</i>	Providing services in the system of additional education.	Advanced training services. Training of specialists with primary vocational education in the field of consumer services, tourism, etc.	The introduction of state educational standards of the new generation and modern educational technologies.
	<i>Culture and leisure</i>	Restoring historical and cultural monuments. Organizing museums, museum corners in libraries and schools.	Holding film screenings, concerts and exhibitions, creative meetings. Organization of excursions to local historical and cultural sites and museums. Sale of printed and souvenir products.	Re-equipment. Mastering modern forms and methods of organizing cultural and leisure activities.
	<i>Physical culture and sport</i>	Organizing sports events. Sports equipment rental.	Services of sports sections. Preparing and conducting rural sports games. Organization of trainings and master classes. Training in national sports.	Technology of differentiated physical education, health, activity, etc.

	<i>Retail trade and public catering</i>	Exit service. Opening stores, incl. at home. Trade and procurement activities. Expansion of catering network.	Procurement and sale of goods and raw materials from small-scale producers, products of local catering enterprises. Reception, execution of orders for the delivery of goods. Production of culinary products and confectionery products according to customer orders. Providing services to the cook and pastry chef at home.	Using the services of virtual enterprises – information and service centers. Mobile provision of services in the “application - order – execution” mode. Placement of advertising information in the media.
--	---	--	--	---

**Figure 2.** Diversified development of social services in rural areas.

#### 4. Conclusions

The necessity of restructuring the rural economy through the development of social services focused on the development of new activities, the creation of jobs for rural residents, increasing the availability of social and cultural services for villagers.

The study of international experience has shown that in the developed European countries, diversification processes in rural areas are widespread, including due to the intensive development of service industries. At the same time, domestic experience clearly demonstrates the underdevelopment of the sphere of social services in rural areas, significant differentiation in the availability of services for villagers, poor effectiveness of measures taken to develop non-agricultural activities in rural areas.

The problems of developing the service sector in rural areas, such as lack of financial resources, inconsistency of management quality with modern requirements, lack of competence of personnel, significant excess deterioration of fixed assets of institutions, as well as their insufficient material and technical base are identified and described in the paper.

An expert assessment of the need to develop activities in the service sector of the village showed that, on the one hand, experts were fairly reticent about the prospects for the development of rural activities being an alternative to agrarian production, and, on the other hand, recognized the need to create a full-fledged the service sector because of low and insufficient social benefits for the villagers. Thus, in the Voronezh region, only 68.8% of districts were provided with household services, 75.0% of districts had cultural and leisure services, 56.3% were rural residents, 84.4% were medical residents.

Diversification directions for the development of social services in rural areas (by type of activity; manufactured products; technologies) have been proposed, contributing to expanding the range of services provided and modernizing the forms and methods used to serve rural residents, as well as state support measures for their implementation [22].

A restructuring of the rural economy, based on the development of the service sector, will lead to its more sustainable operation by optimizing the reproductive structure, making it possible to improve the quality of life of the rural population, contributing to the growth of its employment, increasing incomes, and providing the residents with necessary social services.

#### References

- [1] Malofeev I V 2012 Social services in the system of social services for the population p 176
- [2] Krutikov V K and Fedorova O V 2011 *Rural Development: Innovation, Diversification* **216**
- [3] Lanovenko O A 2010 Social efficiency in the provision of social services: criterion indicators of its assessment *Bulletin of the Kharkiv National University named after V. N. Karazin* **889** pp

142-147

- [4] Khoreva L V 2006 *Sphere of social services: formation and directions of regulation* p 200
- [5] Zinchuk T O 2007 Theoretical and methodological approaches to the diversification of the rural economy in the EU and Ukraine *Nikon readings* **12** pp 543-546
- [6] 2006 *Rural development in the European Union Statistical and Economic Information* p 401
- [7] Brouder P 2012 Tourism development against the odds: the tenacity of tourism in rural areas *Tourism Planning and Development* **9** pp 333-337
- [8] Hall C M, Hultman J and Gossling S 2011 Tourism mobility, locality and sustainable rural development *Sustainable Tourism in Rural Europe: Approaches to Development* p 43-57
- [9] Neffke F, Hartog M, Boschma R, Henning M 2014 Agents of structural change. The role of firms and entrepreneurs in regional diversification *Papers in Evolutionary Economic Geography* **14**(10)
- [10] Boschma R, Coenen L, Frenken K and Truffer B Towards a theory of regional diversification *Papers in Evolutionary Economic Geography* **16.17**, (2016)
- [11] Christiaensen L, Weerdt J and Todo Y 2013 Urbanization and poverty reduction: the role of rural diversification and secondary towns *Agricultural Economics* **44**(4-5), pp 435-447
- [12] Cortinovis N, Xiao Jing, Boschma R, Van Oort G 2016 Quality of government and social capital as drivers of regional diversification in Europe *Papers in Evolutionary Economic Geography* **16**(10) p 37
- [13] Makhosheva S A 2008 Russian Service Market: Research Methodology *Current State and Development Paths* p 372
- [14] Frolova O A 2011 Development of non-agricultural activities in rural areas *Vestnik NGIEI* **1**(2) pp 72-79
- [15] Merenkova I N and Pertsev V N 2011 Differentiation of rural areas of the district according to the level of sustainable development of FES *Finance. Economy. Strategy* **1** p 28-31
- [16] Merenkova I N, Novikova I I and Kusmagambetova E S 2016 Differentiation of Rural Territories by the Level of Social Infrastructure Development Scientific Review *Theory and Practice* **3** pp 181-191
- [17] Merenkova I N and Kusmagambetova E S 2018 *Formation and Development of Social Infrastructure in Rural Territories* p 182
- [18] Novikova I I, Kusmagambetov S M and Kusmagambetova E S 2018 *Development of Social Infrastructure as a Direction of Diversification of Rural Economy Region: systems, economics, management* **1**(40) p 92-98
- [19] Merenkova I N and Pertsev V N 2016 Priorities of socially oriented development of rural areas and settlements *Economics of Agricultural and Processing Enterprises* **4** p 54-57
- [20] Radina O I 2007 *Institutional-market mechanism for managing the development of social services in the region* p 259
- [21] Bogoviz A V, Semenova E I and Alekseev A N 2018 New challenges for regional economy at the modern stage *Advances in Intelligent Systems and Computing* **622** pp 574-580
- [22] Semenova E I and Domrachev A S 2014 Evaluation of social and economic efficiency in agriculture *Economics of Agriculture of Russia* **12** pp 63-68