Assessment of Rural Areas Development

Vladislav Leonidovich Anichin[1], Alexander Vladimirovich Turyanskiy[2] and Alina Ivanovna Dobrunova[1]

[1-3]Belgorod State Agricultural University named after V. Gorin, Russia, 308503, Belgorod Region, pos. Mayskiy, ul. Vavilova 1

ABSTRACT

The methodology described in the article to assess the development of rural areas takes into account the UNDP's experience of measuring human development. A principal difference of the authors' technique is the emphasis on the comparison of socio-economic development of rural and urban population, essential for Russia. Cases of advanced development of rural areas were developed.

Keywords: Rural development, human development, UNDP methodology, territorial indices.

1. INTRODUCTION

In accordance with the Federal Act "On the Development of Agriculture", state agrarian policy is aimed at the sustainable development of agriculture and rural areas. The sustainable development of rural areas means their stable socio-economic development, increase of agricultural production, improvement of the efficiency of agriculture, full employment of the rural population and increase of its living standards, rational use of land (Federal'nyy zakon No. 264-FZ). This means that the development of rural areas affects the interests of various segments of the population: consumers, businesses, employees, owners of the land and all rural residents, regardless of their socio-economic status. The diversity of interests and potential conflicts of interest give rise to the need to control the development of rural areas. One of the most important aspects of management is the assessment of the achieved level of development of rural areas.

Some authors offer their techniques to assess the development of rural areas, mainly characterized by the following:

1. allocation of economic, environmental and social components and relevant groups of indicators (Gazizov, 2015; Gromov, 2016). Merenkova and Novikov also offer the fourth group comprising indicators reflecting the institutional conditions (Merenkova & Novikova, 2015);

2. making of the integral index, which characterizes the state of development of rural areas (Gazizov, 2015; Gromov, 2016; Dobrunova, 2014; Karpov, 2016; Merenkova & Novikova, 2015; Molchanenko, 2016).

However, the methodological approaches presented in the literature to the making of the integral index vary significantly, leading to the conclusion on the feasibility of unification and updating of methods to assess the development of rural areas.

2. RESULTS

Based on the targets identified in the Concept of Long-Term Socio-Economic Development of the Russian Federation for the period up to 2020, its main criteria are income level, high standards of personal safety, availability of education and health services of the required quality, necessary level of housing, access to cultural goods and environmental safety (Rasporyazhenie Pravitel'stva RF No. 1662-r).

The level of income, of course, is an important indicator of socio-economic development. However, in terms of increasing income differentiation, as evidenced by the dynamics of the decile coefficient, the use of per capita income as the main indicator of economic development of rural areas seems inappropriate to us.

Preference should be given to the indicators characterizing the proportion of poor people. The poor population is recognized by average per capita disposable resources below the subsistence minimum. Of interest are both the analysis of dynamics of the share of the poor to the total rural population (Table 1.1) and its comparison with the similar level calculated for the urban population (Table 1.2).

Table 1.1
Dynamics of the share of poor people in the total rural population, % (calculated according to Rosstat (Regiony Rossii. Sotsial'no-ekonomicheskie pokazateli, 2015; Sotsial'noe polozhenie i uroven' zhizni naseleniya Rossii. 2015))

Regions of the Central Federal District of Russia	2009	2010	2011	2012	2013	2014	Average in 2009-2014	Linear trend
Belgorod	6.8	5.5	3.8	5.3	7.6	6.8	6.0	0.2
Bryansk	18.8	16.7	15.3	13.7	14.0	13.9	15.4	−1.0
Vladimir	29.1	26.1	25.7	21.4	18.9	28.6	25.0	−0.8
Voronezh	29.0	29.2	24.4	17.7	15.0	12.4	21.3	−3.8
Ivanovo	17.7	15.9	6.2	3.4	3.1	3.0	8.2	−3.3
Kaluga	18.1	17.4	13.4	8.4	11.2	9.0	12.9	−2.0
Kostroma	25.9	21.7	20.9	17.8	16.7	15.6	19.8	−2.0
Kursk	12.1	11.4	9.5	7.8	9.5	9.0	9.9	−0.6
Lipetsk	12.7	12.8	13.9	11.8	9.8	11.0	12.0	−0.6
Moscow	13.3	12.6	13.9	13.4	10.9	10.4	12.4	−0.6
Oryol	27.0	22.7	20.4	17.0	19.1	16.5	20.4	−1.9
Ryazan	14.9	14.2	16.2	10.8	10.2	10.3	12.8	−1.2
Smolensk	12.7	12.6	11.6	10.9	11.5	10.7	11.7	−0.4
Tambov	13.2	12.1	11.3	10.1	9.4	9.1	10.8	−0.9
Tver	15.0	14.2	18.4	15.4	19.1	11.8	15.7	−0.1
Tula	14.0	12.1	9.1	6.2	4.0	6.0	8.6	−1.9
Yaroslavl	24.7	20.4	15.5	16.0	17.2	10.7	17.4	−2.3

Based on the information presented in Table 1.1, the lowest long-term share of the poor in the total rural population is observed in the Belgorod Region (6.0%), the highest – in Vladimir (25.0%). In most regions of the Central Federal District of Russia, there is a trend to reduce poverty of the rural population, indicating the progress in the implementation of the program provisions in the field of rural development.

For comparison of the share of the poor among the rural and urban residents, the nonparametric Wilcoxon test was used.

Wilcoxon test is built on the comparison of the sum of ranks of positive and negative differences. Each difference depending on its absolute value, excluding zero, is attributed to the corresponding rank. The greater the absolute value, the greater the rank. The smallest absolute difference has the rank equal to one. The highest one has the rank equal to the number of all the differences. If the absolute values of a few differences coincide, then each of them is attributed to the average of possible ranks. Then, the sums of rank of positive and negative differences are separately calculated. The smallest of the sums is the observed value of the criterion. It is compared with the critical value of criterion to formulate conclusions on the null hypothesis (Anichin, 1994).

Table 1.2
The share of poor people in the total rural and urban population in 2014 (calculated according to Rosstat (Regiony Rossii. Sotsial'no-ekonomicheskie pokazateli, 2015; Sotsial'noe polozhenie i uroven' zhizni naseleniya Rossii. 2015))

Regions of the Central Federal District of Russia	Share of poor people		Differences	Rank	Ranks of differences	
	Among rural population	Among urban population			Negative	Positive
	ω_r	ω_u	$\Delta = \omega_r - \omega_u$	R	R^-	R^+
Belgorod	6.8	7.9	−1.1	7	7	
Bryansk	13.9	11.6	2.3	8		8
Vladimir	28.6	9.2	19.4	17		17
Voronezh	12.4	7.5	4.9	12		12
Ivanovo	3.0	16.8	−13.8	16	16	
Kaluga	9.0	9.5	−0.5	3.5	3.5	
Kostroma	15.6	12.7	2.9	9		9
Kursk	9.0	8.5	0.5	3.5		3.5
Lipetsk	11.0	6.3	4.7	11		11
Moscow	10.4	7.0	3.4	10		10
Oryol	16.5	10.9	5.6	14		14
Ryazan	10.3	11.2	−0.9	5	5	
Smolensk	10.7	16.9	−6.2	15	15	
Tambov	9.1	9.4	−0.3	2	2	
Tver	11.8	11.9	−0.2	1	1	
Tula	6.0	11.1	−5.1	13	13	
Yaroslavl	10.7	9.7	1.0	6		6
Total	–	–	–	153	62.5	90.5

It is noted that critical Wilcoxon test for significance level of 0.05 for the 17 adjacent pairs (17 areas) is equal to 36. That is, to recognize the difference in the share of poor people between rural and urban residents significant, the observed value of Wilcoxon test should be less than critical. The data in Table 1.2 indicate that the observed value of the test is equal to 62.5 and significantly exceeds the critical value, so the analyzed data are consistent with the null hypothesis which is the assumption that between rural and urban residents are no significant differences in the share of poor people.

However, in the context of individual regions of the Central Federal District, there are significant differences between rural and urban populations in the share of poor residents. In this regard, we believe it appropriate to assess the economic component of development in rural areas by using the following index, which by its structure is territorial:

$$I_{economic\ development} = \frac{(100 - \omega_r)}{(100 - \omega_u)} \tag{1}$$

The values of the index of economic development of rural areas are displayed in Table 1.3.

Table 1.3
Dynamics of the index of economic development of rural areas
(calculated according to Rosstat)

Regions of the Central Federal District of Russia	2009	2010	2011	2012	2013	2014	Average in 2009-2014	Linear trend
Belgorod	1.058	1.045	1.081	1.019	0.997	1.012	1.035	–0.012
Bryansk	0.940	0.947	0.957	0.948	0.963	0.974	0.955	0.006
Vladimir	0.851	0.868	0.875	0.906	0.920	0.787	0.868	–0.004
Voronezh	0.832	0.812	0.874	0.881	0.908	0.947	0.876	0.025
Ivanovo	1.081	1.066	1.203	1.154	1.163	1.165	1.139	0.019
Kaluga	0.915	0.912	0.967	1.002	0.968	1.005	0.961	0.019
Kostroma	0.881	0.901	0.926	0.955	0.956	0.967	0.931	0.018
Kursk	0.993	0.990	1.015	1.007	0.991	0.994	0.998	0.000
Lipetsk	0.951	0.950	0.943	0.943	0.969	0.950	0.951	0.001
Moscow	0.962	0.965	0.941	0.916	0.956	0.963	0.951	–0.001
Oryol	0.835	0.863	0.899	0.905	0.891	0.938	0.889	0.017
Ryazan	1.017	1.014	0.996	1.028	1.024	1.010	1.015	0.001
Smolensk	1.045	1.042	1.098	1.065	1.059	1.074	1.064	0.005
Tambov	0.975	0.976	0.989	0.987	0.979	1.004	0.985	0.004
Tver	0.985	0.984	0.925	0.940	0.893	1.002	0.955	–0.005
Tula	0.979	0.984	1.025	1.046	1.084	1.057	1.029	0.020
Yaroslavl	0.872	0.897	0.971	0.932	0.911	0.989	0.929	0.017

In addition to the economic component of rural development, we propose to take into account the longevity of the population and level of education. The same components are used to calculate the Human Development Index of the UN Development Program (UNDP) (Doklad o chelovecheskom razvitii – 2015). They express in a concentrated form the social and environmental conditions for the development of rural areas.

The longevity index is offered to count as a territorial index using the formula (2).

$$I_{longevity} = \frac{T_r}{T_u} \tag{2}$$

where, T_r – rural life expectancy at birth, years;

T_u – urban life expectancy at birth, years.

Table 1.4 shows the values of longevity indices, calculated for 2009-2014. In some areas, life of rural population is longer than of urban, but in general there is a positive trend for the longevity growth of the rural population, both in absolute terms and relative to the urban population.

Table 1.4

The dynamics of the longevity index of rural areas (calculated according to Rosstat (Demograficheskiy ezhegodnik Rossii, 2010; Demograficheskiy ezhegodnik Rossii, 2012; Demograficheskiy ezhegodnik Rossii, 2013; Demograficheskiy ezhegodnik Rossii, 2015))

Regions of the Central Federal District of Russia	2009	2010	2011	2012	2013	2014	Average in 2009-2014	Linear trend
Belgorod	0.967	0.979	0.972	0.977	0.983	0.977	0.976	0.002
Bryansk	0.947	0.947	0.965	0.972	0.966	0.972	0.961	0.005
Vladimir	0.925	0.946	0.975	0.975	0.991	1.000	0.969	0.014
Voronezh	0.972	0.974	0.972	0.974	0.976	0.978	0.974	0.001
Ivanovo	0.976	0.977	1.001	1.000	1.009	1.007	0.995	0.007
Kaluga	0.925	0.943	0.984	0.977	0.990	0.991	0.968	0.013
Kostroma	0.965	0.959	0.960	0.967	0.976	0.957	0.964	0.001
Kursk	0.939	0.955	0.943	0.948	0.951	0.943	0.947	0.000
Lipetsk	0.967	0.980	0.972	0.963	0.974	0.973	0.972	0.000
Moscow	1.010	1.029	1.031	1.031	1.032	1.028	1.027	0.003
Oryol	0.939	0.942	0.953	0.952	0.955	0.952	0.949	0.003
Ryazan	0.945	0.946	0.969	0.963	0.976	0.977	0.963	0.007
Smolensk	0.901	0.906	0.942	0.950	0.947	0.953	0.933	0.011
Tambov	0.967	0.963	0.975	0.980	0.973	0.978	0.972	0.003
Tver	0.924	0.926	0.951	0.975	0.977	0.989	0.957	0.014
Tula	0.944	0.954	0.989	0.984	1.010	1.001	0.980	0.013
Yaroslavl	0.966	0.964	0.968	0.965	0.983	0.984	0.971	0.004

We offer to calculate the education index using formula (3). The education index is the geometrical average of the four subindices characterizing the share of rural and urban population with higher, secondary professional and high education respectively as well as the level of literacy.

$$I_{education} = \sqrt[4]{\frac{HRE_r}{HRE_u} \times \frac{SPE_r}{SPE_u} \times \frac{HE_r}{HE_u} \times \frac{L_r}{L_u}} \tag{3}$$

where, HRE_r and HRE_u – the share of rural and urban population with higher education;

SPE_r and SPE_u – the share of rural and urban population with secondary professional education;

HE_r and HE_u – the share of rural and urban population with high education;

L_r and L_u – the share of literate rural and urban population.

Table 1.5
Indices characterizing rural population's education compared to urban
(All-Russian population census of 2010 (Itogi Vserossiyskoy perepisi naseleniya 2010 goda))

Regions of the Central Federal District of Russia	Subindices				Education index
	Higher education	*Secondary professional education*	*High education*	*Literacy*	
Belgorod	0.471	0.715	1.623	0.996	0.859
Bryansk	0.441	0.705	1.300	0.995	0.796
Vladimir	0.455	0.837	1.163	0.996	0.815
Voronezh	0.392	0.826	1.299	0.995	0.804
Ivanovo	0.543	0.855	1.080	0.997	0.840
Kaluga	0.481	0.827	1.225	0.997	0.835
Kostroma	0.470	0.827	1.197	0.994	0.825
Kursk	0.385	0.715	1.281	0.995	0.769
Lipetsk	0.464	0.782	1.490	0.995	0.856
Moscow	0.641	1.001	1.286	0.998	0.952
Oryol	0.430	0.784	1.272	0.994	0.808
Ryazan	0.398	0.723	1.206	0.995	0.766
Smolensk	0.443	0.784	1.181	0.995	0.799
Tambov	0.429	0.745	1.280	0.994	0.799
Tver	0.400	0.807	1.108	0.995	0.772
Tula	0.425	0.828	1.193	0.997	0.805
Yaroslavl	0.437	0.804	1.073	0.996	0.783

The integral rural areas development index (I_{RAD}) may be obtained as the geometrical average of economic development, longevity and education indices:

$$I_{RAD} = \sqrt[3]{I_{economic\ development} \times I_{longevity} \times I_{education}} \qquad (4)$$

The values of the integral index in 2014 are displayed in Table 6.

Table 1.6
Integral index of rural areas development in 2014

Regions of the Central Federal District of Russia	$I_{economic\ development}$	$I_{longevity}$	$I_{education}$	Integral index of rural areas development
Belgorod	1.012	0.977	0.859	0.947
Bryansk	0.974	0.972	0.796	0.910
Vladimir	0.787	1.000	0.815	0.862
Voronezh	0.947	0.978	0.804	0.906
Ivanovo	1.165	1.007	0.840	0.995
Kaluga	1.005	0.991	0.835	0.940

Regions of the Central Federal District of Russia	$I_{economic\ development}$	$I_{longevity}$	$I_{education}$	Integral index of rural areas development
Kostroma	0.967	0.957	0.825	0.914
Kursk	0.994	0.943	0.769	0.897
Lipetsk	0.950	0.973	0.856	0.925
Moscow	0.963	1.028	0.952	0.980
Oryol	0.938	0.952	0.808	0.897
Ryazan	1.010	0.977	0.766	0.911
Smolensk	1.074	0.953	0.799	0.935
Tambov	1.004	0.978	0.799	0.922
Tver	1.002	0.989	0.772	0.915
Tula	1.057	1.001	0.805	0.948
Yaroslavl	0.989	0.984	0.783	0.913

The proposed method of assessing the development of rural areas is based on the experience of measuring human development within the UNDP methodology. In the selection of criteria and form of indices, the sensitivity of their semantic (longevity, education and income sufficiency) and essential for Russia comparison of rural and urban living standards were accounted for.

3. CONCLUSION

Our study has allowed establishing the following.

1. In a number of regions of the Central Federal District, there are positive trends in absolute and relative indicators of development of rural areas.

2. A comparison of socio-economic development of rural and urban populations within the regional borders is advisable in view of the uniformity of climatic living conditions and opportunities of realization of people's economic interests via migration.

3. Despite the existing problems in rural development, socio-economic development of cities in several areas of the Central Federal District cannot serve as a guide for the first.

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