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# DATA ARTICLE

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## INTER-REGIONAL DISPARITIES IN AGRICULTURE AND RURAL POPULATION CHANGE IN RUSSIA

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*The article presents data reflecting the territorial peculiarities of rural population dynamics and shows their dependence on external factors (primarily, the development of agriculture). The database includes 14 indicators of the regional spatial differentiation of rural population development in Russia between 2010–2020. A typology of regions based on eight economic and ecological parameters is provided. The dataset covers the statistical indicators of 85 Russian regions from 2010 to 2020, published by the Federal State Statistics Service and the Unified Interdepartmental Information and Statistics System. The results are presented in seven tables and six maps. The dataset can be used by federal and regional authorities elaborating science-based rural development programmes and strategies, as well as experts on rural development.*

### Keywords:

rural settlement, production dynamics, inter-regional disparities, typology of regions, Russian Federation

### Data characteristics

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Subject area	Geography, planning and development
Data type	Tables Figures
Data collection method	The statistical data were obtained from the Unified Interdepartmental Statistical Information System (EMISS) and the <i>Regions of Russia. Socio-economic Indicators</i> official statistics publications, prepared by Russia's federal state statistics service
Data format	Raw data Grouped data
Data collection process	The data collected include key indicators of settlement, agricultural production and regional employment in Russia. The data were structured by collating statistical information and normalising it by 1,000 population. Changes in the measures were calculated

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Data source location	<p>Central federal district (18 regions): Belgorod region, Bryansk region, Vladimir region, Voronezh region, Ivanovo region, Kaluga region, Kostroma region, Kursk region, Lipetsk region, Moscow region, Oryol region, Ryazan region, Smolensk region, Tambov region, Tver region, Tula region, Yaroslavl region, Moscow;</p> <p>Southern federal district (eight regions): Republic of Adygea, Republic of Kalmykia, Republic of Crimea, Krasnodar Krai, Astrakhan region, Volgograd region, Rostov region, Sevastopol;</p> <p>Northwestern federal district (11 regions): Republic of Karelia, Republic of Komi, Arkhangelsk region, Vologda region, Kaliningrad region, Leningrad region, Murmansk region, Novgorod region, Pskov region, Nenets Autonomous Okrug, St. Petersburg;</p> <p>Far Eastern federal district (nine regions): Republic of Sakha (Yakutia), Kamchatka Krai, Primorsky Krai, Khabarovsk Krai, Amur region, Magadan region, Sakhalin region, Jewish autonomous region, Chukotka Autonomous Okrug;</p> <p>Siberian federal district (12 regions): Republic of Altai, Republic of Buryatia, Republic of Tuva, Republic of Khakassia, Altai Krai, Transbaikalia Krai, Krasnoyarsk Krai, Irkutsk region, Kemerovo region, Novosibirsk region, Omsk region, Tomsk region;</p> <p>Ural federal district (six regions): Kurgan region, Sverdlovsk region, Tyumen region, Chelyabinsk region, Khanty-Mansi Autonomous Okrug — Yugra, Yamal-Nenets Autonomous Okrug;</p> <p>Volga federal district (14 regions): Republic of Bashkortostan, Republic of Mari El, Republic of Mordovia, Republic of Tatarstan, Republic of Udmurtia, Republic of Chuvashia, Kirov region, Nizhny Novgorod region, Orenburg region, Penza region, Ulyanovsk region, Samara region, Saratov region, Perm Krai;</p> <p>North Caucasus federal district (seven regions): Republic of Dagestan, Republic of Ingushetia, Republic of Kabardino-Balkaria, Karachay-Cherkessia Republic, Republic of North Ossetia — Alania, Republic of Chechnya, Stavropol Krai</p>
Data availability	<p>The data are also available on Mendeley Data: Kuznetsova, Tatyana (2022), A regional-level database of rural population and agriculture in Russia, Mendeley Data, Vol. 2, doi: 10.17632/t286xfwmj6.2</p>

### **Value of data**

Rural areas across the world develop at different speeds. This has been linked in the literature to the national economic and political transformations [1], the state of infrastructure and market accessibility [2], natural and migration population change [3; 4] and the principal economic activity in the study area [5].

In Russia, rural development disparities are enormous. There are significant differences in settlement characteristics: population density, the share of the rural population and the population per village ratio. The economic and social indicators of agricultural development vary by region. The size and geographical features of Russia's territory, and the history of its exploration and development also have a role here. Tatyana Nefedova has categorised the factors at play into seven groups: a vast territory, diverse natural conditions, a sparse city network,

incomplete urbanisation, the vagaries of history, a centralised economy and social inequality [6]. She concludes that the key to the spatial reformatting of rural areas is their position along the ‘north–south’ and ‘suburb–periphery’ axes [7, p. 52].

Since rural areas develop under disparate conditions, different approaches should be applied to their study and management [8; 9]. The database presented in the study covers a range of indicators for measuring disparities in the development of rural population at a regional level. Linking the inequalities to the peculiarities of agricultural production and employment, this database may benefit rural development experts and the authorities in devising science-based programmes and strategies for rural development.

## Methods

Russian official statistics publications containing information on rural population density, rural population as per cent of the total national population, the average number of villages and agricultural output were used to create a list of statistical indicators of settlement and socio-economic development of rural areas [10]. The data on the rural population employed in agriculture were obtained from the Unified Interdepartmental Statistical Information System for agriculture (EMISS) [11]. Growth and correlation coefficients were calculated to track changes in settlement indicators occurring in response to rural socio-economic processes.

## Data description

The data cover 85 Russian regions for 2020. When comparing the change between 2010 and 2020 values, the Republic of Crimea and Sevastopol were left out, as comparable data are unavailable.

Table 1 shows the data used in the database.

*Table 1*

### Measures of rural population development by region

Measure	Calculation method	Data source
Annual average population, 1,000 people	Raw data	Annual average resident population, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/31556">https://www.fedstat.ru/indicator/31556</a>
Annual average rural population, 1,000 people	Raw data	Annual average resident population, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/31556">https://www.fedstat.ru/indicator/31556</a>
Rural population as % of the regional population, 2020	Calculated as the ratio between the annual average rural population and the total annual average population	Annual average resident population, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/31556">https://www.fedstat.ru/indicator/31556</a>
Rural population as % of the regional population, 2020	Calculated as the ratio between the annual average rural population and the total annual average population	Annual average resident population, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/31556">https://www.fedstat.ru/indicator/31556</a>

*The continuation of the Table 1*

Measure	Calculation method	Data source
Annual average number of people employed in agriculture, forestry, hunting, fishing and fishery, people	Raw data	Annual average employment (calculated based on data integration) since 2017, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/58994">https://www.fedstat.ru/indicator/58994</a>
Average rural population per village ratio, 2020, people	Calculated as the ratio between the annual average rural population and the number of villages (national census)	Number of municipalities, inner-city districts, city districts, inter-settlement territories and settlements, All-Russian Population Census 2020, Rosstat, 2022, URL: <a href="https://rosstat.gov.ru/vpn_popul">https://rosstat.gov.ru/vpn_popul</a> ; Annual average resident population, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/31556">https://www.fedstat.ru/indicator/31556</a>
Population change, 2020, % of the 2010 value (as of the beginning of the year)	Calculated as the ratio between the annual average population in 2020 and the national population in 2010	Annual average resident population, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/31556">https://www.fedstat.ru/indicator/31556</a>
Rural population change, 2020, % of the 2010 value (as of the beginning of the year)	Calculated as the ratio between the annual average rural population in 2020 and the rural population in 2010	Annual average resident population, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/31556">https://www.fedstat.ru/indicator/31556</a>
Value added in agriculture, 1,000 roubles	Raw data	Gross regional product in basic prices (OKVED 2) in agriculture, forestry, hunting, fishery and fishing, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/61497">https://www.fedstat.ru/indicator/61497</a>
Value added in agriculture per a rural resident, 2019	Calculated as the ratio of gross regional product in basic prices (OKVED 2) in agriculture, forestry, hunting, fishery and fishing to the annual average rural population	Gross regional product in basic prices (OKVED 2) in agriculture, forestry, hunting, fishery and fishing, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/61497">https://www.fedstat.ru/indicator/61497</a> Annual average resident population, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/31556">https://www.fedstat.ru/indicator/31556</a>
Agricultural output per a rural resident, 2020	Calculated as the ratio between agricultural production across all categories in actual prices and the annual average rural population	Agricultural output in actual prices (final data), EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/43337">https://www.fedstat.ru/indicator/43337</a> ; Annual average resident population, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/31556">https://www.fedstat.ru/indicator/31556</a>

The end of Table 1

Measure	Calculation method	Data source
Agricultural output per person employed in agriculture, 2020	Calculated as the ratio between agricultural output across all categories in actual prices and the annual average number of those employed in agriculture, forestry, hunting, fishing and fishery	Agricultural output in actual prices (final data), EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/43337">https://www.fedstat.ru/indicator/43337</a> ; Annual average employment (calculated based on data integration) since 2017, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/58994">https://www.fedstat.ru/indicator/58994</a>
Contribution of the region to agricultural output, 2010, %	Calculated as the ratio between regional agricultural output across all categories in 2010 in actual prices and the national average	Agricultural output in actual prices (final data), EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/43337">https://www.fedstat.ru/indicator/43337</a>
Contribution of the region to agricultural output, 2020, %	Calculated as the ratio between agricultural output across all categories in 2020 in actual prices in the region and the national average	Agricultural output in actual prices (final data), EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/43337">https://www.fedstat.ru/indicator/43337</a>
Change in the regional contribution to the total agricultural output, 2010–2020, percentage points	Calculated as the difference between regional contribution to the total agricultural output in 2020 and 2010	Agricultural output in actual prices (final data), EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/43337">https://www.fedstat.ru/indicator/43337</a>
Agricultural output per person employed, % of the national average, 2020	Calculated as the ratio between agricultural output per person employed in the region and the national average	Agricultural output in actual prices (final data), EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/43337">https://www.fedstat.ru/indicator/43337</a> ; Annual average employment (calculated based on data integration) since 2017, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/58994">https://www.fedstat.ru/indicator/58994</a>
Agricultural production per capita, 2020 % of the national average	Calculated as the ratio between agricultural output per capita in the region and the national average	Agricultural output in actual prices (final data), EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/43337">https://www.fedstat.ru/indicator/43337</a> ; Annual average resident population, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/31556">https://www.fedstat.ru/indicator/31556</a>
Those employed in agriculture as % of the total rural population, 2020,	Calculated as the ratio between those employed in agriculture, forestry, hunting, fishing and fishery and the total rural population	Annual average employment (calculated based on data integration) since 2017, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/58994">https://www.fedstat.ru/indicator/58994</a> ; Annual average resident population, EMISS, 2022, URL: <a href="https://www.fedstat.ru/indicator/31556">https://www.fedstat.ru/indicator/31556</a>

The Appendix contains a database of the absolute and relative measures regarding settlement, rural population employed in agriculture and agricultural output by Russian regions between 2010 and 2020. Fig. 1 shows key parameters of rural settlement as of 2020 are rural population density, rural population as per cent of the total population and the population per village ratio.

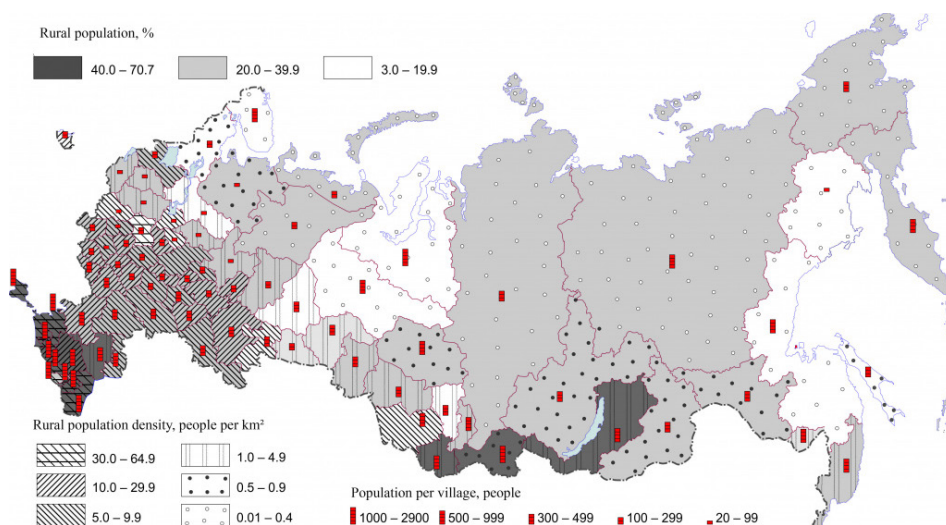


Fig. 1. Spatial features of rural settlement in Russia, 2020

Prepared based on data from [10].

The central factor in rural settlement is favourable farming conditions. Spearman's rank correlation coefficient between the annual average temperature in the administrative centre of a region and population density is 0.67; between the share of rural population and the average annual temperature, 0.51. The average population per village ratio is also affected by natural conditions: smaller settlements are usually found in non-Black Earth regions where croplands have sinuous contours and pre-Soviet settlement patterns dominate. The southern steppe regions of the country with regular cropland contours and the eastern territories, where villagers are often involved in non-agricultural pursuits, have larger settlements. In most of the northern and eastern regions, the proportion of rural population is low and so is its density (less than 1 person per km<sup>2</sup>). In the north of European Russia, the situation is further complicated by a sparse population of local settlements and the resultant inadequate transport and social infrastructure. Although in the east, the population per village ratio is relatively high, rural settlements are still not sufficiently large to provide services of a quality comparable to that available in usually remote cities. The correlation coefficient between average population density and mean annual temperature is 0.52, compared to 0.62 for regions with more than one inhabitant per km<sup>2</sup>.

Almost all non-Black Earth regions of Central Russia, as well as the southern territories of Western Siberia and the Far East, have a rural population density in the range of 1–10 people per km<sup>2</sup>. The proportion of rural population is either low or close to the national average, except in the Republics of Kalmykia, Altai

and Buryatia, where it is rather high. There is a preponderance of smaller rural settlements in European Russia (albeit medium size villages are prevalent along the Volga River) and larger ones in the Asian part of the country. A peculiar is the Leningrad region, which is technically independent of St. Petersburg, but comprises with it a single territorial system.

The regions with the highest rural population density (10–75 people per km<sup>2</sup>) are in Black-Earth Central Russia, the Middle Volga area, the North Caucasus region and the western part of the Southern federal district. Most of these territories have a high proportion of rural population. The exceptions are the highly urbanised Kaliningrad region, Moscow, Vladimir and Tula regions, the latter three strongly influenced by the Moscow agglomeration. The density of rural settlements in the southern regions is high and decreases northwards.

### Rural population change

Russian regions also differ substantially in rural population change. In 2010–2020, the Republic of Adygea witnessed a 16 % increase in the rural population; the Republic of Karelia and the Kirov region, a 27 % reduction. Fig. 2 shows population change in regions differing in rural population density. As can be seen from the figure, rural population grew in the metropolitan Moscow and Leningrad region, three rapidly developing highly urbanised regions in Central Russia (Kaliningrad, Kaluga and Samara), Krasnodar Krai, several North Caucasus republics (except North Ossetia, whose rural population diminished), the Republics of Altai and Sakha (Yakutia), Yamal-Nenets Autonomous Okrug. In the republics, the growth is due to natural increase and/or a continually high population replacement rate; in the other regions, to a positive net migration rate. The most rapid decline in rural population was taking place in the north of European Russia, as well as some regions of the country's Far East and Southern Ural,

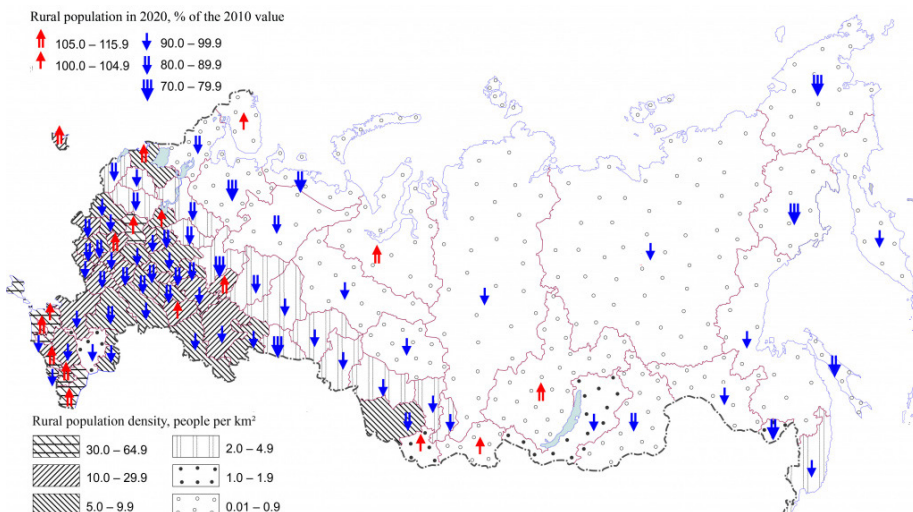
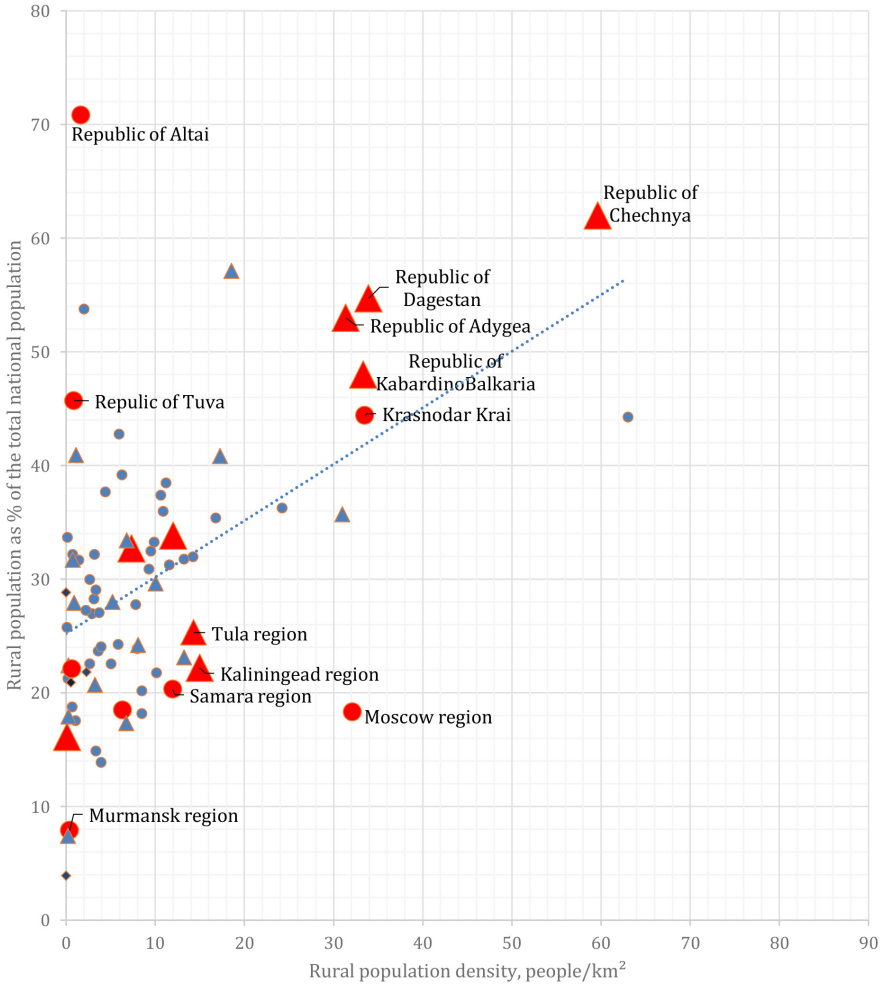


Fig. 2. Differences between Russian regions in rural population change and density

Prepared based on [10; 11].



Fig. 3 shows that rural population declined in most regions that have a rural population density of about the national average, regardless of the degree of urbanisation.<sup>1</sup> The reduction is due to migration from villages to towns, interregional population redistribution and age structure peculiarities.



Symbols	Rural population, 2020, % of 2010 values	Symbols	Rural population, 2020, % of 2010 values
	105.0—119.9		95.0—99.9
	100.0—104.9		80.0—94.9
			70.0—79.9

Fig. 3. The distribution of Russia’s regions according to some measures of agricultural development pace and rates, 2015—2019 average, % of the national average

Prepared based on data from [10; 11].

<sup>1</sup> There is a direct correlation between the density of a population and its contribution to the total national population, as the trend line in Fig. 3 demonstrates.

A higher proportion and density of rural population is associated with population growth, which is the case in Russia's southern regions (Fig. 3, top right). Amongst the regions that have a low density but a high proportion of rural population, the number of rural residents increased in the Republic of Altai and Sakha (Yakutia).

In highly urbanised and densely populated regions, such as the Moscow and Leningrad region, suburbanisation stimulates rural population growth. These processes were also taking place in the Kaliningrad and Samara regions, as well as Udmurtia.

### Rural population change and spatial features of agriculture

There is no apparent direct connection between the change in a region's contribution to agricultural output and rural population change (Fig. 4). Therefore, it would be false to claim that population drift from rural areas has a markedly negative effect on agricultural output. In other words, Russian regions with a similar population change rate can perform differently in terms of agricultural production.

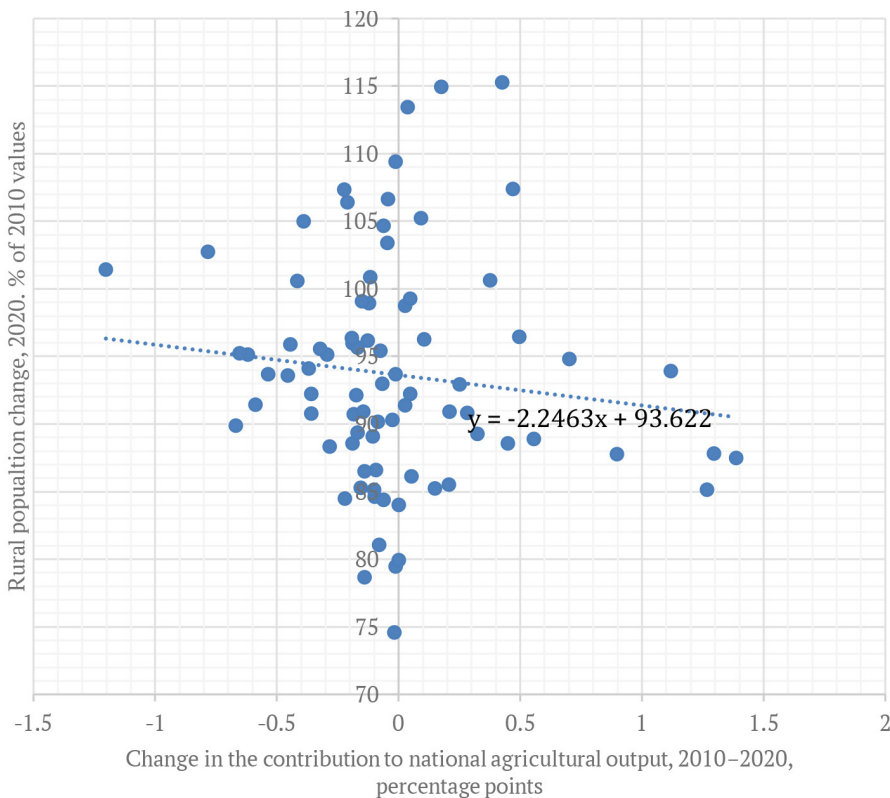


Fig. 4. Distribution of Russia's regions according to rural population change and change in their

Prepared based on data from [10; 11].

Table 3 shows Russian regions grouped according to the two measures. As can be seen, only some regions with a growing population became more visible in national agricultural output. And the contribution of economically prosperous territories with a growing population, such as the Moscow and Leningrad regions and Krasnodar Krai, diminished, the latter having extremely favourable conditions for agriculture. The opposite change occurred in the south-west of European Russia, i.e., in the regions located in the fertile Black Earth zone and outstripping other territories in agricultural output per rural resident against the background of a declining population (Fig. 5). The contribution of some agriculturally developed and densely populated republics of North Caucasus decreased.

Table 3

**Russian regions grouped according to their contribution  
to agricultural output and rural population change**

(1)*	Rural population, 2020, % of 2010 values			
	70.0—79.9	80.0—89.9	90.0—99.9	100.0—115.9
0.50—1.39	—	Kursk, Voronezh, Tambov, Penza, Oryol regions	Belgorod, Lipetsk, Rostov regions	—
0.20—0.49	—	Ulyanovsk, Volgograd, Bryansk regions	Ryazan, Orenburg, Saratov regions	Republic of Dagestan, Tula, Samara regions
0.0—0.19	Chukotka Autonomous Okrug	Republics of Mordovia, Mari El, Nenets Autonomous Okrug	Republics of Tatarstan, Ingushetia; Astrakhan, Amur, Kaluga regions	Republic of Chechnya, Republic of Adygea, Leningrad region
-0.09— -0.01	Arkhangelsk, Magadan regions	Nenets Autonomous Okrug, Tver, Sakhalin, regions, Republic of Karelia	Khanty-Mansi Autonomous region — Yugra, Kamchatka Krai, Republics of Khakassia, Kalmykia, Novgorod region	Yamal-Nenets Autonomous Okrug, Republic of Kabardino-Balkaria, Republics of Altai, Tuva
-0.19— -0.10	Kirov region	Pskov, Ivanovo, Vologda, Kurgan regions, Jewish autonomous region, Republic of Chuvashia, Republic of Komi	Republics of Buryatia, North Ossetia — Alania, Karachay-Cherkessia Republic, Primorsky, Transbaikal Krai, Smolensk, Tomsk, Nizhny Novgorod, Vladimir regions	Yaroslavl region

The end of Table 3

(1)*	Rural population, 2020, % of 2010 values			
	70.0—79.9	80.0—89.9	90.0—99.9	100.0—115.9
-1.3— -0.21	—	Kostroma region, Altai Krai	Kemerovo, Omsk, Sverdlovsk, Tyumen, Chelyabinsk, Novosibirsk regions, Republic of Bashkortostan, Perm, Krasnoyarsk, Khabarovsk, Stavropol Krai, Republic of Sakha (Yakutia)	Murmansk, Moscow, Irkutsk, Kaliningrad regions, Republic of Udmurtia, Krasnodar Krai

Comment: (1\*) change in the region’s contribution to national agricultural output, 2010—2020.

Prepared based on data from [10; 11].

A common trend is the concentration of agricultural production in regions with a higher per capita output (Fig. 5).

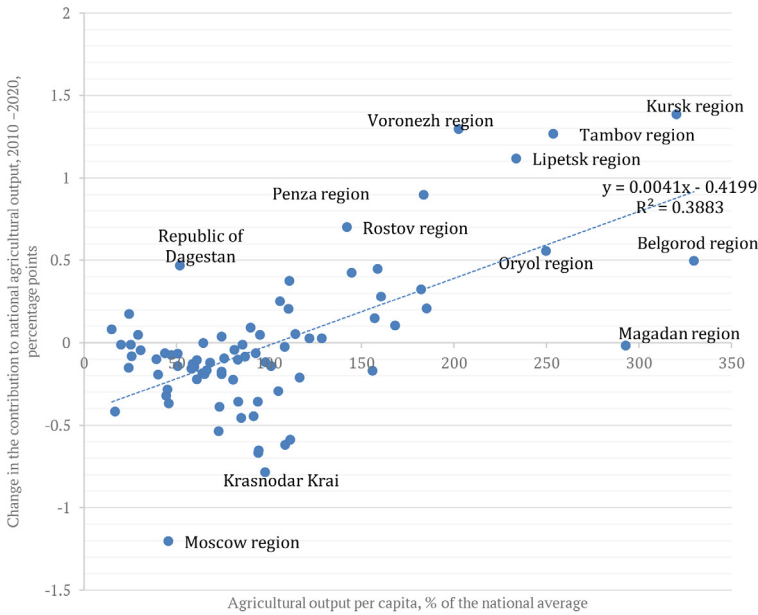


Fig. 5. The distribution of regions according to per capita agricultural output and change therein.

Prepared based on data from [10; 11].

Agricultural production grew most rapidly in central Black Earth regions with the highest per capita rates (top right in Fig. 5). This is explained by their contribution to the national output increasing faster than in other territories. In the bottom left, there are regions performing the most poorly on per capita output and production development. These are the Moscow region, where most of the population is engaged in industries other than agriculture, as well as Russia’s northern and eastern territories.

As can be seen in Fig. 6, the contribution of a vast majority of Russia’s northern and eastern regions to national agricultural output declined in 2010–2019. Most of these territories lag behind the national average as regards output per capita and per person employed. Yet, stronger performance on both indicators does not immediately translate into output growth above the national average. Rural population is declining everywhere in the north and east of Russia, except the Republics of Sakha (Yakutia) and Altai (due to a high birth rate) and Yamal-Nenets Autonomous Okrug (where those employed in agriculture account for only 9% of the rural population, the lowest percentage across the country).

The contribution to agricultural output of some southern regions with a growing population decreased as well. In most non-Black Earth regions, this reduction occurs against the backdrop of a rapid decline in the rural population.

The contribution to agricultural output increased not only in Black Earth regions proper but also in some of the neighbouring ones. All these regions are leaders in per capita agricultural output, whilst their rural population is declining.

An increase in this measure was also observed in regions where conditions are relatively favourable for agriculture. These are territories in the Middle and Southern Volga area, Southern Ural, the south of Central Russia, and the Kaliningrad and Pskov regions.

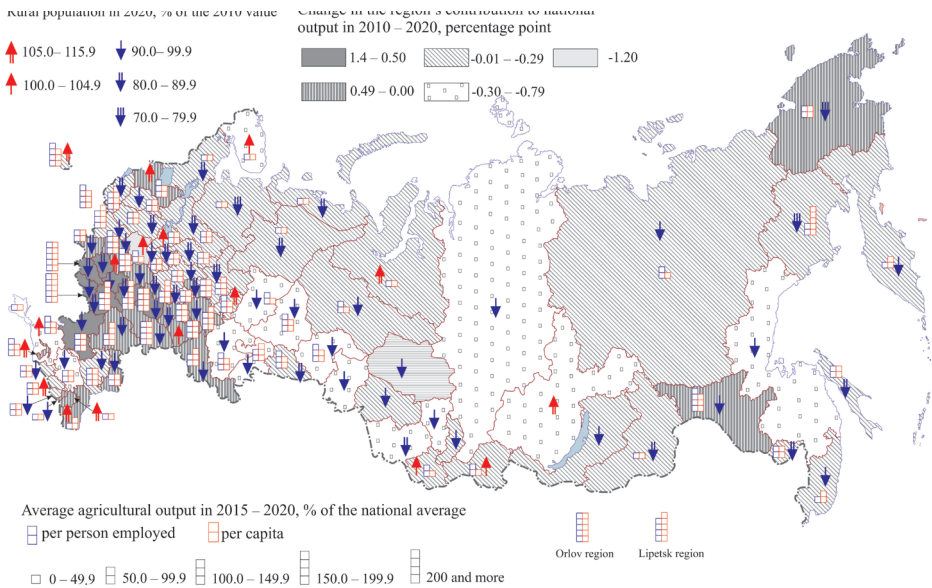


Fig. 6. Some indicators of agriculture development and rural population change in Russian regions

Prepared based on data from [10; 11].

Russian regions were divided into seven groups according to the features of rural population change, rural settlement and agriculture development.

The first three groups bring together 15 Russian regions with a growing rural population (Table 4). The groups differ markedly in settlement indicators, characteristics of agriculture development and the role natural increase and migration have in population change. Let us now consider them in detail.

Table 4

**Regions with a growing rural population (2010 – 2020)**

Region (17)	Measure*							
	1	2	3	4	5	6	7	8
National average	98.5	2.2	25.3	241.9	100	100	12.3	100
<i>1</i>								
1.A. Moscow region	101.4	32.1	18.5	243.9	88.4	45.8	6.4	-1.20
1.A. Leningrad region	105.2	7.4	32.7	214.9	108.3	90.2	10.2	-0.46
1.B. Kaliningrad region	106.4	15.0	22.3	210.6	150.8	116.7	9.5	0.07
<i>2.1</i>								
2.1.A. Tula region	115.3	14.3	25.2	106.6	171.9	144.8	10.4	0.43
2.1.B. Republic of Udmurtia	107.4	12.0	33.8	259.2	130.3	80.8	7.6	-0.23
2.1.B. Yaroslavl region	100.9	6.4	18.4	38.2	68.3	98.1	17.7	-0.10
<i>2.2</i>								
Samara region	100.6	12.0	20.2	489.9	107.9	111.2	12.7	0.38
<i>2.3</i>								
Krasnodar Krai	102.7	33.5	44.5	1465.4	136.4	98.1	8.8	-0.78
Republic of Adygea	113.4	31.4	52.8	1073.3	131.9	74.5	6.9	0.04
<i>3</i>								
Republic of Dagestan	107.4	33.9	54.7	1065.1	48.4	52.0	13.2	0.47
Republic of Kabardino-Balkaria	106.7	33.3	48.0	2422.6	58.6	81.4	17.1	-0.04
Republic of Chechnya	114.9	59.7	62.5	2607.3	25.9	24.5	11.6	0.17
<i>4.1</i>								
Republic of Altai	104.7	1.7	70.8	634.5	64.0	43.8	8.4	-0.06
Republic of Tuva	103.4	0.9	45.7	1043.5	84.8	30.8	4.5	-0.05

The end of Table 4

Region (17)	Measure*							
	1	2	3	4	5	6	7	8
4.2								
Yamal-Nenets Autonomous Okrug	109.4	0.1	16.1	1109.5	37.7	20.1	6.6	-0.01
Irkutsk region	105.0	0.7	22.1	358.0	68.7	73.3	13.1	-0.4
Murmansk region	100.6	0.4	7.8	530.6	11.9	16.9	17.5	-0.42

*Comment:* \*the key:

- 1 — rural population change, 2020, % of 2010;
- 2 — rural population density, people per km<sup>2</sup>, 2020;
- 3 — rural population as % the total national population, 2020;
- 4 — average population per village ratio, people, 2020;
- 5 — output per person employed in agriculture, % of the national average, 2020 average;
- 6 — agricultural production per capita, % of the national average, 2020 average;
- 7 — the ratio between the number of people employed in agriculture and rural population, %, 2020;
- 8 — change in the contribution to national agricultural output, 2010—2020, percentage points

Prepared based on data from [10; 11].

Type 1 is represented by two metropolitan regions (Moscow and Leningrad) and the Kaliningrad region, whose rural population increases due to suburbanisation, whilst the rate of growth in agriculture is either at or below the national average.

Type 2, represented by developed regions of Central Russia with a growing rural population, includes three subtypes:

2.1 — highly urbanised industrial-agrarian regions of non-Black Earth Russia where rural population increases due to the administrative transformation of urban settlements into rural ones with the rate of growth in agriculture above (2.1. A) and below (2.1 B) the national average;

2.2 — the Samara region, which, very much like southern Black Earth regions, has large rural settlements. Its agricultural output per person employed and per capita is above the national average. The region's contribution to agricultural output increased over the study period;

2.3 — Krasnodar Krai and the Republic of Adygea, which have large rural settlements, a high rural population density, a significant proportion of rural residents in the total population and an agricultural output per capita and per person employed above the average. The contribution of these regions to the total output either reduced (Krasnodar Krai) or remained unchanged (Republic of Adygea).

Type 3 is represented by the republics of North Caucasus with large rural settlements and a high proportion and density of rural population. Output per person employed is below the national average. An increase in the rural population is due to a high birth rate and a low mortality rate (life expectancy in the territories is above that of an average Russian region). The contribution of Dagestan and Chechnya to the national agricultural output grew over the study period.

Type 4 brings together sparsely populated eastern regions with large rural settlements and the proportion of the rural population either high (4.1) or low (4.2). These regions have poor conditions for agriculture; the ratio between the number of people employed in agriculture and the rural population is low (which is especially true of subtype 4.2). Agricultural output per person employed and per capita is below the national average.

Tables 5–7 describe the characteristics of regions with a falling rural population. The types and subtypes are identified based on the same measures as used in Table 4.

Table 5

**Regions with a 10 % reduction in rural population (2010–2020)**

Region (36)	Measure*							
	1	2	3	4	5	6	7	8
5								
Republic of North Ossetia — Alania	96.0	31.0	35.7	1153.6	92.3	74.4	9.9	-0.19
Karachay-Cherkessia Republic	98.9	18.6	57.1	1940.2	96.1	68.3	8.7	-0.12
Republic of Ingushetia	92.2	63.0	44.3	1937.0	26.5	29.4	13.7	0.05
6.1								
Stavropol Krai	95.9	17.3	40.9	1558.7	71.4	91.9	15.8	-0.45
Astrakhan region	99.3	6.8	33.4	797.6	66.3	95.1	17.6	0.05
6.2								
Belgorod region	96.5	18.5	32.5	319.0	203.4	329.8	19.9	0.50
Lipetsk region	93.9	16.7	35.4	250.5	197.1	233.8	14.6	1.12
Republic of Tatarstan	96.3	13.3	23.1	292.5	130.5	168.2	15.8	0.10
Rostov region	94.8	13.2	31.8	588.2	108.4	142.2	16.1	0.70
Ryazan region	90.8	7.7	27.8	111.6	229.2	160.7	8.6	0.28
Kaluga region	98.8	8.1	24.2	76.0	158.3	128.7	10.0	0.03
Saratov region	90.9	5.8	24.3	329.8	163.0	185.4	14.0	0.21
Orenburg region	92.9	6.2	39.3	448.2	89.0	106.0	14.6	0.25
7.1								
Republic of Bashkortostan	93.7	10.6	37.5	332.7	123.5	72.8	7.2	-0.53
Tyumen region without autonomous okrugs	93.6	3.1	32.4	405.1	129.2	85.1	8.1	-0.46



The end of Table 5

Region (36)	Measure*							
	1	2	3	4	5	6	7	8
7.2								
Chelyabinsk region	95.1	6.8	17.3	479.6	91.4	108.7	14.6	-0.62
Novosibirsk region	95.2	3.3	20.8	383.2	106.7	105.0	12.1	-0.29
7.3								
Vladimir region	90.7	10.1	21.8	118.0	76.4	64.0	10.3	-0.19
Nizhny Novgorod region	92.1	8.4	20.3	135.7	99.2	74.5	9.2	-0.17
Smolensk region	96.2	5.2	28.1	53.7	87.5	58.8	8.3	-0.13
Novgorod region	90.2	3.1	28.4	45.6	91.4	87.2	11.7	-0.08
8.1								
Tomsk region	95.7	0.9	27.8	522.4	104.2	66.4	7.8	-0.17
Kamchatka Krai	93.7	0.1	21.4	826.5	43.2	85.7	24.4	-0.01
Krasnoyarsk Krai	95.2	0.3	22.4	384.3	78.0	94.6	14.9	-0.65
Khanty-Mansi Autonomous Okrug	95.4	0.2	7.4	811.7	55.6	47.2	10.4	-0.07
Republic of Yakutia (Sakha)	96.3	0.1	33.8	576.1	57.7	46.0	9.8	-0.28
Khabarovsk Krai	95.5	0.3	17.9	568.5	45.8	44.4	11.9	-0.32
Primorsky Krai	90.9	2.6	22.6	687.2	39.1	59.8	18.8	-0.15
Amur region	91.4	0.7	32.2	420.5	167.4	122.0	9.0	0.03
8.2								
Republic of Khakassia	93.0	2.6	30.1	592.3	78.0	50.8	8.0	-0.07
Republic of Buryatia	99.1	1.1	40.8	654.3	46.7	24.3	6.4	-0.15
Perm Krai	94.1	3.9	24.1	174.4	74.1	45.8	7.6	-0.37
Omsk region	91.4	3.7	27.1	352.5	69.1	111.7	19.9	-0.59
Kemerovo region	90.8	3.9	13.9	346.3	132.6	94.1	8.7	-0.36
Sverdlovsk region	92.2	3.3	14.9	362.9	123.7	83.4	8.3	-0.36
Republic of Kalmykia	90.3	2.0	54.0	557.3	106.3	108.6	12.6	-0.03

*Comment:* \* see Table 4 for the key.

Prepared based on data from [10; 11].

Table 5 describes types 5–9, where rural population decreased by 10% or less in 2010–2020.

The republics of North Caucasus (Type 5) are less urbanised than an average Russian region. They also stand out for a high density of rural population and large rural settlements. Output per person employed and per capita is above the national average.

Type 6 regions also have a high proportion and density of rural population. Rural settlements are rather large as well. Output per person employed is below the national average for type 6.1 and above it for type 6.2. Agricultural output per capita and production growth rate are above those in an average Russian region.

Type 7 regions, on the contrary, have lower rates of growth in agriculture: in 2010–2020, their contribution to the national output decreased. Type 7.1. territories are less urbanised; just like subtype 7.2 regions, they have larger-sized rural settlements. Agricultural output per capita, as well as production per person employed, is rather high. In subtype 7.2 and 7.3 regions, the degree of urbanisation is higher, and output per person employed and per capita is lower. In subtype 7.3 regions, rural settlements are usually small-sized.

Type 8 regions have a low population density; output per person employed and per capita is below the national average, with the exception of the Omsk and Kemerovo regions; production growth rates are below those in an average Russian region, the only exception being the Amur region.

Table 6 describes regions that experienced a 10–20% population decline in 2010–2020. Amongst them, only the Republic of Chuvashia (type 10) is a developed agrarian region: its rural population density is above 24 people per km<sup>2</sup>, with rural residents accounting for 36.6% of the total population. Yet, in the region, output per person employed and per capita is below the national average. The contribution to the national agricultural output decreased in Chuvashia over the study period, just as it did in type 12, 13 and 14 regions, with the exception of the Pskov region (subtype 13.1). The highest production growth rates are characteristic of subtype 11.1, whose regions are the most agriculturally developed, boasting an output per person employed and per capita above the national average. Yet, the ratio between the number of people employed in agriculture and the rural population is higher for subtype 11.2, which increased its contribution to the national output over the study period. At the same time, these regions lag behind subtype 11.1 and the national average in terms of output per person employed.

Table 6

### Regions experiencing a 10–20% reduction in the rural population (2010–2020)

Region (24)	Measure*							
	1	2	3	4	5	6	7	8
<i>10</i>								
Republic of Chuvashia	85.3	24.2	36.5	257.2	68.0	58.1	10.5	-0.16
<i>11.1</i>								
Penza region	87.8	9.3	31.0	290.6	163.2	183.8	13.8	0.90
Kursk region	87.5	11.5	31.4	124.6	232.2	320.4	17.0	1.39
Oryol region	88.9	9.8	33.3	83.0	280.6	249.8	10.9	0.56
Voronezh region	87.8	14.2	32.0	436.5	141.6	202.6	17.6	1.30
Tambov region	85.1	11.2	38.5	248.0	124.2	253.7	25.1	1.27
Bryansk region	88.6	10.1	29.6	134.8	142.6	158.7	13.7	0.45
<i>11.2</i>								
Republic of Mari El	86.1	9.5	32.7	138.9	116.9	114.4	12.0	0.05

The end of Table 5

Region (24)	Measure*							
	1	2	3	4	5	6	7	8
Republic of Mor-dovia	85.2	10.8	36.1	228.7	77.4	157.2	24.9	0.15
Ulyanovsk region	85.5	7.9	24.0	303.0	103.9	110.7	13.1	0.21
Volgograd region	89.3	5.0	22.6	385.7	91.7	182.4	24.4	0.32
12.1								
Altai Krai	89.9	5.9	42.9	624.1	102.9	94.4	11.3	-0.67
Kurgan region	85.1	4.3	37.7	254.6	111.4	83.2	9.2	-0.10
13.1								
Pskov region	89.4	3.3	29.1	21.7	118.6	156.0	16.2	-0.17
13.2								
Kostroma region	84.5	2.8	27.1	49.6	88.0	61.2	8.6	-0.22
Vologda region	88.6	2.2	27.3	40.2	71.0	65.3	11.3	-0.19
Tver region	86.6	3.5	23.8	31.3	63.7	75.9	14.6	-0.09
Ivanovo region	89.1	8.5	18.2	60.0	87.1	61.2	8.6	-0.10
Kirov region	78.7	2.3	22.0	66.1	68.7	101.3	18.1	-0.14
14								
Transbaikal Krai	88.3	0.8	31.7	399.1	45.9	40.2	10.6	-0.19
Sakhalin region	84.4	1.0	17.6	384.5	60.2	92.9	19.0	-0.06
Jewish auton- omous region	86.5	1.4	31.5	501.3	64.6	50.8	9.7	-0.14
Republic of Komi	84.6	0.4	21.7	247.4	49.0	39.1	9.8	-0.10
Republic of Ka- relia	81.1	0.6	18.9	140.8	27.6	25.8	11.5	-0.08

Comment: \* see Table 4 for the key.

Prepared based on data from [10; 11].

Table 7 includes northern and eastern regions with a low population density and agricultural production rates about the national average.

Table 7

#### Regions experiencing a 20-30 % reduction in the rural population (2010 – 2020)

Region (3)	Measure*							
	1	2	3	4	5	6	7	8
15								
Chukotka Autonomous Okrug	79.9	0.1	28.7	376.3	61.9	64.5	12.8	0.00
Nenets Autonomous Okrug	84.0	0.2	26.0	280.7	43.1	38.6	11.0	-0.01
Magadan region	74.6	0.3	3.9	116.3	82.1	293.0	43.9	-0.02

Comment: \* see Table 4 for the key.

Prepared based on data from [10; 11].

## Conclusion

The rural population is declining in Russia. Economic realities and concentration effects cause agricultural production and the rural population to converge on southern and metropolitan regions, which have favourable natural and socio-economic conditions. The patterns of settlement and spatial organisation of production change differently in regions of disparate socio-economic types having unique agrarian production and rural settlement features.

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