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Twenty-Five Years of Russia's Post-Soviet Agriculture: Geographical Trends and Contradictions

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Abstract—Structural and regional changes in Russian agriculture over the past 25 years are analyzed, and the main antagonistic trends in its development are identified. Regional differences in decreasing planted areas are considered, which nevertheless did not hinder increased crop production or its exports. Annual changes in the balances of production and consumption; grain, meat, and milk exports and imports; and regional shifts in the production of key products are analyzed. Herd dynamics of various cattle and poultry species and changes in the ratio of meat-to-milk production at agricultural enterprises, farms, and homesteads are considered. Analysis of production concentration in agroholdings has shown that it facilitates urban food supply, but intensifies the spatial polarization of agriculture. Changes in the production pattern in the aftermath of the crisis and modernization of agriculture are considered in comparison to decreasing employment, the low prestige of agricultural labor, and its underpayment. These have resulted in increased rural unemployment and expanded temporal labor migration (*otkhodnichestvo*) from country to cities. Temporal labor migration in several regions surrounding the Moscow agglomeration has led to the blockage of agricultural development. Graphs and maps are widely used.

Keywords: agriculture, production, export, import, grain crops, meat, milk, concentration, rural population, employment, *otkhodnichestvo*

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FORMULATION OF THE PROBLEM

The agricultural crisis in the 1990s and the rise in the 2000s, the industry's market transformation, the change in its role in the economy and the country's food security, its impact on land use, and social consequences for the population have been described by economists, agricultural specialists, sociologists, and geographers.

This article focuses on identifying the relations between the industry's structural reforms and changes in land and labor-resource use over the past 25 years, especially during the restoration and growth of agricultural production. These changes had significant, often unexpected social, economic, and environmental consequences. They can be expressed by several contradictions:

—planting area losses vs. increased crop product exports;

—cattle stock losses vs. the country's increased self-reliance on meat;

—increased concentration of production in the industry vs. the continuing importance of household production;

—decreased rural population vs. the emergence of labor surpluses in rural areas.

One explanation for the above contradictions is the increased territorial division of labor and changes in the structure and geography of agriculture. The aim of this article is to identify and analyze the impact of structural changes in the industry on the rural space, including the spatial polarization of agricultural production and the countryside.

The study is based primarily on annual regional data for 1990–2015 (2016) from statistical handbooks and web resources of the Federal Statistics Service (Goskomstat, Rosstat), the 2010 All-Russia census, and the Population Survey on Employment Issues. Individual examples use information about municipalities. In addition, the analysis relies on the author's perennial study, including field studies, of agriculture and rural areas in various Russian regions.

RESULTS AND DISCUSSION

Planting areas or products? Over the past 25 years, on the one hand, significant losses in planting areas have occurred, and on the other, the role of crop production, the overall output and export of key crops, primarily grains, substantially increased in 2000–2010s. Russian authorities, inspired by grain yields,

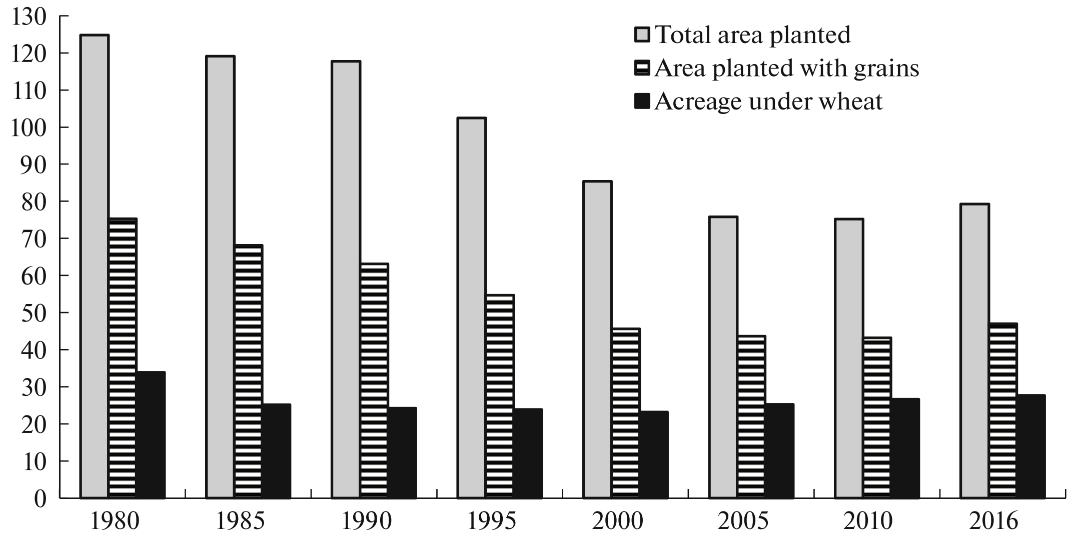

Fig. 1. Changes in planting areas in Russia, as well as in grain crops and wheat plantings from 1980 to 2016. *Source*: Goskomstat and Rosstat data.

plan to expand export by further yield growth and by reclaiming disused land for planting.

Planting areas, according to the Rosstat data, decreased from 119 mln ha in 1990 to 79 mln ha in 2016. The decrease in planting areas began back in late Soviet times, but they decreased especially quickly during the crisis of the 1990s (Fig. 1). The same also happened to grain crop areas. Only in recent years they have been more actively returned circulation.

The losses were associated not only with the economic crisis in general, but also because kolkhozes could not survive without huge Soviet subsidies in a vast territory with natural and demographic conditions unfavorable to agricultural development. Even more so that in Soviet times, farm units controlled by party bodies in some regions had to plow up more areas than they could actually cultivate and harvest.

Non-Chernozem regions with low-yield and small-contour lands and strong rural depopulation [17, 20] had the strongest losses, reducing planting areas more than twofold from 1990 to 2016 [22]. Meanwhile, southern regions of European Russia reduced all planting areas by only 10% and have been expanding them in recent years. The Volga and Eastern regions lost about one-third of their planting areas, and abandoned lands are also being partially restored there [22]. Areas with grain crops also decreased most noticeably in the Non-Chernozem Zone. Wheat plantings changed much less. The irrationality of growing wheat in regions with unfavorable natural conditions became obvious back in the late Soviet period, and in the post-Soviet period, wheat areas in southern regions of European and Asian Russia even expanded because of the profitability of wheat export. Nevertheless, the inevitability of overall reduction in planting areas in Russia is obvious due to increased territorial labor division in agriculture. Other researchers also confirm this [19].

The losses of low-yield lands did not noticeably affect the overall increase in grain, sunflower, sugar beet, and grain production. Its share in the gross agricultural output was 37% in 1990; grain production began to outstrip livestock production since the 1990s (during a greater crisis in the latter); by 2016, it reached 55%. The ratio of the two sectors of Russian agriculture became a subject of discussion: to export grain and purchase meat (especially beef) or to restore Soviet livestock [10, 25]. However, in the second case, there will be no such surplus grain for export, and grain is the hard currency to support and modernize agriculture.

In recent years, the gross grain output has continued to grow. Favorable weather conditions and modernization of production caused high crop yields, although technologically, Russia still noticeably lags Western countries. This is visible by the amount of machinery in crop production: in 1990, there were 11 tractors per 1000 ha of plow land; in 2000, there were 7; and in 2015, only 3. True, their productivity changed because of the increased share of imported machinery. Hence, the potential of crop production is not exhausted [16].

The spatial structure of grain crop production has undergone most noticeable transformations. It increasingly concentrates in regions with the most favorable natural conditions (Fig. 2). In 2016, 58% of grain was harvested in the south of European Russia (minus the Volga region); the southern regions of the Volga and Urals added 21%, although these two macroregions together occupy only 10% of Russian territory, holding half of the farmland. Another 11% of grain was harvested in the Non-Chernozem Zone,

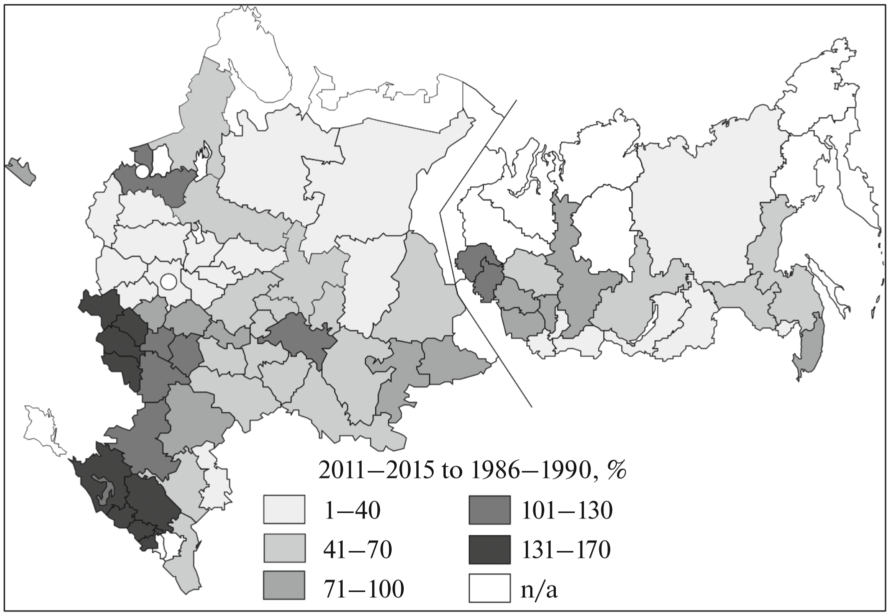

Fig. 2. Grain production dynamics in Russia's regions, 2011–2015, % of 1986–1990. *Source*: Rosstat data.

and 10%, in the south of West Siberia and the Far East. If we compare the spatial distribution of gross grain outputs produced in late Soviet and recent years (see Fig. 2), we will see how grain production departed from Soviet self-sufficiency of the regions and shifted southward [23]. The role of plain regions of the North Caucasus and Central Chernozem Zone, as well as Omsk oblast and Altai krai in the east, increased noticeably. In addition to grain farming, in recent years we have seen successes in the production of greenhouse vegetables in the suburbs, which can, as the period of banned Turkish vegetables has shown, partially replace vegetables import by volume.

Grain production in 2016 practically returned to the Soviet level (Fig. 3). A sharp drop in industrial consumption and the output of formula feed for cattle formed substantial grain surpluses, allowing Russia to return to the club of the world's largest grain exporters after decades of grain imports in Soviet time. In addition, wheat made up 72% of grain exports in 2016. The grain business made it possible to increase the Russian agriculture's profitability and drove its development in the south of the country.

The general increase in crop yields leaves unresolved high yield fluctuations under changing weather conditions and, consequently, instability in gross grain harvests. The raw-material nature of Russian crop exports is also irrational: it is lucrative for grain buyers who produce flour, pasta, etc.

Self-reliance on meat or its import? Livestock development creates much more complex problems. Although overall meat production has grown in recent years, it is mainly associated with the restoration of poultry and hog farming (Fig. 4), whose overall production had almost liberated Russia from corresponding imports. Partial restoration of these two sectors over the past 15 years has also contributed to the return of lands to circulation for grain feed production [23].

The difference between the modern and the Soviet livestock industry is that breeding and selection, largely lost by now, are very hard to restore. Many livestock facilities depend on imported breeding, youngsters, and chicks.

Recent years have also witnessed a certain drop in beef imports owing to replacement of the main suppliers to Latin American countries and New Zealand after the introduction of sanctions (Fig. 5). However, the main point is that consumers switched over to cheaper pork and poultry, whose production in Russia increased. The share of poultry in the Russian meat market was 60% in 2016.

According to some sources [2], Russia is already experiencing overproduction of pork and poultry, which entails a drop in prices. Favorable for consumers, it is painful for producers due to the importation of cheaper pork. This concerns beef to an even greater degree: beef production in Russia is much more expensive compared to grassland-raised livestock in exporting countries, even considering transportation costs.

The dairy herd in the post-Soviet period continued to decrease especially rapidly owing to the culling of low-productivity breeds and cattle malnutrition. Throughout the 1990s, it decreased by 40%, and from 2000 to 2015, by another 35%. A decrease in the consumption of milk and dairy products, adequate to a decrease in production, was also recorded (Fig. 6); it has stabilized at a much lower level since the 2000s.

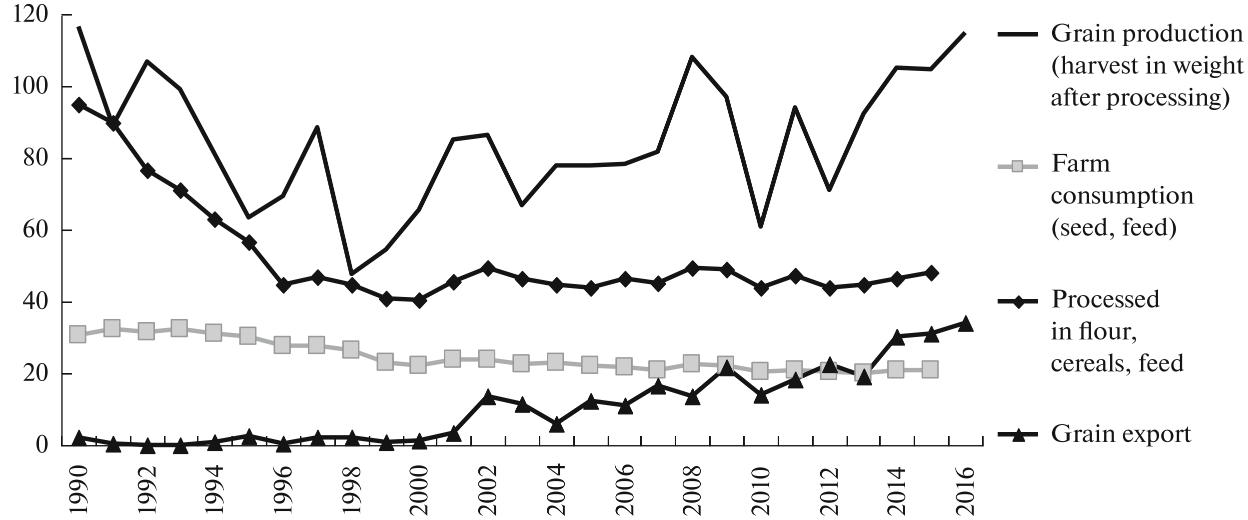

Fig. 3. Grain production, consumption, and export in Russia from 1990 to 2016, mln t. *Source*: Rosstat data.

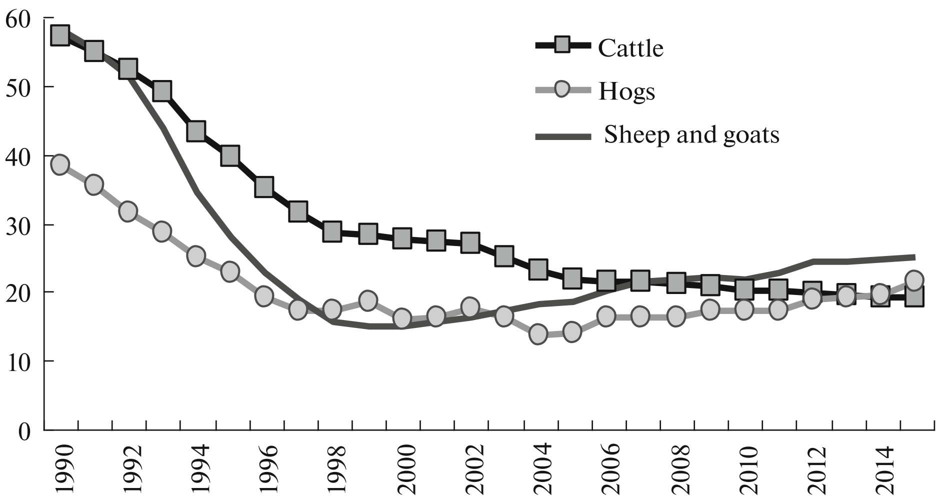

Fig. 4. Changes in cattle, hog, sheep, and goat stock from 1990 to 2015, mln head. *Source*: Rosstat data.

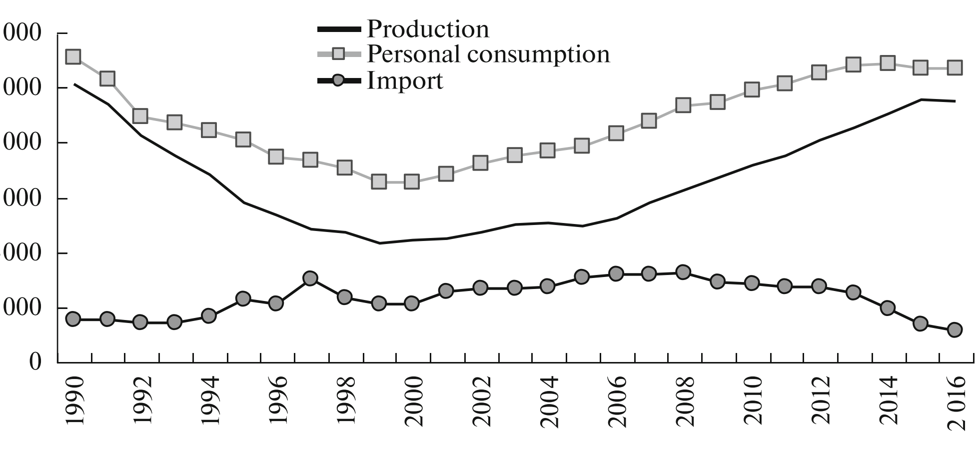

Fig. 5. Meat production, consumption, and import in Russia from 1990 to 2016, thous. t. *Source*: Rosstat data.

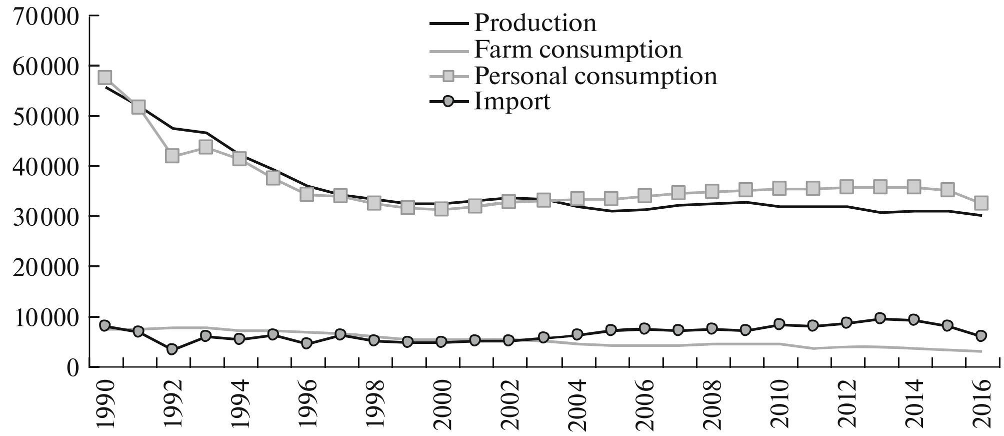

Fig. 6. Milk and dairy products production, consumption, and import from 1990 to 2016, thous. t. *Source*: Rosstat data.

The import of dairy products from Belarus, which flooded the Russian market, open within the Union State and partially replacing imports from Europe, was a hard experience for producers. Nevertheless, government assistance allowed large enterprises to continue modernization and renovation of breeding stock, noticeably increasing milk yields per cow (at industrial farms, they increased from 2.8 to 5.1 t per cow per year, while at homesteads, yields remained at 3.5 t).

Increased production concentration at large enterprises and agroholdings or disperse production among small producers? A characteristic feature of agricultural production in Russia was that since the 2000s, it has been progressively concentrating in large agricultural organizations. The constant demand for food products, comparably small investments into industries with a short investment turnover (crop production, hog farming, poultry), and the weakening ruble in the late 1990s, which made food imports less profitable, forced the newly evolved class of managers pay attention to Russian agriculture [1, 7, 13, 15]. Growing investments into the industry gave a powerful rise to agroholdings from above: from food enterprises, financial holdings, government agencies, etc. [6, 20].

The rapid growth of agroholdings in the 2000s has led to a strong dependence in several regions on one large enterprise. In addition, its city managers, as a rule, are not interested in the development of rural areas, unlike former kolkhoz managers, private farmers, and the rural population [6].

Agroholdings that deal with poultry and pork farming often deliberately push out not only small producers (Fig. 7) but also medium-sized businesses (former kolkhozes and poultry farms); mainly, they do not interact with them. This is the fundamental difference between Russian agriculture and that of European countries and the United States, where farmers are built into the operations of agroholdings [1, 5]. Moreover, when a large producer appears in a region, the population, as a rule, is forbidden to keep their own hogs for fear of animal disease distribution.

Cattle, under a continuing decrease in livestock count, are concentrated at large facilities in a less degree than hogs and poultry are, and still play an important role for the rural population. The role of homesteads (household food production) especially increased in the 1990s. Before 2005, they produced 51% of meat. By 2016, as agroholdings restored poultry and hog production, the share of homesteads, according to Rosstat data, dropped to 22.5%. Private farmers also deal with beef farming. In 2015–2016, according to Rosstat data, they produced 7–8% of beef, while their share was only 1.5% of pork production and 1% of poultry production.

The government is trying to stimulate livestock farming on private farms, but only regions that have retained their labor potential have responded. For example, in Tatarstan, where agroholdings play a significant role [6], numbers of cattle, sheep, and goats on private farms (especially in Tatar and Chuvash communities) are significantly higher that on other territories. The program for the development of livestock family farms (for 24 head of cattle) is successful here. In the Non-Chernozem Zone, there are few such minifarms, because the local population is not interested in private commercial livestock farming, especially due to aging of the rural population, the outflow of young people, and insufficient support from regional authorities.

Big cities became the main market for agroholdings. The fact that most of them specialized in pork, poultry, vegetables, and grains for export and cattle feed predetermined their location in the suburbs or in southern Russia. The emergence of large agroholdings on the periphery of Non-Chernozem regions is a rare phenomenon [7, 21]. Although attempts are made to keep meat breeds outdoors all the year round not only in Bryansk oblast and in neighboring chernozem

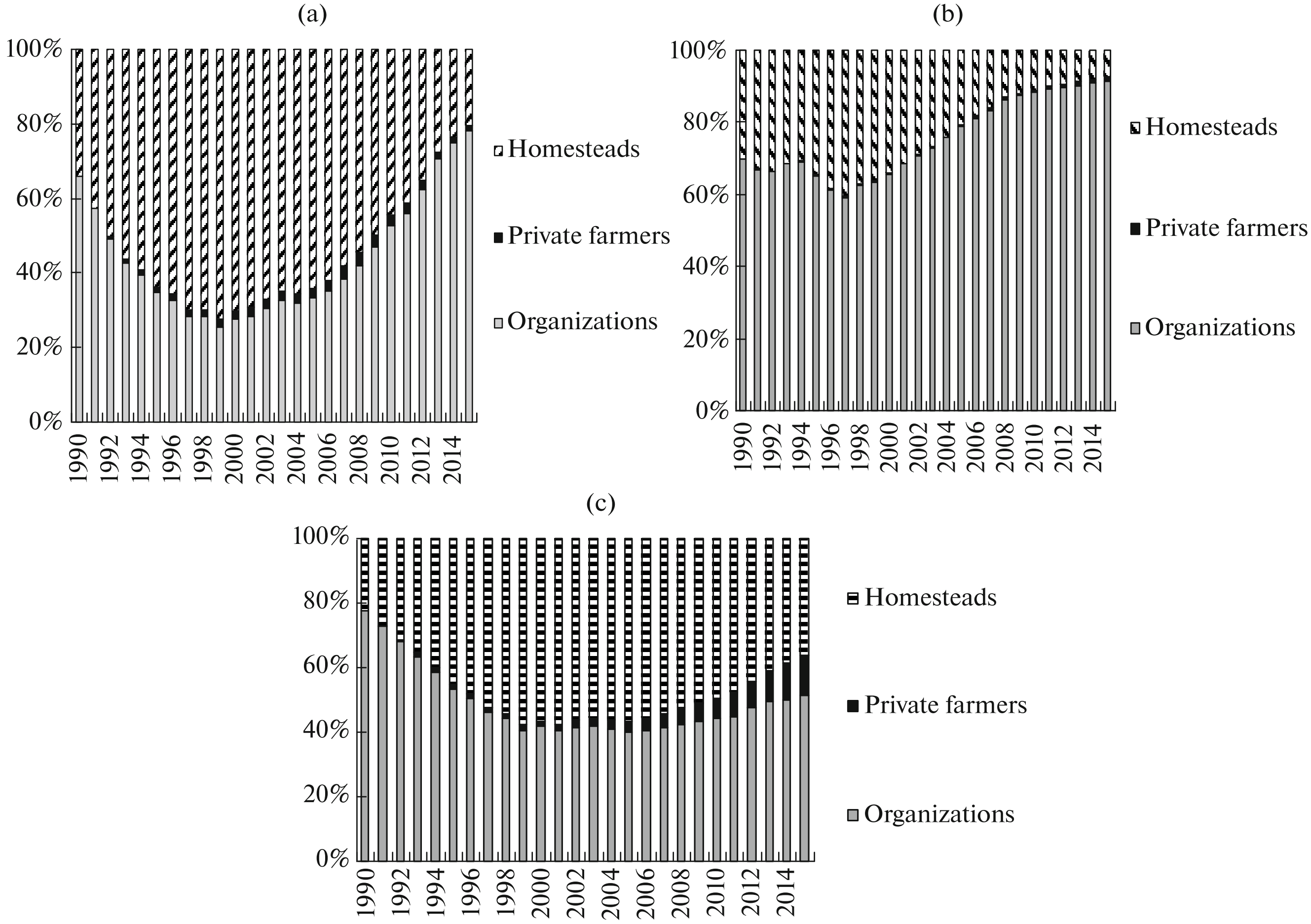

Fig. 7. Changes in the share of patterns from 1990 to 2015 in production of (a) pork, (b) poultry, and (c) beef meat, %. *Source*: Rosstat data.

oblasts but also in Non-Chernozem regions [8, pp. 163–167].

Only the loci of dairy farming remain in the Non-Chernozem Zone. Over the past 10–15 years, dairy farming has often been developed at the expense of megafarms, although agroholdings produce animal feed in southern regions, and the managing center and processing facilities are often located in large cities. New poultry and hog complexes are also drawn closer to powerful market outlets. Therefore, the impression of full agricultural decay at the sight of overgrown fields and pastures in the Non-Chernozem Zone is often deceptive: the sector have been preserved pointwise thanks to agroholdings and their branches [9, pp. 136–145].

Fifteen leading regions have been identified, in which half of the cattle stock is concentrated (Table 1, Fig. 8). In addition, while in many republics and some eastern regions this is associated with the significant role of homesteads and private farmers, the role of large enterprises is much greater in European Russia. This is seen from the column "Cattle in agricultural organizations" in Table 1, where among leaders are regions with the highest share of agroholdings, although even these regions must go a long way to restore lost cattle stock (Fig. 9).

Hog farming has an even larger degree of concentration: the 15 leading regions concentrate 60% of hog stock. The absolute leader is Belgorod oblast, "Russia's meat capital," where 18% of stock is located. Kursk and Tambov oblasts are also distinguished for the largest agroholdings.

Nevertheless, throughout the post-Soviet years, as agricultural units lost their guaranteed earnings, the cow remained the provider in many rural regions, especially those that retained their labor potential. The sale of surplus milk, dairy products, and beef became a source to replenish family budgets, including education and support of children in the city [13, 24]. By late 2015, Rosstat showed that the share of homesteads in milk production was still 48%, although many specialists think that these data are overstated [1]. In addition, the highest activity of the population in the livestock industry is observed not in the Non-Chernozem

Table 1. Fifteen leading regions in cattle stock in all unit categories in 2015 and 1990 and in agricultural organizations in 2015, thous. head by year end

Total cattle stock	2015	Cattle in agricultural organizations	2015	Total cattle stock	1990
Republic of Bashkortostan	1139.5	Republic of Tatarstan	666.9	Republic of Bashkortostan	2392.9
Republic of Tatarstan	1033.7	Republic of Bashkortostan	403.9	Rostov oblast	2112.7
Republic of Dagestan	1011.3	Bryansk oblast	381.5	Altai krai	2042.9
Altai krai	817.3	Altai krai	359.2	Krasnodar krai	1778.1
Orenburg oblast	594.5	Krasnodar krai	352.6	Orenburg oblast	1752.0
Rostov oblast	590.0	Novosibirsk oblast	328.6	Omsk oblast	1655.5
Krasnodar krai	538.0	Voronezh oblast	291.9	Saratov oblast	1639.0
Republic of Kalmykia	499.3	Republic of Udmurtia	279.9	Novosibirsk oblast	1633.8
Novosibirsk oblast	469.9	Orenburg oblast	251.2	Republic of Tatarstan	1573.2
Zabaikalskii krai	469.0	Krasnoyarsk krai	219.6	Volgograd oblast	1521.8
Voronezh oblast	462.8	Kirov oblast	212.5	Voronezh oblast	1389.3
Krasnoyarsk krai	425.1	Omsk oblast	208.3	Krasnoyarsk krai	1302.0
Bryansk oblast	422.1	Nizhny Novgorod oblast	206.9	Nizhny Novgorod oblast	1264.3
Omsk oblast	412.5	Moscow oblast	195.6	Moscow oblast	1218.2
Saratov oblast	405.9	Sverdlovsk oblast	188.6	Chelyabinsk oblast	1198.2
Share in Russia's cattle stock, %	49	Share in Russia's cattle stock, %	54	Share in Russia's cattle stock, %	43

Source: Goskomstat and Rosstat data.

Zone, where farm units suffered most, but in the southern regions, where the heirs of kolkhozes, agroholdings and private farmers deal with crop production and partially pay employees and owners of land shares with grain and animal feed (Fig. 10). Private livestock farming is also preserved in some regions with a high share of non-Russians, who, as kolkhozes disintegrated, returned to traditional farming. Thus, the increased concentration of production did not oust small farms but partially stimulated the popula-

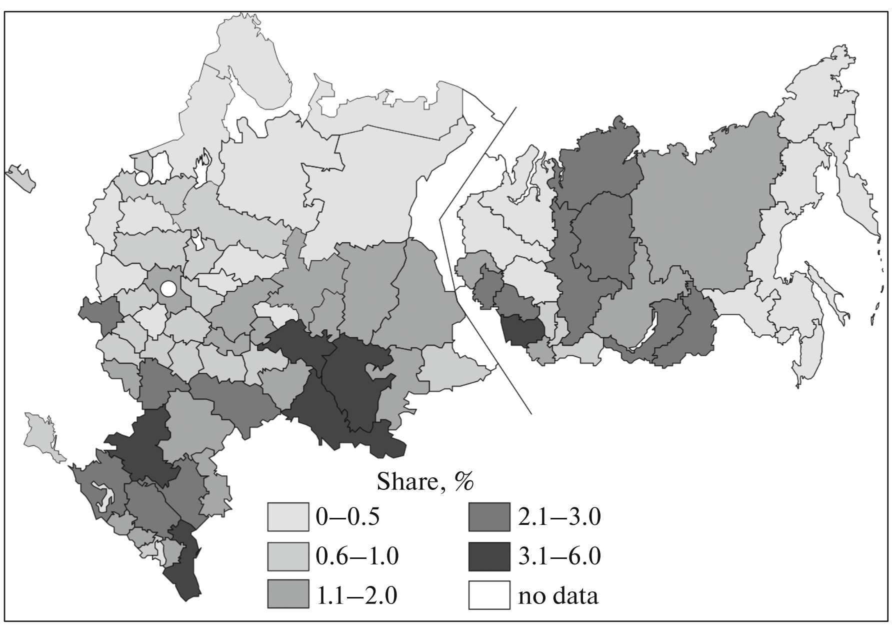

Fig. 8. Share of regions in cattle stock in Russia in 2015, %. *Source*: Rosstat data.

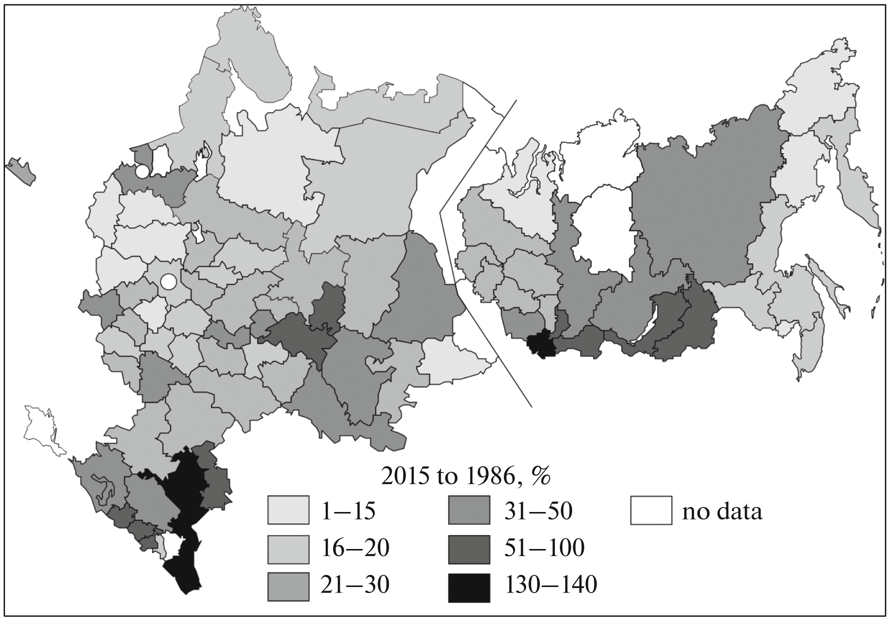

Fig. 9. Cattle stock dynamics in Russia, 2015, % of 1986. *Source*: Goskomstat and Rosstat data.

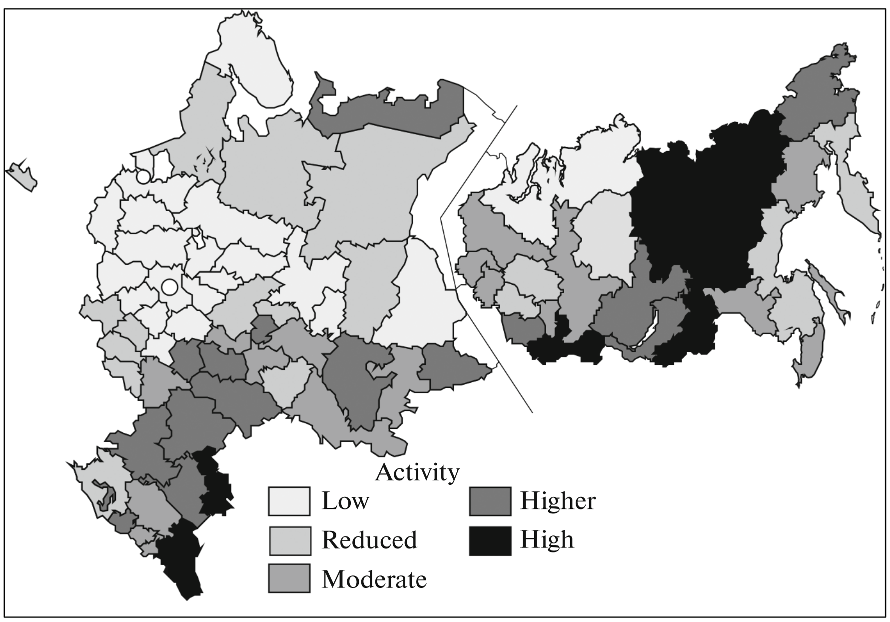

Fig. 10. Activity of homesteads in small informal livestock business (by cattle, hog, sheep, and goat stock index per 100 rural households). *Source*: Rosstat data.

tion's self-reliance on food in regions that retained the working population. This was largely related to a sharp decrease in rural employment.

Labor deficit or surplus in rural areas? In the Soviet period, the outflow of the rural population, especially strong in the Non-Chernozem Zone, was largely associated with urbanization. In the post-Soviet period, the accumulated consequences of outflow began to show more vividly. From 1959 to 2015, the rural population decreased by 19 mln people: even though the birth rate in many regions before the 1990s exceeded that of mortality, migration was the main factor for the decrease. It was possible to keep young people in rural areas and is still possible only in southern republics, krais, oblasts, and the suburbs of large centers [4]. The outflow from European Russia was supplemented by mass departure from northern and eastern regions. The selectivity of agriculture's exit from the crisis only contributed to the increased polarization of the rural space along the north–south and suburb–periphery axes [20], accelerating departure from economically and demographically unfavorable rural territories.

The closure of incapable enterprises and modernization of surviving ones in post-Soviet time intensified the transition from a labor-deficient pattern of employment in agriculture with a large number of employees and low labor productivity to a labor-saving pattern, revealing unsuspected surpluses of the rural population in many regions. Currently only 22% of the working-age rural population are employed in agriculture (Fig. 11). A drop in agricultural employment is associated not only with the closures and production modernization. The reduction in the most labor-intensive livestock industry, especially the cattle stock, and the formation of fully mechanized agroholdings unleashed great numbers of the unemployed population [6, 22]. Only a small part of it is officially registered as unemployed, preferring informal employment at enterprises or on private farms, hired help to dacha dwellers from cities, or labor migrations to large cities and agglomerations.

The reasons for the spread of current labor migrations of rural population to cities and suburbs (*otkhodnichestvo*) are largely associated with the dissatisfaction with employments in the places of residence [3, 14, 21]: (1) a drop in the number of local vacancies that meet the needs of modern rural population, although the needs of employees with lower skills are often overstated; (2) the increase of low-skill workplaces in large centers and agglomerations; and (3) the difference in wages and personal incomes in rural areas, on the one hand, and in large centers and agglomerations, on the other. Young people leaving for cities right after graduation from school to study or work, as a rule, stay in the city after study, although some retain permanent registration in the countryside. Others work in cities as temporary and recurrent labor migrants (*otkhodniks*) with week- and month-long cycles [18]. Surveys show that about half of rural seasonal workers would like to move to cities [12], but they are restrained by the inaccessibility of housing in large centers, making them split their lives between two homes, which partly hinders urbanization. On the other hand, many consider recurrent labor migrations as a gradual inclusion into the urban way of life and "a step toward the city," which prolongs urbanization in Russia.

According to the 2010 census, the number of seasonal workers from the countryside who work away from their region of residence is small, about 800000 people. However, surveys in various Russian regions in the 2000s yielded substantially larger estimates [3]. The relative share of labor migrants from the countryside is especially high in regions surrounding the Moscow agglomeration. From 7 to 20% of the working-age rural population have jobs in Moscow and Moscow oblast, and in some regions, e.g., in

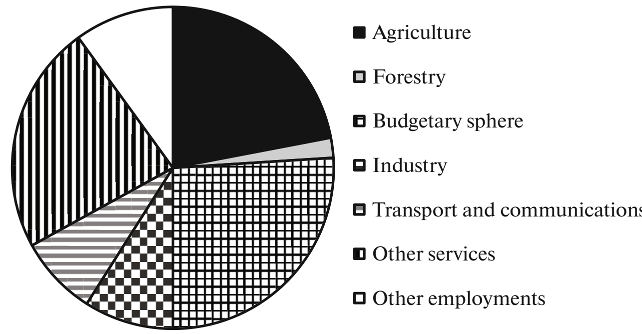

Fig. 11. Russia's rural employment structure in 2015. *Source*: Rosstat data.

northern Tula oblast, up to one-half of the economically active rural population [21, 22]. As a result, these regions, which have a large share of labor migrants with temporary and often off-the-books jobs in Moscow and Moscow oblast, experience a sharp deficit of workers in the local budgetary sphere and in agriculture.

CONCLUSIONS

Russia has been under sanctions since 2014, which have crippled the economy, although they do not directly concern agriculture. However, they deprived it of comparably cheap funding, because they affected large banks, including Rossel'khozbank, which provided loans. The extension of sanctions included freezing of assets of several companies and has affected the export of their goods and provision of services. Russia's counteractions to stop the import of beef, pork, poultry, fruit and vegetables, fish, milk, cheese, and other dairy products from EU countries, Australia, Canada, Norway, and the United States were political measures, but their effect was also substantial. They sent a shock wave to trade in large cities and spurred growth in food prices. However, domestic agricultural producers, unlike Western producers[1], were given an opportunity with the change in Russia's food market.

In recent years, the government has supported mainly large enterprises with loans. This concerns not only the production but also marketing of agricultural products. Market outlets and the creation of wholesale distribution bases and logistic centers for all kinds of producers on different scales still remain a key problem in Russia. Although local goods began to appear in the stores of provincial cities, small businesses are increasingly ousted by retail chains, which feel much more comfortable in dealing with large product

[1] From April 2015 through March 2016, food exports from the EU to Russia dropped by 29%, and the losses of the EU countries were estimated at about EUR 2 bn [11]. This especially concerned fruit, milk, and hog producers.

batches. This reduces the available diversity of foods, affecting not only Russia's food security as a state but also the economic affordability of food products for the population.

The prolongation of sanctions and low oil prices leave open the question of how much time and effort the Russian economy will need to overcome the crisis and stagnation. The ban on food imports from the European Union and the United States under existing institutions did not stimulate domestic producers (large, medium, and small) to long-term and massive investments in agricultural production. Instead it created relatively hothouse conditions, to which producers, especially those supported by the government, began to grow accustomed. Adding import competitors with the cancellation of the Russian embargo has frightened them, their only hope being that not all will return to the Russian market, because they have already fixed deliveries to other countries. Belarus remains the main competitor in the milk market, in comparison to less competitive Russian products.

Nevertheless, against the backdrop of decay in many industries of the Russian economy, the existing agricultural complex, especially in southern regions, has a favorable outlook. It is important to rely not on political, but on economic levers to balance, first, production, import, and export and, second, large, medium, and small production so as not to increase food prices for consumers, but, at the same time, not to ruin domestic producers.

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