



Review paper

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POTATO PRODUCTION AND SUPPLY IN CERTAIN TERRITORIES OF RUSSIA IN 2003-2012

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Abstract: The article discusses the current state of the food supply of population by potatoes in several territories of the Russian Federation (Nizhny Novgorod region and Volga Federal district). Some tendencies of development of the industry of potato production are revealed. A system of measures to increase the economic efficiency of the industry is proposed.

Keywords: Potato, production, supply, import & export, efficiency.

Introduction

The potato is a staple food, which is nowadays spreading increasingly to the developing world. It is one of the top four crops in the world (following rice, wheat and corn), and it is prized as a fresh nutritious product or as the basis of many processed foods. The potato was first domesticated in the region of modern-day southern Peru and north-western Bolivia. After the conquest of the New World by the Spanish in the second half of the 16th century, it was introduced to Europe and it spread around the world eventually becoming a staple crop in many countries. The importance of the potato, however, varies locally, at the same time changing rapidly. It is an essential crop in Europe (especially in its Eastern and Central areas), where the production per capita is the highest in the world, but the most rapid expansion over the last decades has occurred in southern and eastern Asia, where the People's Republic of China has become the greatest potato producer of the world. It is obvious that the potato production has shifted geographically from wealthier countries toward lower-income areas, although the degree of this trend is not so clear.

From a nutritional standpoint, potatoes were superior to preexisting staple crops because they provided more vitamins and nutrients and they provided a greater supply of calories. According to FAO reports (FAOSTAT), about two thirds of the global production is eaten directly by humans with the rest being fed to ani-

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mal or used to produce starch. FAO reports that the global potatoes production in 2013 (preliminary) was about 368 million of tones. The total area harvested in ha was 19.5 millions. This means that average yield in the world was 189 kg/ha. Because the suitability for cultivating potatoes are very different, there is the great regional variation in its production. Most the production of potatoes comes from Europe, Eastern Europe and the Russian Federation. Regional distribution of the potatoes production suitability in the Old World is shown on Figure 1.

Russian Federation is one the greatest potatoes producers. According to FAO, potatoes production in Russian Federation was in 2013 30 million of tones (8.2% of the global world production), harvested area was 2.1 million ha (10.7%), and average yield 144.6 kg/ha (76.5% of the world level).

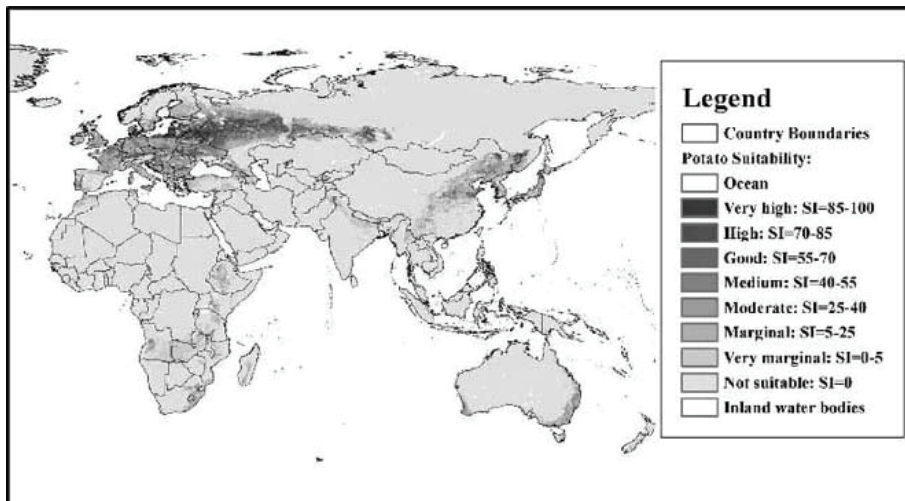


Figure 1. Average Potato Suitability in the Old World
Source: Nathan & Qian (2011)

The potato is a substantial, perishable product of low intrinsic cost, but high transport expenses limit its export possibilities. In spite of these drawbacks, the exports of fresh potatoes increases, but slightly.

State of the potato production in Russia and certain territories

Development of branches of agriculture and the satiation of food market by domestic food products increases the food independence of the country. In turn, the crop growing is a foundation of all agriculture, where the main products are grain and potatoes.

Potato is one of the essential, the most valuable and irreplaceable everyday food products. In recent years, as in general in Russia, and in its regions, the area under potatoes reduced in large commercial farms and increased in private farms, which led to a change in requirements for sorts, in particular in terms of taste quality.

Table 1. The area under potato in certain territories of the Russian Federation, thousand of ha

Year	The Russian Federation	Volga Federal district	Nizhny Novgorod region
2003	2530.92	681.42	59.93
2004	2415.42	661.47	57.72
2005	2277.26	617.23	50.68
2006	2128.51	554.41	50.74
2007	2068.83	539.54	51.15
2008	2104.22	555.43	56.32
2009	2192.81	588.12	59.62
2010	2212.16	597.02	62.15
2011	2225.12	572.25	62.83
2012	2093.11	536.91	60.71
Deviation 2012/2003	-437.81	-144.51	0.78

Source: Regions of Russia. Social and economic indicators. 2013: P32 Stat., Rosstat. M., P. 549.

During the period from 2003 to 2012 acreage of potatoes has been declining in most areas: in Russia for 437.81 hectares, in the Volga Federal District for 144.51 hectares. However, the Nizhny Novgorod region observed a slight increase in the area under potato for 0.78 hectares. (Table 1.)

In the face of declining acreage of potatoes it is necessary to show the way, increasing the productivity of the industry. The most effective way of increasing the productivity of the potato is a practical application of agricultural production of high yielding sorts, which biological features are more consistent with the local soil and climatic conditions (Zaitsev, 2004).

Table 2. Dynamics of gross yield of potatoes in certain regions of the Russian Federation, mln tons

Year	Russian Federation	Volga Federal District	Nizhny Novgorod region
2003	29.44	7.51	0.61
2004	27.93	7.61	0.49
2005	28.17	7.66	0.64
2006	28.33	7.77	0.68
2007	27.22	7.45	0.58
2008	28.82	8.35	0.78
2009	31.15	9.13	0.86
2010	21.13	3.51	0.42
2011	32.75	8.35	0.86
2012	29.31	7.63	0.88
Deviation 2012/2003	-0.13	0.12	0.27

Source: Regions of Russia. Social and economic indicators. 2013: P32 Stat. / Rosstat. M., P. 570.

It is known that potato production in Russia for several decades has a distinctly extensive nature of functioning; however, the total gross harvest of potatoes in the Russian Federation has increased significantly due to the changing relationship between the collection of potatoes in the major categories of farms.

In 2012, the gross harvest in Russia amounted to 29.31 million tons, which is 0.13 million tons less than in 2003. Throughout the whole period the figure tended to increase with the exception of 2010, when gross yield was only 21.13 million tons due to adverse weather conditions. In the Volga Federal District and, in particular, in the Nizhny Novgorod region was an increase of gross harvest of potatoes by 0.12 and 0.27 million tons respectively. (Table 2)

The basic amount of the product is obtained in the private households, while agricultural enterprises annual decreasing of production is observed. However, low marketability of agricultural production on private farms does not allow them to fully meet consumer demand for potatoes. The situation on the potato market is characterized by imbalances, reduced sales volumes, increasing demand by a decline in the supply of this product, with both supply and demand are inelastic to price. Solving of problems in Russia's economic growth is associated with a system combination of not fully resolved issues, including food security. This is due to several factors (Lobyrev, 2012):

- food security of the country is an important component of national and economic security;
- state must ensure the needs of the population for food at a level ensuring its normal functioning;
- state food security strategy as a constituent part of national security should be aimed at creating conditions for improving the level and quality of the diet of the population to ensure the solution of social problems in the society.

Market relations in agriculture lead to the formation of consumer market based on the free choice of partner. In potato production, along with immunological characteristics grades its consumer properties are also important. Originally producers wanted to get the necessary gross yield of tubers, but now consumers are placing greater demands on the trademark characteristics such as attractive appearance, uniformity of tubers, the right shape and characteristics determine consumer demand and affect the price. In potatoes such factors as color of peel and pulp, depth of buds, taste characteristics, starch content, suitability for processing is important (Turco, Rubel, & Ivaniuk, 2007).

Agricultural enterprises (peasant) farms and their associations are to study problem of market capacity, peculiarities of demand for certain foods in particular circumstances of time and place, the establishment of new cooperation ties between producer and consumer.

In this regard, potato farming regions of Russia and agribusiness as a whole is experiencing a deep and protracted economic crisis linked to the lack of conditions for balanced supply and demand. For regulation and improvement of competitive qualities are necessary to increase the share of potato production in the public sector of agriculture. Agricultural producers have to work in the absence of state support, as well as having lack of funds needed for stabilization and further development of industries.

Table 3. Proportion of individual territories in the sown area and gross harvest of potatoes in Russia, % (Russian Federation=100)

Year	Agricultural area		Gross harvest	
	Volga Federal District	Nizhny Novgorod region	Volga Federal District	Nizhny Novgorod region
2003	26.92	2.37	25.54	2.07
2004	24.99	2.39	27.28	1.76
2005	27.10	2.22	27.26	2.27
2006	26.05	2.38	27.46	2.43
2007	26.08	2.47	27.39	2.12
2008	26.39	2.68	28.99	2.71
2009	26.82	2.72	29.36	2.77
2010	26.99	2.81	16.59	2.00
2011	25.72	2.82	25.54	2.63
2012	25.66	2.91	26.11	2.98
Deviation 2012/2003	-1.26	0.54	0.57	0.91

Source: Regions of Russia. Social and economic indicators. 2013: P32 Stat., Rosstat. M., P. 549.

During the period from 2003 to 2012 the proportion of the cultivated area of the Volga Federal District in the overall composition of land under potatoes in Russia decreased by 1.26% , while the share of the Nizhny Novgorod region opposite familiarize increased to 0.54% and the balance sheet date amounted to 25 indicators, 66% and 2.9%, respectively. Gross harvest in Nizhny Novgorod region amounted to only 2.98% of the total potato production in the Russian Federation, which is 0.91% more than the base of 2003. (Table 3)

Currently, the production of potatoes in Russia in all categories of farms is purely quantitative, yield does not exceed 14–15 t/ha. In countries with high production, comprehensive mechanization, intensive labor, rational use of fertilizers and pesticides, such as Holland, Germany, England, the U.S., the average yield is much higher and is – 50–65 t/ha.

From 2003 to 2012 the yield of potatoes in Russia increased by 23 units and was 140 kg/ha. In the Volga Federal District and the Nizhny Novgorod region potato yield amounted to 142 and 144 kg/ha, which exceeds the 2003 baseline of 31 and 42 q/ha, respectively. (Table 4)

Table 4. Potato yields in certain regions of the Russian Federation, centner per ha

Year	Russian Federation	Volga Federal District	Nizhny Novgorod region
2003	117	111	102
2004	116	116	87
2005	124	124	126
2006	133	141	134
2007	132	139	113
2008	138	151	138
2009	143	156	145
2010	100	66	84
2011	148	148	138
2012	140	142	144
Deviation 2012/2003	23	31	42

Source: Regions of Russia. Socio-economic indicators. 2013: P32 Stat., Rosstat. M., P. 572.

The main reasons hindering the higher yields of potatoes in Russia are: seed quality, level of technology and, especially, technological discipline, lack of mechanization and low quantity of machines, weak material and technical base for storage and processing, as well as lack of training of specialists to about progressively growing technologies. The main task of producing agricultural products must be to improve the efficiency of cultivation, the use of modern varieties of potatoes, or just intensified industry (Turco et al. 2007).

Intensification of potato production is based on application of achievements of scientific and technological progress, the use of special varieties, rational forms of compensation and benefits. In potato production many intensive technologies are applied, they all have common characteristics and trends:

- high farming level, envisaging cultivation of potatoes on the cultivated, fertile soil, with relief and configuration of fields for optimal for operation and performance. A network of roads, irrigation systems, etc.;
- strict regulation of basic agricultural methods (taking into account the state of crops, soil and weather conditions): progressive methods of soil preparation, irrigation, fertilization, application of fertilizers in high doses and increased density of growing plants;
- creation and use of high yielding varieties, which provides high-quality products, suitable for machine harvesting;

- creating of conditions for the maximum exclusion of technology manual work due to mechanization and proper organization of work, the replacement of old kinds by new ones of packaging;
- division of harvesting on the steps: cleaning and loading of products into vehicles, delivery of products to the place of its storage;
- combination of advanced technological methods with rational organization.

Competitiveness and Russian potato import and export

Currently potato in Russia is at a low level of competitiveness in comparison with other countries. In 2012 only 29 tons of this species of agricultural culture were delivered abroad. The main buyers – Azerbaijan, Uzbekistan, Kazakhstan, Tajikistan and Georgia. In 2011 from Russian Federation were exported 41.9 thousands tones of potato, mainly in Azerbaijan: 72.4% (see Figure 2).

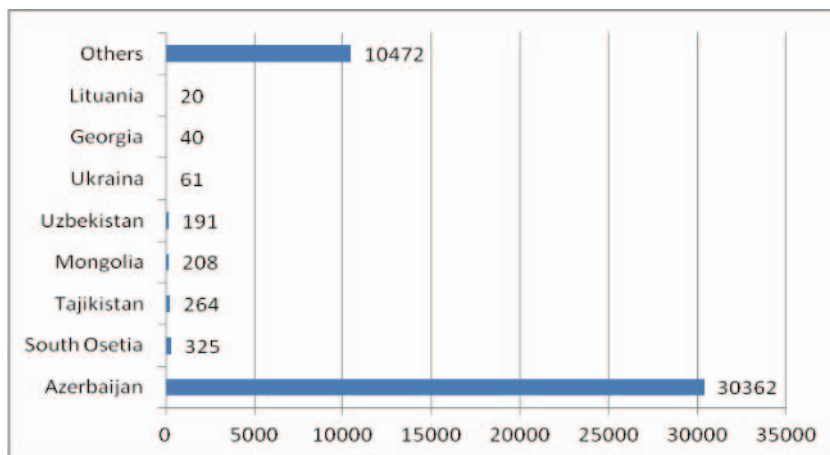


Figure 2. Export of potatoes from Russian Federation in 2011, in tonnes

Source: Kartoffelny Soyuz, www.agropak.ru

In 2012 the Russian potato was not sold in far abroad countries. The largest volumes of potato exports from Russia were observed in 1992 (258 tons) and 2007 (139 thousand tons), respectively. However, with such large volumes of its own production, some large firms prefer to buy imported potatoes, the total amount of it was 490 thousand tons in 2012 (Figure 3).

The largest volumes of imports of potatoes in Russia were sent to the 2011 – 1512 tons, due to a poor harvest in Russia in 2010. The share of imports in the Russian market as a whole in 2012 amounted to only 1.6%.

Domestic production of potato ensures population by quality products, but due to low competitiveness of domestic potatoes, presence of imported products in major retail chains is still high.

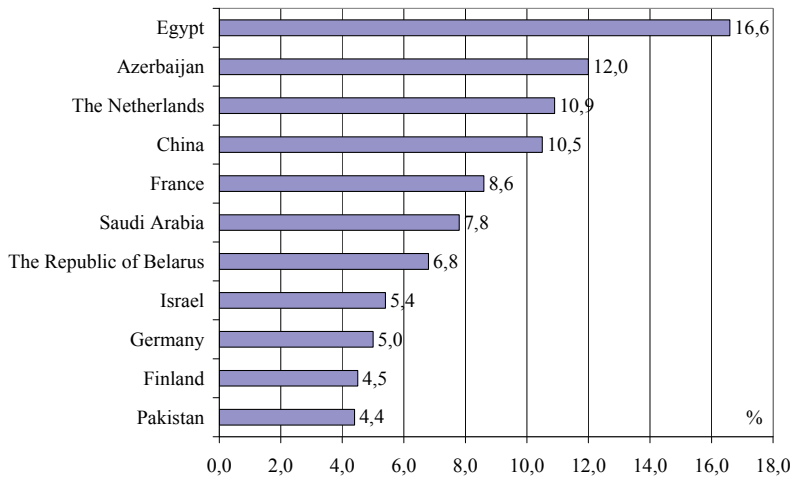


Figure 3. The volume of imports of potatoes in Russia in 2012, %.

Source: Analytical report «Analysis of Russian import of potatoes in 2012-2013», Custom Stat. 2012.

Potatoes supply in study area tends to increase. In 2012 compared with 2003 production figure of potato per 1 inhabitant increased by 13.61 kg and was at the balance sheet date 204.82 kg. In the Volga Federal District index also increased by 20.15 kg per 1 person and in 2012 was 256.28 kg. The highest growth of potatoes per 1 inhabitant observed in the Nizhny Novgorod region, on 132.53 kg or 50.2%. (Table 5)

Table 5. Availability of potatoes in certain areas of the Russian Federation, 1 kg per person

Year	Russian Federation	Volga Federal District	Nizhny Novgorod region
2003	191.21	236.13	133.81
2004	194.01	248.05	142.11
2005	196.18	251.51	187.17
2006	226.65	256.74	200.65
2007	190.55	247.12	171.57
2008	201.77	277.84	232.36
2009	217.74	304.43	258.49
2010	147.69	117.14	127.87
2011	228.58	280.12	260.54
2012	204.82	256.28	266.34
Deviation 2012/2003	13.61	20.15	132.53

Source: Regions of Russia. Social and economic indicators. 2013: P32 Stat., Rosstat. M., P. 47.

Despite the high level of supply of domestic production, sellers select imported potatoes, causing this choice acceptable to them by price, quality and of the correct packaging, stability and a wide range of imported products.

In most organizations of the Nizhny Novgorod region, cultivation of potatoes is produced by traditional technology, with high production costs, which increases the cost of goods. There are many new techniques and technologies for growing potatoes. Proper organization of work processes determines by 80% the final results because it considers proper production stages, depending on the biological characteristics of crops (selection of different varieties of the ripening with application of proper agricultural activities, etc.) required amounts of labor and coherence in the labor collectives.

In the domestic potato industry it is necessary to carry out measures to improve the competitiveness of products and increase the level of marketability. In this context of agricultural enterprises in the region, specializing in the production of potatoes and having the opportunity to modernize production, realization of the following activities is actual:

- greensprouting, wilting and warming of tubers with using fertilizer;
- planting potatoes to a depth of 6–8 cm which increases the efficiency of the use of fertilizers and improves yields than when planting to 8–10 cm;
- increasing of row spacing which creates better conditions for realization of the potential productivity of intensive breeds, improves the density of the soil in the area of tuber, increases the marketability of the tubers by reducing the amount of adulterated products, creates more favorable humidity in crops, reduces damage of plants by late blight;
- modernization of material and technical base for productive new planting, harvesting technology, which can reduce the labor wastes as potato production is characterized as a hard one by a volume of manual labor;
- development of selection, implementation and use of new varieties, characterized by increased yield, frost resistance, stability to diseases having increased palatability and attractive appearance;
- market research in order to improve the amount of a distribution channels and learning activities of competitive enterprises;
- raising the level of specialization and focus on competitive potatoes.

Conducting this set of activities or individual of paragraphs require significant financial investments by the agricultural producers, as well as search and attract of investors willing to take significant risks. However, the proper use of agricultural areas, timely application of fertilizers, seed competent selection of base and, of course, a professional organization of process all costs will be paid back many times. The modern market requires innovative solutions made by management.

Conclusion

The potato is one of the most important, most valuable and irreplaceable foods in the world. The Russian Federation belongs to the one of the areas with best suitability for potatoes production, but the production has extensive nature, and the yield is under the world level. In last few decades the area under potatoes reduced in large farms and increased in private. This lead to a change in requirements for sorts, particularly in terms of taste quality.

In last ten years potatoes production and yield in Russian Federation, also in the observed regions, was increased, but the efficiency of cultivation is not satisfied. The main task of producing agricultural products must be to improve the efficiency of cultivation, the use of modern varieties of potatoes, or just intensified industry. The intensification of potato production is based on application of achievements of scientific and technological progress, the use of special varieties, rational forms of compensation and benefits.

Currently potato in Russia is at a low level of competitiveness in comparison with other countries, but the great production gives the possibilities for export (Russian potato is sold to near countries, but not in far abroad countries). In the Russian potato industry it is necessary to carry out measures to improve the competitiveness of products and increase the level of marketability. The measures for this are proposed. Conducting this set of activities or individual of items require significant investments by the agricultural producers, as well as search and attract of investors willing to take significant risks. However, the proper use of agricultural areas, timely application of fertilizers, seed competent selection of base and, of course, a professional organization of process all costs will be paid back many times. The modern market requires innovative solutions made by management.

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