Trends and prospects for the development of horticulture and vegetable growing in the region

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Abstract. The article is devoted to the study of the development of horticultural products markets. Trends and prospects for the development of horticulture and vegetable growing are considered on the example of the Kursk region – one of the traditionally agricultural region of the Russian Federation. Gardening in the region undoubtedly has certain prospects. To ensure stable and balanced development of the industry and to receive high financial results, it is necessary to use seedlings of varieties with high taste and nutritional characteristics. This will ensure the satisfaction of the needs of the population and stable demand for products. In addition to the importance of productivity growth, the problem of crops storage is no less relevant. At the same time, the industry is also important for ensuring food security.

1. Introduction
Horticulture and vegetable growing in the Kursk region were historically developed in the region due to the combination of relatively favorable weather conditions and the location in the central region of the country, what ensured the proximity to the sales markets. In the 30-80 years of the last century the gardens of the Kursk region were known throughout the Soviet Union – apples, plums, cherries, strawberries and other fruit and berries were sold almost throughout the country. Horticultural sovkhozes were mainly concentrated in Oboyansk, Lgovsky, Shchigrovsky and Kursk regions. For example, the Oboyansk horticultural sovkhoz was formed in 1922 with an area more than 5 thousand ha and with a productivity reaching 40 thousand tonnes of gross yield. In Soviet times the sovkhoz area was smaller than only the gardens of the Krasnodar region. A product processing system was built on the basis of experience of functioning canneries. The development of the horticultural industry and the growth in the production of fruit and berries in the Kursk region was carried out both extensively due to the increase in the area of gardens and intensively due to the growth of their productivity. Specialized sovkhozes and kolkhozes were the basis of the horticultural complex in the spheres of production and public procurement.

The fact that one of the symbols of the Kursk region is an Antonovka apple also confirm the high level of horticulture development in the region. Common Antonovka is a widespread old Russian winter apple cultivar that has been and remains very popular among professional breeders as well as apple lovers and appreciators. There is a monument to the Antonovka apple in the city center of Kursk since 2008 and the regional annual award has been bearing a name after the Kursk Antonovka since 2000.
In the process of market reforms, privatization and reorganization in the agricultural sector, as well as in the whole economy, new organizational and legal forms of management were created. At the same time, the state attention to the functioning of this industry has weakened.

2. Prospects for the development of horticulture and vegetable growing in the Kursk region

Competitive pressure from imported fruit and vegetables (mainly apples, pears, citrus fruits) exacerbated the market situation and reduced the demand for products of domestic enterprises that were not ready to work in the conditions of fierce competition. As a result, large horticultural farms have become diversified and have expanded their production in order to reduce the risk of sectoral work in the fruit and vegetable sector. The market has become saturated with imported fruits and vegetables, and the production of these products in the Kursk region ceased to satisfy the needs of the population in fruit and vegetables.

The dynamics of the area of fruit plantations in the Kursk region is presented in table 1.

| Name of indicator | Years | 2018 in% to 2005 in % | +/- |
|-------------------|-------|----------------------|-----|
| The area of fruit plantations | 2005 | 10.8 | 69.4 | -3.3 |
| including at the fruiting age, ha | 2010 | 8.6 | 55.4 | -4.5 |
| | 2012 | 7.8 | 93.5 | - |
| | 2013 | 8.4 | 94.2 | |
| | 2014 | 7.4 | 92.3 | |
| | 2015 | 7.6 | 91.7 | |
| | 2016 | 8.1 | 90.5 | |
| | 2017 | 8.0 | 88.2 | |
| | 2018 | 7.5 | 87.7 | |
| | | | 78.8 | |
| | | | 74.7 | -18.9 |

According to the table, we should note a stable decrease in area of fruit plantations – from 10.8 ha in 2005 to 7.5 thousand ha in 2017. The overall decline was 3.3 thousand ha or 30.6%. This situation is exacerbated by the fact that the area of fruitful gardens for the same period decreased at a faster pace – by 4.5 thousand ha or by 44.6%. Consequently, the proportion of fruitful plantations decreased. If it was on the level of 93.5% in 2005, then– only 74.7% in 2018. Moreover, in recent years, we could observe the most significant decline – by 8.9% in 2017 and by 4.1% in 2018. Obviously, the currently functioning fruit plantations, a significant part of which was laid back in Soviet times, are exhausting their biological productivity potential. That leads both to a decrease in areas of plantings and to a deterioration in their structure, and, as a result, to a decrease in the economic efficiency of enterprises operating in this industry.

This conclusion indicates the negative dynamics of the development of this industry and makes the need for government support measures obvious. Especially in the view of the accumulated problems and the need to ensure the country’s food security, and the implementation of the import substitution policy.

We could note multidirectional change of production volumes not only in the production of these products. The differentiation of agricultural production is steadily increasing over time due to the competitive advantages of the regions in the cultivation of certain crops and livestock production [1], [2]. At the same time, it should be noted that there are favourable conditions for the cultivation of fruit and vegetables in the Kursk region, which will ensure the competitiveness of enterprises in this field.

In the areas where gardens have historically grown (Oboyansky, Belovsky, Kursky districts), about 500 ha of new intensive gardens have been planted over the past 5 years, as well as fruit nurseries and berry bushes: gooseberries, currants, raspberries. The preparation of intensive gardens was carried out mainly in Pselskoye LLC (Belovsky District), Oboyansky Garden LLC, Zorinsky Garden LLC,
Soynikov SP (Oboyansky District), Leshchenko peasant farm, Melnik peasant farm and Koptorg LLC (Kursky District).

The positive dynamics of the recent years in the industry is associated both with changed market conditions due to the sanctions policy and, as a result, of a certain state attention to this activity [3].

Organizations and peasant farms in these areas received 250 million rubles of state subsidies for the development of this activity as part of the implementation of the Kursk region state program ‘Agriculture Development and Regulation of agricultural, raw material and food products markets in Kursk region’ [4].

The development dynamics of the perennial fruit and berry plantations is presented in figure 1. The planned volumes of perennial fruit and berry plantations development are reflected in accordance with the state program.

![Figure 1. The implementation of the plan for the development of perennial fruit and berry plantations in the Kursk region.](image)

On the one hand, according to the figure, we should note the growth from 2014 to 2017 of both planned and actual volumes of preparing perennial fruit and berry plantations in the Kursk region. With the plan of 5 ha and its actual implementation at this level in 2014, in 2017 the planned area was 151 ha and 163 ha were actually prepared for cultivating. At the same time, the planned volumes for 2018 were reduced and actual 155.8 ha were prepared, what is lower than the level of 2017.

This dynamics indicates that despite certain positive trends the horticulture industry continues to operate in difficult economic conditions in the absence of stable growth in the preparing of perennial gardens. Considering that the efficiency evaluation of the state program is done through the assessing the level of achievement of the planned parameters of the state program to actual results. It takes place through comparing the actual volumes of the indicators of the state program and their planned volumes [5]. We can conclude that the state support is highly effective, while the negative trends in development dynamics of the industry, based on this diagram, are obvious.

Thus, the development of the horticultural industry is characterized by an increase in production and sales. It is also has the advancing character in comparison with other industries (an increase in the cost of crop production from 0.12% to 0.35% and increase in cost of sales from 0.09 % to 0.17% in 2014-2018). However, it occurs in conditions of low efficiency and increasing rates of production loss. At the same time, these tables reflect that gardening in the Kursk region does not play a significant role in the agricultural economy due to low production volumes.

The importance of the industry development is also confirmed with the pyramid of healthy nutrition. It shows that a person daily diet should include 40% of fruit and vegetables. The medical norm of vegetables consumption is 146 kg, fruit and berries 80-120 kg per person.

We believe that the current improvement in the market situation cannot create long-term conditions for the stable and profitable functioning of agricultural enterprises, which necessitates further state regulation and support for the development of this industry in order to solve the accumulated in this industry problems.

At the same time, gardening in the region undoubtedly has certain prospects. For example, in the Kursk region the local authority plan to increase the area of intensive gardens to 1700 ha by 2024. This will double the current production of fruits— up to the level of 70 thousand tonnes per year.
To provide a stable and balanced development of the industry and to receive high financial results, it is necessary to use varieties of seedlings with high taste and nutritional characteristics. This will ensure the satisfaction of the needs of the population and stable demand for these products. At the same time, apples of traditional varieties for the Kursk region, such as Bogaty, Sinap Orlovsky, Zhigulevskoye, Melba, Common Antonovka are also familiar to consumers, that guarantees stable demand for them.

Besides the need to increase production, the problem of crops storage is also relevant. It is necessary to reconstruct an old fruit and vegetable storages and to build modern ones.

It is useful to note significant state support for this area, as far as gardening is one of the priority areas, which has recently received significant attention at both the federal and the regional levels. For example, agricultural producers can rely on 85-90% cost recovery, including costs for preparing land for cultivation and taking care for young gardens, as well as 20% direct costs recovery, including costs for the construction and reconstruction of fruit storages and purchase of equipment.

Efficient production also requires usage of modern technologies and equipment. In this direction it is possible to use the experience of Zorinsky Garden LLC where a modern apple sorting line was put into operation. It allows not only to wash and dry fruits delicately, but also to sort them by size and colour. A significant advantage of using this equipment is an increase in the attractiveness, competitiveness of products and the expansion of the supplies geography. All these benefits increase the effectiveness of the marketing policy of the enterprise and the whole region [6]. Today the sales under the brand ‘Fructovoe Obayanie’ is carried out in Moscow, St. Petersburg, Krasnodar, Irkutsk, Yekaterinburg and many other cities of Russia. According to the signed agreement, deliveries of fruit are planned even to Kamchatka.

This equipment requires significant investments, as the cost of the new line exceeds 45 million rubles, but the reimbursement of 20% of the enterprise’s costs for the purchase and installation of a line for sorting apples and state support allow partially recouping investments while the line’s productivity of 12 tonnes per hour ensures stable production.

Zorinsky Sad LLC is located in the Oboyansk district of the Kursk region and currently has a garden area of 300 ha. The company is a producer of apples of both traditional varieties of Russian selection and varieties of foreign selection. The presence of stable demand for products allows planning an increase in the area of new gardens of intensive trellis type to 700 ha by 2021.

Note that gardening in the Kursk region is subjected to the risks depending on weather conditions: frequent harsh low-snow winters with air temperatures below 15 degrees, late frosts in the spring period and the possibility of dry seasons [7, 8]. Therefore, to ensure the expansion of the production of fruit and berries in the Kursk region, it is necessary to develop industrial nurseries – specialized farms that could ensure the production of frost-resistant area-based seedlings. At present, the existence of a vicious circle is obvious – the production of seedlings on an industrial scale does not develop, because there is no stable demand for it, at the same time, the development of effective competitive production is impossible without ensuring high-quality area-based seedlings.

The development in this direction is possible with the usage of private investments, but it will go at a slow pace considering the weak state of the horticultural industry at present. Accordingly, the state support should be directed to this activity, because, if any, the industry will receive an inflow of private investment, the development would be carried out at a slow pace and for a long time.

At the same time, the specialized nurseries should focus their operation not only on specialized organizations, but also on sales to the population, which also plays a significant role in the production of fruit and berries. One of the specific features of this industry is the high share of goods produced by individual households. This situation is explained by the solution of the food problem by households, carried out by producing of fruit, berries and vegetables in the conditions of a low living standards and increase in horticultural products prices. The result was the development of backyard and collective gardening and vegetable growing. The availability of high-quality seedlings will allow the implementation of the replacement and thickening of existing perennial plantations on household plots. That will also increase production and contribute to the development of this industry, providing the population with fresh fruit, berries and ensuring food security of the country.
Since the level of tradability of vegetable growing and horticulture in households is not more than 20% [9, 10, 11], it is also necessary to promote the creation of consumer cooperatives, [12] that will begin to carry out the marketing and processing of cultivated products. This will ensure the further development of vegetable growing and horticulture in households [13], the development of small business [13] and saturation of the agricultural products market with fruit and vegetables.

In view of the current global trends in horticulture, the development of competitive industrial horticulture in the Kursk region is possible only by replacing the existing unproductive extensive gardens with new intensive low-growing ones. Along with the use of area-based seedlings, experts recommend to use domestic technologies for the production of fruit and berries, since the climate conditions of many regions of the Russian Federation are differ sharply then the weather conditions of Western countries. Thus, the usage of imported technologies, that are not adapted to local environmental conditions, is not always effective [14].

The situation is exacerbated by the fact that during 2014-2018 the production of berry products, with the exception of 2017, was unprofitable and in 2015-2016 the cost price was many times higher than sales price. The low level of development is also confirmed by insignificant (at the level of several hundred percent), and not increasing in dynamics share of berry products in the total cost of production and sales of crop products. This situation indicates that the production of berries in the Kursk region does not meet market criteria. The berries produced in the region are uncompetitive and their production is characterized by a side-by-side nature.

One of the specific features of the modern economy is the development of retail chain stores, which are interested in working with large manufacturers. This fact, along with the high cost of preparing perennial plantations, necessitates the development of competitive production of fruit and berries in the Kursk region based on the development of large industrial gardening organizations in areas of traditional gardening. This will allow them to compete with importers of these products and ensure competitiveness in the domestic market and cooperation with retail chains stores.

Next, we consider the dynamics of indicators showing the level of hardy vegetables sales by agricultural enterprises and farms of the Kursk region. There is a significant increase in the sales of vegetables. If in 2014-2015 it was insignificant at the level of 24-52 centners, until by 2018 it had significantly increased to 54.9 thousand centners. Accordingly, revenue from the sales of products increased from 27 thousand rubles in 2014 to 34.3 million rubles in 2017 and to 71.7 million rubles in 2018. Such trends reflect the development of vegetable growing in agricultural organizations of the Kursk region during the analyzed period under conditions of almost being absent production in 2014-2015. A positive trend is the fact that the growth in sales volumes was accompanied by a simultaneous increase in the profitability of activities. If in 2014-2016 the sale of vegetables was unprofitable, then in 2017 and 2018 the profit from the sales of one centner of vegetables amounted to 105 and 270 rubles, respectively. This made it possible to make a profit of 2.9 million rubles in 2017 and 14.9 million rubles in 2018.

The development of this industry is also evidenced by the increase in the share of sales revenues from garden vegetable growing in the total sales revenues from crop production. However, it should be noted that it is still very insignificant – 0.12% in 2018 and obviously does not correspond to the potential and capability of the industry in the Kursk region.

Further, we analyse the dynamics of the main economic indicators of the greenhouse vegetables sales by agricultural enterprises and farms of the Kursk region. Until 2013, greenhouse vegetables in the Kursk region were grown only in APK Kursk AES OJSC with a production capacity of 3.2 thousand tonnes of products per year. Thanks to the implementation of the program ‘Development of greenhouse vegetable growing in the Kursk region for 2013–2015’ greenhouse complexes were built with a production capacity of 10.4 thousand tonnes of vegetables per year. The rapid growth of greenhouse vegetables sales was caused by the commissioning of greenhouses in the Seym-Agro OJSC in the Kursk district and greenhouses in Agro Park LLC in Glushkovsky district in 2016. This allowed to increase the area of greenhouses in the Kursk region to 30.5 ha and the sales of fresh greenhouse products to 113.9 thousand centners in 2017 and up to 166.5 thousand centners in 2018. At the same time, the steady
increase in the share of greenhouse vegetables sales reflects the development of this industry at a faster pace than the development of the agricultural sector as a whole [15, 16]. If in 2014-2015 it was less than 1%, then by 2017 it increased to 1.72%, and by 2018 to 2.52%. At the same time, production efficiency also increased. Taking into account unprofitable activities in 2014 and 2016, the sales of 1 kg of greenhouse vegetables in 2017 provided a profit of 262 rubles, and in 2018 – 1.4 thousand rubles. This allowed making a profit of 29.9 million rubles in 2017 and 234.9 million rubles in 2018 [17, 18].

The production of greenhouse vegetables is developing in Seym-Agro OJSC more dynamically than in other organisations. In 2019, the company plans to complete the construction of the third stage of the greenhouse complex, which will expand production and provide the region with new jobs.

3. Conclusion

In conclusion, we note that agricultural enterprises are reorganized into large agricultural holdings. An advantage of such organizations is the fact that a high profitability of production and a high level of profit make it possible to ensure a high level of employees’ wages, which in the Kursk region in these organizations are about 40 thousand rub.

One of the significant problems in the development of both the fruit and vegetable industry is the insufficient number of developments of agricultural machine for gardening and vegetable growing. The developments in this industry are based on the introduction of foreign technologies and expensive foreign agricultural machinery, which does not ensure the formation of the country's food security. Since we are talking about linkages, agricultural organizations cannot solve this problem on their own. Therefore, we can conclude that this area also requires state regulation.

In general, we can conclude that the development of the production of fruit and vegetable products in order to ensure food security is most promising in the conditions of concentration of horticulture and vegetable growing in specialized enterprises on the basis of intensification and increase in the yield of existing berries and vegetables gardens. For this purpose, it is necessary to increase the role of these sectors in agricultural production, increase the gross yield of fruit and vegetables gardens and berry bushes. These measures will create the prerequisites for increasing production and ensuring food security of the country.

In addition, an essential element of the stable development of the industry is the effective functioning of the entire production chain – from seed production and equipment to storage, processing and sales of products. At the same time, taking into account the importance of this industry for ensuring food security, in the market conditions the amount of accumulated problems would be resolved over a long time with the help of private investments. It is worth emphasizing the role of the state that should provide the necessary level of state support and solving infrastructure problems.

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