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**The Seminar**

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CHALLENGES OF TRANSITION AND  
INTEGRATION PROCESSES**

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# THE STATE AND DEVELOPMENT TENDENCIES OF FRUIT AND VEGETABLE SUBCOMPLEX WITH CONSIDERATION OF REGIONAL PECULIARITIES

A. S. Ovchinnikov, O. S. Oleynik, N. N. Balashova<sup>1</sup>

## Summary

*The development problems of a fruit and vegetable sub-complex in the risky conditions of the Volgograd region agriculture are discussed in the article. The organizational and economic assessment is given to formation of the fruit and vegetable production regional market; the major factors influencing its development are defined.*

**Keywords:** *fruit and vegetable sub-complex, agricultural producers, sale.*

**JEL classification:** *Q10, Q12*

## 1. Introduction

Reliable population support with food of a good quality domestically produced is nowadays the most important mission of Russian economy. Fruit and vegetable sub-complex development is a one of the essential factors of saturation of the food market, because its products are considered as major among the group of the population essential food.

In spite of the fact that Volgograd region is in the risky agriculture zone, its weather conditions permit the agricultural commodity producers of the region to organize the production of the fruit and vegetable competitive products of a good quality.

## 2. Fruit and vegetable production in Volgograd region

Volgograd region's quota in the crops of the vegetable and melon cultures on the farms of all categories in Russian Federation during last 10 years didn't decrease less 9% and made from 9% in 2002 till 12,7% in 2007. In 2011 vegetable and

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melon cultivated area in the farms of all categories of the region made 102.4 thousand hectares (11.5% of crops in Russian Federation) (Table 1).

**Table 1:** Vegetable and melon crops on the farms of all categories in 2002-2011 thousand hectares

	2002	2003	2004	2005	2006	2007	2009	2010	2011
Russian Federation	838.0	853.9	795.3	741.5	754.0	776.2	809.1	809.8	891.5
Volgograd Region	75.8	82.2	82.8	68.3	81.1	98.3	92.8	81.5	102.4
Specific weight of the Volgograd region in the Russian Federation, %	9.0	9.6	10.4	9.2	10.8	12.7	11.5	10.1	11.5

Vegetable, melon and fruit as well as the vegetable crops are irreplaceable raw materials for industrial production. Crops' size of the potatoes and vegetable and melon cultures for the analyzed period were varied in dependence of the demand for their processing products in the limits from 102.4 thousand hectares in 2005 till 136.1 thousand hectares in 2011. For last 10 years (since 2002 till 2011) the crops for the vegetables and melons on the farms of all categories increased for 10.0 thousand hectares (46%) and in conformity with it for 1.8 thousand hectares (34%). On the contrary, fruit crops' plantings have slightly changed (from 17.6 thousand hectares up to 21.8 thousand hectares), the most outstanding results were achieved in 2002, and the poorest results were in the 2011. For the period 2002 to 2011 the area of the fruit crops' planting has reduced for 4.2 thousand hectares (19%).

Marketing relations developed in agriculture affect the cultivation of not only regionally traditional agricultural crops. In recent years the structure of the cultivated areas of the vegetable crops has changed. Thus, among the other vegetable crops, that made 15% in 2011, the quota of the beet, the garlic and the vegetable marrows increased, so their part in the vegetable crops has proved insignificant and make a little more than 8%.

In recent years in the region we can see a steady tendency of the vegetable crops' height. In 2011 in comparison with 2002 the vegetable's gross collecting increased almost by 2.5 times, in general for the account of their crops' increase (on 46,1%) and productivity's increase (on 65.0%). The potatoes and fruit-berries crops' manufacture in 2011 was almost at level of 2002, because it decreased on 2.5% and, accordingly on 0.9%.

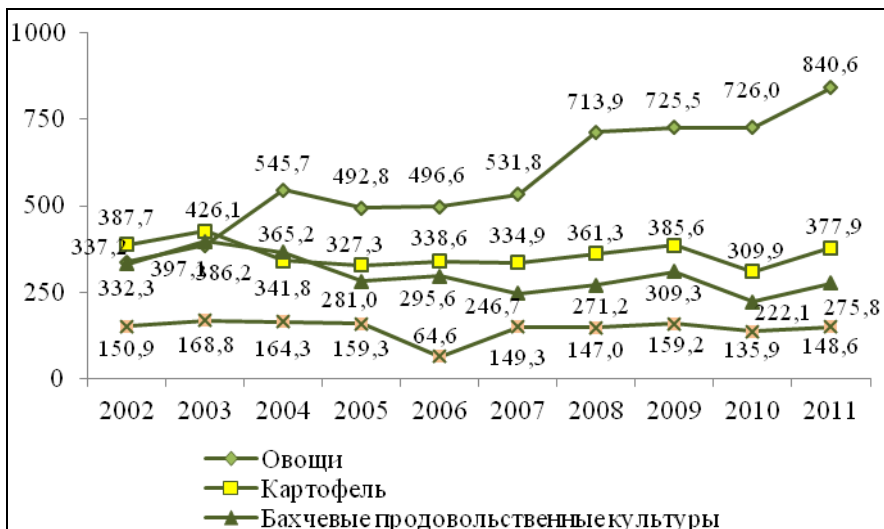
**Table 2:** Vegetable, melon and fruit crops' manufacture in all categories of farms in 2011, thousand hectares

	<b>Volgograd region</b>	<b>Southern Federal District (SFD)</b>	<b>Russian Federation (RF)</b>	<b>Specific weight of the Volgograd region in SFD, %</b>	<b>Specific weight of the Volgograd region in RF, %</b>
Melon food crops	275.8	595.9	1574.6	46.3	17.5
Potatoes	377.9	1641.7	32681.5	23.0	1.2
Vegetable crops, in total	840.6	3113.5	14696.2	27.0	5.7
Including:					
Onions	302.4	900.4	2122.7	33.6	14.2
Carrots	92.7	193.4	1735.0	47.9	5.3
Cabbage	101.7	308.1	3533.4	33.0	2.9
Tomatoes (of an open ground)	147.6	635.3	2200.6	23.2	6.7
Cucumber (of an open ground)	47.9	205.3	1202.4	23.3	4.0
Pumpkin	43.6	159.3	616.3	27.4	7.1
Vegetable marrows	193.0	153.6	559.6	12.6	3.4
Beet	17.5	98.9	1072.3	17.6	1.6
Garlic	5.7	29.0	234.0	19.7	2.4
Fruits and berries	148.6	781.4	2926.7	19.0	5.7

For the last ten years the maximum gross collecting of the vegetables in all categories of farms was obtained in 2011 and comprised 840.6 thousand tons, the minimal gathering held in 2002 and made 337.2 thousand tons. Fruits and berries were collected in the biggest quality in 2003 that made 164.4 thousand tons, and in the smallest quantity in 2006 that made 61,6 thousand tons (Picture 1).

The main producers of the vegetable crops of the open and closed ground, of the fruit and berry crops and of the grapes in the region are the population farms. Since 2002 till 2011 their quota in the total amount of the potatoes' manufacture made more than 93%, vegetables of the opened and closed ground made from 42 till 79%, melon and food crops made from 49 till 83%, fruits and berries made from 79 till 97% (including small-fruit patch that made till 100%), grapes made 100%.

The population farms cultivate in general such vegetable crops as tomatoes, cabbage, cucumbers, garlic, pumpkin, vegetable marrows, beet, and peas. In 2011 their quota in the total amount of this crops' manufacture in the region made from 45.7% on beet till 100.0% on garlic and green peas.



**Picture 1** Manufacture dynamics of the fruit and vegetable production on the farms of all categories of the Volgograd region, thousands of tons

In comparison with the level of the 2002, in 2011 we could see the height of the population's manufacture of all major types of vegetable crops. In 2011 cucumbers' and cabbage's manufacture significantly increased (in 3.0 and accordingly in 2.2 times), on 62.6% - tomatoes, on 58.9% - carrots, on 61.7% - garlic, on 49.1% - onions, on 26.5% - beet (Table 3).

In comparison with the level of the 2010, the vegetables' manufacture in 2011 on population farms also increased (in spite of the beet and the garlic). In 2011 the collecting of tomatoes grew to 3.8 thousand tons plus (3.6%), cucumbers have grown up to 0,5 thousand tons (1.3%), cabbage – up to 7.0 thousand tons (11.2%), pumpkin – up to 1,9 thousand tons (5.2%), vegetable marrows on 0.9 thousand tons (5.2%). The collecting of potatoes and fruit and vegetable crops by the population in comparison with the level of the 2010 increased on 62.3 thousand tons (20.9%) and accordingly 12.2 thousand tons (9.3%).

In reforming years of the agro-industrial complex the farms and the individual entrepreneurs became an integral part of the agricultural production. Carrots, onions, melon food crops, beet, tomatoes and cabbage made the main part of the vegetables cultivated by farmers.

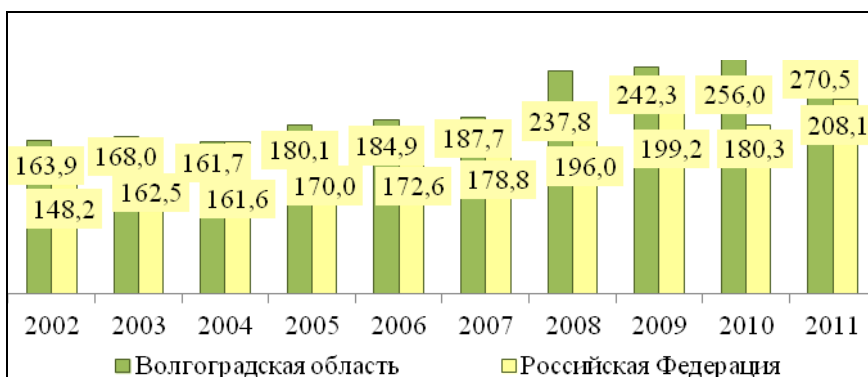
One of the most important indicators of efficiency of the agricultural crops cultivation is the productivity.

On the average on region in the period analyzed, on farms of all categories we could see the steady tendency of the productivity increase of the vegetable crops (except in 2004). For the last ten years vegetable productivity increased from 163.9 till 270.5 centners of hectares (65%). On the contrary, fruit and berry crops productivity from year to year varied from 41.7 till 115.5 centners.

**Table 3:** Main vegetable crops' manufacture on farms of the population of the Volgograd region at 2002-2011, thousand tons

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Onions	18.6	18.6	14.8	12.1	15.3	16.0	20.4	20.6	20.7	27.7
Carrots	10.1	12.1	12.5	11.3	11.4	12.6	15.2	17.4	15.5	16.1
Cabbage	31.5	46.9	30.8	25.3	31.1	31.3	35.4	68.3	62.1	69.1
Tomatoes	67.2	84.4	42.5	68.7	76.7	66.1	67.7	93.0	105.4	109.2
Cucumbers	14.1	26.4	19.9	18.1	24.0	21.6	24.4	28.6	42.2	42.8
Beet	6.3	8.3	8.0	7.4	6.9	8.7	10.8	13.2	10.4	8.0
Garlic	3.5	3.2	4.1	3.8	4.2	5.7	6.7	6.0	5.8	5.7
Pumpkin	0.03	48.1	57.2	49.9	30.7	26.1	32.6	30.7	36.6	38.5
Vegetable marrows	-	13.6	15.7	12.4	10.1	8.6	11.1	16.8	16.8	17.7

For the analyzed period vegetable crops productivity in the region annually exceeded the average indicators on Russia. So, the least excess was in 2004 (on 0.1 centner of hectares), the greatest excess was in 2010 (on 75.7 centners of hectares) (Picture 2).



**Picture 2** Vegetable crops productivity on farms of all categories, centner/hectare



In comparison with 2002, in 2011 in the region we could see the productivity increase of all the main kinds of vegetable goods. In 2011 onions productivity increased in 2.7 times, cucumbers – in 2.2 times, pumpkin - in 6.1 times, carrots – on 74.5%, cabbage – on 58.1%, tomatoes – on 63.0%, beet – on 28.2%, garlic – on 7.4%, vegetable marrows – on 60.0% (Table 4).

**Table 4:** Vegetable crops productivity on the farms of all categories in Volgograd region at 2002-2011, centner/hectare

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Onions	148.3	146.8	155.2	199.9	210.1	217.5	346.1	349.1	346.0	395.6
Carrots	126.3	131.2	142.1	151.8	176.3	165.4	213.1	255.6	253.0	220.4
Cabbage	184.8	236.3	196.0	196.2	192.1	191.2	225.8	299.7	271.1	292.2
Tomatoes	142.6	145.2	153.3	183.2	208.6	199.2	175.7	208.9	239.4	232.4
Cucumbers	124.7	153.1	136.0	131.9	151.3	136.5	154.5	188.0	287.6	278.9
Beet	171.9	176.4	138.5	167.1	166.3	172.5	220.8	280.7	266.5	220.4
Garlic	77.5	72.7	84.7	89.9	83.4	89.5	96.2	89.2	85.5	83.2
Pumpkin	34.3	213.0	220.8	222.8	170.8	111.7	190.1	175.6	289.4	207.8
Vegetable marrows	124.2	194.7	202.8	180.2	184.7	186.5	228.7	178.2	184.1	193.7

In recent years, agricultural goods' producers of the region expended amounts of work upon the improvement of the soil fertility under the crops. Mineral fertilizers under vegetable crops and potatoes were introduced annually at 2002-2011. In 2002 agricultural organizations introduced under vegetal crops 87 kilograms of mineral fertilizers on a hectare of the crops, and in 2011 it made 117kg [2].

For the analyzed period, mineral fertilizers for vegetable crops cultivation have been applied in 13 districts of Volgograd region cultivating this kind of production, that allowed them in 2011 to get vegetable productivity higher than on the average in the region on 7.1 – 32.3%.

Domestic fruit and vegetable production is in the increasing demand on the Russian internal market. In comparison with 2002, in 2011 the realization of the vegetable cultures in the region increased almost in 5 times (on 292.5 thousand tons).

The sale of the vegetable goods is being carried out by agricultural organizations. Over the last ten years they realized from 41 till 76% of vegetables. Since 2006 farms and individual entrepreneurs much increased the volumes of the vegetable crops realization. For this period they realized from 42 till 48% of goods. Population farms' quota in the realization of the vegetable production is insignificant and makes from 2% till 12% (Table 5).

**Table 5:** Realization of the vegetables on farm categories of the Volgograd region in 2002-2011, thousand tons

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Farms of all categories	74.1	97.7	158.7	194.1	253.8	259.2	314.8	376.5	366.6	366.6
Including: Agricultural organizations	54.7	69.3	121.2	129.8	128.4	124.6	166.1	164.1	150.5	163.4
Farms and individual entrepreneurs	10.7	19.4	34.1	50.1	114.0	108.8	132.6	177.7	177.3	161.0
Population farms	8.7	9.0	3.4	14.2	11.4	25.8	16.2	34.7	38.8	42.2

The main sales channel of the agricultural production is the sale of the cultivated crops directly to the processing organizations and organizations of the wholesale trade (including enterprises and organizations carrying out purchases for state and municipal needs), in the market, through their own shops. In 2011 on this channel large and average agricultural organizations realized 88.6% of vegetables and 99.9% of fruits and berries; including the realization through their own shops, tents, booths and also in the market they sold the tenth part of potatoes and on the average no more than 5% of vegetables. In more degree through this sale channel, among vegetable production, 8-10% of greenhouse and hothouse cucumbers, tomatoes and carrots from total amount were realized.

**Table 6:** Average consumer prices on fruit and vegetable production and potatoes in Volgograd region at 2002-2011, rouble/kg

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Potatoes	10.48	7.01	7.55	9.24	10.36	13.52	15.44	11.92	31.41	11.48
Fresh white cabbage	10.54	4.06	5.97	8.75	8.34	17.64	7.89	11.74	31.37	9.02
Onions	10.17	8.21	7.59	9.52	12.70	13.78	8.13	13.96	23.18	8.69
Beet	9.46	8.02	8.59	10.12	12.21	13.95	12.20	10.52	24.10	12.92
Carrots	9.08	7.18	7.15	11.54	11.24	14.78	12.88	12.90	27.88	12.58
Garlic	42.34	44.95	48.55	46.74	49.01	61.28	52.19	90.10	134.75	66.90
Fresh cucumbers	60.00	68.30	51.98	52.08	62.23	67.46	77.40	65.23	77.11	91.87
Apples	27.15	20.14	22.86	30.65	40.53	41.69	52.73	43.86	60.55	54.69

In 2002-2011 years we could see the ambiguous consumer prices dynamics for the fruit and vegetable production. In relation to the last year, the highest rates of the rise in prices were registered in 2002, 2005, 2007 and 2010, that was caused by a

considerable rise in price for potatoes and separate types of vegetable crops. In 2011 the greatest reduction of consumer prices for fruit and vegetable production was noticed. It changed on 38.1%. In a year potatoes became cheaper in 2.7 times, vegetables – in 2.3 times.

**Table 7:** The consumption of vegetables, potatoes and fruits and berries in the RF and in the regions of the Southern Federal district per capita a year at 2002-2011, kg

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	<b>Vegetables and melon food crops</b>									
Russian Federation	80	84	85	87	90	93	99	102	101	106
Republic of Adygeya	107	107	108	110	108	116	115	122	123	129
Republic of Kalmykiya	57	62	68	75	84	96	98	107	90	103
Krasnodar Kray	88	86	88	99	106	110	126	130	130	132
Astrakhan region	133	133	135	135	139	146	158	162	165	165
<b>Volgograd region</b>	<b>135</b>	<b>140</b>	<b>141</b>	<b>151</b>	<b>152</b>	<b>152</b>	<b>158</b>	<b>161</b>	<b>162</b>	<b>166</b>
Rostov region	87	93	99	94	102	106	118	124	130	137
	<b>Potatoes</b>									
Russian Federation	106	109	108	109	110	108	111	112	104	110
Republic of Adygeya	86	81	82	70	71	61	63	61	61	62
Republic of Kalmykiya	25	25	26	26	30	34	41	41	44	47
Krasnodar Kray	79	77	81	80	79	78	84	84	84	88
Astrakhan region	71	76	83	91	98	104	116	115	116	116
<b>Volgograd region</b>	<b>125</b>	<b>135</b>	<b>132</b>	<b>131</b>	<b>132</b>	<b>131</b>	<b>131</b>	<b>132</b>	<b>131</b>	<b>135</b>
Rostov region	83	87	99	94	94	91	101	100	92	92
	<b>Fruits and berries</b>									
Russian Federation	39	39	43	46	48	51	53	55	58	60
Republic of Adygeya	30	33	34	38	44	46	55	60	63	65
Republic of Kalmykiya	19	20	22	23	24	25	27	28	31	32
Krasnodar Kray	60	71	77	88	88	89	94	95	96	97
Astrakhan region	35	35	38	40	43	51	56	62	66	65
<b>Volgograd region</b>	<b>68</b>	<b>69</b>	<b>71</b>	<b>70</b>	<b>69</b>	<b>70</b>	<b>71</b>	<b>74</b>	<b>74</b>	<b>75</b>
Rostov region	38	44	47	49	50	53	58	59	64	67

Needs of the population of the Volgograd region in fruit and vegetable production are satisfied at the expense of their own manufacture and a significant import share of some types of goods.

In 2011 level of the region self-sufficiency made: on vegetables and melon food crops – 218.4%, on potatoes – 78.2%, on fruits and berries – 67.3%.

Formation of resources of vegetables and melon food crops, fruits and berries in the region takes place mainly thanking the private manufacture. In 2011 share of production in resources of vegetable and melon crops made more than 57% (at 2002 – 75.5%), and import share was insignificant and made less than 1% (at 2002 – 0.3%). In fruits and berries resources the private production made 62.5% (at 2002 – 70.3%), import share – 32.1% (at 2002 – 22.1%).

In general, among the fruit and berry production, potato and vegetable and melon crops manufactured in Volgograd region, vegetables and melons are exported in rather considerable volumes. Their export share at 2011 made 29.4% and exceeded personal consumption in the region on 32.6%.

In Volgograd region the average per capita consumption of vegetable and melon crops, fruits and berries, potato considerably exceeds the average Russian indicators and indicators of certain subjects of the Southern Federal district. In 2011 consumption of vegetables in the region made 166kg per capita in a year (in RF 106kg), potato – 135kg (in RF – 110kg), fruits and berries – 75 kg (in RF – 60kg).

In Volgograd region during the period analyzed we can register a steady tendency of vegetable and melon crops consumption volumes increase. Over the last ten years their consumption in the region increased on 23.0%. In comparison with the level of the 2010, in 2011 the height of consumption volumes made 2.5%. The consumption of potatoes and fruits in the region for 2002-2011 also had positive dynamics (Table 7).

### **3. Conclusion**

Fruit and vegetable production is a necessary element of population nutrition. According to selective inspection of house farms, share of the fruit and vegetable production and the potatoes in the structure of the expenses on purchase of food in recent years made on the average 13-15% [3].

Development of the agricultural manufacture in the region, formation of enough of resources, creation of the logistics centers and control of the consumer prices of socially important kinds of fruit and vegetable production will permit to stabilize a situation not only in the market of the fruit and vegetable production, but also of the foodstuff in general.

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