

## Management of Innovative Development of Agro-Industrial Complex

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**Abstract:** The study discusses the impact of innovation on the development of agro-industrial complex. Particular attention is paid to the principles of regional agricultural policies that promote innovation activity of market participants. The necessity of improving the innovative process control system is defined in order to improve the competitiveness of agricultural production. Questions of influence of innovations on competitiveness of agro-industrial complex are considered. The special attention is paid to the principles of the regional agrarian policy stimulating innovative activity of subjects of the market. Need of improvement of a control system of innovative processes for increase of competitiveness of agrarian production is defined.

**Key words:** Agro-industrial complex, investment policy, innovative activity, competitiveness, stimulating

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### INTRODUCTION

Addressing increasing the competitiveness of agricultural enterprises is the key to ensuring food security of Russia. In this regard, it is important to form such an agrarian policy which stimulates innovation of agricultural enterprises. In the transition to innovation type of development the role of the achievements of national and world science is becoming more and more important in agriculture. To improve the competitiveness of agribusiness it is necessary to establish an effective system of management of innovation processes. In agriculture, the expansion of innovation requires continuous improvement of technical and technological level of production, upgrading the species composition of animals, strain renovation, provides system integration with the scientific and technical sphere and ensure sustainable inflow into the industry effective innovations.

Attracting investments in the Agro-Industrial Complex (AIC) and the formation of effective investment policy today is given considerable attention because it is able to make investments “catalyst” of economic development as the state as a whole and any region or municipality. Terms of managing in agrarian and industrial complex at the present stage are focused on obtaining the economic benefits of investment in new technologies, modern machinery and equipment, the use of other innovative developments. The limited material and

financial resources requires very strict conditions intended effect evaluation, the cost-effectiveness of innovation, feasibility of investments in them. It is increasingly evident that the traditional management methods, the use of high-cost, energy-intensive technologies are not outdated models of machines and equipment to ensure obtaining competitive products. The market conditions of a particular innovation strategy of the enterprise are becoming a major factor in its “survival”.

Modern agriculture is rapidly improving, introducing new technologies of cultivation of plants, animal breeding, processing production processes are improved. The management of these processes abroad dedicated many works (Bilson and Darku, 2015; Rakhil and Shashini, 2014). The Russian agricultural sector management experience is summarized in work (Maleichenko *et al.*, 2016). The dynamics of the rural economy in the Republic of Mari El was investigated (Kazakovtseva *et al.*, 2015; Goretov *et al.*, 2015). A great contribution to the development of agricultural production in the Republic of Chuvashia have work (Evgrafov *et al.*, 2015).

### MATERIALS AND METHODS

Agriculture of Mari EL Republic on the right holds a leading position in the Volga Federal District. The share of the agricultural sector accounts for about 15% of the

Table 1: Gross value added by economic activity (at current prices, mln.)

Years	Agriculture, hunting and forestry	Total
2005	5380.9	30 085.6
2007	7686.8	43663.7
2009	10043.4	65765.3
2011	10160.7	82374.4
2013	15757.3	117201.1
2014	18265.9	124 400.2

Table 2: Implementation of agricultural products by agricultural organizations (tons)

Products	2014	2014 (%) , compared to 2013
Crop products	53257	97.3
Wheat	19717	109.2
Barley	12865	118.6
Leguminous	3381	126.6
Potatoes	4174	85.0
Vegetables	8192	85.8
<b>Livestock products</b>		
Cattle	6998	110.6
Pig	52887	107.5
Poultry	157129	126.1
Milk of all kinds	94735	103.3
Eggs (thousand)	233163	94.9

gross regional product of the republic. The total volume of gross agricultural output produced by all categories of farms of the republic amounted to 19.3 bln. rub. in 2015 which is 3 times more than in 2005 (Table 1).

The Republic of Mari El is making a sufficient contribution to the development and strengthening of agriculture and domestic food market of the country and district. The contribution of the agricultural enterprises of the Republic of Mari El in the all-Russian agricultural production is about 1 and 16% of the Volga Federal District.

Agricultural enterprises of the republic produce such volumes of production which in addition to domestic demand are able to provide products and many other regions of the Russian Federation. Based on the data shown in Table 2 we can see that demand is particularly animal products.

The main factor that has a significant impact on the highly dynamic development of the agro-industrial complex of the Republic of Mari El is the formation of a favorable investment climate in the region on the part of the government together with adequate financial support for economic operators. In 2014, the state support of agriculture from the state and federal budgets have been allocated >2.4 bln. rub.

It should be noted that an important component of the development of agro-industrial complex, along with state support is the high investment activity of representatives of the agricultural business.

The study of statistical data leads to the conclusion that the total investment in fixed assets of agriculture of the Republic of Mari El in 2000 and 2015 amounted to >50 bln. rub., >6000 workplaces were created (Fig. 1).

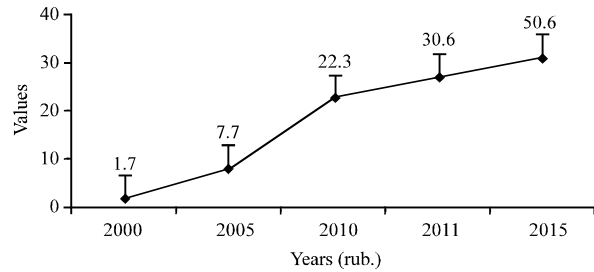


Fig. 1: The volume of investments into the fixed capital of agriculture of the Republic of Mari El

## RESULTS AND DISCUSSION

For successful implementation of the projects it is necessary to attract sources of financing through the creation of a favorable investment climate in the region as in the long term basis for sustainable economic development of agro-industrial complex is planned to reduce import dependence. Under the agreement with the Ministry of Agriculture of the Russian Federation, the state program of development of agriculture, agro industrial complex enterprises of the republic funds provided by the provision for reimbursement of the cost of interest on loans and borrowings in the amount of 1.8 bln. rub. from federal and republican budgets.

Also there should be noted a new form of support for the federal target program “sustainable development of rural areas in the 2014-2017 and for the period till 2020. This planned amount of state support will be about 20 mln. rub.

Under the state program of development of the industry there is work with the Ministry of Industry and Trade of the Russian Federation to attract federal budget to subsidize the interest rates of investment and working capital loans to industrial enterprises, the total amount of planned subsidy of about 150 mln. rub. Consequently, the basis of modern agro-industrial complex of the region’s control system is deep integration activities under the State program of agricultural development and project financing management. The Head of the Republic of Mari El has approved a list of investment projects in the agro-industrial complex of the region, aimed at import substitution and planned to be implemented in the years 2015-2019 which includes a number of promising investment projects such as the construction of turn 9, Ltd. “Poultry Farm Akashevskaya”, construction of a new pig farm for 30 thousand heads of Agroholding “Yola”, modernization of JSC “Plemzavod Semyonovsky”.

Agriculture and its basic economic activity agriculture are the leading backbone sectors of the economy of the Chuvash Republic, forming the agri-food market, food and economic security, employment and

settlement potential of rural areas. Chuvash Republic historically belongs to the agricultural region and among the 83 regions of Russia is one of the regions with moderate risk.

The development of agriculture in the region is carried out on the basis of the program “development of agriculture and regulation of the market of agricultural products, raw materials and food in the Chuvash Republic” for 2012-2020 which marked development priorities: stimulating the growth of the main types of agricultural products; stimulation of investment activity of innovative development of agribusiness; ensuring sustainable development of rural areas; support small farms.

During the period of implementation of the state program of development has increased the volume of production. In Volga Federal District (VFD) Chuvashia takes 2nd place in terms of potato production in all categories of farms and in 2012 its gross harvest amounted to 900.7 thousand tons or 109.1% in 2011 (according to the Russian Federation 29.4 million tons or 89.8%, VFD 7.7 million tons or 92.4%).

In 2012, the country produced gross output of 100 ha of farmland in the amount of 3321 thousand rubles (3rd place in the Volga Federal District).

Meat production per 100 hectares of farmland in 2012 was 11.2 tons (an average of VFD-5.5 tons, according to the Russian Federation 6.9 tons), milk 47.4 tons (for VFD 21.5 tons, the Russian Federation 19.0 tons). Livestock density is also one of the highest among the regions of the Volga Federal District 20.3 head of cattle on 100 ha of farmland (for VFD 12.6 head, the Russian Federation 11.9 per head) and 19.7 pigs per 100 ha arable land (for VFD 8.2 head, the Russian Federation 11.2 heads).

In 2012, the financial performance of agricultural activity was improved. According to the report on the financial and economic condition of agricultural organizations for 2012, the amount of profit increased by 2.1 times in 2011 and amounted to 382.6 mln. rub.

The share of profitable enterprises was 75.5% while the share of overdue accounts payable of the total was 0.6% (in the Russian Federation 2.0%) which indicates compliance with the Republic of payment discipline of settlements for earlier loans.

Considering the trends of development of agriculture structurally can highlight that in the Chuvash Republic the main direction is livestock. Dynamics of production of major livestock products is reflected in Table 3. Analysis of the table leads to the conclusion that in general, the main livestock products in the Chuvash Republic

Table 3: Dynamics of the main livestock products in all categories of farms in the Chuvash Republic

Products	Rubles				
	2010	2011	2012	2013	2014
Cattle and poultry for slaughter (thousands of tons)	69.6	69.1	72.6	66.9	65.9
Milk (thous. of tones)	494.6	489.3	457.6	422.8	420.9
Eggs (mln. pcs.)	284.2	323.8	350.2	337.6	260.6
Wool (tons)	412.0	422.0	386.0	377.0	335.0

Table 4: Dynamics of production of crop products in all categories of farms in the Chuvash Republic

Products	Rubles				
	2010	2011	2012	2013	2014
<b>Gross harvest (thous. tons)</b>					
Grains and legumes	127.7	555.4	411.9	396.2	554.2
Sugar beet	15.1	34.8	49.7	27.7	19.8
Potatoes	301.3	825.2	900.7	633.0	580.3
Vegetables (total)	99.2	175.0	167.8	140.9	143.4
<b>Yield (hundred weight/hectare, harvested area)</b>					
Grains and legumes	11.2	23.0	19.8	17.7	21.1
Sugar beet	211.2	273.6	262.6	338.2	263.6
Potatoes	79.8	170.7	191.5	171.2	173.9
Open ground vegetables	184.7	271.9	323.0	292.2	292.7

observed reduction in livestock production and poultry slaughter weight from 2010-2014 by 6.3%, milk by 15%, eggs by 8.3%, wool in bulk 18.6%.

The favorable geographical position of the Chuvash Republic in the Russian Federation is reflected in the dynamics of crop production (Table 4).

Analyzing the dynamics of crop production can be noted that the process of increasing the volume of production from 2010-2014 in potatoes by 92.5%, grain in 3.5 times, vegetables by 44.5% which is reflected in the structure of agricultural production (Table 5). However, some topical issues remain unresolved, among them are the following:

- Reduction of material and technical equipment due to the insufficient level of profitability of agricultural producers, anticipating growth of prices of goods and services of natural monopolies, unfavorable market conditions
- Low investment attractiveness of the agricultural producers, agricultural organizations financial instability, the inaccessibility of credit resources in the conditions of debt load, lack of collateral, lack of development of mortgage lending
- Limited access of agricultural producers to market conditions in the imperfections of its infrastructure, the weak development of cooperation in the sphere of production and sales of agricultural products
- Unused agricultural land
- Insufficient pace of implementation of energy efficient and innovative technologies in the production of food in the food processing industry

Table 5: Structure of agricultural output by types of farms in the Chuvash Republic for 2010-2014 (in current prices, mln. rub.)

Products	Rubles				
	2010	2011	2012	2013	2014
<b>Farms of all categories</b>					
Agricultural products	21388.3	32122.2	32625.4	30862.4	37764.7
Crop	6766.5	16669.1	15857.0	14928.6	18943.8
livestock	14621.9	15453.1	16768.3	15933.7	18820.9
<b>Agricultural organizations</b>					
Agricultural products	6252.2	9637.5	11370.0	11040.3	13957.3
Crop	1625.7	4262.7	4190.0	4141.6	5357.5
livestock	4626.5	5374.8	7180.0	6898.7	8599.9
<b>Population agriculture</b>					
Agricultural products	14456.8	19713.2	18817.0	17713.4	20712.7
Crop	4810.9	9988.1	9689.6	9068.1	11090.8
livestock	9645.9	9725.2	9127.4	8645.3	9621.9
<b>Peasant (farmer) economy</b>					
Agricultural products	679.3	2771.5	2438.4	2108.7	3094.6
Crop	329.8	2418.3	1977.4	1719.0	2495.5
livestock	349.5	353.2	461.0	389.8	599.1

- Insufficient pace of social development of rural areas, determining the deterioration of the socio-demographic situation, the outflow of able bodied population, especially the young, the weak development of alternative activities

Pursued in recent years agrarian policy in the Chuvash Republic aimed at the preservation of all the state support measures for the development of new areas, aimed at increasing the final results, the regulation of the market of agricultural products has led to an increase in the gross output of agriculture and food production. In recent years, the situation in agriculture has improved markedly, agricultural holdings begin to develop such as Ltd. "Agroholding "URMA", "JSC" Vurnary Meat Processing Plant" Agricultural company "Oldeevskaya", CJSC "Company Akkond-Agro" which occupy 7.9% of the market for that. It indicates an increase in the concentration and consolidation of agro-holdings.

The dynamics of development of agricultural sector is influenced by various factors. On the one hand, influenced by the measures that have been taken in recent years to improve the sustainability of agricultural production on the other-remains difficult macroeconomic environment in the aftermath of the crisis which increases the probability of risks for sustainable and dynamic development of the agricultural sector.

AIC will be developed under the influence of measures to improve the sustainability of agricultural production, contributing to its growth, namely an increase in volumes and directions of state support; introduction of innovative technologies in agricultural production and the acquisition of resource saving equipment; better utilization of the existing natural and economic potential for the production of competitive products; expansion of the agri-food market.

In crop production increasing will be achieved through the development of the following areas maintenance of soil fertility (preservation, reproduction and rational use of fertility of agricultural land), agrochemical and reclamation activities, the use of fertilizers and plant protection products, biologization agriculture, the development of new technologies in growing crops, expanding the acreage of high yielding varieties and hybrids.

In the build-up of livestock meat production, milk, eggs, fish pond will be achieved by improving the genetic potential of animals, state support of tribal organizations, creation of favorable conditions for investment policy in this sphere of activity, introduction of energy saving technologies.

Production of environmentally sound agricultural and food products is a promising direction of development of agribusiness. The Chuvash Republic has all the prerequisites for the development of environmentally friendly products and technologies that enhance the competitiveness of the country. This will contribute to measures to improve the use of agricultural land, development of elite seed.

As a result of the above stated measures to forecast figures the share of food products of own production by 2021 will be: grain 88.6%, potatoes 100.0%, vegetables 91.0%, meat and meat products 87.9% , milk and dairy products 97.6%, eggs and egg products 93.7%.

Livestock and poultry production (live weight) by 2021 will increase to 137.8 thousand tons or by 26.9%, milk-up to 600 thousand tons or by 21.8%. Most of the growth will be obtained at the expense of growth of productivity of livestock and poultry on the basis of improving the species composition.

As a result of agrarian reform private farms were able to expand their land areas at the expense of equity shares,

purchase-sale, lease, etc. As a result, the area of land plots of private farms in Chuvash Republic population has increased 2.1 times, accounting for 21.2% of the total arable land in the country and in the early 90's of 20th century, the figures were 5-6%.

Positive dynamics in the expansion of the area of land contributed to an increase in the share of private farms of the population in agricultural production by economic entities of the Chuvash Republic. For certain types of products of private farming production figures are as follows: 81.9% of potatoes, 80.7% of vegetables, 64.4% meat, 68.9% of the milk, eggs 48.8%, 97.3% wool, produced in the region. This growth was driven by both an increase in production in households and a drop in production in large-scale agricultural enterprises.

Of the total population of the Chuvash Republic (1238 thousand), 486.6 thousand people (39.3%) live in rural areas. According to the Russian State Register at the beginning of 2015 the number of smallholders in the country is 212.7 thousand pieces. According to official data, reducing the number of small holdings in 25 years is insignificant and amounts to 0.3% (in 1990-213.3 thousand).

Due to the fall in production in the agricultural enterprises, poor farmers are betting on private farms of the population.

In 2006, private farms are included in the National Priority Project (NPP) "development of agriculture", according to which the loan is issued for conducting NPP with a subsidized interest rate.

The Chuvash Republic is the leader in the Russian Federation in terms of preferential loans attracted small forms of management. In 2006-2014 in the framework of the priority national project "Development of agriculture" 118 thousand citizens, who have private farms or every second family, provided >116.9 thousand preferential loans in the amount of 22.2 billion rubles in 2014-14.1 thousand credits amounting to 3.4 bln. rub.

The need for this direction of state support for private households was caused by the current situation in agricultural production. First and foremost is to reduce the number of livestock farms of all categories and reduction of sown areas (Table 6). From 1990-2002, for all types of cattle, sheep and poultry there was a dynamic

growth. Comparing 2002-2005 numbers of cattle reduced for 18.4%, number of pigs for 40.8%. The desire to reverse the current negative trend in the number of farm animals kept in smallholdings and provide stimulus to build a national project of livestock associated with an increase in employment and improvement of the material conditions of people in rural areas, released during the reform of AIC.

The study found that over the period of implementation of the priority national program "development of agriculture" more dynamic development received no private farms and peasant (farmer) farms and agricultural enterprises. Their annual growth rate for the period under review amounted to 129.5% at the Russian level and 117.2%, respectively and in the Chuvash Republic 135.9 and 105.8 9% (Table 7).

The average annual growth rate of the physical volume of production for smallholders 2005-2014 lead to the conclusion, that it was not able to fully realize the potential of rural families as form of management. During this period the number of cows in private farms decreased by 31.9%, pigs 16.6% which influenced the decline in livestock production. The same situation and in agricultural crops, which are in private farms in the past decade decreased annually and in 2014 accounted for 86.9% of the 2005 level.

However, private farms of the population in the structure of agricultural products in total remain predominant importance and occupy 54.8%, while production of potatoes (73.9%), vegetables (78.4%), milk (67.5 %) and wool (96.4%).

Thus, during an epidemic of bankruptcy of agricultural enterprises (1995-2005), private farms for the majority of the rural population, especially agricultural workers were the only sphere of application of labor, have

Table 6: Changes in the number of livestock and poultry farms in the chuvash republic of the population (at the end of the year, thousand heads)

Years	Cattle	Cows	Pigs	Sheep and goats	Poultry
1990	134.9	95.7	51.3	304.5	905.7
2002	160.0	112.7	75.4	184.8	731.8
2005	130.7	91.4	44.6	151.3	589.1
2014	122.1	62.3	37.2	168.6	624.2

Table 7: Indexes and average annual growth of physical volume of agricultural output by types of farms Russia (Russian Federation) and the Chuvash Republic (CR) (in comparable prices to the level of 2009)

Years	Farms of all categories		Agricultural organizations		Population agriculture		Peasant (farmer) farms	
	RF	ChR	RF	ChR	RF	ChR	RF	ChR
2011	96.7	103.4	115.2	101.1	100.7	101.0	126.6	145.9
2012	92.1	104.1	109.4	109.8	97.3	98.5	112.9	140.2
2013	97.5	92.7	118.5	101.5	97.6	86.7	133.7	113.6
2014	100.9	95.4	126.5	110.4	96.2	83.3	147.6	147.2
Mid-annual growth rate	96.7	98.8	117.2	105.8	97.9	92.0	129.5	135.9

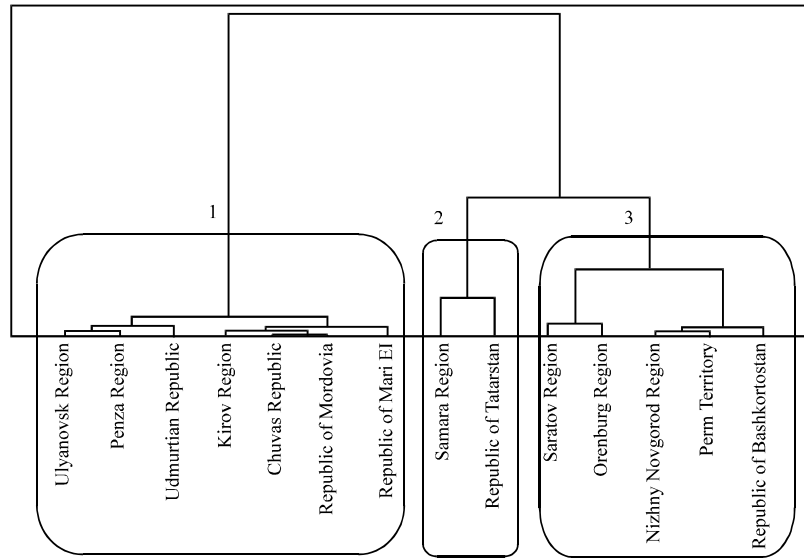


Fig. 2: Dendrograms cluster analysis of investments in fixed assets (total) by economic activity “agriculture, hunting and forestry” for 2014 (in actual prices, mln. rub.)

a decisive importance in the rural family incomes, thus contributed to the preservation of the rural population and the rural way of life, social control over the territory. As we noted above, production in private farms based on personal labor of citizens and members of his family on the land, provided for the conduct of private farming. At present, the labor potential of the rural family is almost exhausted. In Chuvashia, the process of urbanization is going on, migration of population from rural areas. Migration decline reduced the population of the republic in the 4474 people in 2014. The negative consequences of the reforms affected the demographic decline. As a result, over the past two decades in the Chuvash Republic from 709 schools in 1990, closed in 2011, more than 200 institutions or 28.9%. The lack of jobs in rural areas, the unattractiveness of agricultural labor led to the fact that the left and back into the village of no more than 20% of school leavers. The level of average wages in agriculture amounted to 12766 rub. in 2014 which is 61.4% of national average. In rural areas, in 2014, the population was 268.4 thousand people. At the same time, the number of workers employed in agriculture in the region is 12,152 people or 4.5%.

At the same time in 2014 in Chuvashia employed in the informal sector to the total employed population totaled 30.5%. As a result of the field survey of rural settlement residents Staroaybesinskoe settlement in Alatyrsky District in Chuvash Republic revealed that out of 440 households are operating 285 households or 64.8%. In 2005, 386 farmsteads were active. The number of existing farmsteads decreased over ten years by 26.1%.

On the territory of the settlement in 2005, the agricultural cooperative ceased to exist after the bankruptcy. The production infrastructure is completely destroyed, nothing remains of the livestock buildings, potato, garage. Agricultural land covered with low forest. Of the 910 the conclusion that it was not able to fully realize the potential of rural families as form of management. During this period the number of cows in private farms decreased inhabitants of the village in the retirement age-212 persons (23.2%), working-age population 498 people, including 130 people (26.1%) who go to work outside the country, 192 people (38.5%) are registered but not live in the village. population of the region will decline for 100 thousand people. One of the main directions of the adaptation of the agricultural enterprises to the changing conditions systems. The yield on the optimum operating parameters is impossible without investment, providing the necessary structural changes. In this connection, a special poignancy and urgency is the problem of activation of investment process in agriculture.

Let's make cluster analysis of subjects of the Volga Federal District for investments in fixed assets (total) and investment by kind of economic activity “Agriculture, hunting and forestry” for 2014.

Figure 2 shows Dendrograms cluster analysis of investments in fixed assets (total) by economic activity “Agriculture, hunting and forestry” for 2014 (in actual prices, mln. of rub.).

Results of the analysis show that the Republic of Mari El and Chuvashia republic are included in the first

group on investments in fixed assets by activity “agriculture, hunting and forestry” although the association in the statistics, investment in agriculture prevails to forestry, the share of agriculture greatly predominates and the results of cluster analysis showed an adequate picture.

### CONCLUSION

As the current realities there are many problems in the field of investment that need to be addressed at the highest level. It is necessary to create a support system for investors, a significant part of which can be a set of tax breaks for businesses, oriented to innovative development and leading the country to an innovative model of economic growth.

Creating favorable conditions for doing business reduce its costs and investment risks, the introduction of tax incentives for investment projects determined by strategic foundation for further improving the competitiveness of agriculture which provides food security of the country.

Thus, the research has shown that in order to stabilize the region’s agricultural sector it is necessary to ensure an average annual growth of investment in fixed assets in the amount of 4.5%, to achieve the level of profitability in the agricultural organizations to 15.0% (including subsidies) to create 416 units of high performance workplaces to ensure the growth of labor productivity index by 4.5 times and increase agricultural production in all categories of farms (in constant prices) by 2021 relative to 2014 by 21.3%, food products by 28.8%.

It is necessary to expand the state support of private farming because: firstly, individual farms are the basis on which the training of local staff for the organization of a peasant (farmer’s) economy or other organizational and legal form of entrepreneurship in agriculture; secondly, private farming is an integral part of rural infrastructure, rural carrier of culture and identity of peoples; third, private farms performed better efficient use of land resources in comparison with other forms of management, to quickly adapt to the market situation.

Thus, under the state action plan to import substitution it is necessary to carry out monitoring of prices, quality and safety of food imported into the territory of the Republic of Mari El including from outside

the Russian Federation as well as to consolidate the steps at each stage. Ultimately, the implementation of investment projects will allow for import substitution in the sectors of agriculture, strengthen the agri-food market, food export potential of the Republic of Mari El, had a favorable impact on food security not only to the region but also in Russia as a whole.

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