Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics

Diploma Thesis

Grain market current state and future perspectives - Case study of Russia

Author: Sofiia Baderina

Supervisor: Assoc. prof. Ing. Mansoor Maitah, Ph.D. et Ph.D., Department of Economics

CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

DIPLOMA THESIS ASSIGNMENT

Bc. Sofiia Baderina

Economics and Management

Thesis title

Grain market current state and future perspectives – Case study of Russia

---

Objectives of thesis

The importance of the grain market is defined by its leading role in formation of food resources of the country, existence and a variety of inter-industry communications. In 2016 the share of grains in the structure of sown areas in the Russian Federation was circa 60%. The main grain producers are agricultural organizations that account for 70% of the volume of production.The aim of this work is a consideration of the current state of the grain market of Russian Federation and also the analysis of prospects of its development on the future.

Methodology

The research under studying of the market grain in Russia includes various methods of research. The methodology will be directed to studying of professional literature, articles and other sources of printed and electronic character. The thesis Will use statistical data of the authoritative Russian sources.

Also, the analysis of the existing situation the historical and logical method will be applied. In this analysis, the following factors will be considered: The volume of issued credits to the economy in general; the loans granted to agriculture; growth in the use of factors of production; the role of the state and private financial institutions in financing of agriculture.

The proposed extent of the thesis

50-60 pages

Keywords

Grain market, agricultural industry, export, grain consumption, economic.

Recommended information sources

Barnett, H. Morse, C.: Scarsity and Growth: The economics and natural Resources Scarsity. Baltimore, Johns Hopkins Press, 1963

Grishaeva L.V.: Agricultural Markets. Omsk, 2003

Kovalenko N.Ya.: Economy of agriculture. Yurkniga, 2004

Expected date of thesis defence

2017/18 WS – FEM (February 2018)

The Diploma Thesis Supervisor

doc. Ing. Mansoor Maitah, Ph.D. et Ph.D.

Supervising department

Department of Economics

Electronic approval: 12. 3. 2018

prof. Ing. Miroslav Svatoš, CSc.

Head of department

Electronic approval: 12. 3. 2018

Ing. Martin Pelikán, Ph.D.

Dean

Prague on 21. 03. 2018

Declaration

I declare that I have worked on my diploma thesis titled "Grain market current state and future perspectives - Case study of Russia" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on 29.03.2018 _____

Acknowledgement

I would like to thank Assoc. prof. Ing. Mansoor Maitah, Ph.D. et Ph.D., for his advice and professional leadership during my work on this thesis.

Grain market current state and future perspectives – Case study of Russia

Abstract

The grain market is the main element of the world market of agricultural products and food. In general, grain products are produced in more than 90 countries. More than a half of all arable land is steadily occupied, and the volume of world trade by grain exceeds 240 million tons.

The theoretical part contains a general overview and key participants of the world grain market. The analytical part offers a review of the condition of the Russian agriculture sector. In order to demonstrate the dynamic development of the grain market in Russia, the data relevant to 2016/2017 were chosen. The practical part focuses on possibilities for the advancement of the Russian grain market. The last but not least, there is a forecast of economic parameters for the market for the next two years.

The central aims of the Diploma thesis are to analyse the current situation of the grain market of Russian Federation, describing its essence as well as identifying its problems and also to examine the prospects of its expansion in the future.

Keywords: Russian agriculture sector, grain market, grain consumption, development of agriculture, production, raw materials, investment attractiveness.

Trh obilovin aktuální stav a budoucí perspektivy – Případová studie Ruská Federace

Abstrakt

Trh obilovin je hlavním prvkem světového trhu zemědělských produktů a potravin. Výrobky z obilovin se obecně vyrábějí ve více než 90 zemích. Více než polovina veškeré orné půdy je trvale obsazena a objem světového obchodu s obilím přesahuje 240 milionů tun.

Teoretická část obsahuje obecný přehled a klíčové účastníky světového trhu s obilovinami. Analytická část nabízí přehled stavu ruského zemědělského sektoru. Za účelem prokázání dynamického vývoje trhu s obilovinami v Rusku byly vybrány údaje roku 2016/2017. Praktická část se zaměřuje na možnosti rozvoje ruského trhu s obilovinami. V neposlední řadě je provedena prognóza ekonomických parametrů pro trh v příštích dvou letech.

Hlavním cílem diplomové práce je analyzovat současnou situaci na trhu obilovin Ruské federace, popsat její podstatu, identifikovat její problémy a také prozkoumat vyhlídky jeho rozšíření v budoucnu.

Klíčová slova: Ruské zemědělství, trh obilovin, spotřeba obilovin, rozvoj zemědělství, produkce, suroviny, investiční přitažlivost,

Table of content

1 Introduction

Providing the population of Earth with food resources has been recognized as a global problem for mankind several decades ago. For the last 20 years, the population of the planet has increased more than by 1.4 billion people and in 2011 approached 7 billion. According to forecasts of scientists, this tendency will remain and in the future. So, by 2050 on the population on Earth could be about 9.3 billion. This will not only affect availability of food in the quantities providing the balanced structure of a food allowance, but also its quality – safety and ecological purity of foodstuffs becoming one of the main tasks of today. Considering extremely uneven level of development of agriculture in various countries and regions, the solution of these tasks depends on tendencies of development of the world market of agricultural products and food. (Fao.org, 2017)

The world agrarian market is the market of export goods. Its competitive environment is formed by provision dealers, and the prices depend on the product cost made in optimum agro economic conditions. Such conditions are capable to provide only the most effective producers including by means of various measures and forms of stimulation. Producers which work in the worst conditions or it is less effective, can't adequately compete in the world market without serious state support that affects market condition and indicators of availability of agricultural goods.

Recently, questions of development of the global food market acquire increasing relevance and become one of key international problems which solution is an important condition of creation of the atmosphere of stability and wellbeing both in the world in general, and in certain states. Questions of providing with availability and qualitative food gain special value against the background of the crisis phenomena in world food system. (Un.org, 2017)

The grain market - the largest market of agricultural raw materials which forms all other agricultural and food markets. Grain is used as raw materials for the food industry (production of food), and as forages in livestock production. Due to this, the situation in the market of grain can exert impact and on the markets of oil-bearing crops (cakes and cakes olive also form a food supply of branch of livestock production). (Oecd-ilibrary.org, 2018)

The grain market is the largest market of agricultural raw materials which forms all other agricultural and food markets. Grain is used as raw material for the food industry (production of food), and as forages in livestock production.

The main types of grain crops in the world market are wheat, barley, oats, corn, rice, buckwheat and peas.

The grain market of Russia is one of the largest world producers of grain by volume. So, for example, Russia is in 3rd position in the world on production of wheat (8,3% of world production) and on export of this type of grain (12,6% of world trade). Russia occupies the 1st position in the world on production of barley (14,2% of world production) and the 4th - on its export (12,0% of world trade). Gradually Russia also became a significant producer of corn, for example, production of corn in the Russian Federation in 2001 was little more than 0,8 million tons, but by 2015 it reached 13,2 million tons. (Un.org, 2017)

Historically, production of grain in Russia in general, tended to be for internal consumption, but due to increases in global demand for grain, development of export logistics and infrastructure became a primary consideration.

2 Objectives and Methodology

2.1 Objectives

The importance of the grain market is defined by its leading role in formation of food resources of the country, existence and a variety of inter-industry communications. In 2016 the share of grains in the structure of sown areas in the Russian Federation was circa 60%. The main grain producers are agricultural organizations that account for 70% of the volume of production.

The aim of my Diploma thesis is a consideration of the current state of the grain market of Russian Federation relevant to 2016/2017 and also the analysis of prospects of its development on the future.

2.2 Methodology

The research under studying of the market grain in Russia includes various methods of research. The methodology will be directed to studying of professional literature, articles and other sources of printed and electronic character. The thesis will use statistical data of the authoritative Russian sources. Comparative analysis will be used for the comparisons with main exporters at international grain market.

Also, the analysis of the existing situation will be applied the historical and logical methods. In this analysis, the following factors will be considered: the loans granted to agriculture; share of grain production in agriculture; number of livestock; cultivated area; world prices for grain; the role of the state and private financial institutions in financing of agriculture relevant to 2016/2017. The last but not least point in the practical part is to forecast of economic parameters for grain market for the next two years.

3 Theoretical Part

3.1 General overview of the world grain market

The market of grain is the main element of the world market of agricultural products and food. From all other segments of the agrarian market it is distinguished by the greatest conservatism and closeness therefore it is quite difficult for the new player to enter the grain market. First of all it is connected with the fact that major agrarian countries conduct purposeful policy of legislative and financial support of national producers. Introduction of new technologies of cultivation of cultures, transportations and storages of finished goods is among other things stimulated. (Chernyakova, 2008)

The level of development of grain industry is a peculiar indicator of geopolitical power of the state. On volumes of absolute and per capita production of grain, the sizes of the carryover stocks, existence of reserve funds and a condition of the markets it is possible to judge not only efficiency of functioning of agro-industrial complex (AIC) of the country and its separate branches, but also the standard of living of the population. (Altukhov, 2009)

The grain market covers all stages of expanded reproduction of grain farm and represents the difficult structural institution including a set of elements of market system.

In general grain products are produced in more than 90 countries of the world. Under seeding of grain more than a half of all arable land is steadily occupied, and the volume of world trade by grain exceeds 240 million tons. The main food grain crops are wheat and rice, technical (for animals) – corn, barley, sorghum, millet and oats. At the same time wheat, corn and rice make about 85% of total production of grain. (Gordeyev, 2007)

Various factors exert impact on the world market.

The population of Earth grows, and together with it grain consumption increases. Wheat role as food crop increases in the third countries of the world, (the Middle East, Africa, Latin America), its consumption in traditional the rice-producing countries, especially in China, in connection with an urbanization and transition considerably to the western type of food increases. (Fao.org, 2017)

The important factor exerting impact on a situation in the world grain market is the size of the carryover stocks in the largest countries-exporters. This size averages 20% of the size of the annual needs for grain. However, in some countries, for example the USA, it reaches 40% of internal needs of the country.

World planting acreage for the last three decades were reduced. There was an essential reduction of acreage in the USA and Western Europe and mass erosion of soils in many Third World countries. The productivity for these years has increased by 57%. This growth of productivity has been generally provided due to use of achievements of scientific and technical progress in the developed countries which predetermine global trends in grain industry.

Therefore in the world market of grain could be observed a steady specialization: production of grain concentrates in the developed countries, and many developing countries aren't able to solve the grain problems, and are forced to go for broad import of grain. As a result world grain trade grows. (Fao.org, 2017)

3.2 Key participants of the world grain market

The main participants of the world grain market can be conditionally divided into three groups.

First group *"Exporters-producers"* include the USA, Canada, Australia, Argentina and EU countries treat the first. They have well developed grain sector quite often completely focused on export. In recent years very close the countries of the Black Sea and Caspian region – Russia, Ukraine and Kazakhstan have approached this group. The American export of wheat also faces the amplifying international competition, especially from the European Union and Russia. The European Union reaps a bigger harvest, than last years and is ready to support repeatedly its export to the North African markets. Russia was the growing force in foreign market for last 5 years. With a record harvest and large volume in stocks, Russia as expect, will be the world's leading supplier of wheat, setting a new record for its export. Export from both countries will probably be accelerated through the most part of 2017/18. (Usda.gov, 2017)

The second group is *Importers-Consumers*. The countries with adverse climatic conditions, not capable to provide the population and the industry with enough volume of grain. This group includes Egypt, Mexico, Saudi Arabia and Japan. Egypt and Mexico, for example, annually buy in the world markets 14–15 million tons of grain, Saudi Arabia – 12.5 million tons, Japan – about 25.5 million t. In Egypt after the political crisis at the beginning of 2011 the market of grain was stabilized, and in 2016, supply of wheat has made about 10.5 million tons. (Usda.gov, 2017)

It is also possible to note the following changes among importers of the market in 2017/18 as of September, 2017:

- Indonesia is raised 500,000 tons to 10.5 million based on larger expected consumption growth.
- Iran is cut 700,000 tons to 500,000 due to the recent imposition of a ban on wheat imports.
- Iraq is up 200,000 tons to 2.7 million based on the recent uptick in purchases from government tenders, as well as reports of a lower-quality domestic crop.
- Syria is down 200,000 tons to 700,000 on lower expected demand based on reduced 2016/17 imports.
- Turkey is lowered by 400,000 tons to 5.0 million based on a larger domestic crop. (Fas.usda.gov, 2018)

The third group of *Importers-Producers* includes two states: India and China. They have a considerable share in world production grain, but don't satisfy the high internal consumption. So, China is in the 1st place in the world on production of rice, on the 2nd – on gross gathering wheat and on the 3rd – on release of commercial grain crops. In 2016/17 in the country about 356,3 million tons of grain have been produced, however internal consumption has made about 370,6 million tons. India has grown up 218 million tons grain, and has consumed about 221 million tons. Recently these countries import small volumes of grain (China has bought in 2016/17 about 3 million tons, India – about 3.5 million tons), however in the medium term can increase their import. The Chinese experts consider that within the next several years demand on grain will grow in the country at least on 4 million tons a year. Besides, in the People's Republic of China the course towards inflation control which will counteract also increase in prices for food within the country is announced. Such decision among other things means that China will be forced to increase import of food products, including grains. (Gordeyev, 2007)

The cumulative offer of the countries which are traditionally included in the first group (net - exporters), makes 84% of all world trade by grain. Characteristic signs of the grain markets formed by these states are:

- Existence of the stable legislative base adequate to conditions of the market relations which leans on the system of legal, economic and organizational and administrative measures; (Un.org, 2017)
- Flexibility of the relations in a chain "production – consumption" which is reached due to protectionist support of national producers of grain by the state, freedom of choice for ways of its selling, wide use of cooperation, existence of

advanced network of specialized credit and financial institutes and also the state and commercial information and analysis centres and any services of the grain market;

- Reliable coordination of economic actions between economic entities when strengthening competition, existence of inter-industry and inter-regional communications with constant various participation of the state in regulation of the grain market. (Un.org, 2017)

3.3 Forecast for world total grains production during 2017/18

The forecast for total world grains (wheat and coarse grains) production in 2017/18 is increased by 12m t m/m (month-on-month) to 2,049m, but still down 4% year-on-year, owing to lower production area and poorer average yields. Increases from before for wheat (+10m t m/m) and barley (+4m) reflects better than expected harvests in the Black Sea region, while a maize reduction (-3m) includes lower figures for the EU and China. (Gurova, 2012)

Higher projection for feeding contributes to a larger consumption forecast, however, this absorbs only a portion of the supply increase and carryover stocks are up by 8m t m/m, to 485m. The forecast 40m t fall in stocks is predominantly for maize, while wheat inventories are predicted to increase to record amounts. With m/m gains for wheat and maize, global trade is seen reaching a new high of 354m t. (Grun, 2017)

With an upgraded forecast for the USA more than offsetting marginal reductions for other producers, the outlook for global soya bean output in 2017/18 is lifted by 2m t from July, to 347m, just fractionally below the previous season. The m/m increase in supply is channelled to higher projections for consumption and ending stocks, the latter lifted by 2m t, to 41m. Nevertheless, global inventories are still expected to tighten, with major exporters' surpluses predicted to drop by nearly one-fifth, to 22m t. Trade is seen marginally up from previously, at 149m t, a 6m y/y increase. (Un.org, 2017)

The global rice supply and demand is unchanged for 2016/17 but, due to fractional adjustments, world output in 2017/18 is a little lower, at 485m t, albeit, potentially a new high. The outlook for consumption is reduced, but final season stocks are maintained at 118m t, down by 2m y/y. The small annual reduction in inventories stems from an anticipated drop in major exporters' reserves to a ten-year low, predominantly stemming on a drawdown in Thailand. Trade throughout 2018 is projected to stay elevated on solid demand from buyers in Africa, Asia and the European Union. (Rosinformagrotech, 2017)

Led by a slump in wheat prices, but with declines in the other components as well, the IGC Grains and Oilseeds Index (GOI) weakened by 4% m/m.

WORLD ESTIMATES

Table 1: Total grains (Wheat and coarse grains)

Million tons	***14/15***	***15/16***	***16/17 est.***	***17/18 forecast***	
				July	***August***
Production	*2052*	*2012*	*2128*	*2038*	*2049*
Trade	*322*	*346*	*352*	*349*	*354*
Consumption	*2011*	*1988*	*2085*	*2083*	*2089*
Carryover stocks	*457*	*482*	*525*	*478*	*485*
year/year change	*41*	*25*	*43*		*-40*
Major exporters [b]	*150*	*153*	*181*	*150*	*157*
b - Argentina, Australia, Canada, EU, Kazakhstan, Russia, Ukraine, USA					

Sourse: AB-Centre, 2016

Table 2: Wheat

Million tons	***14/15***	***15/16***	***16/17 est.***	***17/18 forecast***	
				July	***August***
Production	*730*	*738*	*754*	*732*	*742*
Trade	*153*	*166*	*175*	*170*	*172*
Consumption	*715*	*718*	*736*	*735*	*738*
Carryover stocks	*206*	*226*	*244*	*241*	*248*
year/year change	*15*	*19*	*18*		*4*
Major exporters [b]	*66*	*68*	*77*	*65*	*69*
b - Argentina, Australia, Canada, EU, Kazakhstan, Russia, Ukraine, USA					

Sourse: AB-Centre, 2016

Table 3: Maize (corn)

Million tons	***14/15***	***15/16***	***16/17 est.***	***17/18 forecast***	
				July	***August***
Production	*1022*	*978*	*1073*	*1020*	*1017*
Trade	*125*	*136*	*139*	*143*	*146*
Consumption	*997*	*975*	*1049*	*1054*	*1055*
Carryover stocks	*207*	*210*	*234*	*197*	*196*
year/year change	*25*	*3*	*24*		*-38*
Major exporters [c]	*58*	*59*	*79*	*69*	*69*

[c] *- Argentina, Brazil, Ukraine, USA*

Sourse: AB-Centre, 2016

OVERVIEW

- A 78m t y/y drop in total grain production is forecast for 2017/18, including maize down by 56m.
- With grain consumption edging higher, world stocks may contract for the first time in five years, including in the USA and China.
- World rice inventories in 2017/18 are likely to reduce, including tighter stocks in the major exporters, forecasted to contract by 11%, to a decade low.
- Soya bean trade in 2017/18 is seen rising by 6m t y/y, to a fresh peak, with both Brazil and the USA potentially exporting at least 60m.
- Record grain trade is envisaged, led by larger maize shipments. Total grain exports from the Black Sea region could reach a new high. (Rosinformagrotech, 2017)

4 Analytical Part

4.1 Review of Russian Agriculture sector

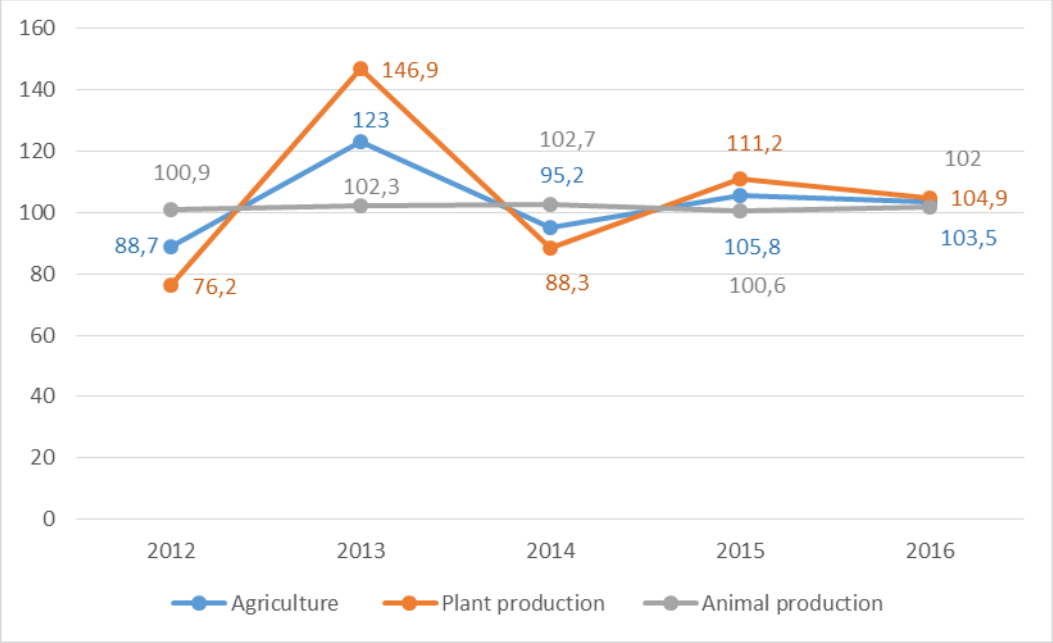
4.1.1 Agriculture as an industry of a strategic importance for Russia, realizing the concept of import substitution

Agriculture is one of the most important and priority segments of the national economy. In terms of gross value added the share it achieved 3,8% in 2015, according to Rosstat data. In recent years increase in production of gross output of agriculture exceeds growth rates in the food industry and economies of the Russian Federation in general. Production of gross output of agriculture has grown in the current prices from 2014 to 2016 for 29%. (Gurova, 2012)

The greatest growth rates of gross output during 2012-2016 are reached in 2015 – 105,8%, including in plant production – 111,2% and in livestock production – 100,6%.

Significant growth in agriculture for the specified period is reached thanks to increase in volumes of the state support of branch during implementation of the Governmental program "Development of agriculture and regulation of the markets of agricultural production, raw materials and food for 2013-2020". (Rosinformagrotech, 2017)

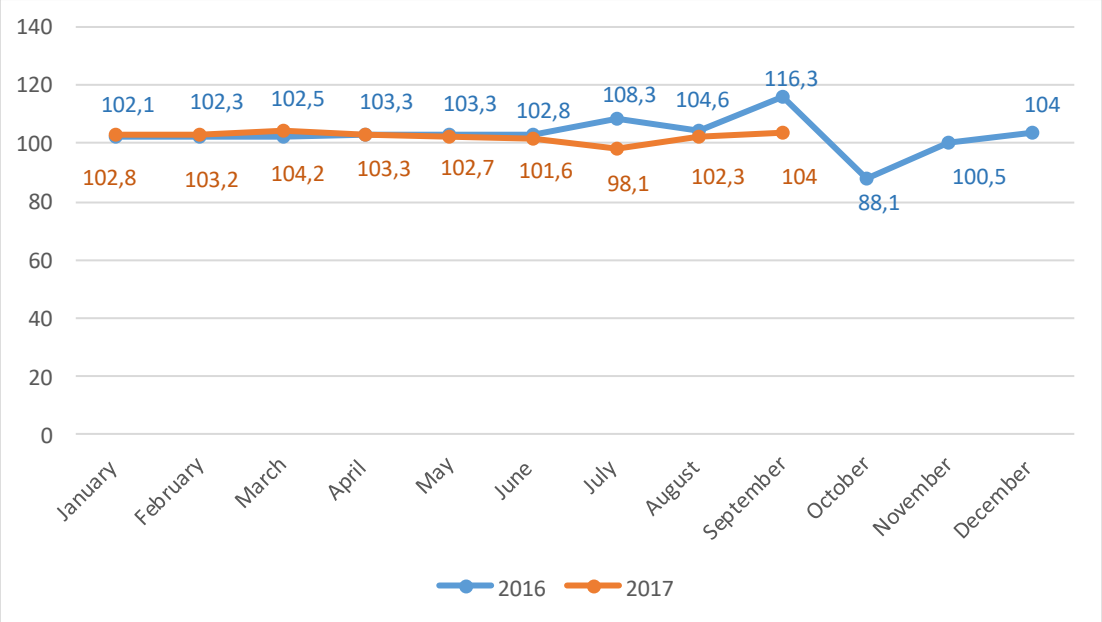
Graph 1: Growth rates of gross output of agriculture in the Russian Federation, %



Source: Rosstat, 2016

In 2017 agriculture has continued to be one of drivers of economy growth in Russian Federation, showing positive dynamics, however growth rates were lower than last year's (Picture 2). For January-September, 2017 the production gain in agriculture has made 2,4% against 7,6% for the same period of 2016. (Usda.gov, 2017)

Graph 2: Dynamics of gross output of agriculture in 2016-2017, %

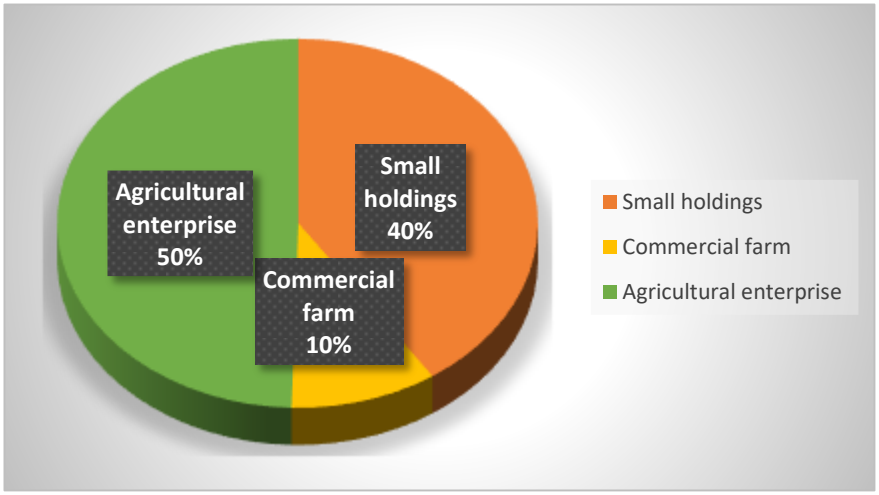


Source: Rosstat, 2017

According to the Ministry of Economic Development of the Russian Federation, the gain of production of gross output of agriculture following the results of a year is expected at the level of 1,4%. Positive dynamics, mainly, will be reached due to considerable gross grain harvesting and dynamic development of meat livestock production. (Fas.usda.gov, 2017)

In an institutional view it is possible to note that today more than 50% of the gross output of agricultural products are provided with small farms, the majority of which, from the economic point of view, can be referred to category low effective as in the course of production the outdated equipment and technologies is used, and a main objective of producers is only ensuring simple reproduction. (Grun.ru, 2017)

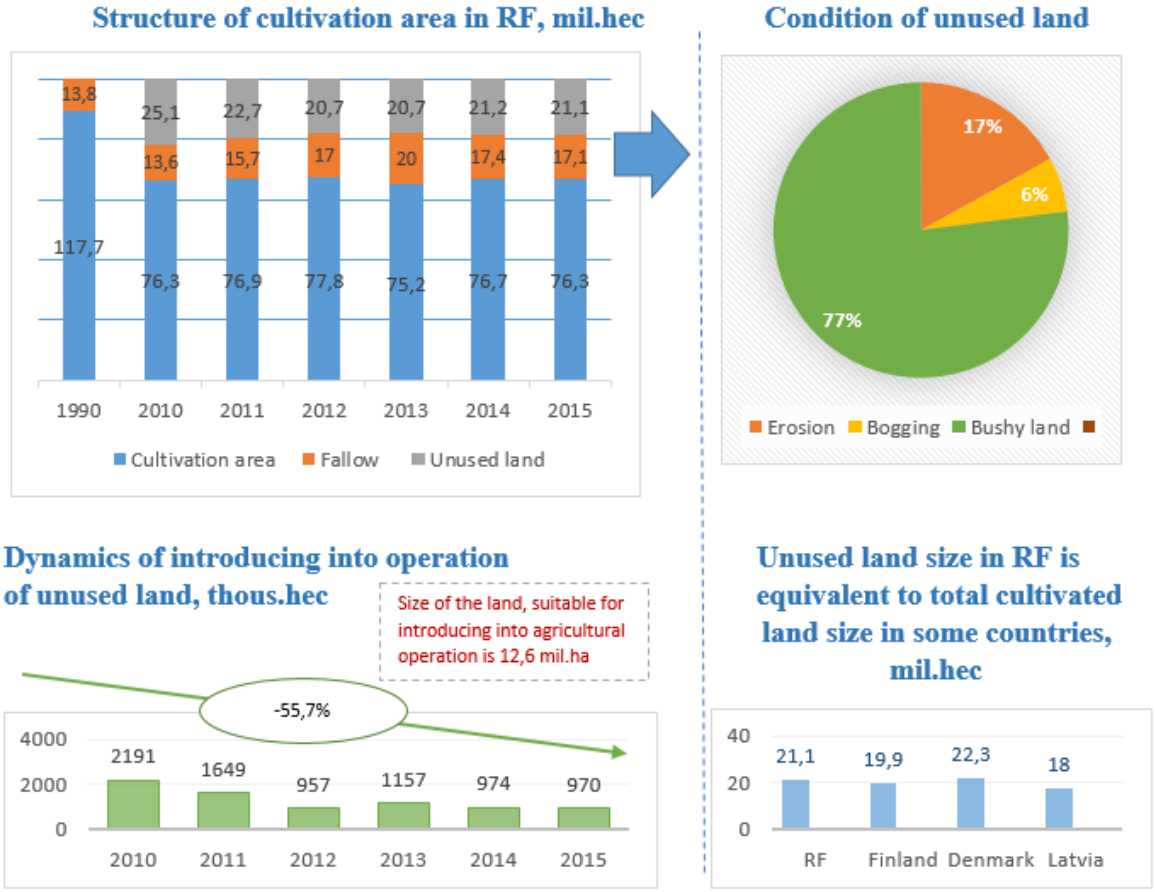
Graph 3: Structure of gross output of agriculture on categories of farms in the Russian Federation in 2016, %



Source: Rosstat, 2016

Concerning land resources in the Russian Federation there is still a high share of unused lands, that are good for agriculture. Russia has the huge capacity of agricultural lands – 406,2 million hectares, or 13% of all land fund. The extensive areas of land resources are in adverse conditions for conducting agricultural production. Now in the territory of the Russian Federation 20 million hectares of farmlands are out of use, and their return to operation requires the solution of the following tasks: systematic reproduction and increase in natural fertility of soils in agricultural purpose; protection of lands against influence of negative technogenic factors; introduction of mineral fertilizers. (Agro2b.ru, 2017)

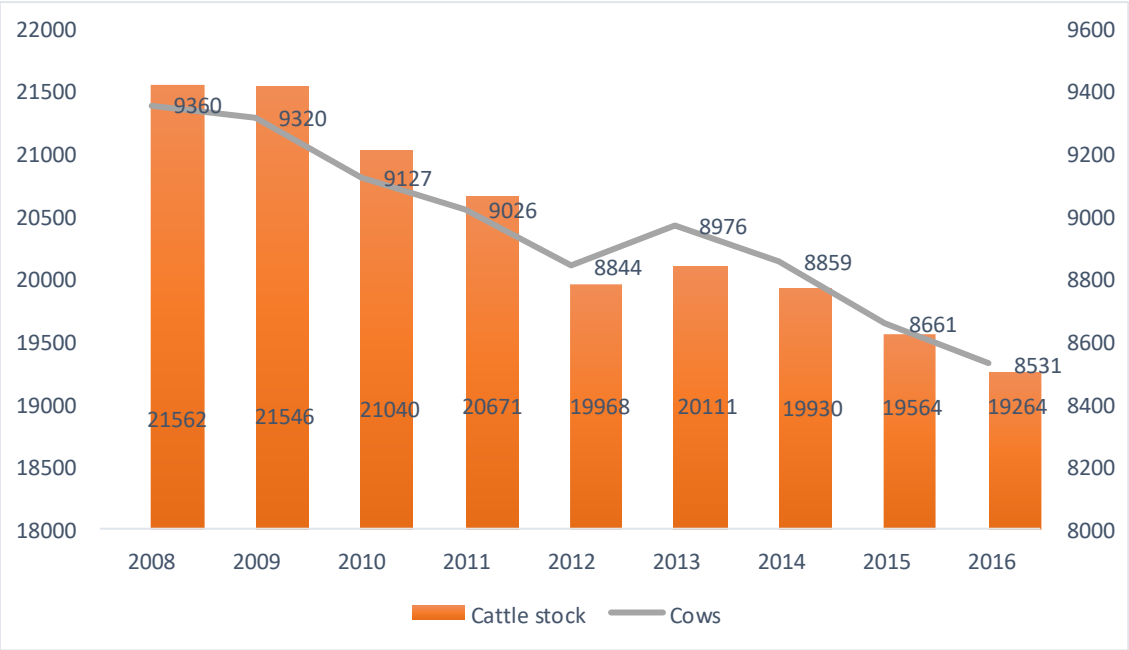
Figure 1: Agriculturally used areas in Russia



Source: Ministry of Agriculture of RF, 2017

Dairy cattle breeding in the Russian Federation, is the leading activity of agricultural production, occupying 49,7% in structure of gross output of livestock production. Importance of development of branch is enshrined in the Doctrine of the food security approved by the decree of the Russian President dd. 1/30/2010. Despite the positive changes reached in recent years in branch – change of breed structure towards highly productive genotypes, activation in construction of large-scale dairy farms, growth of cows' efficiency; continues the process of reduction of a livestock (the livestock of cows has decreased since 1990 by 2,4 times), production of milk lags behind the level of 1990 by 1,8 times, average per capita consumption of milk and dairy products is lower than rational norm for 25%. (Agro2b.ru, 2017)

Graph 4: Live stock in RF, thousand heads



Source: Rosstat, 2016

Production of beef in the Russian Federation mainly is based on a slaughtering of defected cattle of the dairy and combined breeds and only 5% of meat is received from feeding of the cattle of specialized meat breeds and their hybrids. In the structure of a cattle livestock of the meat direction the efficiency occupies only 2,3%. At the same time, in the countries with the developed meat cattle breeding the share of meat cattle in a livestock makes up to 85%. (Usda.gov, 2017)

The sufficient size of natural pastures and considerable share of lay lands are prerequisites for effective development of meat cattle breeding in the Russian Federation. Growth of level and efficiency of the governmental support in development of meat cattle breeding will allow to increase, in the long term, significantly the number of meat breeds livestock. (Sekhar, 2003)

The main restrictions of export to the sector of poultry farming are: unevenness in placement of production capacities in the territory of the Russian Federation, low efficiency of a logistics system of poultry farming; insufficient development of production and trade in the cooled poultry in the form of carcasses, their parts and semi-finished products; necessity in expansion of production range; insufficient development of the technical regulations, that contribute the increasing of quality in poultry farming. (Meza, 2009)

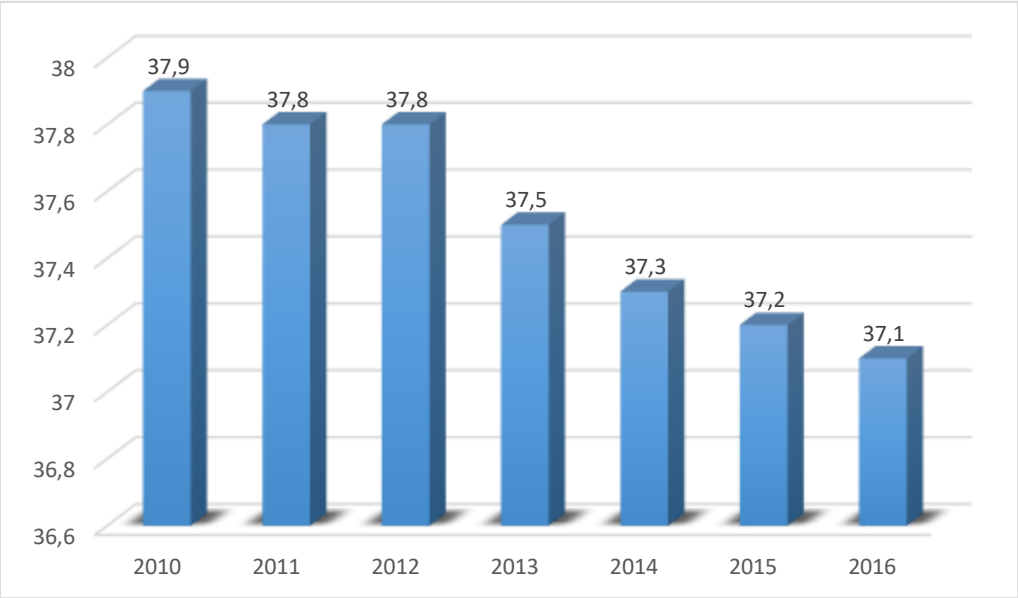
Regarding social development of agriculture it is possible to note the following tendencies which have developed in recent years:

- The ratio of the salary in agriculture with the average Russian indicator practically doesn't improve, during the last five-year period it fluctuated within 45–52%.
- The located resources counting on 1 member of a rural household are 36% lower in comparison with the city. (Rosinformagrotech, 2017)
- The coverage of children by preschool educational institutions in rural areas is 42,5% against 68,1% in city. Availability of out-patient and polyclinic institutions in the village is 2,6 times lower, than in the city (respectively 117,6 and 311 visits per shift on 10 thousand inhabitants). (Un.org, 2017)
- According to the villagers interviewed within the All-Russian monitoring of the social and labour sphere of the village (2014), 21% of the population has no territorial access or absolutely has no possibilities to primary education, 23% – the same for basic education, 26% – secondary general education.

More than 2/5 of the respondents consider territorially inaccessible or not absolutely available preschool institutions, 49% – medical, 56% – cultural.

- Because of insufficient volumes of the state support differentiation in development of rural territories is aggravated. So, the average radius of availability of rural school fluctuates from 5,7 km in the Republic of Dagestan up to 94,6 km in the Magadan region, being 15,3 km on average in Russia.
- In depressive regions the growth of depopulation is observed, that in the greatest measure has captured the Russian Non-Black Earth Region, and the migration processes, proceeding especially intensively in the region of the Far North and the Far East. The number of territorial subjects of the Russian Federation with mechanical outflow of country people in 2013 has increased to 61 against 57 in 2009. There is a process of reduction of the size of households on family number.
- The agricultural organizations are insufficiently provided with the qualified personnel capable to development of innovative technologies that is considerably caused by a low wage. (Specagro.ru, 2017)

Graph 5: Dynamics of agricultural population number in RF, mil.people



Source: Rosstat, 2016

In recent years the tendency of decrease in a share of the population with incomes below the poverty line in the Russian Federation due to increase in the minimum wage, doles and growth of social pensions is observed. However, the level of this indicator remains high taking into account the considerable level of differentiation of income of the population.

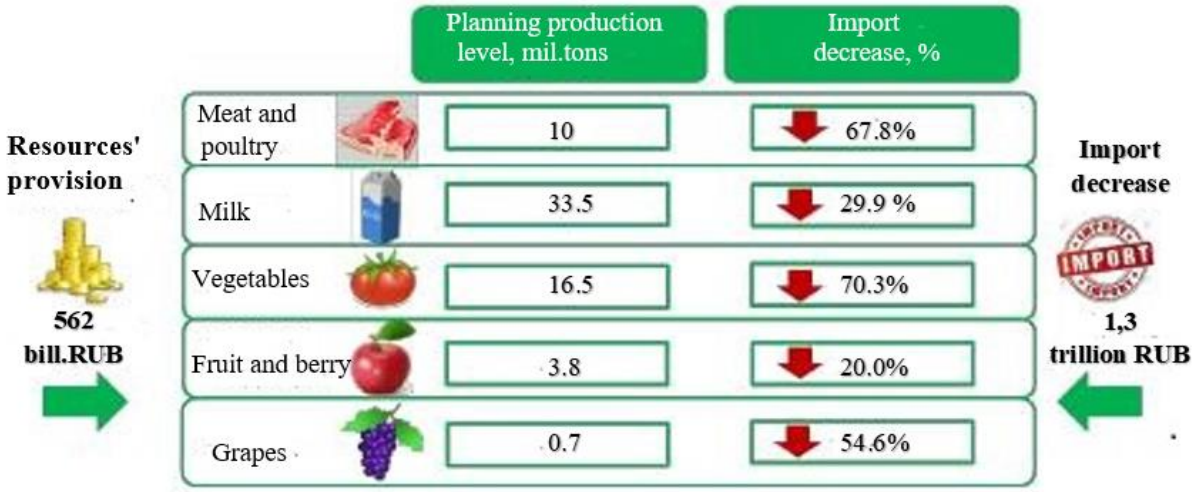
During the period from 2008 to 2015 the share of expenses on food products in structure of the general consumer expenses was reduced from 42,7% to 37,1%. However, this tendency is connected not with redistribution of expenses of the population in favour of the bigger volume of consumption of more expensive goods and reduction at the same time of expenses on food products to a large extent, and with the advancing growth rate of the prices of consumer goods and services in comparison with food. The share of expenses on food in the developed countries is much lower and makes in the USA – 6,4%, in Germany – 10,9%, in the certain countries of BRICS – doesn't exceed 30%. (Un.org, 2017)

The key direction of increase in economic availability of food is the advancing growth of per capita incomes of the population over increase in prices for food. At the same time the priority has to be given to growth in incomes of the poorest segments of the population considerably to lower in society extent of stratification on income.

In world practice for ensuring inflow of investment resources to sectors to which inflow of the private commercial capital is complicated are created and effectively functioning the state financial institutions of development which purpose of activity is support of long-term financing. (Rosinformagrotech.ru, 2017)

Despite positive dynamics of growth of a share of domestic production in resources of meat, meat products, milk and dairy products, the standard indicators by these types of production determined by the Doctrine of food security still aren't reached (85% on meat and meat products, 90% on milk and dairy products). Following the results of 2016 the share of domestic production in resources of meat and meat products has made 74,7%, on milk and dairy products – 79,6%. Achievement of the standard indicators determined by the Doctrine of food security in a meat sub-complex is predicted by the end of 2018, in a dairy sub-complex – by 2020. (Aoozk.com, 2017)

Figure 2: Resources' provision and planning results of import substitution in agriculture by year 2020



Source: Rosstat, 2017

In October, 2014 the Government of the Russian Federation has approved the Road Map on realization of import substitution in agriculture for 2014-2015 (After sanctions) According to it to State Program of agriculture development for 2013-2020 the new priority directions of development of agrarian and industrial complex are allocated and necessary volumes of resource providing of 568,2 billion rubles for 2015-2020 are determined that has allowed to reduce import volume by the sum of 1,3 trillion rub. (Ac.gov.ru, 2017)

The possibility of an entry into the international market can be considered as one of incentives for the Russian producers of agricultural production and food to increasing production and, finally, the level of self-reliance of the country production of agrarian and industrial complex. Besides, an environment of the separate markets of agrarian and industrial complex is such, that further increase in production is impossible without parallel establishing product sales for export (for example, the market of poultry). (CSA, 2003)

According to the forecast of the Ministry of Agriculture of the Russian Federation, export of poultry from the Russian Federation by 2020 can reach 150 thousand tons, i.e. in 6 times more, than following the results of 2015, grain export – 30 million tons that is 1,6 times more, than in 2014. According to the Strategy of development of agricultural mechanical engineering till 2020, export of production of this branch can grow by 20 times, having reached by 2020 46,2 billion rubles (without negative impact of WTO membership on branch of agricultural mechanical engineering). (Ab-centre.ru, 2017)

4.1.2 Investment attractiveness of Russian agricultural sector

One of the most current problems of the agrarian sector of economy is creation of favourable investment climate in the agrarian sphere and activation of investment activities of all economic entities. Attraction of finances and ensuring their effective use in various branches of the national economy, in particular in agrarian and industrial complex, – are the main tasks standing today both on regional and at the federal level. (Altukhov, 2009)

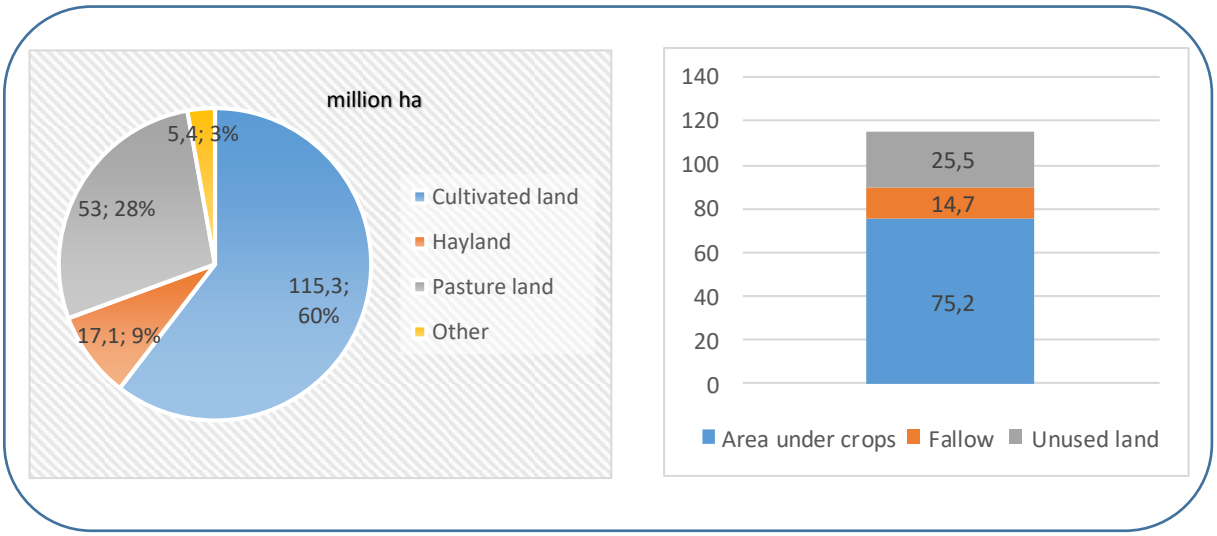
Now positive tendencies on improvement of investment climate of agrarian and industrial complex of the Russian Federation are observed: annually volumes of production of agriculture increase, investments into fixed capital of branch steadily grow, the financial position of agricultural producers is strengthened. Along with it the Russian government is interested in support and development of the agricultural sector: the Doctrine of food security (2010) is accepted, the State program of development of agriculture until 2020 is implemented. (CSA, 2003)

Main objectives of state policy in the agrarian and industrial complex sphere now are: ensuring the regulating impact on investment process by realization of evidence-based pricing, carrying out flexible credit, tax and depreciation policy, increase in opportunities of leasing, stimulation of business activity and granting privileges to investors at privatization, target public financing, allocation of the priority directions of investment and other types of financing, drawing up indicative plans of capital investments. (Hardaker, 1997)

One of the most important sources of economic growth is improvement of use of agricultural capacity of the Russian Federation. Today the Russian Federation has one of the highest the agricultural potentials in the world that more than 10% of universal arable land, including significant areas of fertile black-earth lands, the high market capacity of food and considerable annual rates of its growth (11% on average), growth of volumes of attraction of the loan capital with support of the state (for 20010-2015 by 4,2 times are confirmed by

existence), the high export potential concerning grain. All these factors are the key to stable interest of investors in the sphere of agrarian and industrial complex and agriculture.

Graph 6: Factors of investment attractiveness of Russian agricultural sector (Russia possesses 10% of the total world cultivation land, including black-earth lands)

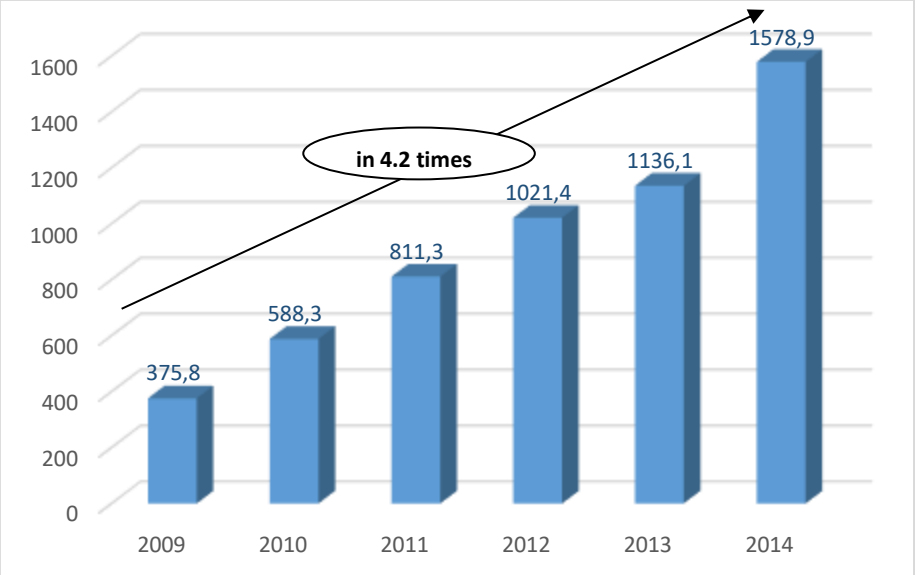


Source: Rosstat, 2017

Graph 7: Factors of investment attractiveness of Russian agricultural sector (High capacity of food market, considerable annual growth rates)

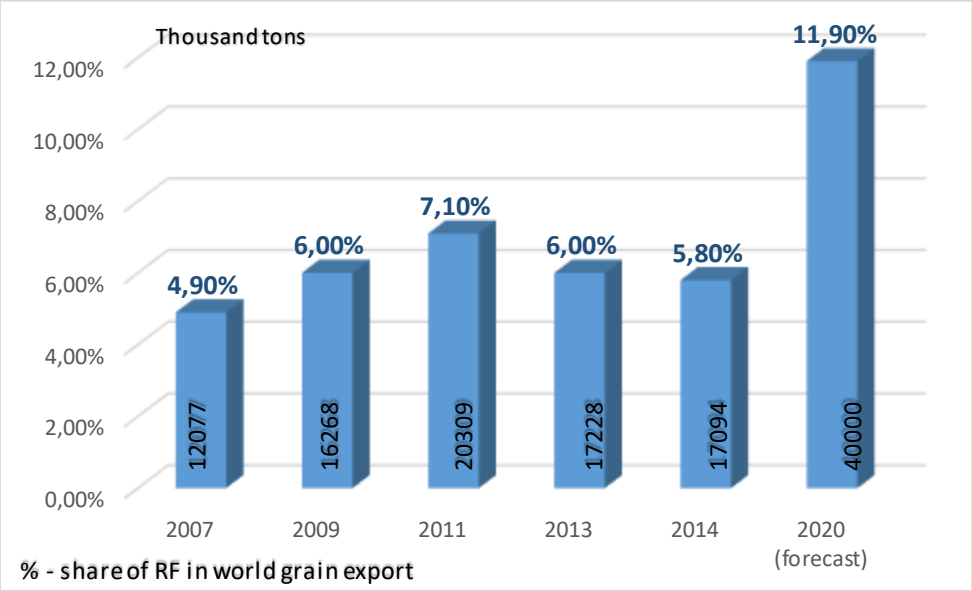
Source: Rosstat, 2016

Graph 8: Factors of investment attractiveness of Russian agricultural sector (Growth in amounts of attracted loan capital with governmental support)



Source: Rosstat, 2015

Graph 9: Factors of investment attractiveness of Russian agricultural sector (High export potential relating grain)



Source: Rosstat, 2015t

The priority directions of investment into agrarian and industrial complex of the Russian Federation are development of export infrastructure (development of optimum routes of transportation on the target markets, increase in capacities of grain terminals and elevators), creation of large grain and meat and dairy assets and also development of high-performance agricultural mechanical engineering. In branch of dairy cattle breeding ensuring import substitution requires essential increase in a livestock of cows. (CSA, 2003)

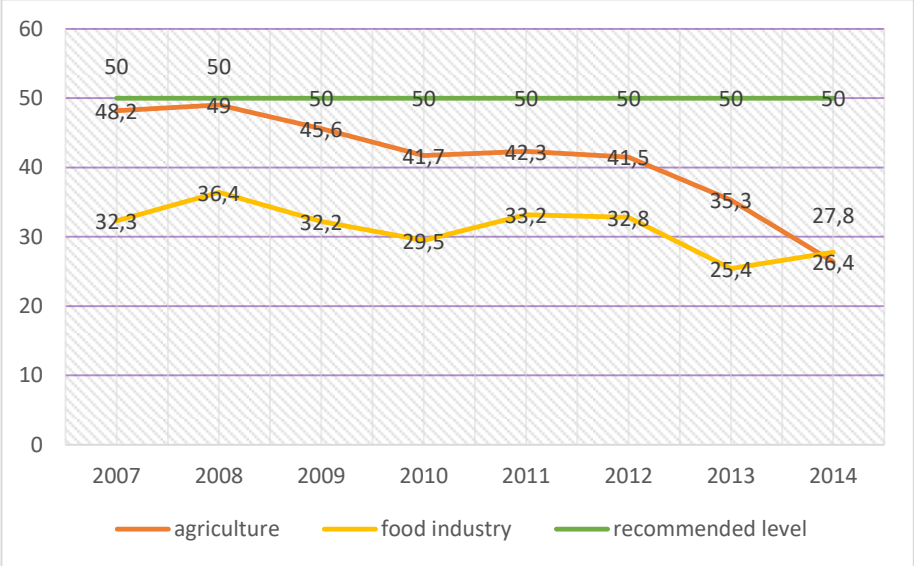
In meat cattle breeding a strategic task is bringing a share of the cattle of the meat direction of efficiency in the general livestock of cattle to level of the developed countries. Elimination of deficiency of elevator capacities will allow to come to the volumes of export of grain to 40 million tons planned by 2020 (more than twice in relation to the current level). Growth of security with power capacities will allow to increase overall effectiveness of agricultural production, to modernize the machine and tractor fleet of agriculture of Russia.

At the same time, despite positive tendencies in development, for agrarian and industrial complex there are relevant system problems including in the sphere of a financial state. (Sivakumar, 2005)

The main problem causing and strengthening many existing negative tendencies in agriculture is connected with its low profitability owing to what the main part of agricultural producers is incapable to use constantly achievements of scientific and technical progress for increase in efficiency and competitiveness of production made by them, implementation of technical and technological modernization of production. (CSA, 2003)

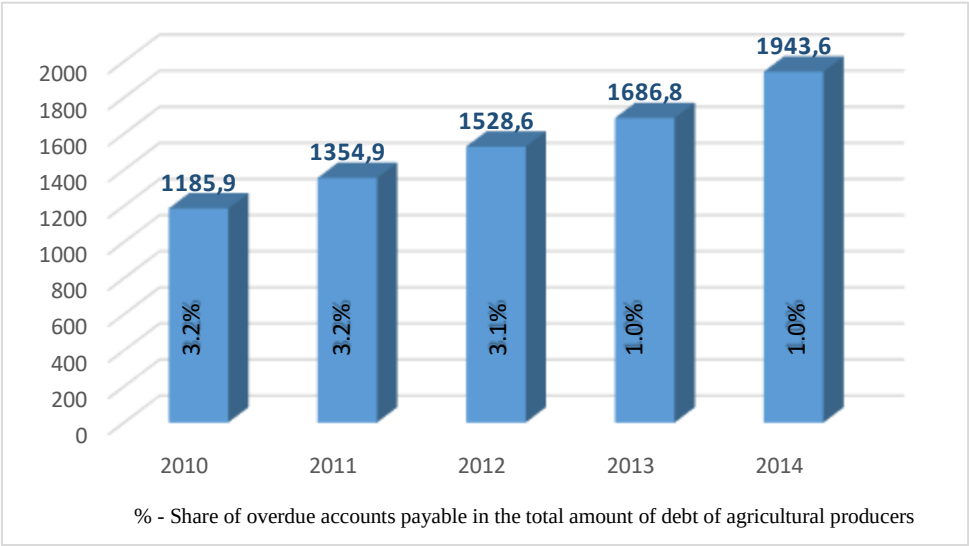
The main reasons for low level of crediting and non-performance of volume of the attracted subsidized loans is the high debt load of the agricultural enterprises for earlier taken credits and also high cost and a difficult procedure of their receiving. In the course of preparation for a new agricultural season in the conditions of low volumes of net profit agricultural producers aren't capable to carry out independently preparation for spring field works, and are forced to apply to banks for the loans for replenishment of current assets again. The cost of credit resources in the Russian economy is significantly overstated now that indirectly is confirmed by existence of the mechanism of subsidizing and also an essential gap between the average interest rate for the investment credits in the Russian Federation and in foreign countries. (Aksoy, 2005)

Graph 10: Financial state of agricultural producers in RF (Equity ratio for enterprises in agriculture sphere)



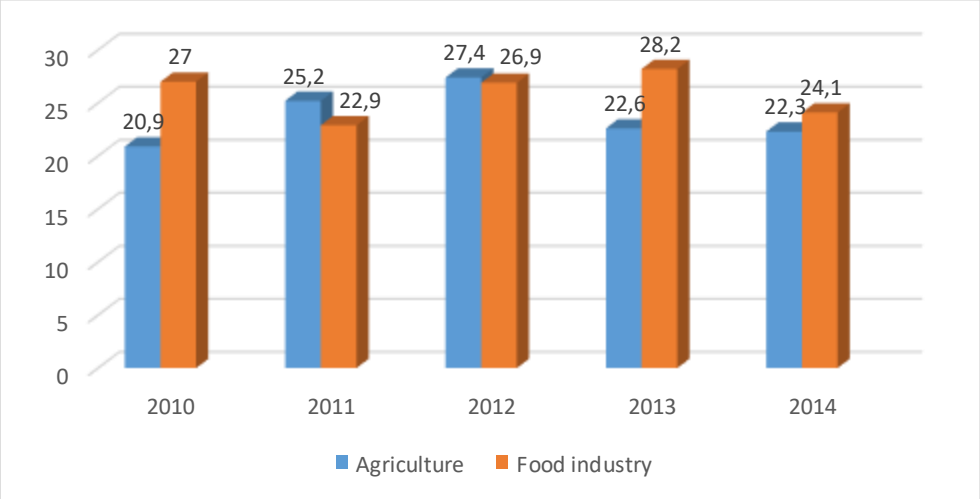
Source: Rosstat, 2015

Graph 11: Financial state of agricultural producers in RF (Accounts payable, including credits and loans, billion RUB)



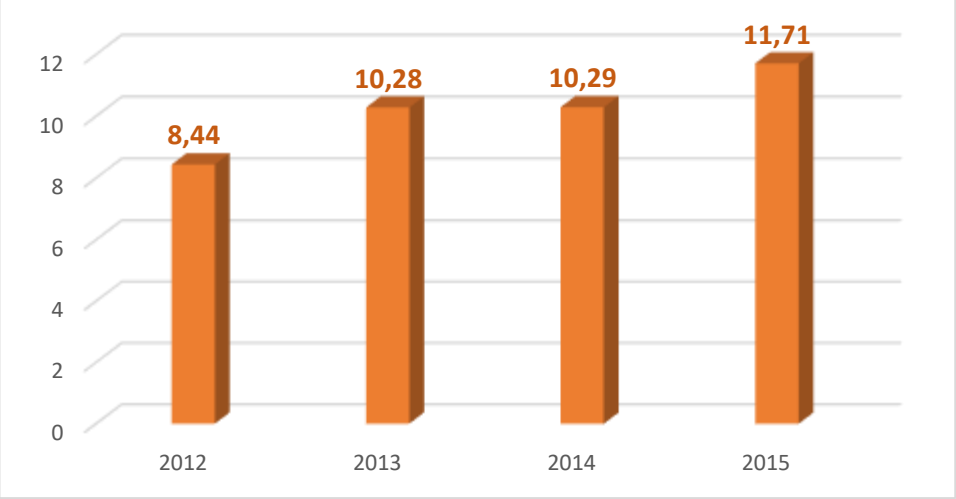
Source: Rosstat, 2015

Graph 12: Financial state of agricultural producers in RF (Share of the unprofitable companies, %)



Source: Rosstat, 2015

Graph 13: Financial state of agricultural producers in RF (Profitability of product sales in agricultural sphere for the beginning of the year, %)



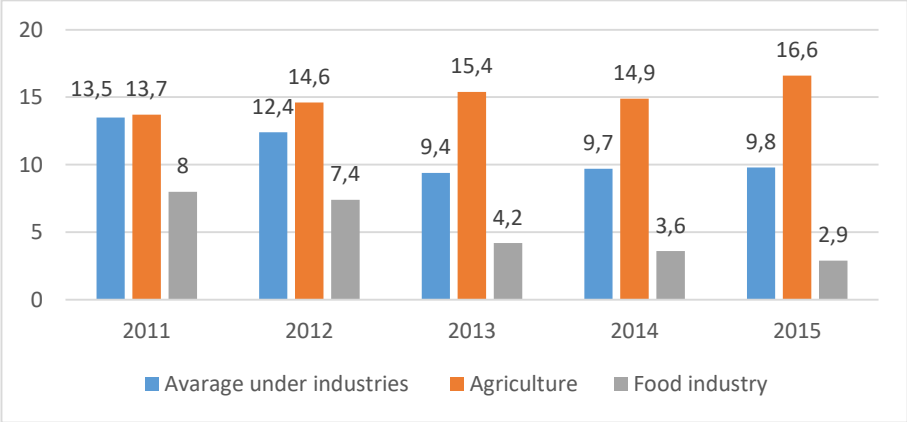
Source: Rosstat, 2016

The accounts payable sizes in total on the agricultural organizations annually increase that testifies to insufficiency of financial resources. The unsatisfactory structure of sources of financing of reproduction of fixed assets of the agricultural organizations – the low level and a tendency of decrease in the size of equity, a considerable share of accounts payable in structure of sources of financing is observed. So, the accounts payable size from 2014 to 2016 has grown from 1,2 trillion rub to 1,9 trillion rub, or for 64%. (Gks, 2017)

In the Russian Federation significant differences in an indicator of tax burden on branches are observed. At the same time in agriculture the level of tax burden minimum that is connected with the fact that a considerable part of the output is created in personal

subsidiary farms for own consumption and isn't subject to the taxation. Granting the preferential mode to agricultural producers on a number of taxes is added to it. In the food industry the level of tax burden is much higher. (Agro2b, 2017)

Graph 14: Level of tax burden and economic effectiveness of Russian agricultural sector (Level of tax burden)

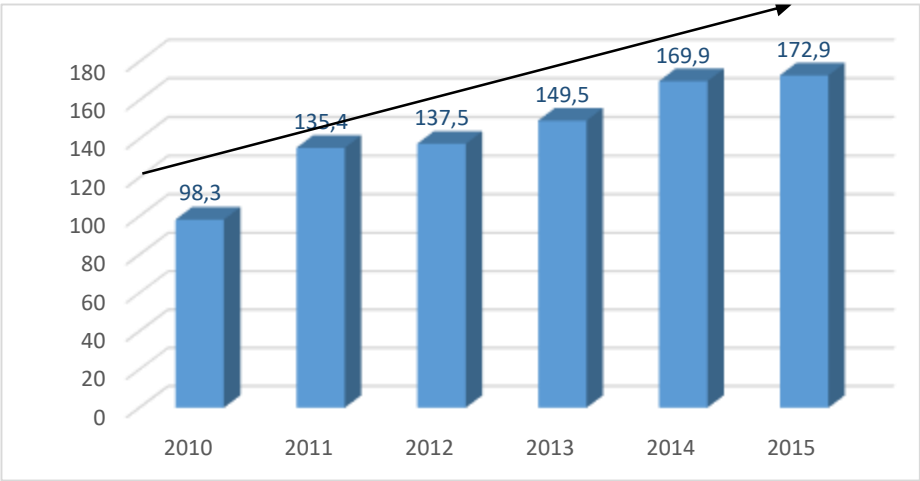


Source: Federal Tax Service of Russia, Rosstat, 2016

Graph 15: Level of tax burden and economic effectiveness of Russian agricultural sector (Profitability of product sales in agricultural sphere for July 1, %)

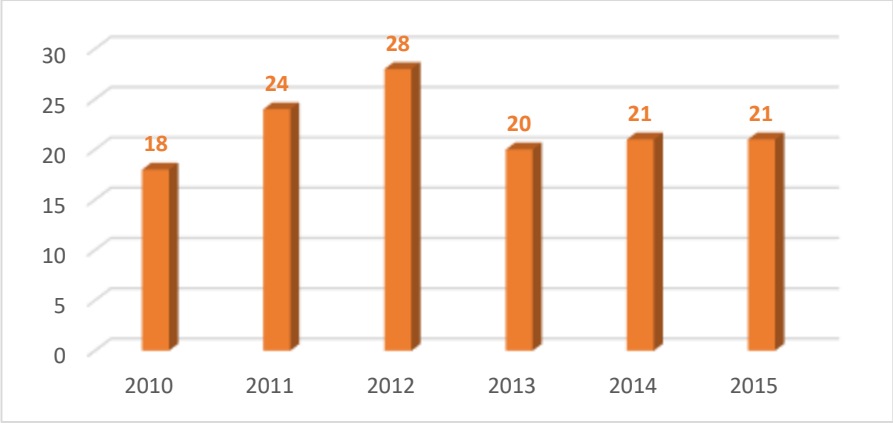
Source: Federal Tax Service of Russia, Rosstat, 2016

Graph 16: Level of tax burden and economic effectiveness of Russian agricultural sector (Federal budget for support of agricultural sector, billion RUB)



Source: Federal Tax Service of Russia, Rosstat, 2016

Graph 17: Level of tax burden and economic effectiveness of Russian agricultural sector (Proportion of loss-makers in agricultural sector on July 1, %)



Source: Federal Tax Service of Russia, Rosstat, 2016

Despite the lowest level of tax burden, indicators of efficiency of activity of agricultural producers (the highest share of the unprofitable enterprises in economy, level of profitability is lower, than in branches with bigger tax burden, the high specific weight of the unprofitable organizations) level the stimulating effect of introduction of tax benefits to branches. Besides, after accession to WTO decrease in profitability of product sales, despite growth of expenses of the budget on support of agriculture is observed. (Specagro, 2017)

4.2 Grain Market of Russia

4.2.1 Economic and management aspects of grain market formation in Russia

The grain market is a basis for the food market of Russia, and grain production and is the largest branch of agriculture. Development of all agrarian and industrial complexes in many respects, depends on the level of development of a grain sub-complex owing to multilateral communications with allied industries of agriculture and the food industry. Production of grain makes fundamentals of crop production and agriculture in general. (Aksoy, 2005)

The grain sub-complex represents a set of branches of production, processing, trade in grain and products of processing. This sub-complex includes independent enterprises of small and medium business in the sphere production of grain and finished products, and the large vertically integrated agrarian holdings performing important function in formation of the modern grain market. (Specagro, 2017)

The priority role of grain in food supply is caused by need for creation of reserves intended for stable provision for the population with food. For international production, food security is considered on the basis that grain reserves, in relation to the level of its consumption, make not less than 17%. (Specagro, 2017)

The Russian Grain Union defines as a strategic objective of development of the market of Russian Federation grain as follows – "the most effective uses of natural potential, steady ensuring internal needs for food and fodder grain, strengthening of positions of the Russian Federation in the world agrarian food market on the basis of formation of the effective market of grain". (Grun, 2017)

The increasing role of the integrated structures in a grain sub-complex should also be noted and this is connected with the aspiration of the companies to use the stabilizing effect of integration in the conditions of instability of the external environment.

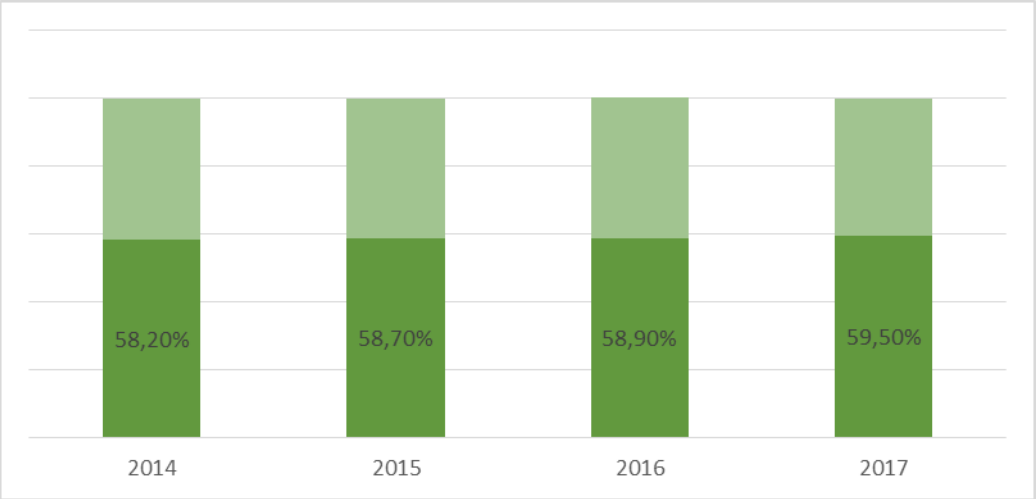
The organizational and economic relations in a chain of value creation of bakery products arise between the enterprises of various branches: agriculture, processing industry, transport and trade. The efficiency of a chain in many respects depends on sustainable development of a source of raw materials that creates prerequisites for creation of the integrated associations between processors and producers of grain (figure 2).

Figure 3: Value creation chain in a grain sub-complex

Source: Rosstat, 2017

In 2014-2016 grain crops in the total area under crops of the Russian Federation occupied between 55% and 61%. About 80% of cost of the gross output made in the agricultural organizations fall to the share of grain. (Rosinformagrotech, 2017)

Graph 18: Share of grain agricultural cultures in total area under crops in the Russian Federation, %



Source: Rosstat, 2017

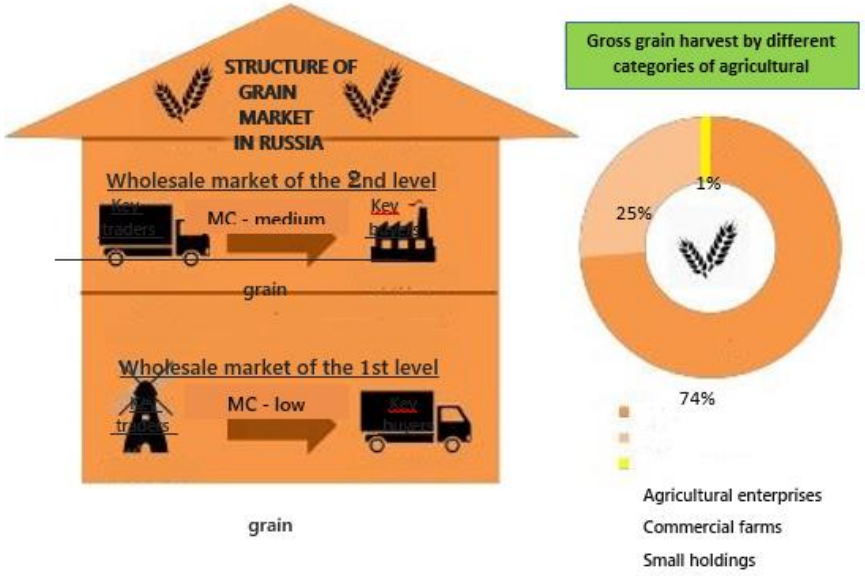
Currently, the Russian grain market is still in its formation stage. Economic characteristics of the market of Russian grain substantially differ from the leading global manufacturers of grain with the developed market economies. Positive tendencies of formation of new institutional structure of the Russian grain market are observed, including both spheres of production, and processing. (Specagro, 2017)

The segment of production of grain and its storage is characterized by a high extent of fragmentation. In a grain sub-complex of agrarian and industrial complex of the Russian Federation a primary form of vertical integration are agrarian holdings. In their activity inflow of investments into the sphere of production of grain and also production management improvement, entering into structure of agrarian holdings is connected. A negative side of activization of activity of agrarian holdings is monopolization of the regional markets of grain

that reduces effective management of agricultural production. However, by expert estimates, currently, agrarian holdings occupy a small share in grain production, and production efficiency indicators which they show exceed averages on branches. (Sekhar, 2003)

In the structure of the grain market the wholesale market is the first level where agricultural producers act as the main sellers of grain, and the main buyers – grain traders, wholesale and intermediary structures. This segment of the market is characterized by the highly competitive relations between participants and low level of concentration of the market (Figure 3).

Figure 4: Structure of grain market of RF under types of companies



Source: Rosstat, 2017

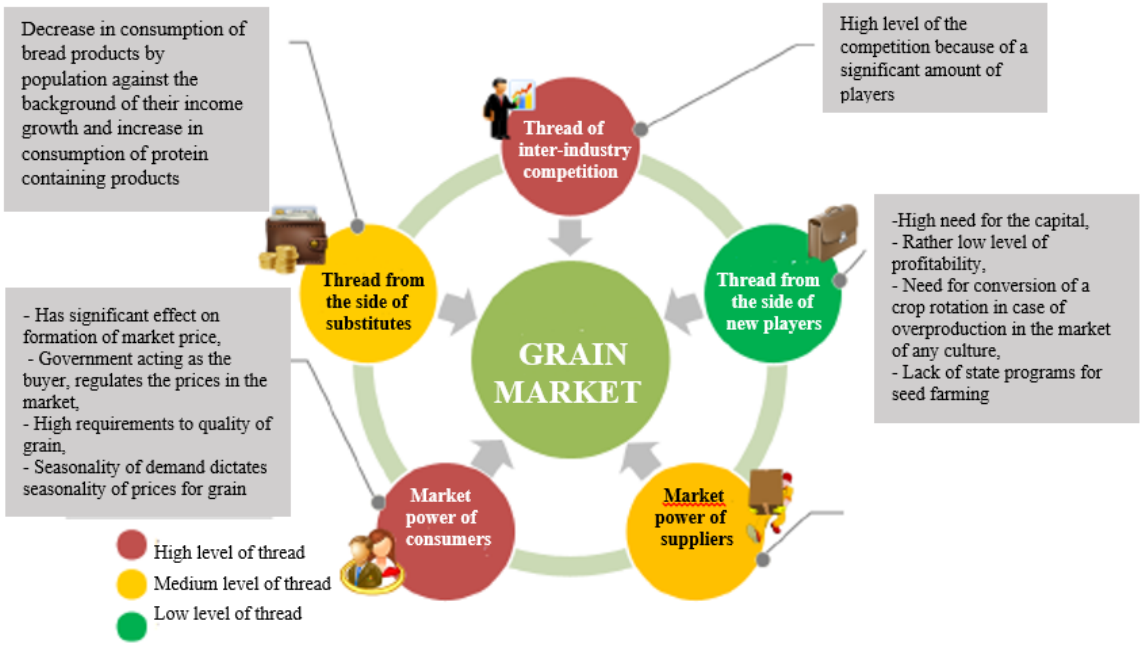
In the wholesale market of the second level, the main sellers of grain are wholesale intermediaries, and the main buyers – processing enterprises. The segment is characterized by moderate degree of concentration. In a section of farms categories, the main producers of grain are the agricultural organizations to which share over 70% of gross harvest fall. (Agro2b, 2017)

The constructed model of competitive forces of M. Porter for the market of Russian Federation grain has revealed that the greatest market power buyers, mainly, in a type of considerable influence on pricing for grain possess. Besides, there is high level of the intra-branch competition owing to a significant amount of players in the market.

The priority for directions of improvement of system of formation of the market of grain in the Russian Federation are:

- Levelling of disparity of prices of corn and the industrial output which is purchased by agricultural producers for needs of production.
- Development of state regulation of the market of grain through the system of purchasing and commodity interventions.
- Creation of reliable financial and credit system for ensuring functioning of a grain sub-complex.
- Development of system of obligatory agro-insurance in the sphere of crop production. (Rosinformagrotech, 2017)

Figure 5: Model of 5 powers by M.Poter for grain market of Russia



Source: Rosstat, 2017

4.2.2 Raw material resources base: technological risks in production and storage of grains

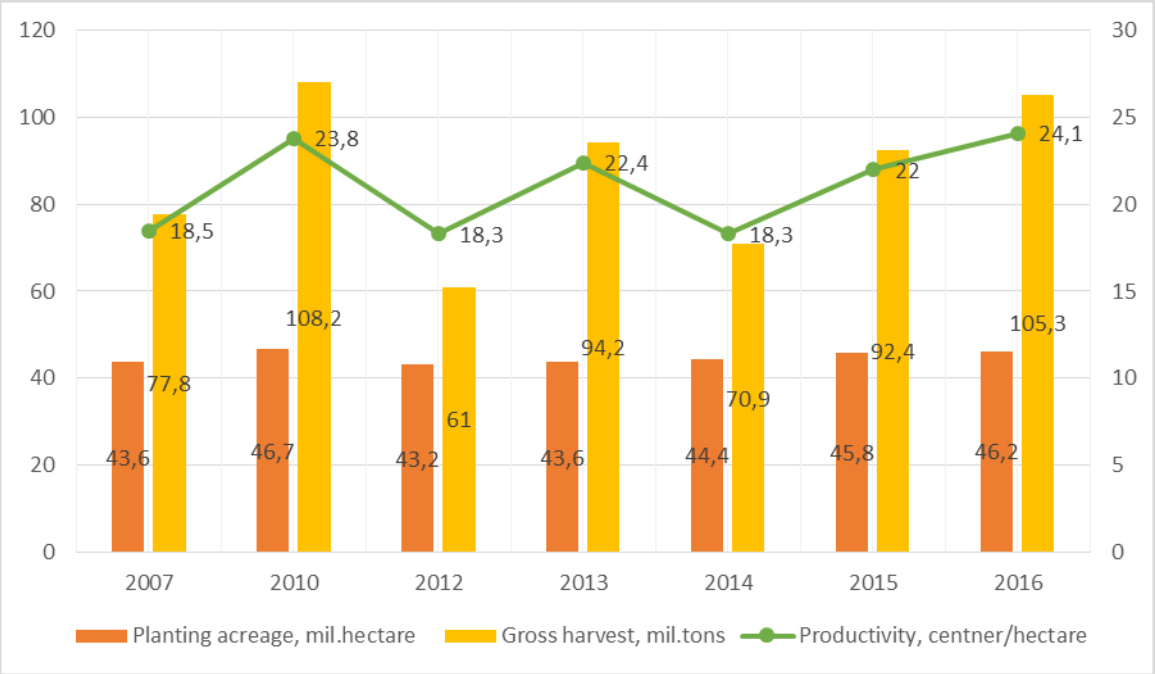
A distinctive feature of the Russian Federation in production of grain is high volatility of productivity and gross harvesting that is connected with the low level of resource providing and creates additional risks of short-reception of a harvest. (Rosinformagrotech, 2017)

In structure of production of grain by types, the stable prevalence of wheat is observed. At the same time since 2015 the tendency to growth of a share of wheat at an insignificant contribution of a rye, corn, oats, and leguminous cultures is observed. From the

point of view of feed production development, a similar structure of a grain production isn't as balanced as the obvious prevalence of food grain is observed.

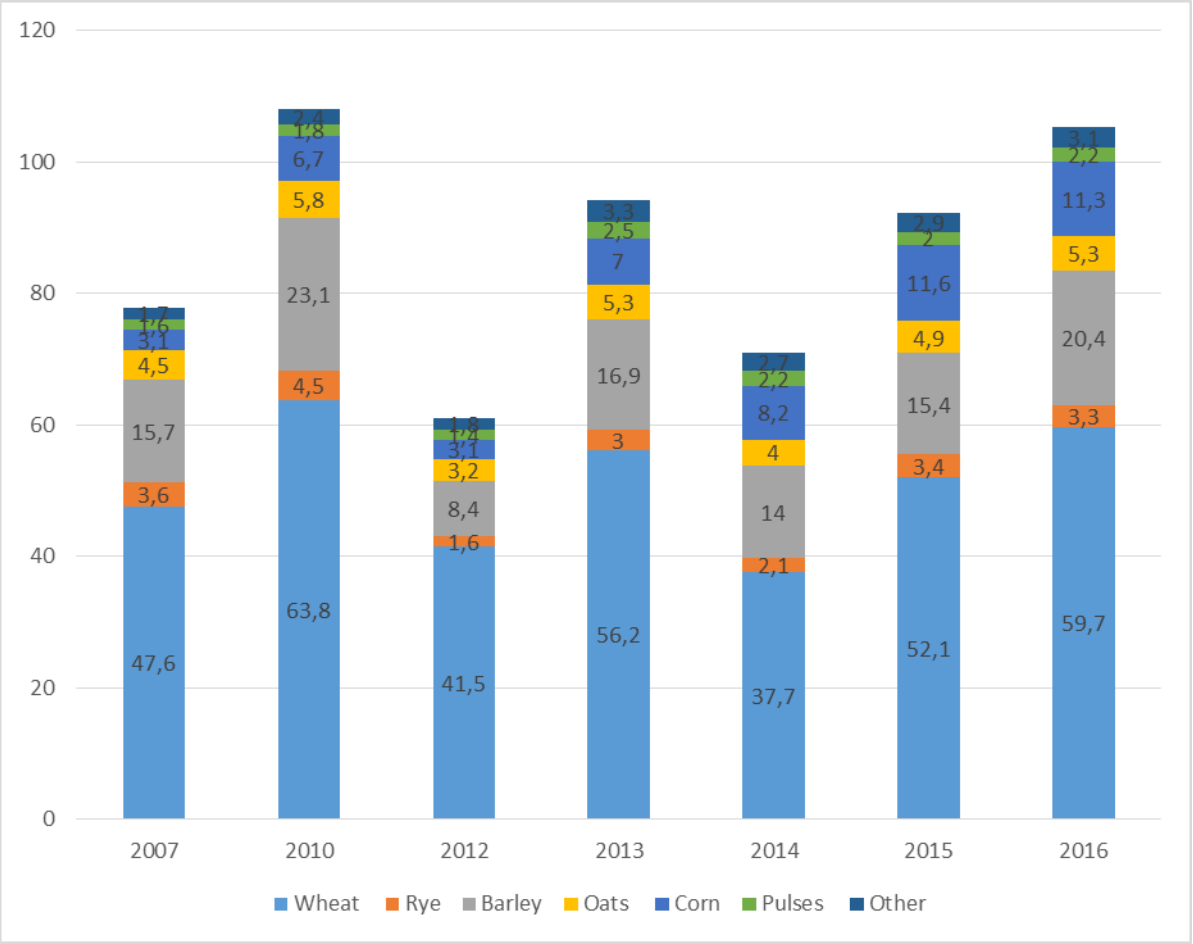
Specific characters of production of grain in the Russian Federation consists in discrepancy of requirements of livestock production to level and quality of the fodder grain produced in the country. At the same time, according to the experts, about 60% of total amount of gross collecting of grain in the Russian Federation are spent for satisfaction of requirements of livestock production. (Aoozk, 2017)

Graph 19: Dynamics of acreage, gross harvest and productivity of grain in Russia



Source: Rosstat, 2017

Graph 20: Structure of grain production under types in Russia in the farms of all categories, %



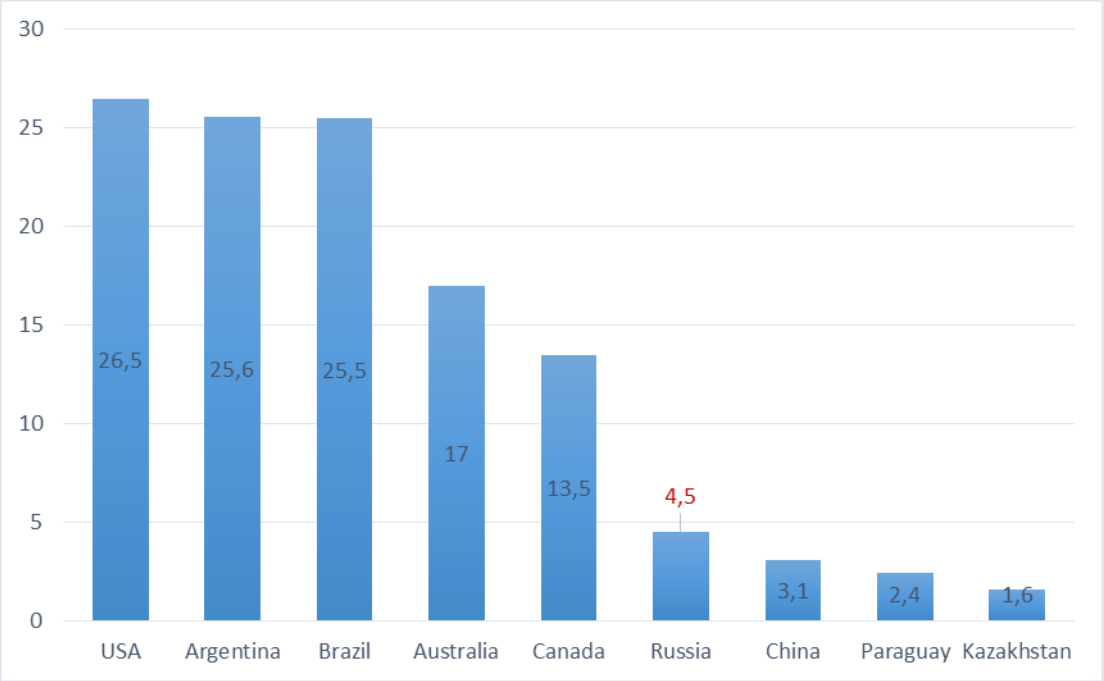
Source: Rosstat

The constant deficit of feed grain which is covered by food grain – mainly wheat, is characteristic of the agriculture of the Russian Federation. Besides, the unevenness of territorial placement of production at more uniform distribution of regional consumers across the territory of the Russian Federation where the main centres of consumption are in large industrial cities, is characteristic of the Russian grain market that defines steady commodity streams of grain.

Technologies of resource-saving agriculture (including "zero" and "minimum" processing of the soil) are developed in such countries as the USA, Canada, Australia, Brazil, and Argentina. For example, in Canada, the share of the lands of agricultural purpose cultivated on resource-saving technology makes about 50%. The specified technologies allow to reduce significantly cost of production of agricultural products, at increase in productivity in particular in the period of a drought. (Gordeyev, 2007)

Resource-saving technology assumes the integrated approach to agriculture including refusal of ploughing by a plough, increase in volumes of the introduced fertilizers, optimization of crop rotations, management of the vegetable remains, etc. This technology allows to reach economy over 70% at repair of equipment, in fuel consumption and also to provide higher rates of productivity in drought years. (Rosinformagrotech, 2017)

Graph 21: Volumes of distribution for resource-saving agriculture in the world, one million hectares



Source: National Movement of Resource-Saving Agriculture, 2017

At the current levels of agricultural production, gross harvesting of grain by expert estimates that 80% depends on climatic factors. In the system of resource-saving agriculture, influence of weather and climate on efficiency of crop production is reduced to 20%. Other 80% fall on technologies and management in agriculture, united in one system. (Aoozk, 2017)

One more advantage of use of resource-saving technologies is growth of productivity of cultures against the background of continuous improvement of structure of the soil. Improvement of quality of grain happens owing to restoration of a fertile layer of earth, accumulation of nutrients. Finally, these advantages lead to increase in profitability of production of grain.

Figure 6: Geography of use of resource-saving technologies in world agriculture

Source: FAO, 2017

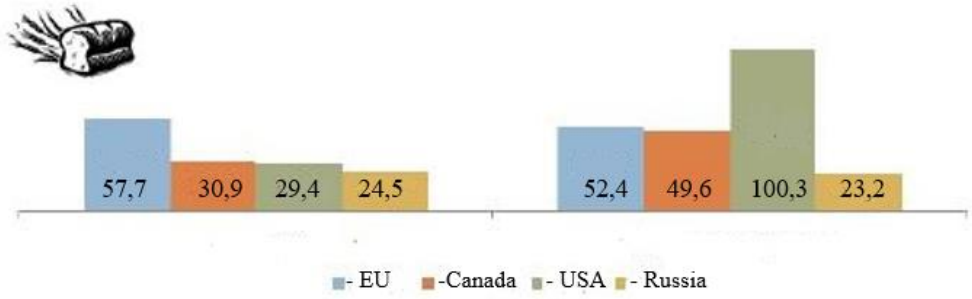
Technological risks are the main restriction in development of grain farm and the market of grain until 2020 when according to State Program of development of agriculture for 2013-2020 by 2020 it is necessary to bring production of grain to 115 million tons, pulses – to 10,3 million tons, grain – to 1,4 million tons, bakery products dietary and enriched with micronutrients up to 0,3 million tons and also to create intervention fund of 8,5 million tons and to bring export of grain to 25–30 million tons. (Specagro, 2017)

Today more than 80% of farms make production of crops try to use the methodology of extensive technologies but are still using outdated agricultural machinery, low-quality sowing material, limited amount of mineral fertilizers. At the same time volumes of gross collecting crops strongly depend on weather conditions and natural fertility of soils.

Key factor of increase in competitiveness of agricultural products is overcoming technical and technological lag from the developed countries. (Ac.gov, 2017)

Distinctive feature of Russia in production of grain is the wide spacing of indicators of productivity and gross collecting that is connected with the low level of resource providing and creates additional risks of short-reception of a harvest.

Figure 7: Grain productivity in the main manufacturing countries of grain in 2016, c/hectare



Source: ОЭСР, 2017

Formation of a developed grain market and increasing the export of high-quality grain is impossible without the corresponding production infrastructure, providing the free and steady movement of commodity grain from producers to its consumers. The problem of mechanization of post-harvest processing and storage of production is particularly acute. The deficiency of elevator capacities is more than 40%. At the same time growth of gross collecting the main cultures and increase in the export potential concerning grain is predicted that will increase requirement of branch for elevator capacities and the overworking of current levels of equipment. (Gordeyev, 2007)

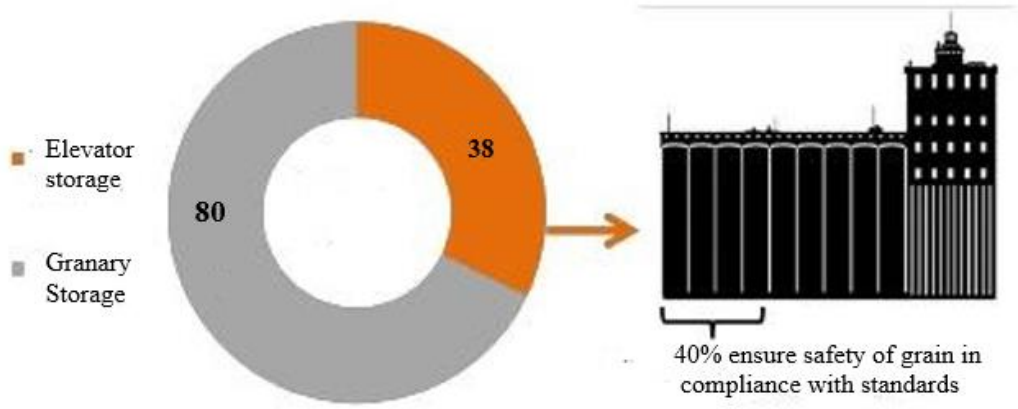
The discrepancy of the existing transport and logistic infrastructure of the market of grain to the current outputs and export is observed in:

- Low intensity of processing of grain freight against the background of obsolescence of the equipment.
- A capacity shortage of elevators basically the grain producing regions that leads to increase in time and cost of transportation.
- Increase in prices for transfer of grain owing to deficiency of port capacities that reduces competitiveness of exports.
- High loading of transport networks during the peak periods of transportation of grain owing to the shortage of cars for grain-carriers against the background of inefficiency of transportation of grain by the motor transport on distances more than 500 km is observed. (Food and Agriculture Organization of the United Nations, 2017)

According to the Russian Grain Union, the total capacity of storage grain facilities is currently 118 million tons. Conversely, elevators cover 38 million tons, and share of granary

storage – is 80 million tons. RGU estimates that from total of elevator capacities only 40% meet the modern requirements for storage and ensuring safety of grain (Figure 7).

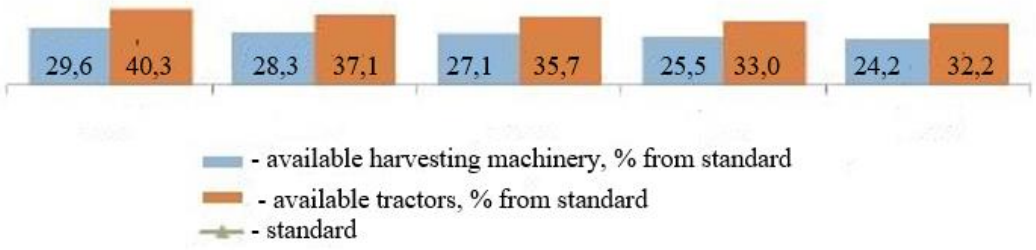
Figure 8: Security of a grain sub-complex of the Russian Federation with elevator capacities



Source: Russian Grain Union, 2017

The Russian Federation concedes to EU countries and the USA on the level of mechanization of agriculture: the available fleet of agricultural machinery is worn-out by more than 70%. Prevalence in turnover of farms of large areas over 400 hectares in size and considerable wear of agricultural machinery defines a need of change of structure of the park in favour of re-equipment with the power saturated equipment. Now agricultural producers are provided with agricultural machinery only for 25–32% of standards of requirement (Figure 8). (Fas.usda.gov, 2017)

Figure 9: Availability of agricultural machinery in RF, %



Source: Rosstat, 2017

Increase in production efficiency of grain is directly connected with stability of volumes of gross collecting. A basis of all system of the reproduction relations of a grain sub-complex of the Russian Federation is ensuring sustainable development of grain production.

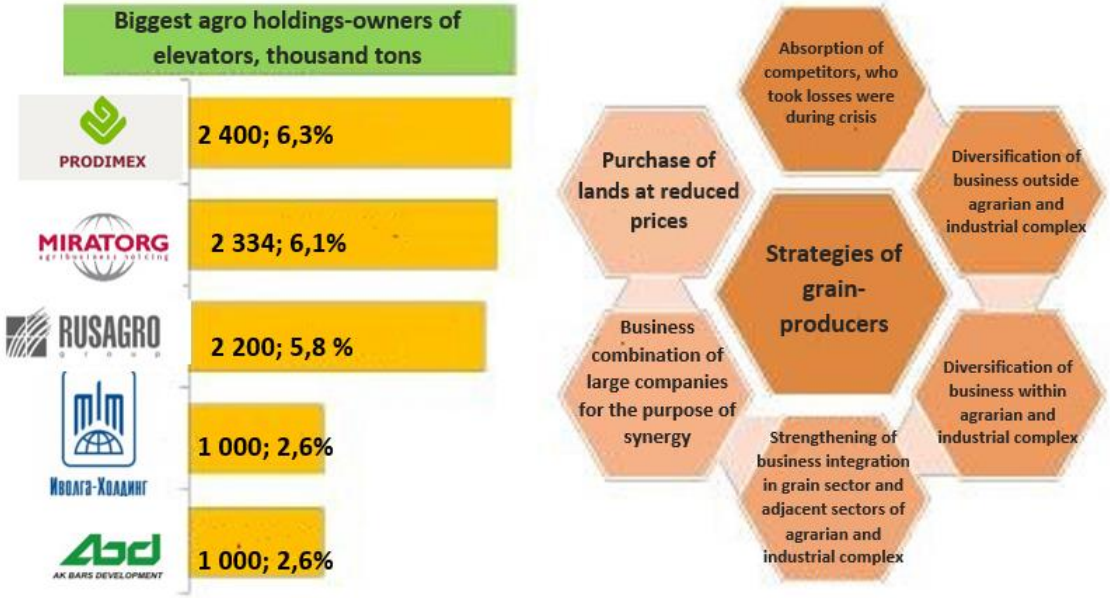
The grain sub-complex is characterized relatively in high gear economic return. Increase in its efficiency is substantially related to the introduction of resource-saving technologies, new grades and improvement of crop rotations. (Smirnov, 2016)

Taking into account the aforesaid, the following directions of improvement of a source of raw materials of a grain sub-complex of the Russian Federation could be expedient:

1) Improvement of structure of production of grain towards increase in a share of fodder cultures due to growth of acreage under grain, reductions of a share of wheat in gross collecting, activization of cultivation of leguminous cultures;
2) Use of cluster approach to development of the regional markets of grain for the purpose of improvement of a chain "producer of grain – an elevator – the processor – the seller", ensuring steady production of grain due to expansion of completeness of access and volume of use of material, labour, financial and information resources, decrease in risks of uncertainty of the external environment, the fullest satisfaction of needs of the population for agricultural production and food.
3) Removal and introduction in production on a constant basis of steady grades of grain crops which will provide optimum use of climatic factors in the course of their cultivation.
4) Introduction of resource-saving technologies in production of grain.(Ortiz, 2008)

4.2.3 Anti-crisis strategies of grain market participants

Figure 10: The largest owners of elevator capacities and strategies of grain producers



Source: Rosstat, 2017

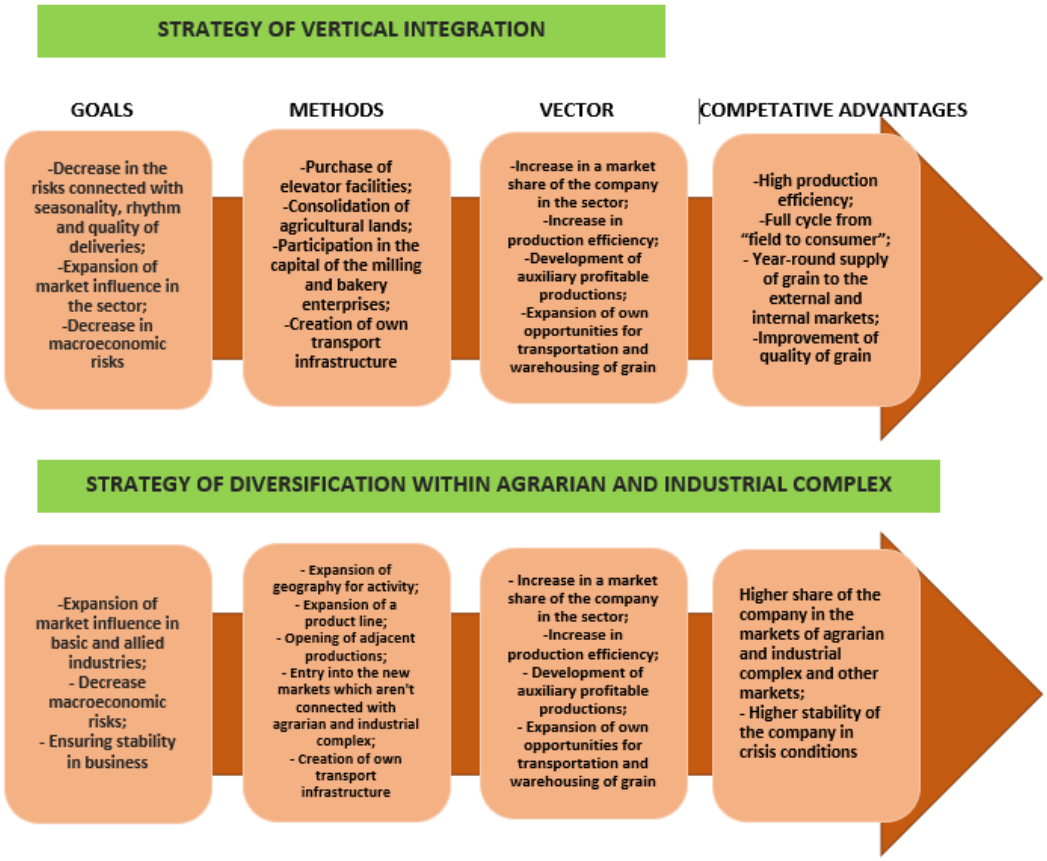
The most perspective from the point of view of stability of business and efficiency in the conditions of crisis are the strategy of diversification of business inside and out of limits of agrarian and industrial complex and also strengthening of integration in the grain sector and adjacent sectors of agrarian and industrial complex. (Rosinformagrotech, 2017)

“Prodimex” company is the largest in Russia vertically integrated holding.

Primary activities of the company are: agricultural production, transportation and storage of grain, production of food and also construction of housing and social facilities. In development of grain production and increase in stability of business during crisis the company uses two main strategy – vertical integration and diversification in agrarian and industrial complex (Figure 10). (Prodimex, 2017)

The anti-crises value of the applied strategy consists in ensuring stability of holding in adverse macroeconomic conditions, a possibility of subsidizing of temporarily unprofitable enterprises, preservation of qualified personnel and social support of workers due to ensuring their employment.

Figure 11: Business case: crisis response strategies of Prodimex grain company



Source: Prodimex, 2017

"United Grain Company" JSC also adheres to the strategy of integration. On May 18, 2015 the development strategy of the company for 2015-2020 has been approved in the Ministry of Agriculture of the Russian Federation. The purpose of the strategy is the creation of the largest vertically integrated operator of the grain market of the Russian Federation playing an essential role in formation of global grain streams (Figure 11). (Prodimex, 2017)

Figure 12: Business case: the development strategy of OZK JSC for 2015-2020

Source: Vedomosti, 2017

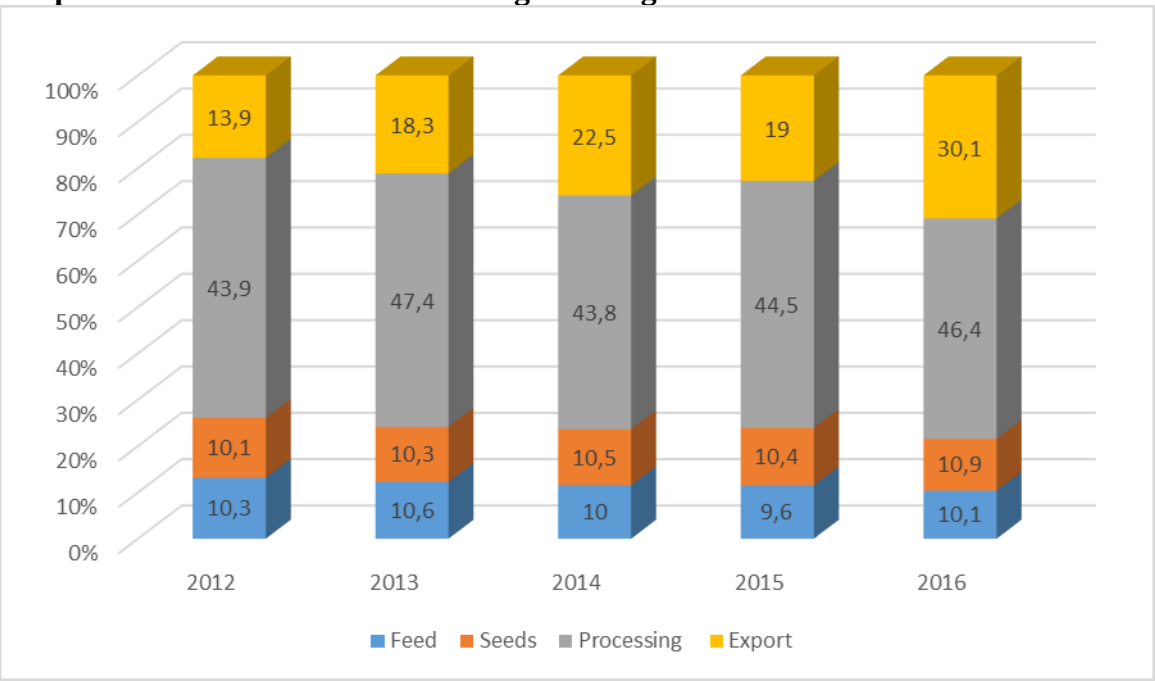
One of the key purposes of "OZK" JSC is the help to the Russian producers in the sphere of agrarian and industrial complex to enter the export markets, being an alternative to foreign traders. (Vedomosti, 2017)

The main sources of financing of the long-term program of development of UGC JSC will be the investment credits, project and trade financing.

4.2.4 Internal grain consumption in Russia: possibilities for growth

The production of grain reached today in the Russian Federation allow to provide the internal needs for grain fully. Internal consumption of grain is rather stable and makes about 70 million tons. The main channel of realization of food grain is its further processing in flour and then in bakery, macaroni and confectionery. (Smirnov, 2016)

Graph 22: Volumes and directions of grain usage in Russia



Source: Rosstat, 2017

Table 4: Grain production

EXPORT	There are restrictions on growth rates of export of grain from Russia against the background of the shortage of logistic capacities and aggravation of the competition in the world market of grain in a consequence of its overproduction
PROCESSING	Development of production of fuel bioethanol from grain crops. Especially favourable production of bioethanol will be for remote grain producing regions owing to high costs of the organization of export
FEED	The expense of feed owing to increase in their conversion against the background of introduction of new technologies in livestock production is reduced. On grade of experts in new projects in livestock production conversion of feed is reduced to 3 kg on 1 kg of an additional weight (earlier - 4,5-5 kg on 1 kg of an additional weight)

Sourse: AB-Centre, 2017

Consumption of grain will grow within the country due to expansion of feed consumption (owing to increase in production of production of livestock production) and uses

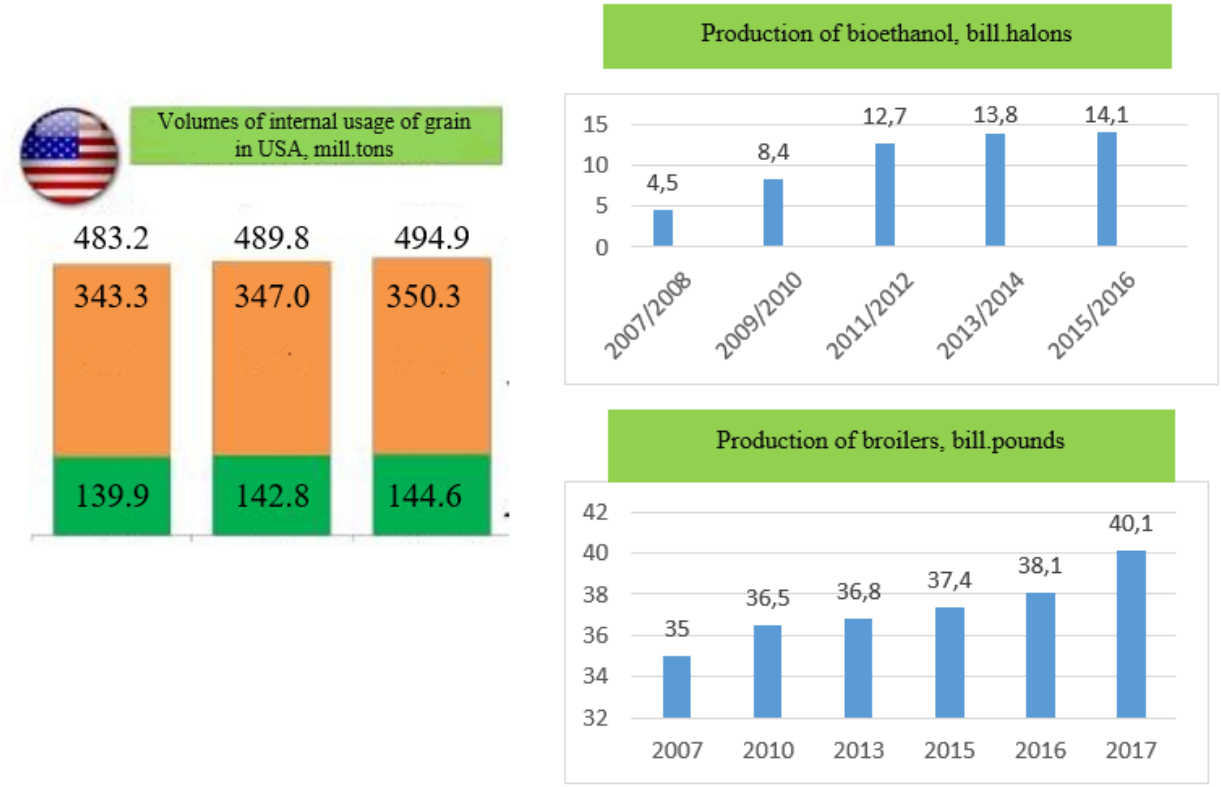
of grain for its deep processing. At the same time the essential growth of scales of fodder consumption of grain, considering duration of an investment cycle in livestock production is improbable.

Growth in consumption of feed grain will lag behind a gain of production of livestock production due to lack of modern technologies and concentration of production in the farms constructed or modernized within State Program for development of agriculture for 2013-2020. (Aoozk, 2017)

Need of increase in production of feed grain in the Russian Federation is caused by need of the country for import substitution and satisfaction of consumer demand of the population for quality meat. However now on a forage to the cattle and birds only 38–39 million tons of grain are used, according to balances of Rosstat (Russian statistical agency). At the same time consumption of vegetable protein makes only 4,5 million tons at the general need for fodder purposes – 12,4 million tons that is a limiting factor of development of branches of livestock production. (Aoozk, 2017)

Against the background of increase in production of grain in the Russian Federation, the main reserve of increase in volumes of its internal consumption is development of production of bioethanol and deep processing of grain. Here experiments of the USA for intensification of domestic demand for grain due to development of processing industries with high volumes of consumption of grain is remarkable. (Usda.gov, 2017)

Figure 13: Business case: experience of the USA in expansion of domestic demand for grain



Source: USDA, National Chicken Council, 2017

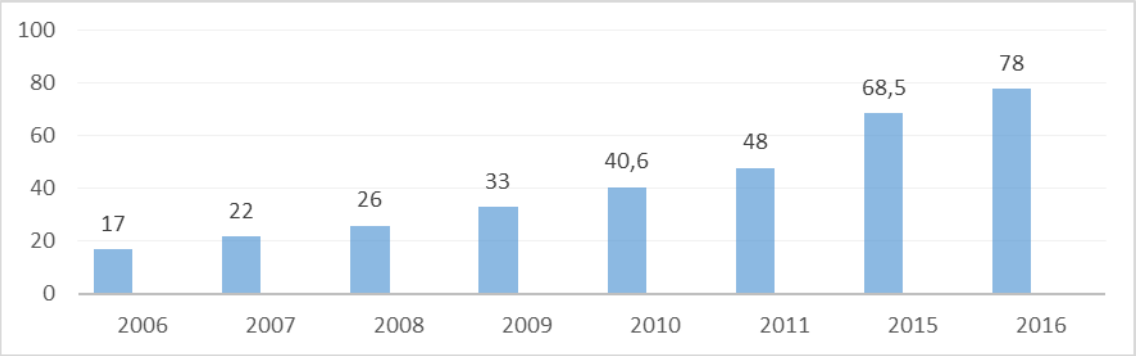
Consumption of grain in the USA has a stable tendency to growth. Major factors of growth of domestic demand for grain are fast rates of development of production of bioethanol from corn, the growing demand from the starch and molasses and brewing industries and also intensive development of branches of pig-breeding and poultry farming.

Owing to the stable growth of productivity the market of grain of the USA periodically experiences crises of overproduction and a collapse in prices. It is an incentive for development of deep processing of grain within the country – production of molasses, bioethanol. Production of bioethanol from wheat and corn has grown from 2003/2005 to 2015/2016 marketing year more than by 7 times, production of broilers – from 2007 to 2017 has grown by 15%. (The National Chicken Council, 2017)

Despite considerable volumes of export of grain, Russia imports from abroad the most important products of processing of grain used by production of compound feeds (in connection with the existing also objective lack of production of domestic feed components). The irrational ratio of export of grain and import of production made from it causes essential damage to the interests of domestic agrarian and industrial complex. (Aoozk, 2017)

Meanwhile, development of deep processing of grain will allow to carry out import substitution of some major products, production of high-quality main foodstuff, compound feeds and also development of livestock production in regions. (Aoozk, 2017)

Graph 23: Consumption of lysine in RF, thousand tons



Source: Abercade, 2017

Lysine is used in production of premixes and compound feeds. The main raw materials for production of a lysine is wheat. According to the research of Abercade company, world production of a lysine makes ~ 600 thousand tons/year. More than 95% of a lysine are used for addition in forages to a bird and pigs. In the late eighties in the USSR 5 manufacturing enterprises of a lysine making 32 thousand tons of a product a year worked. Currently, lysine isn't manufactured in the Russian Federation and completely imported from abroad. Main importers of a lysine in the Russian Federation are Japan, Germany and the USA. (Abercade, 2017)

5 Practical Part: Possibilities for development of grain market

5.1 Strategic importance of Russian grain export

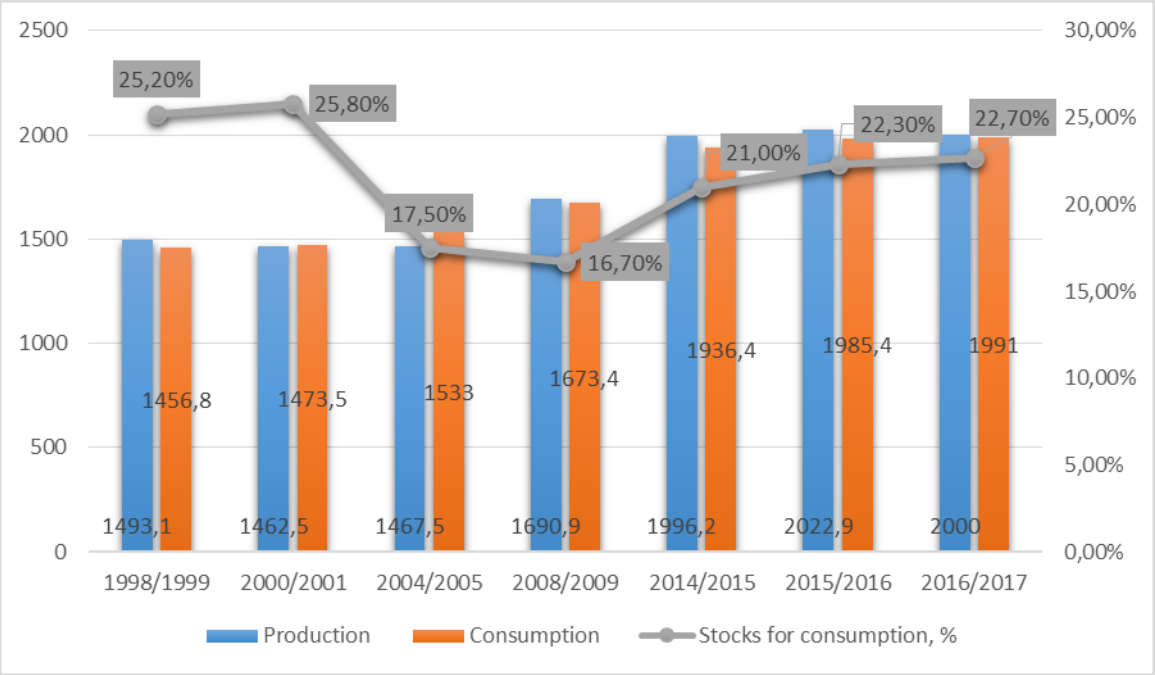
In the sphere of increasing export of grain the main obstacles are: existence of outdated infrastructure of the grain market not meeting the modern requirements; insufficient quality of grain of the Russian production (low content of gluten and protein in comparison with the American grain); imbalance of the domestic grain market against the background of spontaneous production of separate species of grain crops (excess production of wheat at a lack of production of rye, barley, corn, pulses); lack of clear tariff policy of railway transportation of grain in the Russian Federation. (Sivakumar, 2005)

Increasing export of agricultural products and food will allow: to attract additional investments into agro-industrial complex; to increase recoverability of the bank loans granted to producers; at the state level to reduce negative balance of the foreign trade balance; to strengthen a role of the Russian Federation in the sphere of international trade in food.

Competitive advantages of the Russian grain in the world market are influenced by low cost of production, existence of export resources and demand from the countries with the low level of security with agricultural lands.

Volumes of grain export are influenced by two major factors: internal offer and environment of the world grain market. The world balance of grain shows, that the steady growth of consumption volumes for grain is quicker, than increase in production –37% against 34% for the considered period. Major factors of influence on increase in consumption of grain – growth of population in the world, increase in volumes of its food and industrial consumption, first of all from the countries of the Pacific Rim and Africa. An important role in increase in volumes of consumption of grain is the increase in demand from China. Besides, increase in production of biofuel from grain crops is observed. (Fas.usda.gov, 2017)

Graph 24: World balance of production and consumption of grain (without rice), million tons



Source: USDA, 2017

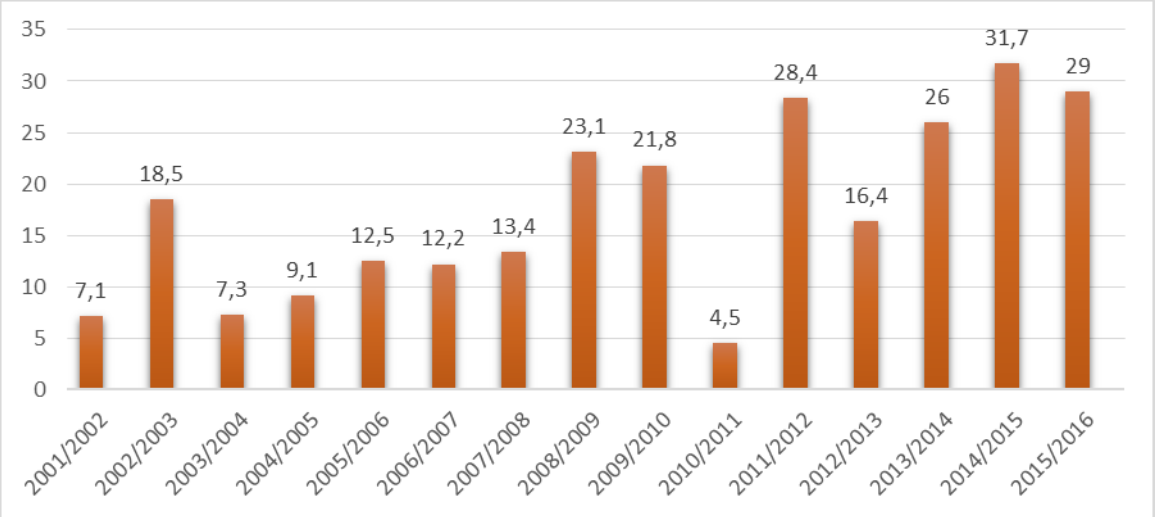
Now export of grain is an indicator of economic capacity of the Russian Federation. Volumes of export testify to a possibility of providing internal needs of the country for food and food security and also demonstrate ability to steadily deliver to the world market considerable volumes of food for the purpose of strengthening of national interests.

Table 5: Geography of export

Tukey	15%
Egypt	12%
Iran	7%
Saudi Arabia	7%
Azerbaijan	5%
Jordan	2%
Georgia	2%
Nigeria	2%
Sudan	2%
Yemen	2%

Source: Rosstat, 2017

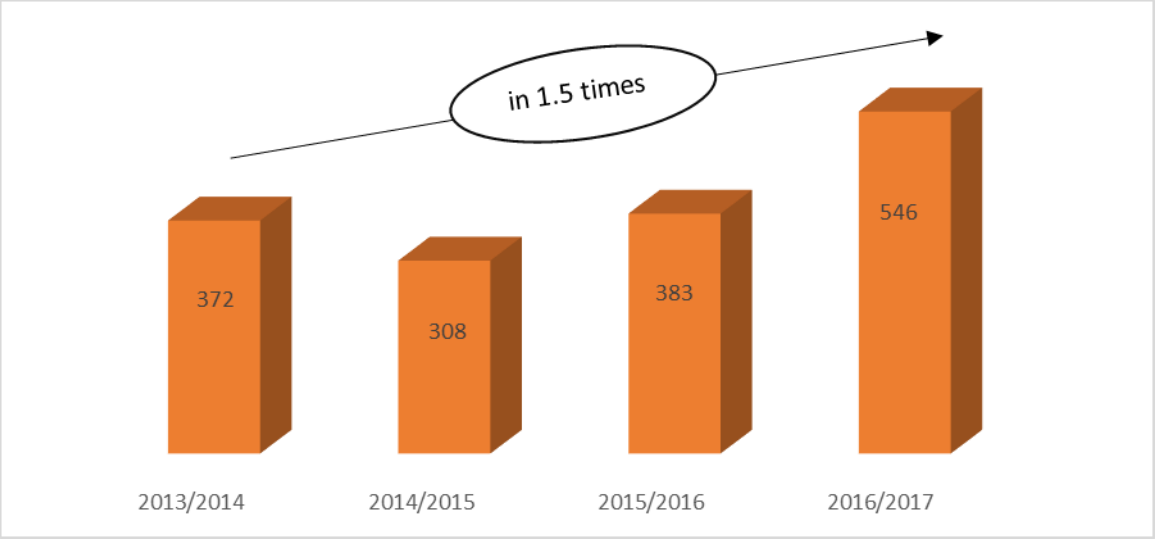
Graph 25: Dynamics and geography of grain export from RF, mill.tons



Source: Rosstat, 2017

During the time Russia entered to the world grain market, the pool of 20 largest export companies was created. Their structure periodically, is replenished with new players. Owing to consolidation of a segment of export of grain growth of cumulative share TOP-20 of the companies in a total amount of export of grain from the Russian Federation from 60% to 80% is observed. (Agro2b.ru, 2017)

Graph 26: Dynamics for the number of grain exporters from RF



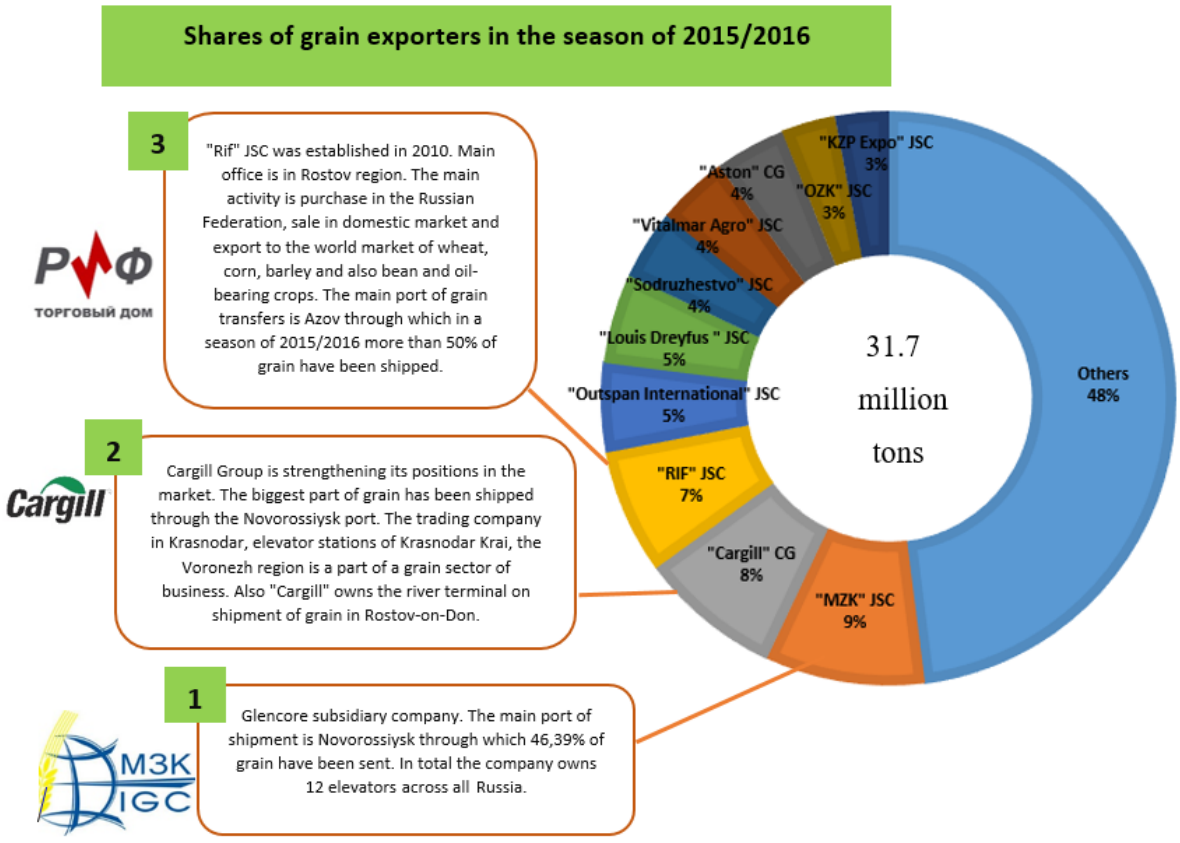
Source: Agro2b, 2017

Growth of a share of the international companies in structure of export which has reached 40% in a season 2015/2016 is observed. These companies operate through affiliated or partner companies. Among them are the following companies: Glencore (MZK), Cargill,

Olam (Outspan), Bunge, ADM-Toeppfer (Artis), CHS (Agromarket), Noble (Bonel), Fedcom (Agrofest-Don). In a season 2016/17 — Miro group (CBH), Vitol (Gravit). (Agro2b.ru, 2017)

At the same time, Russian exporters keep and increase the positions in grain exports. The investment activity regarding acquisition or construction of capacities for storage and transfer of grain near the main ports is observed. The project of "Rif" company which has constructed the largest terminal on transfer on small water in the port of Azov is significant.

Figure 14: Shares of main exporters in season of 2015/2016



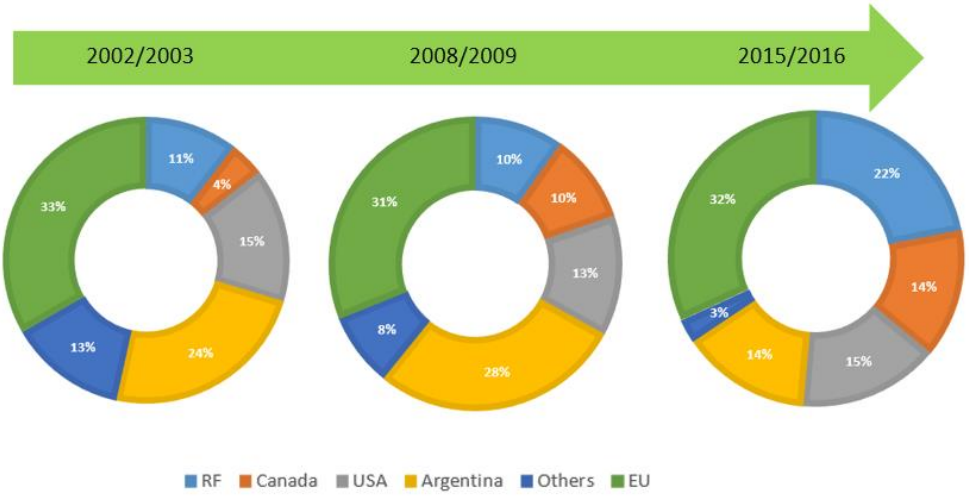
Source: Agro2b, 2017

In March, 2011 the leading export companies of the Russian grain and also the companies which are carrying out logistic ensuring export deliveries, have created the National Association of Exporters of Agricultural Products (NAEAP). It is possible to distinguish the following main objectives of association: development and implementation of the concept of export of agricultural production from the Russian Federation; assistance to development of infrastructure and logistic ensuring market of agricultural products of Russian Federation; introduction of resource-saving technologies and improvement of quality of agricultural products; development of the competitive environment in branches of logistics, export.

Strengthening of investment activity of exporters of grain regarding acquisition of capacities for storage and transfer of grain is observed. TOP-3 leaders of grain export of the Russian Federation own those assets that allows to reduce costs of storage and transfer, to provide synergetic effect between links of a deliveries chain (Figure 13).

From the beginning of grain export during the Post-Soviet period of the Russian Federation, have increased a share in structure of world export of wheat from 4% to 14,1% that has allowed to move in 2015/2016 agricultural season to the 3rd place on export of wheat. By 2020 it is planned to bring a share of supply of the Russian wheat and barley to 20% of volume of global demand. (Agro2b.ru, 2017)

Figure 15: Redistribution of shares of the main export countries in the world grain



Sourse: USDA, 2017

Necessary reserves are included in change for system of grain export regulation, introduction of resource-saving technologies, implementation of material modernization and technical resources of a grain subcomplex.

Owing to the sharp growth of dollar exchange rate in relation to ruble (for the period of June, 2015 – July, 2016 – growth by 75%) profitability of export has considerably increased and strengthened confidence of the Russian exporters in the world market and has allowed to win positions in export of wheat from the USA. Besides, increase in the offer of the Russian grain has allowed exporters to make discount on production and to win new sales markets. In turn, lower prices of Russian grain have expanded sales markets and have increased shares of the main buyers of the Russian grain.

For example, Russian Federation (together with Ukraine) have increased the share in grain purchases by Mexico from 0 to 12% for 2014/2015 and 2015/2016 agricultural seasons;

purchases of Nigeria in the Black Sea region have grown from 1% to 17% for 2014/2015 and 2015/2016 agricultural seasons. (Usda.gov, 2017)

Table 6: Increase in the offer of grain has provided decrease in export prices of grain of the Black Sea region, US$/ton

	October 2015	October 2016	Changes %
Russia (wheat of 4th grade, Novorossisk)	236	185	-21.6
France (FSW 1)	211	190	-10.0
Argentina (milling wheat in bulk)	270	224	-17.0

Sourse: Specialized center for records in agro-industrial complex, 2017

For development of export of agricultural production and food is necessary to:

- Bring food branches to new high technical and technological level, to create export infrastructure, to increase labor productivity.
- Make necessary changes to standard and legal base agrarian and industrial complex for the purpose of legislative ensuring granting soft loans to processing enterprises with the interest rate subsidized from the federal budget; to make use of the experience realized in foreign countries with the developed agriculture for export development.
- More active advance of production to various regions of the world without concentration in the markets of the EU on which advance is complicated because of high barriers. Emerging economies have to become the priority markets: Middle East, Southern and Southeast Asia.
- Provide harmonization of norms of technical regulation of the Russian Federation and the EU that will allow to facilitate access to domestic manufacturers to the next markets.

5.2 Development of exchange grain market in Russia: potential possibility of risk hedging

The Russian market for grain is in a stage of active formation of the exchange market now. The main prerequisites for development of the exchange market of grain in the Russian Federation are: high volatility of the prices of the grain market; lack of close interrelation between the real market of grain in the Russian Federation and futures for grain at the

exchanges CBOT, EURONEXT, MATIF; lack of the similar exchange centre of trade and pricing on grain in the Black Sea region; the developed infrastructure of the real market of grain in the Black Sea region (storage, transportation, shipment); existence in the Russian Federation of infrastructure and resources for the organization of exchange trade taking into account experience in carrying out interventions in the grain market. (Altukhov, 2009)

In world practice, futures for food products are the indicator of the prices by which sellers and buyers in the real market are guided. The largest world exchanges – Chicago Board of Trade, Euronext – organize trade in futures for wheat, corn and barley. They are the international and regional centres of pricing in the grain market.

The bearish dynamics observed now in the future market of wheat is connected both with influence of fundamental factors, and with dollar exchange rate. Despite the predicted growth of volumes of consumption in a season 2017/2018, wheat stocks, record for the last 15 years, – 207,4 million tons, according to FAO are expected that exerts essential negative impacts on grain quotations. (Agro2b.ru, 2017)

Strengthening of dollar exchange rate in relation to other currencies also has a negative effect on future quotations as an increase in its cost at purchase of the future, less dollars are necessary for purchase. Besides, international trade in grain is carried out in dollars and strengthening of dollar leads to decrease in purchasing power of participants of the market.

The analysis of force of influence of factors on the world quotations of futures for wheat which is carried out by USDA has shown that the greatest impact on an environment of the future market is exerted by fundamental factors – a ratio of supply and demand on wheat. Influence of future quotations on oil and dollar exchange rate exerts smaller impact on grain futures.

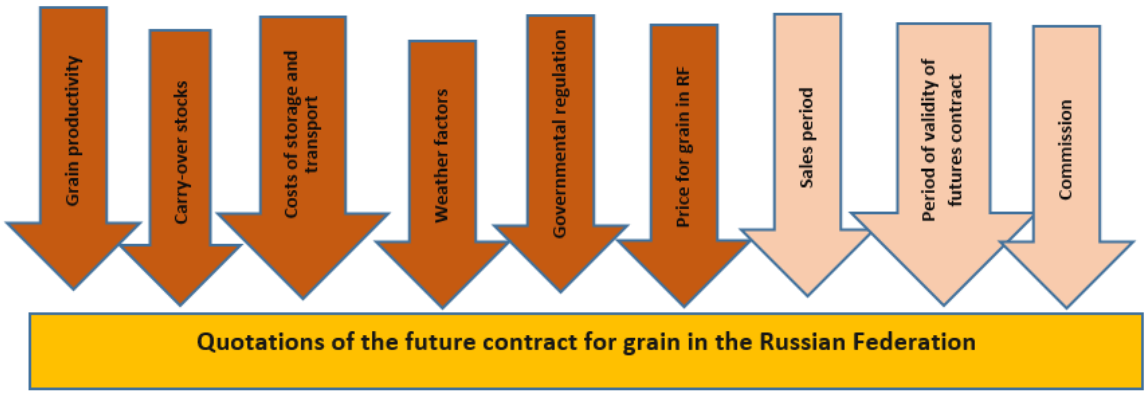
Futures for grain were widely adopted among participants of the world market of grain (producers, processors, traders) as the effective instrument of hedging of price risks. At the same time today grain futures are rather attractive speculative tools. By expert estimates, the annual turnover of the market of futures for wheat is more than 15 times above than the volumes of world export of grain.

When hedging risks of fluctuation in prices in the physical market are replaced with basic risks (basis – a difference between the price of the future and physical markets). For the seller (at short hedging) narrowing of basis is favourable, and for the buyer (at long hedging) brings benefit, on the contrary, its expansion. (Hardaker, 1997)

Interrelation of price dynamics in the Russian physical market and the future markets of grain in Europe and the USA is complicated by such factors as introduction/cancellation of export embargo, influence of local weather conditions on price market condition. At the same time the future contract for wheat for CBOT is characterized by very high volatility and sensitivity to a release of economic data from the USA. Considerable impact on the market is exerted by fundamental factors, news from the export countries and data on stocks of importers, weather, etc. (Usda.gov, 2017)

Hedging with use of futures of the Russian exchanges would possibly lead to decrease in risks. Now on National Mercantile Exchange the liquidity (the number of transactions) is low that increases risks of price fluctuations, complicates search of trade partner and excludes a possibility of fast operations with contracts. Therefore, now National Mercantile Exchange can't be considered as the attractive platform for hedging.

Figure 16: Factors of influence on the quotations of the future contract for grain in the Russian Federation



Sourse: USDA, 2017

5.3 State interventions at grain market as a measure for market support

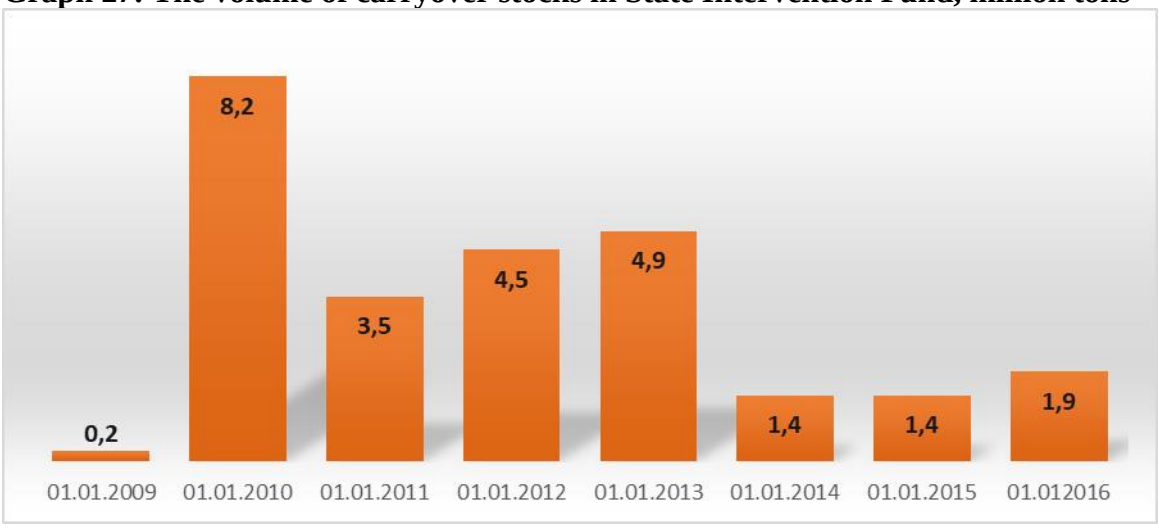
State grain interventions are applied to control price in the market of grain and are implemented in two directions: commodity (sale of grain by the state from the State Intervention Fund during the periods of deficiency of the offer in the market for the purpose of reduction of prices) and purchasing (acquisition of grain by the state in the public intervention foundation during the periods of its surplus in the market for the purpose of ensuring upward price dynamics in the market). As practice of carrying out interventions shows, purchasing interventions are applied much more often than surplus of grain, commodity in a type of need of removal, from the market. The mechanism of purchasing

interventions is designed to provide a favourable environment in the market of grain by establishment of the minimum support prices for grain within interventions. (Ortiz, 2008)

Interventions are intended to promote increase in profitability of agricultural producers and to stimulate them to further increase in production of grain. Despite positive effect which is rendered in general by the system of interventions the mechanism of their realization in practice is far from perfect. So, carrying out the state interventions is followed by the following negative factors of influence on the grain market:

- High costs of the budget for grain purchase at the prices higher than the market ones and also on storage of grain and managing of purchases.
- Shortage and overstocking of elevators.
- Insufficient flexibility of reaction and high dependence on the amounts of financing from Rosselkhozbank JSC (Russian Agricultural Bank) as main creditor of the state purchasing agent of grain of “OZK” JSC.

Graph 27: The volume of carryover stocks in State Intervention Fund, million tons



Source: OZK, 2017

On this background correction of governmental procurement of grain in three directions is necessary: giving to purchases from State Intervention Fund of "dot character" taking into account an environment of the regional markets, realization of the mortgage mechanism of purchases with a possibility of share repurchase, strengthening of function of monitoring and forecasting.

Transformation of a part of the operating measures for support of production of grain products influencing the prime cost and quality of products in a subsidy for increase in income of agricultural producers. (Agro2b.ru, 2017)

Replacement of the mechanism for direct state support of agricultural producers in the form of subsidies for compensation of a part of costs of acquisition of various material resources by the subsidizing mechanism on 1 hectare of cultivated area for providing financial support at execution of account obligations of territorial subjects of the Russian Federation for implementation of the regional and (or) municipal target programs directed to increase in income of agricultural producers in the field of crop production. (Rosinformagrotech.ru, 2017)

5.4 Econometric analysis for dependence of gross harvest of grain on acreage

X – acreage, million hectare;

У – gross harvest of grain, million tons.

Main quantitative characters:

1. Selection criteria – n = 7.

2. Minimal value X – min x=43,2 million hectare

Maximum value X – max x = 46,7 million hectare

3. Minimum value У – min y =61,0 million tons

Maximum value У – max y = 108,2 million tons

4. Average value is calculated by the formulas:

$$\overline{X} = \frac{1}{n}\sum_{i=1}^{n} x_i \qquad \overline{y} = \frac{1}{n}\sum_{i=1}^{n} y_i$$

year	Y	X	$y_i - \overline{y}$	$(y_i - \overline{y})^2$	$x_i - \overline{x}$	$(x_i - \overline{x})^2$	$(y_i - \overline{y}) \times \times (x_i - \overline{x})$	xy	X^2
2007	77,8	43,6	-9,3	86,68	-1,2	1,42	11,08	3392,08	1900,96
2010	108,2	46,7	21,1	444,79	1,9	3,65	40,28	5052,94	2180,89
2012	61,0	43,2	-26,1	681,73	-1,6	2,53	41,51	2635,2	1866,24
2013	94,2	43,6	7,1	50,27	-1,2	1,42	-8,44	4107,12	1900,96
2014	70,9	44,4	-16,2	262,76	-0,4	0,15	6,32	3147,96	1971,36
2015	92,4	45,8	5,3	27,98	1,0	1,02	5,34	4231,92	2097,64
2016	105,3	46,2	18,2	330,88	1,4	1,99	25,65	4864,86	2134,44
∑	609,8	313,5	0,0	1885,09	0,0	12,17	121,75	27432,08	14052,49
Average value	87,11	44,79						3918,87	2007,50

year	y^2	$\hat{y}_i$	$e_i = y_i - \hat{y}_i$	e_i^2	$\hat{y}_i - \bar{y}$	$(\hat{y}_i - \bar{y})^2$
2007	6052,84	72,003	5,797	33,6064	-15,097	227,922
2010	11707,24	111,357	-3,157	9,9692	24,257	588,421
2012	3721,00	66,925	-5,925	35,,1044	-20,175	407,035
2013	8873,64	72,003	22,197	492,7112	-15,097	227,922
2014	5026,81	82,159	-11,259	126,7628	-4,941	24,414
2015	8537,76	99,932	-7,532	56,7295	12,832	164,658
2016	11088,09	105.010	0,290	0,0842	17,910	320,765
∑	55007,38			754,9677	0,0	1961,138
Average value	7858,20					280,163

$\bar{X}$ = 44,79 million hectare

$\bar{Y}$ = 87,11 million tons

Calculation for coefficient of pair correlation for definition of linear relationship, using data from tables, under formula:

$$r_{y,x} = \frac{\sum (y-\bar{y})\cdot(x-\bar{x})}{\sqrt{\sum (y-\bar{y})^2 \cdot \sum (x-\bar{x})^2}}$$

$$r_{xy} = \frac{121,75}{\sqrt{1885,09*12,17}} = 0,80384$$

As coefficient of pair correlation is $0,6 \leq |r| \leq 0,9$, than linear relationship between x and is sufficient. We will try to describe relationship between x and by dependence

$y = b_0 + b_1 x$

Parameters b_0 and b_1 are found by formulas:

$$b_1 = \frac{\overline{yx} - \bar{y} * \bar{x}}{\overline{x^2} - \bar{x}^2}$$

$b_0 = \bar{y} - b_1 * \bar{x}$

$$b_1 = \frac{3918,87 - 44,79*87,11}{2007,50 - 44,79^2} = 12,6950$$

$b_0 = 87,11 – 12,6950*44,79 = -481,4991$

y = 12,6950x -481,4991

As $b_1 > 0$, than dependence y from x is direct. With growth of acreage gross harvesting increases.

With reliability of 0,95 we will check the value of b0 and b1 by means of Student's criterion. For significance value α = 0,95 and number of degrees of freedom of n-2 = 7-2 = 5 criterion of Student is $t_{\frac{\alpha}{2},n-2} = 2{,}571$.

$\hat{y}_i$ =12,6950xi -481,4991

Dispersions and We will determine mean square deviations of coefficients b0 and b1 by formulas, using data from the table:

$D(b_1) = \frac{1}{\sum(x_i-\overline{x})^2}\frac{\sum e_i^2}{n-2}$ $S(b_1) = \sqrt{D(b_1)}$

$D(b_0) = \frac{\overline{x^2}}{\sum(x_i-\overline{x})^2}\frac{\sum e_i^2}{n-2}$ $S(b_0) = \sqrt{D(b_0)}$

$D(b_1) = \frac{1}{12{,}17} * \frac{754{,}9677}{7-2} = 12{,}4071$

$S(b_1) = \sqrt{12{,}4071} = 3{,}5224$

$D(b_0) = \frac{2007{,}50}{12{,}17} * \frac{754{,}9677}{7-2} = 24907{,}1102$

$S(b_0) = \sqrt{24907{,}1102} = 157{,}1987$

For determination of the statistical importance of coefficients b0 and b1 we will find t – for Student's statistics:

$t_{b0} = \frac{b_0}{S_{b0}} = \frac{-481{,}4991}{157{,}1987} = -3{,}0630$

$t_{b1} = \frac{b_1}{S_{b1}} = \frac{12{,}6950}{3{,}5224} = 3{,}6041$

Comparison of estimated data and table values of Student's criterion.

$|t_{b0}| > t_{\frac{\alpha}{2},n-2}$ $|-3{,}0630| > 2{,}571$

$|t_{b1}| > t_{\frac{\alpha}{2},n-2}$ $|3{,}6041| > 2{,}571$

With reliability 0,95 assessment of theoretical coefficients of regression of b0 and b1 are statistically significant.

With reliability 0,95 interval estimations of interval estimates of theoretical coefficients for regression b0 and b1 we will defined and conclusions on the importance of these estimates will be made.

Confidential intervals for these coefficients are:

$$b_0 - t_{\frac{\alpha}{2},n-2} S_{b_0} \le b_0 \le b_0 + t_{\frac{\alpha}{2},n-2} S_{b_0}$$

$$b_1 - t_{\frac{\alpha}{2},n-2} S_{b_1} \le b_1 \le b_1 + t_{\frac{\alpha}{2},n-2} S_{b_1}$$

Having substituted numerical values, values of coefficients b0 and b1, their average square deviations and value for t are:

-481,4991 – 2,571 *157,1987 ≤ b_0 ≤ -481,4991 + 2,571 *157,1987

-885,657 ≤ b_0 ≤ -77,341

As the point 0 (zero) doesn't lie in a confidential interval, interval assessment of coefficient b_0 is statistically significant.

12,6950 – 2,571 *3,5224 ≤ b_1 ≤ 12,6950 + 2,571 *3,5224

3,6389 ≤ b_1 ≤ 21,7511

We will define coefficient of determination of R2 and coefficient of correlation of r_{xy} and we will draw the corresponding conclusions on quality of the regression equation.

Dispersion and average square deviations of independent X and productive Y factors:

$$D(x) = \overline{x^2} - \bar{x}^2 = 2007{,}50 - 44{,}79^2 = 1{,}3559$$

$$S(x) = \sqrt{D(x)} = \sqrt{1{,}3559} = 1{,}1644$$

$$D(y) = \overline{y^2} - \bar{y}^2 = 7858{,}20 - 87{,}11^2 = 270{,}0479$$

$$S(y) = \sqrt{D(y)} = \sqrt{270{,}0479} = 16{,}4331$$

Close connection between variables X and Y is defined through the covariance and coefficient of correlation.

$$\mathrm{cov}(x, y) = \overline{xy} - \bar{x} \cdot \bar{y} = 3918{,}869 - 44{,}79 * 87{,}11 = 17{,}2121$$

$$r_{xy} = \frac{cov(x, y)}{S(x) \cdot S(y)} = \frac{17{,}2121}{1{,}1644 \cdot 16{,}4331} = 0{,}8897$$

Value r_{xy}=0,8897, is close to 1 that characterizes close linear connection between independent and productive signs.

For determination of coefficient of determination we will use results of calculations of the table

According to table will be found:

general error:

$$TSS = \sum (y_i - \bar{y})^2 = 1885{,}09$$

error, explained by regression

$$ESS = \sum (\hat{y}_i - \bar{y})^2 = 280{,}163$$

residual error

$$RSS = \sum e_i^2 = \sum (y_i - \hat{y}_i)^2 = 754{,}967$$

Than coefficient of determination is equal:

$$R^2 = \frac{ESS}{TSS} = \frac{280{,}163}{1885{,}09} = 0{,}1486$$

The variability of data is explained on 14,86% by linear model and on 85,145 by random errors. Quality of the model is bad.

We will check at the level of importance 0,05 the importance of the regression equation by means of F statistics of Fischer and we will draw the corresponding conclusions on the importance of the equation of regression.

Fischer's statistics is calculated under formula:

$$\mathrm{F} = \frac{\mathrm{ESS}}{\mathrm{RSS}} \cdot (\mathrm{n} - 2).$$

F = (280,163/754,967)*5= 1,8555

We will find 0,05 critical value of Fischer's statistics for the set confidential probability:

$F_{кр}$ = 6,6079

$F < F_{кр}$ 1,8555 < 6,6079

The equation isn't significant with reliability 0,95.

By results of the carried-out analysis it is possible to draw the following conclusions:

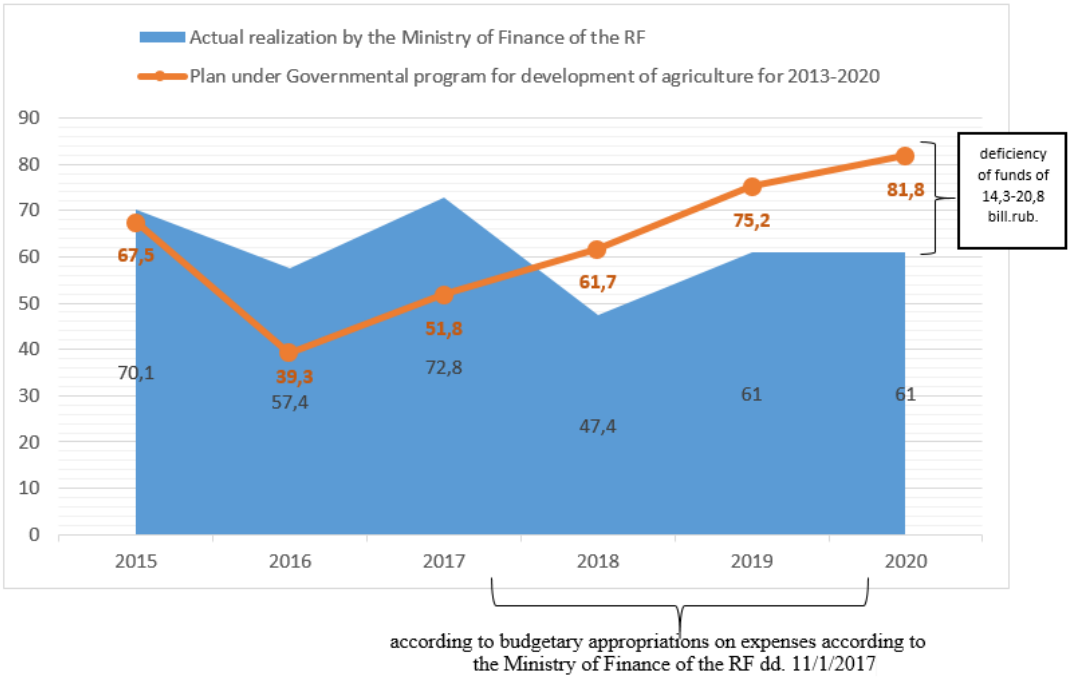
- Dependence of gross harvesting on the size of acreage is direct.
- When checking by the help of Student's criterion with reliability of 0,95 assessment of theoretical coefficients of regression b0 and b1 are statistically significant.
- Interval assessment of coefficients b_0 and b_1 is statistically significant;
- The size of coefficient of correlation is close to 1 that characterizes close linear connection between independent and productive signs.
- Quality of model is bad: the variability of data is explained for 14,86% by linear model and on 85,145 by random errors.
- Check of regression by means of F Fischer's statistics has shown that the equation isn't significant with reliability of 0,95.

5.5 Forecast of economic parameters for grain market for the next two years

A fundamental factor of influence on keeping positive dynamics in production of grain in 2018-2020 is ensuring volumes of the state support within State program of development of agriculture for 2013-2020 at the level of 2015-2017. According to the plan of resource providing the sub-program "Development of subsector of crop production, processing and sales of products of crop production" positive dynamics in financing of branch with average growth rates of volumes of support at the level of 17% a year is expected. By 2020 it is planned that the amount of financing of branch of crop production has to reach 81,8 billion rubles that is 58% above than the level of plan for 2017 (Figure. 17).

However, according to the data of the Ministry of Finance of the Russian Federation, published in "Budgetary appropriations on expenses of the federal budget for 2017 and on planning period of 2018 and 2019" dd. November 01, 2017 in 2018-2019 the planned annual amounts of financing on average is 21% lower, than the plan for State program. By expert assessment, the volume of budgetary appropriations for 2020 is accepted at the level of 2019 – 61 billion rubles. The deficiency of means will be from 14,3 billion rubles in 2018 up to 20,8 billion rubles in 2020. (Fao.org, 2017)

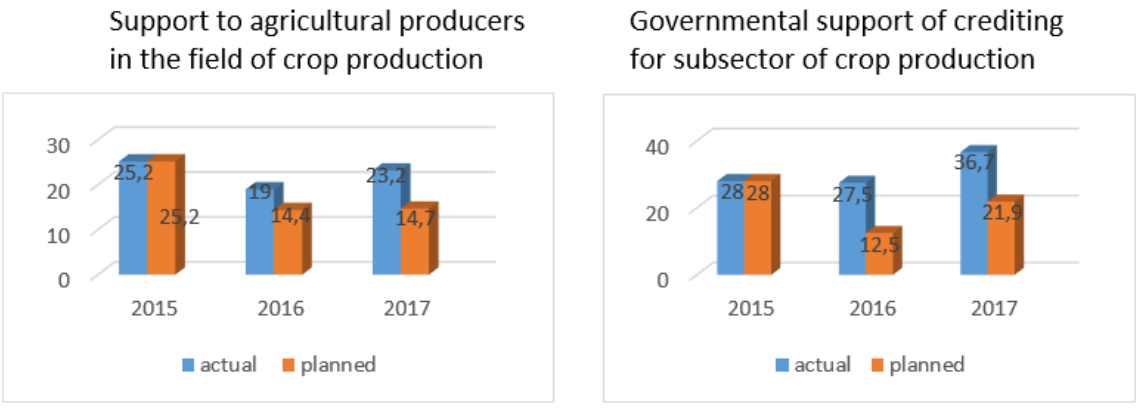
Figure 17: The volume of the state support of agriculture within the sub-program "Development of subsector of crop production, processing and product sales crop production", billion rubles.



Source: The Ministry of Finance of the Russian Federation, 2017

At the same time it is possible to note that during 2015-2017 essential over achievement of the plan for financing of development of crop production in general for 23% for the specified period was observed that in a certain measure will allow to compensate the dropping-out amounts of financing and to create a reserve on implementation of investment projects in spheres of production and processing of products of crop production. So, over achievement of the plan for financing of the most expensive and the actions of the sub-program of development of crop products connected with long-term development of branch – "Rendering untied support to agricultural producers in the field of crop production" and "The state support of crediting of subsector of crop production, processing of its production, development of infrastructure and logistic ensuring the markets of products of crop production" (Figure 17) is observed.

Figure 18: Financing of the most expensive actions of the Sub-program "Development of subsector of crop products, processing and sales of products of crop production"



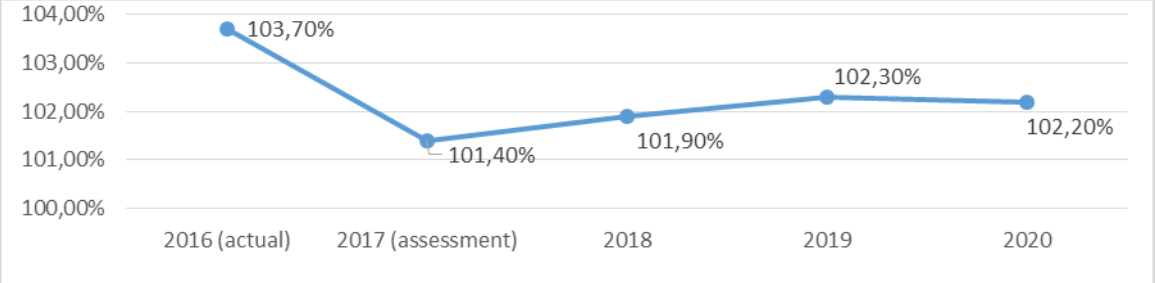
Source: The Ministry of Finance of the Russian Federation, 2017

Besides, according to basic version of the forecast of the Ministry of Economic Development of the Russian Federation October, 2017 keeping positive dynamics in production of agriculture until 2020 inclusively is expected (Figure 18). Key influencing factors for that are the following: weather conditions, preservation of a sanctions regime concerning the Russian Federation and countermeasures, strengthening of ruble exchange rate, restoration of growth rates of national economy, growth of real income of the population, condition of the world markets and also development of the Common economic space. (Rosinformagrotech, 2017)

Keeping positive dynamics in production of gross output of agriculture has been put in a basis of the forecast of balance indicators of development of the grain market.

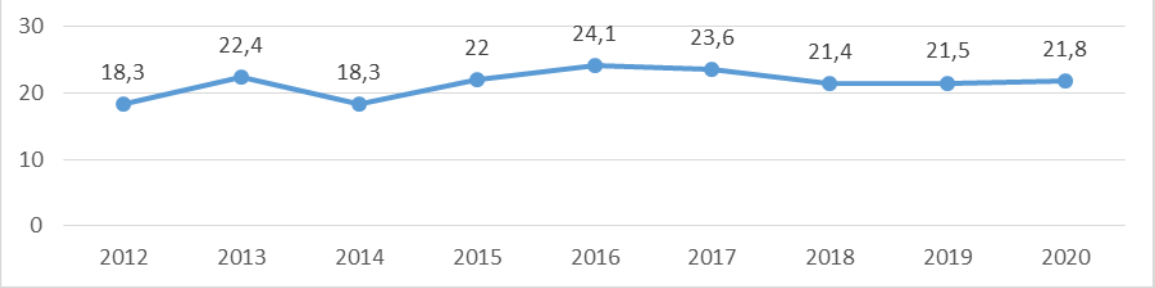
Level of grain productivity in the Russian Federation according to the relevant forecast of OECD and FAO for 2017-2026 has been chosen as an additional factor of influence on volumes of gross harvesting in the Russian Federation. According to this document (OECD-FAO Agricultural Outlook 2017-2026) the productivity grain in the Russian Federation will be average 21,4–21,8 c/hectare in the period of 2018-2020.

Graph 28: Expected dynamics of the index for gross output of agriculture in the Russian Federation, %



Source: Analytical Centre under Government of RF, 2017

Graph 29: Expected dynamics of grain productivity in the Russian Federation, c/hectare



Source: OECD, 2017

According to the specified influencing factors, the stable slow growth of gross grain harvesting in the Russian Federation on average for 2,9% a year up to 104,4 million tons in 2020 is expected. These outputs will fully allow to provide internal needs of the Russian Federation for grain and also to create stable volumes of export for delivery to the world market. (Oecd-ilibrary.org, 2017)

Internal grain consumption in the Russian Federation will be defined on a forecast period of 2016-2018 considerably by requirement of branches of livestock production for fodder grain. Taking into account the planned indicators of volumes of production of meat and dairy sub-complexes designated in State Program development of agriculture for 2013-

2020 it is planned to bring by the end of 2018 domestic production of meat to 13,8 million tons (+7,4% to the level of 2016) that will make 86,9% of the volume of cumulative resources, milk – to 36 million tons (16,7+ % to the level of 2016), what will make 85,9% of the volume of cumulative resources (table 7).

Table 7: Calculation for volume of resources in livestock production for ensuring full import substitution

	2016	2017 (assessment)	2018 (forecast)	2019 (forecast)	2020 (forecast)
MEAT SECTOR					
1. Specific weight of own productions in volume of resources, %	78.9	80.9	84.3	85.9	86.9
2. Production of the cattle and poultry on slaughter in live weight, million tons	12.9	13.5	13.3	13.6	13.8
3. Volume of resources, one million tons	16.3	16.7	15.8	15.8	15.9
MILK SECTOR					
1. Specific weight of own productions in volume of resources, %	81.0	81.9	83.0	84.3	85.9
2. Milk, million tons	30.8	30.6	34.4	35.2	36.0
3. Volume of resources, one million tons	38.1	37.4	41.4	41.8	41.9

Source: Ministry of agriculture of Russia, 2017

Estimates by the Centre of development of Higher School of Economics and National Research University, increase in production of meat in general on 1,0 million tons and milk on 5,2 million tons by 2020 in comparison with the level of 2016 for import substitution will demand additional production of grain in volume of 4,1 million, at the developed structure of production in branches of livestock production following the results of 2016. (Agro2b.ru, 2017)

Necessary production of grain will demand increase in the square for cultivation of additional volume of fodder grain at 1,9 million hectares at the predicted productivity level.

Table 8: Calculation of need for fodder grain for ensuring import substitution in livestock production (taking into account planned targets of development of the meat and dairy complexes determined by the Governmental program)

	2017	2018	2019	2020
1**. Additional volume of production, mill.tons***				
Total meat	**0.6**	**0.4**	**0.7**	**1.0**
including				
cattle	0.1	0.1	0.1	0.2
pigs	0.2	0.1	0.2	0.3
sheep and goats	0.0	0.0	0.0	0.0
poultry	0.3	0.2	0.3	0.4
milk	**0.0**	**3.6**	**4.4**	**5.2**
2.Volume of consumption for forages necessary for production of livestock products, millions of tons of forages, unit**				
total	**3.3**	**6.3**	**8.7**	**11.1**
including				
cattle	1.8	1.1	1.9	2.6
pigs	0.9	0.5	0.9	1.3
sheep and goats	0.1	0.1	0.1	0.2
poultry	0.5	0.3	0.6	0.8
milk	**0.0**	**4.3**	**5.2**	**6.2**
3. Need in crops, mill. tons***	**1.5**	**2.2**	**3.1**	**4.1**
Average crop productivity, centner/hectare	23.6	21.4	21.6	21.8
Area under crops, mill. hectar	0.6	1.0	1.5	1.9

***Taking into account the production structure in 2016; ** taking into account an expense of forages on 1 ton of products of livestock production; ***with accounting of grain share in forage according animal species and coefficient of fodder units in one ton of grain - 1,2**

Reference information for calculation of need in forage			
	Expense of forages on 1 ton of production of livestock products, tons of fodder units	**Grain share in forage according animal species, %**	**Structure of production following the results of 2016**
cattle	**13.8**	**30**	**20.0%**
pigs	**4.5**	**65**	**30.2%**

sheep and goats	**6**	**40**	**2.8%**
poultry	**1.8**	**63**	**46.3%**
milk	**1.2**	**30**	**-**

Source: Ministry of agriculture of Russia, 2017

Estimates by the Centre of development of Higher School of Economics National Research University, increase in production of meat in general on 1,0 million tons and milk on 5,2 million tons by 2020 in comparison with the level of 2016 for import substitution will demand additional production of tons, grain in volume of 4,1 million, at the developed structure of production in branches of livestock production following the results of 2016.

Necessary production of grain will demand increase in the square for cultivation of additional volume of fodder grain at 1,9 million hectares at the predicted productivity level.

Besides, it is necessary to consider that in the Russian Federation the considerable carryover grain reserves are annually accumulated. So, following the results of 2016 the volume of reserves of grain was 60,2 million tons, or 89% of grain internal consumption in the country. On this background taking into account reduction of volumes of support of crop production to branch in 2018-2020 drawing into economic circulation of reserves of grain in the country in volume of additional requirement of branches of livestock production taking into account realization of the purposes of import substitution is expedient.

Against the background of the expected positive dynamics, by estimates of the Centre of development of Higher School of Economics National Research University, consumption of grain on a forage to the cattle directly in farms will grow in development of livestock production on average for 2% a year and will increase to 11,0 million tons in 2020. Taking into account goals on import substitution in the sphere of seed farming it is possible to expect some increase in use of grain for seeds on average for 1,1% a year. In general, by 2020 the specified tendencies in production consumption will lead to expansion of consumption of grain on the production purposes for 6,7% to the level of 22,4 million tons. (Agro2b.ru, 2017)

Regarding development of food consumption of grain, it is possible to expect that essential changes in volumes in the period of 2018-2020 won't happen. In recent years consumption of bakery products tends to insignificant decrease at the level of on average 0,4% a year, according to Russian Statistic Agency that is connected with redistribution of nutrition structure of the population in favour of the products containing protein. In State program of development of agriculture slow increase in production of flour and grain is

planned for 2013-2020 (in 2018 +1,4% and 3% respectively to the level of 2016) that considerably won't affect volumes of food consumption of grain in the Russian Federation.

Stable gross harvesting in the period of 2018-2020 will allow to create sufficient volumes of export and to systematically increase them to the level of 33 million tons in 2020 (+9,6% by 2014). These volumes are represented quite real taking into account internal needs of the Russian Federation, current state of port infrastructure and demand for grain in the world market. It is also necessary to consider that projection of export of grain from the Russian Federation is given taking into account lack of essential restrictions for export from the state. Besides, as a factor of support of export of grain from the Russian Federation preservation of a low exchange rate of ruble (by basic version of the forecast of the Ministry of Economic Development of the Russian Federation dd. October, 2017 the average annual growth rate of ruble exchange rate in 2018-2020 will be 3,2%) will serve that will stimulate exporters to deliveries of production to foreign markets. (Agro2b.ru, 2017)

Table 9 presents expected balance of resources and use of grain in the Russian Federation according to the Centre of Development of Higher School of Economics and National Research University.

Table 9: Expected balance of resources and use of grain in the Russian Federation

	2016 (actual)	**2017 (assessment)**	**2018**	**2019**	**2020**
I. RECOURSES					
Stocks at the beginning of the year	52.6	60.2	60.6	59.4	57.7
Production (gross harvesting)	105.3	100.1	101.3	103.0	104.4
Import	0.9	0.9	0.9	0.9	0.9
Total resources	158.9	161.1	162.8	163.3	163.0
II. USAGE					
Production needs	21.0	21.5	21.7	22.0	22.4
including:					
For seeds	10.9	11.0	11.2	11.3	11.4
To feed cattle and poultry	10.1	10.5	10.5	10.7	11.0
Processing for flour, pulses, forage and other purposes	46.4	47.9	48.6	49.5	50.5
Losses	1.0	1.0	1.0	1.0	1.0
Export	30.1	28.0	30.0	32.0	33.0
Internal consumption (consumption fund)	0.1	0.1	0.1	0.1	0.1
Total usage	98.6	98.5	101.4	104.6	107.8
Stocks for the end of reporting period	60.2	62.6	63.4	62.7	61.0
Stocks to internal consumption ratio, %	76.8	85.4	87.7	87.3	84.7

Source: Russian Statistic Agency, 2017

In the period till 2020, the Russian Federation has every chance to bring production of grain to the level of 115 million tons planned in State Program for development of agriculture for 2013-2020 due to renewal of financing of the state support of agriculture in necessary volumes, involvement of reserves of growth of productivity at the expense of an intensification of crop production, increase in security of agricultural producers with modern power saturated agricultural machinery, expansion of acreage under grain, active implementation of measures of support of "a green basket" of the WTO.

6 Conclusion

The importance of the grain market is defined by its leading role in the formation of food resources of the country, existence and a variety of inter-industry communications. In 2017, the share of grain in the structure acreage in the Russian Federation made about 60%. The main producers of grain are the agricultural organizations, which share in structure of production fall more than 70%. Now there is a tendency to create integrated associations in the form of agro holdings which unite processes of production, storage and trade in grain.

Despite the essential growth of grain productivity in 2014-2016 (for 32% up to 24,1 c/hectare) and record gross harvesting in a season of 2015/2016 (105,3 million tons), the condition of raw materials basis of a grain sub-complex is characterised by preservation of a number of system intricacies.

Distinctive features of the Russian Federation in grain production are high volatility of potency and gross harvesting, that is connected to the low resource level and creates additional risks of short harvest reception. Technological hazards are the principal restriction in production expansion. The deficiency of the fleet of agricultural machinery remains. Security with combine harvesters in 2016 made only 24%, tractors – 32% of the standard. Insufficient security and the high degree of wear of elevator capacities can be observed. According to the Russian Grain Union, only 40% of elevators are capable to provide quality for grain safety.

The constant deficit of fodder grain, which is covered by food grain, mainly by wheat, is characteristic of agriculture of the Russian Federation. In the gross harvesting structure, the wheat share was about 60% in 2016. Besides, the unevenness of territorial placement of production is representative of the Russian market of grain. The total share of 10 main manufacturing regions of grain makes about 60%.

The most promising strategy of grain companies from the point of view of business stability and its ability to function effectively in the conditions of crisis is diversification of business in and outside the agrarian and industrial complex and also integration strengthening in grain and adjacent sectors of the complex. The example would be one of the leaders in elevator capacities of the Russian Federation – “Prodimex”, grain company and also the project of creation on the basis of “OZK” (United Grain Company) JSC - the largest vertically integrated operator of the grain market of the Russian Federation that plays an essential role in formation of global grain streams.

The world balance of grain shows steady growth of volumes of grain consumption by 6% a year on average since the end of 1990. The size of the world market is estimated at the level of 1,99 billion tons (without rice) in the season of 2015/2016. The major factors influencing the increase in consumption of grain – the growth of population in the world, increase in volumes of food and industrial consumption, first of all, from Asia-Pacific countries and Africa. An important role in the increase in volumes of consumption is played by the increase in demand from China. In these conditions of the Russian Federation has every chance to strengthen the role of one of the leading exporters of grain in the world market.

Owing to the sharp growth of dollar exchange rate in relation to ruble (from June 2015 till July 2016 its growth has exceeded 75%) profitability of export has considerably increased that has strengthened confidence of the Russian exporters in the world market. Besides, increase in the offer of the Russian grain owing to record gross collecting in a season of 2015/2016 has allowed exporters to make the discount on production and to win new sales markets. So, the export price of the Russian wheat of the 4th grade from October 2015 until October 2016 fell by 22%. In turn, lower prices of the Russian grain have expanded sales markets and have increased shares of the main buyers of the Russian grain.

The interrelation of price dynamics in the Russian physical market and the future markets of grain in Europe and the USA is complicated by such factors as introduction/cancellation of the export embargo, the influence of local weather conditions on price market condition. At the same time, the futures contract for wheat for CBOT is characterized by very high volatility and sensitivity to a release of economic data from the USA. Considerable impact on the market is exerted balance of supply and demand in the world market of grain, news from the export countries and data on stocks of importers, weather, etc.

Hedging with use of futures by the Russian exchanges would lead to decrease in risks of the grain market. However, now on the National Mercantile Exchange (NME), the liquidity (the number of transactions) is low that increases risks of price fluctuations complicates search of trade partner and excludes a possibility of fast operations with contracts.

The existing mechanism of realisation of the state interventions is designed to correct market condition of Russian Federation grain and to maintain the profitability of agricultural producers. However, it has a number of shortcomings: high costs for managing the process of interventions, lack of flexibility in response to the market condition, the discrepancy of the prices of a real situation. In this background, correction of state procurements of grain in three

directions is necessary: providing purchases to the public intervention foundation of "dot character", whilst taking into account the environment of the regional markets, implementation of the mortgage mechanism of purchases with a possibility of share repurchase, strengthening of function of monitoring and forecasting the market conditions.

7 References

1 Ab-centre. (2017). Analytical center of agribusiness. [online] Available at: http://ab-centre.ru [Accessed 12 Dec. 2017].

2 Abercade, (2017). Marketing reports of Abercade Company [online] Available at: http://www.abercade.ru/ [Accessed 15 Nov. 2017].

3 Ac.gov. (2017). Analytical Center for the Government of the Russian Federation. [online] Available at: http://ac.gov.ru/ [Accessed 15 Dec. 2017].

4 Agrarian sector of USA at the beginning of XXI century (2008). Overview of agrarian problems of USA and Canada ISKAN: [in 2 volumes] / Russian Academy of Science, Institute of USA and Canada; edited by Chernyakova B. A. M: ISKAN, V. I. P. 30.

5 Agro2b, (2017). Russian agro-industrial portal. [online] Available at: http://agro2b.ru/en/site/index [Accessed 10 Nov. 2017].

6 Aksoy, M. A. and Beghin, J. C., Global Agricultural Trade and Developing Countries. The International Bank for Reconstruction and Development. The World Bank, (2005), pp. 195-214.

7 Altukhov A. I. Grain industry and food safety of Russia / A. I. Altukhov // APC: economics, management, 2009, № 1.

8 Aoozk. (2017). United Grain Company. [online] Available at: http://aoozk.com/ [Accessed 10 Nov. 2017].

9 Barnett, H. Morse, C.: Scarsity and Growth: The economics and natural Resources Scarsity. Baltimore, Johns Hopkins Press, 1963.

10 CSA. Area and Production of Crops. Country Level, Part II, Addis Ababa, 2003, pp. 323-327.

11 Fao.org. (2017). World agriculture: towards 2015/2030. [online] Available at: http://www.fao.org/docrep/004/y3557e/y3557e06.htm#e [Accessed 15 Oct. 2017].

12 Fas.usda.gov. (2017). Grain: World markets and Trade. United States Department of Agriculture. Foreign Agricultural Service. Report. [online] Available at: https://www.fas.usda.gov/data/grain-world-markets-and-trade [Accessed 8 Sep. 2017].

13 Food and Agriculture Organization of the United Nations, (2017). [online] Available at: http://www.fao.org/home/en/ [Accessed 25 Nov. 2017].

14 Gks. (2017). Federal State Statistics Service, [online] Available at: http://www.gks.ru/ [Accessed 26 Dec. 2017].

15 Gordeyev A. A., Butkovskiy V. A., Altukhov A. I. Russian grain – strategic goods of XXI century. Gordeyev A. A., Butkovskiy V. A., Altukhov A. I., Deliprint (2007), p. 46.

16 Grishaeva L.V.: Agricultural Markets. Omsk, 2003. ISBN 2414-4649

17 Grun. (2017). Russian grain union. [online] Available at: http://grun.ru/ [Accessed 26 Dec. 2017].

18 Gurova I.P. World economy; text book/ed. – 2nd edition, Moskow, 2012: Omega. ISBN: 5-365- 00109-6.

19 Hardaker, J.B., Huirne, R.B.M., Anderson, J.R. 1997. Coping with risk in agriculture. CABI Publishing. Wallingford Oxforshire United Kingdom. ISBN 0 85199-119.

20 Kovalenko N.Ya.: Economy of agriculture. Yurkniga, 2004. ISBN 0042-8736

21 Meza, J. Francisco, and Silva, D., Dynamic adaptation of maize and wheat production to climate change. Climatic Change (2009), Vol. 94, Issue 1-2, pp. 143–156.

22 Oecd-ilibrary.org. (2017). OECD iLibrary: Organisation for Economic Co-operation and Development. [online] Available at: http://www.oecd-ilibrary.org/ [Accessed 10 Nov. 2017].

23 Ortiz, et al. Climate change: Can wheat beat the heat? Agriculture, Ecosystems and Environment 126, 2008, pp. 46–58.

24 Prodimex, (2017). [online] Available at: http://prodimex.ru/ [Accessed 17 Nov. 201].

25 Rosinformagrotech, (2017). Information bulletin of Ministry of Agriculture of Russia. [online] Available at: http://www.rosinformagrotech.ru/ [Accessed 10 Dec. 2017].

26 Sekhar, C.S.C., Price formation in world wheat markets — implications for policy. Journal of Policy Modeling. Volume 25, Issue 1, 2003, pp. 85–106.

27 Shend, Y. Jaclyn, Agricultural Statistics of the Former USSR Republics and the Baltic States. Statistical Bulletin Number 863, ERS, USDA, 1993.

28 Sivakumar, M. V. K., Impacts of present and future climate variability and change on agriculture and forestry in the arid and semi-arid tropics. Climate change, 2005. pp. 31-72.

29 Smirnov A.S. Indexes of regional activity. Magazine, Questions of statistics, Nr10, 2016. ISSN 2313-6383.

30 Specagro. (2017). Specialized center for records in agro-industrial complex. [online] Available at: http://specagro.ru/#/custom/128 [Accessed 10 Nov. 2017].

31 The Global Food Security Crisis, (2018). The secretary-general's high-level task force on the global food security crisis. [online] Available at: http://www.un.org/en/issues/food/taskforce/background.shtml [Accessed 10 Nov. 2017].

32 The National Chicken Council. (2017). The National Chicken Council. [online] Available at: http://www.nationalchickencouncil.org/ [Accessed 14 Oct. 2017].

33 Un.org. (2017). Welcome to the United Nations. [online] Available at: http://www.un.org [Accessed 22 Nov. 2017].

34 Usda.gov. (2017). USDA, Grain and Feed Weekly Summary and Statistics. United States Department of Agriculture [online] Available at: https://www.usda.gov/ [Accessed 26 Sep. 2017].

35 Vedomosti, (2017). Russian online newspaper. Daily news. [online] Available at: https://www.vedomosti.ru/business/articles/2015/07/16/600826-obedinennaya-zernovaya-kompaniya-hochet-k-2020-g-stat-liderom-rossiiskogo-rinka-zerna [Accessed 29 Sep. 2017].

8 Appendix

8.1 List of graphs

8.2 List of figures

8.3 List of tables