

Establishing Efficient Conditions for Agriculture Development



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Abstract: *The purpose of this paper is to adapt theoretical knowledge to derive practical recommendations on developing agriculture with a view to finding solutions to the problem of building up economic potential. The paper substantiates the relevance of further development of agriculture, emphasising the role of the industry in sustaining stable operation and development of the agro-industrial sector in general. The authors have shown that the identified conditions of efficient agricultural reproduction of the expanded type are not yet fully established. The conducted analysis of the state of Russian agriculture has shown that the industry has built sufficient capacity not just to supply its own needs from inner sources, but also has stable positions in the global market in grain and sunflower oil production; national requirements are fully met in egg products, pork and poultry meat, white sugar; a deficit in commodity supply, nationally, exists in fruit, berries, grape, vegetables, beef, milk. No expanded reproduction is yet attained in horticulture, vegetable farming, cattle farming. The reason for this condition is the high capital intensity and low capital turnover rate in production, on the one hand, and insufficient infrastructure profile, on the other hand. Moreover, the reserves for production growth lie in the active engagement of minor agricultural producers and private households to the mass market. Alongside the issues of resource supply, systematic state support of the agricultural sector should also address measures to ensure and regulate guaranteed marketing of agricultural products.*

Index Terms: *Russia, agriculture, reproduction, conditions, guaranteed marketing, purchasing and commodity interventions, agricultural cooperation, agro-industrial integration, industry cluster.*

I. INTRODUCTION

Given its central place in the network of Russian real economy and the multiplier effect in the agro-industrial complex and national economy in general, agriculture is a priority industry for restoring economic potential. Contributing more than 6% of the gross domestic product, agriculture is the supplier of fresh food products for consumers and agricultural materials for the food and textile industries and a consumer for the machinery and chemicals

sectors and infrastructural service providers (logistics, financial, educational sectors). As part of the economic cycle, agriculture should procure resources for its economic activities from external sources on a paid-for basis and maintain the capacity to build up its inner stability potential, i.e. ensure efficient reproduction of all inputs engaged in agribusiness. It can only be achieved in the following conditions:

- equality in the interindustry exchange relations;
- stability of the agricultural product market;
- economic affordability of land and labour resources, fixed and working capital, including those attracted to replenish deficits in the production lag periods.

Ensuring the above conditions should be a priority requirement for the operating environment of agriculture. Operation of the reproduction process in accordance with formal rules will inspire private initiative of agricultural producers to unleash the reserves for building up production and enhancing efficiency.

II. METHODS

High reliability of the research was assured by the application of a complex of methods including the monographic, statistical and economic, economic and mathematical, calculation and design methods. Each of them helped to ensure adequate analysis of the modern state of agriculture, the identification of its developmental issues, substantiation of the parameters of resource supply for the forward-looking strategies to attain the targets of the national food doctrine.

III. RESULTS AND DISCUSSION

As can be seen from the practice of agriculture in the late 20th century, maintaining a balanced profile of the organisational and economic conditions of operation is an objective requirement of the reproduction process in the national economic field. As soon as an industry or a complex emerges in a privileged position in the pricing system, a disruption occurs in the reproduction process in the economy nationwide. The imbalance primarily affects the industries aimed at the needs of the Russian domestic market. The effect is especially profound in absence, or inefficiency, of government regulation of economic relations in a "self-governing" economy, which applies to the market economy arrangements. Reproduction in the economy is a continuing reiteration of production of a product in quantities as demanded by the market.

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Meanwhile, the buyer's geographical location is not important and the choice of the counterparty is solely governed by the level of potential income actually available for the seller.

In a regulated market economy environment, the priority direction for saturating the economic field lies with the country of production and only excesses may be channelled for exports. The levelling-off of sales conditions in the domestic and external market is the responsibility of the state, addressed through direct economic mechanisms of withdrawal and subsidies. This applies to all commodities. On the one hand, this helps to prevent deficits in the national markets and ensure reproduction process stability in the economy, taking into account the population's purchasing power, and, on the other hand, procure equal income-earning potential in various marketing channels.

The reproduction process is a time period between the production (creation) of a product and its full consumption. Millions of interrelated reproduction processes occur in national economies.

A special place in the Russian economy belongs to the agro-industrial complex and agriculture in particular as an industry supplying materials for the food industry and

eventually food products for the population. Therefore, it should be viewed as one of the crucial structural parts of the national economy and its development – as an element of addressing national food security [1].

Over the past decade, there was an attempt to restore the economic potential of the agro-industrial complex in a targeted program-based administration of its transformation. As part of the State Program for Development of Agriculture and Regulation of Agricultural Commodity, Materials and Food Markets, investment is allocated to priority projects in the industry, subsidies are provided for agricultural production to create equal opportunities of expanded reproduction in agriculture as in other industries, to ensure more stable rural development and create favourable economic conditions for the entities of agricultural economy.

Economic operational conditions are external circumstances driving the entities of economic environment toward a particular line of behaviour to achieve the goals of their operation. They can be either sufficient or insufficient for persuading them to use the existing opportunities.

The implemented complex approach to the development of agriculture and agro-industrial complex in general has helped to improve the state of the industry (Table I).

Table I. State of agriculture in the Russian Federation, 2017

Types of products	Cropped area, million ha	Livestock, million units	Yields (productivity), hundred kilograms per ha (hundred kilograms per unit)	Self-sufficiency rate, % (2016)	Nutrition rate, % (2016)	Profit margin, %
Grain	47.6	-	29.2	492.9	121.9	19
Sugar beet	1.2	-	442	108.0	162.5	15
Oilflower seed	8	-	14.5	82.2	114.2	32
Potato	1.9	-	156	187.9	125.6	-11
Vegetables	0.6	-	236	179.5	80.0	17
Fruit, berries, grapes	-	-	76.5	23.8	62.0	-14
Animals	-	-	-	91.3	101.4	-
- cattle	-	10.5	126	-	-	-15
- pigs	-	23.2	206	-	-	27
Milk	-	8.2	5,660	89.1	72.6	-15
Eggs	-	-	311	109.0	105.0	5

The increased productivity of cultivated fields and agricultural animals amid more and more intense management of agricultural production allowed to raise nutrition levels above the recommended minimum rate of the Institute of Nutrition of the Russian Academy of Sciences. Noticeably, this did not apply to a number of products of agricultural industries linked to diet quality, including the production of vegetables, fruit, berries, grapes, milk and cattle. Vegetable farming, horticulture, grape farming and cattle farming are the most capital intense industries of the agricultural sector with contracted reproduction (except vegetable farming). So, the negative margin in milk production was 15% in 2017, live weight growth equalled 15% for cattle and 14% for fruit, berries and grapes. Neither were break-even rates achieved in potato growing. It should be specifically noted that no cardinal shift of balance towards protein-rich and highly vitamin-enriched food types has been seen yet. An objective factor, apart from the high capital and labour intensity of these types of products, is the existence of a

prolonged production lag, while a subjective factor is the lack of resources supplied from external sources despite the increase in the absolute levels of state support of agriculture. The reason for that is electricity rate growth. In such an economic situation, the reproduction processes in these industries can follow the simple reproduction patterns and the reproduction of deficits in the resource supply (labour) follows contracted reproduction patterns. It is exactly the orientation at full utilisation of the available production potential and a full supply of the needs of those engaged in the production process in agriculture that is the priority choice of private farms supplying up to 80% of berry, grape and vegetable produce. However, their low merchantability levels (not more than 15%), low availability of innovative technology and logistic solutions restrain interest in growing the scale of agribusiness and cap the competitive potential of market engagement.

Supplying the needs of the population, particularly between seasons, is maintained with the help of imports from the countries of the former Soviet Union and farther abroad. For instance, meat imports to Russia in 2017 (excluding

poultry) accounted for 21.7% of the incoming food supply, with 15.9% for potato, 23.9% for vegetables, 30% for fresh apples (Figure 1).

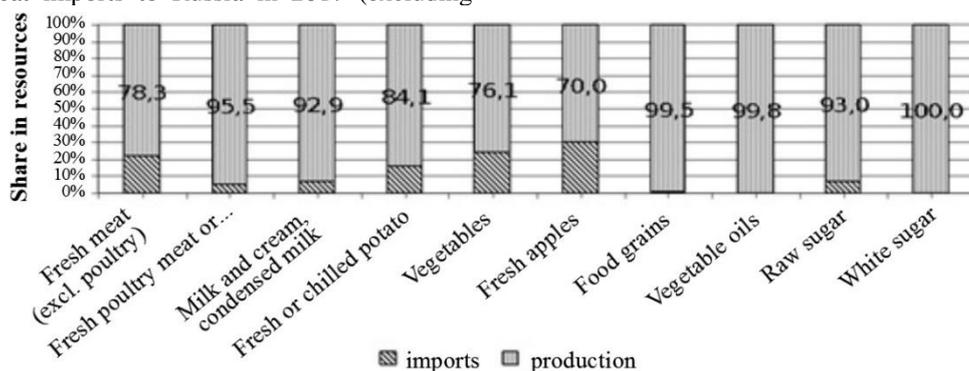


Figure 1. Share of production in food resource structure in Russia in 2017, %.

Full supply of the consumer market in 2018 was attained for the production of poultry meat, grain, vegetable oil and white sugar (beetroot sugar). Noticeably, the main producers in these types of products (particularly, sugar beet crop for sugar production, oilflower seeds for oil) are major and mid-size agricultural entities. They appeared as the main drivers of import phase-out accompanying the policies of protectionism and enhancing the efficiency of agricultural production under high-intensity growing technologies with innovative solutions, particularly, involving mechanisation.

Import phase-out refers to the substitution of imported goods with domestic products by improving their competitive profile. The main requirement for that should be the high purchasing power of the consumers, i.e. there must be a free choice for consumers not restrained by their purchasing power. In terms of agricultural products, the winner in the fair competition would be the entity maximising its economic effect by unleashing internal resources and improving agricultural performance efficiency. Import phase-out should be a continued approach irrespective of the scale of protectionist policy. Amid the war of sanctions, import substitution in agriculture should primarily apply to its resource base. Apart from improved education levels among rural populations engaged in agricultural production, there should also be wide adoption of innovations by the manufacturers of agricultural equipment and machinery, mineral fertilizers and herbicides. This will contribute to improved efficiency in the utilisation of agricultural resource potential through the increased intensity of production. In fact, import phase-out and substitution should contribute to

the smoothening and elimination of negative consequences of the systemic crisis in the national agro-industrial complex.

The intensification of agricultural production in Russia is the main way to improve the efficiency of its operation. However, taking into account the innovative technological change in the resources used, the mass of the output produce should grow at a faster rate compared to the growth of the invested capital. This is the main condition for unleashing growth potential and improving agricultural economic potential. Various lines of intensification would be practicable for different agricultural industries (Table II). For instance, grain, beetroot and gardening follow different vectors of improvement, though with a common intended goal, which is to improve the efficiency of growing agricultural produce. The existing differences in the complexity and depth of the applied production methods depend primarily on the attained levels of intensity of production. For instance, 100% of the cropped area in beetroot farming utilise innovative technologies (resource- and labour-efficient), while in horticulture, the areas developed under high-intensity technologies do not exceed 10% of the total. The ratio of the industry average actual costs of growing sugar beet crops per 1 ha of cropped area equals 99.5% of the normative rate, while in horticulture, it stands at 79.6% per 1 ha of gardens of fertile age. The differences are not only in the amount of funding and materials available in growing various agricultural crops and animal farming but also in the requirements to the development of storage and processing industries, as well as the logistics of agricultural product flows in long distances.

Table II. Main dimensions of intensification of production in major plant crop farming industries.

Grain production	Beetroot farming	Fruit farming	Berry farming
Engagement of highly productive equipment		Enhancement of planting ergonomics	Minimisation of care operations (mulching)
Refinement of crop grade composition with a view to improved quality profiles and prolonged produce supply			
Optimisation of labour costs per 1 ha of cropped area		Enhancement of commercial values of crops	Improvement of merchantability and transportability of berries
Enhancement of seed farming of recognised varieties of domestic grain crops	Application of granulated seeds F ₁ -hybrids of foreign breeding	Improvement of storability Thick planting technology	Introduction of seeds of foreign breeding

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Modern consultation system is also contributing to wider adoption of intense production technologies in crop farming and animal farming, improvement of governance, utilisation of state support opportunities and arrangement of land relations. According to the Federal Center of Agricultural Consultation and Talent Development in Agro-Industrial Complex, consultation structures were instrumental in developing 411 innovation projects with the total economic effect of more than 620 million roubles, which is 54.8% above the level of 2014.

In 2016, more than 510 thousand consultations were provided in Russia, including 45% in peasant (private) farms. It was one of the causes leading to the improved technological discipline of agricultural production in the agricultural small business economy. Today, peasant (private) farms account for more than 30% of gross grain output nationwide, 7.6% of milk production, 3.5% of live weight growth in cattle farming.

Approximately 4% of services dealt with the aspects of lending, particularly on eased terms. The procedure of short-term and investment loans changed in 2017. The approved banks of the Ministry of Agriculture (JSC Rosselkhozbank, Sberbank, Bank GPB (JSC), AO "ALFA-BANK", "Bank Otkritie Financial Corporation" (Public Joint-Stock Company), PJSC ROSBANK, Promsvyazbank PJSC, Raiffeisenbank, AO UniCredit Bank, etc) were obliged to provide loans to agricultural producers, organisations and sole traders engaged in the processing and (or) marketing of agricultural products with interest rates not more than 5%. Meanwhile, the lender's lost profits were compensated directly from the budget in accordance with the primary rate of the Bank of Russia. This measure helped to

- relieve the administrative burden for agricultural producers;
- strengthen payment discipline of the borrowers;
- stabilise the loan market at a level enabling expanded reproduction of the resource base of the borrowers.

According to the Ministry of Agriculture of the Russian Federation, investment lending on eased terms amounted to 2,764 loan agreements for a total of 107.7 billion roubles in 2017 and 2,222 loan agreements for a total of 168.1 billion roubles in 2018, an increase of 57% from the previous year. It should be noted that there were amendments in the legal acts regulating the mechanism of eased lending in 2018, including an extension in the range of specified purposes of the application of loans attracted on eased terms [2]. The implemented measures help to "revitalize" the agricultural producer economy. The share of agricultural organisations with outstanding debt has shown a continued decline: it stood at 12.3% in 2017 (including 2.5% for loans and borrowings owed to lending organisations), which marks a decline of 4.9% compared to 2015 (Table III).

Generally, only a subsystem is established in regulating agriculture in the Russian Federation now that only addresses a fraction of economic processes. The lack of efficient levers to stabilise the pricing system in the national economy and switching to the "manual control" mode in crisis periods does not allow outright suggestions of intense progress in agriculture. It remains subject to withdrawals of value added on the part of some resource-producing industries (fuel and energy complex, chemical industry) mitigated by administrative methods. In such circumstances, considerable importance is now attached to the issue of building, on a systematic basis, of a whole self-sufficient economic

macrosubject on the basis of all product subcomplexes of the agro-industrial complex. This means favourable conditions have to be created for the interaction of the subjects of the food market, including consumers.

Table III. The relative share of agricultural organisations with overdue payables.

Indicators	Agriculture			Change in 2017 compared to 2015 (+, -), %
	2015	2016	2017	
Share of organisations with overdue payables in the total number of organisations	17.2	13.8	12.3	-4.9
Share of organisations with overdue loans and credit payable in the total number of organisations	4	3	2.5	-1.5

The establishment of an efficient national food supply system operating in a market economy should not only include the "input" control measures but also shape the relevance of the "output" product. It is an objective requirement of the market economy, where "demand begets supply". Stable development of the agro-industrial complex can be only ensured provided all elements are in place in the distribution chain from growing agricultural commodities to products with high consumer value and provided also there are close economic ties between them based on equal exchange relations. For food producers and sellers, the market aspect in food supply development will provide an impulse for their progressive transformation as stable economic subjects only given specific conditions. Such conditions include:

- availability of guaranteed marketing of the products of the agro-industrial complex;
- high stability of general economic conditions, which involves macroeconomic risk mitigation;
- openness and accessibility of real innovation in all elements of the product subcomplexes of the agro-industrial complex.

The solution to the problem of marketing of agricultural produce can be found through implementing a complex approach to refine the system, including the following main directions:

- development of a network of wholesale distribution centres for agricultural produce;
- development of agricultural consumer marketing cooperation;
- wider adoption of state interventions for an extended range of agro-industrial produce;
- establishment of agro-industrial structures with a view to building closed technological cycles for agro-industrial end products [3], [4].

All these directions in their organisational unity can potentially produce stronger economic effect in terms of increased sales revenues on increased consolidated batches of agricultural produce, lower production costs in growing, development and storage, additional benefits from the operation of fair proportions of value distribution from the end product and the rationalisation of marketing channels, particularly through the use of trading and electronic trading platforms.

The development of wholesale distribution centres for marketing agricultural products refers to a three-tier network organisation.

Federal structures of wholesale distribution centres should coordinate investment flows to eliminate capacity gaps in storing and conditioning of agricultural produce, its primary processing and distribution within the country; promote the structuring of the market; develop and implement the state agricultural policy in pricing, public food procurement.

Regional structures of wholesale distribution centres should be primarily in charge of phytosanitary and veterinary control of agro-industrial produce from the interregional and international exchange and their domain also includes the conduct of similar works in regional production and logistics centres.

Production and logistics centres should engage in direct procurement of agricultural produce within a transportation leg of 200-300 km, its conditioning, standardisation, stocking and distribution in the marketing chain [5], [6].

Such a scheme of progression of agricultural produce "from field to consumer" will be effective only for large-scale agribusiness. Therefore, the construction of facilities of wholesale distribution centres will be concentrated in the regions with a high share of agriculture in the regional domestic product. These specifically include Moscow, the Moscow region (first leg), the Nizhny Novgorod region, the Republic of Tatarstan, the Perm and Primorye Territories (second leg), the Voronezh and Lipetsk regions (third leg), the Belgorod, Bryansk, Kursk, Tambov, the Tver and Tula regions (fourth leg) [7].

Therefore, an attempt was made to overcome the barrier in agricultural development linked to the lack of well-organised marketing of agricultural produce.

Partners of the production and logistics centres in the regions should be agricultural consumer marketing cooperatives that should handle the accumulation of produce from small agricultural producers, particularly private households. The initiative of creating such organisational form usually comes from economic subjects of smaller forms, meanwhile grant support from the government is solely an instrument to maintain economic stability in the environment of high operational and financial risks. This allows for a conclusion that rural cooperative movement becomes part of the overall distribution flow engaging producers of all legal forms and statuses. In 2017, there were 3,750 operational consumer agricultural cooperatives, with 18% of them established for the processing of produce supplied by its members, 7%, for joint marketing of the products, 7%, for arranging centralised procurement of production resources [8]. The most dynamic cooperative building trends are observed in the Lipetsk region and the Republic of Tatarstan, i.e. the regions with the outlook of intense development of organised interregional marketing.

Wholesale distribution centres may provide a positive effect on state interventions.

The mechanism of intervention purchases has already been tested and is used in the regulation of the grain and milk markets. However, given the short life of such products, an objective requirement for extending the shelf life is the engagement of processing. The objects of state interventions in the processed milk product market are dry low-fat milk and whole milk, butter. Due to this, the system of state engagement in demand shaping includes the whole product subcomplex. Presumably, the government agent will conduct purchasing interventions in milk products from May till August if purchasing prices of agricultural produce are lower than the calculated values and commodity interventions (reverse purchasing of the output by producers in case stocks were not realised in commodity interventions) in September and October, when raw milk supply in the consumer market declines and purchasing prices tend to rise. A similar scheme may be adopted for other types of produce (Table IV).

It is worth noting that the criteria for the calculated price applied in decision-making concerning purchasing interventions may be the so-called equitable purchasing price of agricultural produce.

Table IV. Range of food products to be potentially included in the program of intervention purchases.

Product	Agro-industrial product subcomplex	Shelf life	Note
White sugar	Beet sugar	4 years	GOST 21-94
Dried apple juice	Canned fruit and vegetable	36 months	GOST 32101-2013
Apple juice concentrated		12 months	
Carrot juice concentrated		12 months	
Grape juice concentrated	Grape and winemaking	12 months	Main State Trade Inspectorate of the RSFSR Letter of 21 July 1987, No. 23-1-6/52n
Frozen meat (beef)	Meat	18 months	
Frozen meat (pork)		12 months	
Frozen poultry meat		14 months	

An equitable purchasing price of agricultural produce can be defined as such price level that makes up for the industry average full costs of its production and marketing and generates income (profit) at a level sufficient for simple reproduction in the industry.

For wider adoption of government interventions, two principal issues have to be addressed:

- 1) intervention funding source and volume;
- 2) administrative decision-making concerning the need in regulation in such food markets.

An important direction for ensuring guaranteed marketing of agricultural produce concerns the opportunity for agricultural organisations to engage in integrated structures. A common trend in Russia today is the operation of major agricultural holding structures based on property relations.



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On the one hand, it creates the environment for hierarchical managerial principles in managing such structure's development, while on the other hand, the economic requirement of the commensurate capacity of the production units engaged in end-product manufacturing determines the scale of investment into the "bottlenecks" of inter-industry interaction to intensify them. However, there come the risks of property complex losses by the participants, that is why the most appropriate practicable form of agro-industrial integration is considered to be the establishment of industry clusters. Their participants may be small and mid-size agricultural entities retaining economic and legal independence, processing and service enterprises and innovation centres of universities accumulated by the geographical principle [9], [10].

Industry clusters can anchor internal pricing to equitable prices of agricultural produce with further distribution of profits generated from the sales of end product among the participants proportionally to their respective economic contribution.

It should be noted that integrated and cluster structures will have access to marketing their products both through the inter-regional wholesale distribution centres and to other counterparties.

Guaranteed marketing of agricultural produce is only possible where there is demand for such product as an intermediary product for food industry consumption. The potential demand of the consumers should be supported by their purchasing power which means the national economic environment should include personal income sources. It is the level of income flows and their resilience against inflation that should keep up the reproduction process, particularly in the agro-industrial complex. Actually, effective demand is subject to some conditions, including the following:

- high physical and economic accessibility of food;
- growing purchasing power;
- free choice of food products based on quality.

IV. CONCLUSION

The formation of an efficient environment for agricultural development is only possible given adequate resource availability across the stages of the reproduction process in the national agro-industrial complex. The measures taken for stabilisation of the agricultural sector allowed for more intensive unleashing of the internal growth resources by agricultural producers. However, unfortunately, not all industries have seen it at a systemic level or registered the expected result of food security or import substitution as a consequence of lower capital turnover rates due to the objective production lag factor. A considerable potential of agricultural growth lies in the marketing system of grown produce. Moreover, there is a need to enhance the accessibility of efficient marketing chains for small agricultural businesses and private household farms. It can be achieved through the interaction of wholesale distribution chains and agricultural consumer cooperatives formed by agricultural entities for processing and marketing of major quantities of end products.

Generally, successful sustainment of agricultural growth will depend on the success and rate of creation of effective conditions for interaction with the external operational environment and the potential to exploit resources it provides

for progressive development.

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