

Russian Federation
Agricultural Sector Subsidies and Resilience

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ABBREVIATIONS

CAP	Common Agricultural Policy
GAO	gross agriculture output
GDP	gross domestic product
GSSE	general services support estimate
NPPAD	National Priority Project for Agricultural Development
OECD	Organisation for Economic Co-operation and Development
RUSLANA	Private data provider of financial performance indicators of Russian companies
US\$	United states dollar

1 INTRODUCTION

The National Priority Project for Agricultural Development (NPPAD), announced in 2005, emphasized the importance of agriculture in the economy. This emphasis brought with it a significant growth in federal and regional agricultural budgets and state support measures. From 2008 to 2012, annual federal support to agriculture under the NPPAD averaged more than 130 billion rubles, up by more than 500 percent from the 2006-2007 annual support. Annual support doubled again to an average 270.2 billion rubles per year from 2013 to 2020. During the same time came a shift in policy objectives toward greater production, food self-sufficiency, and exports (World Bank 2020).

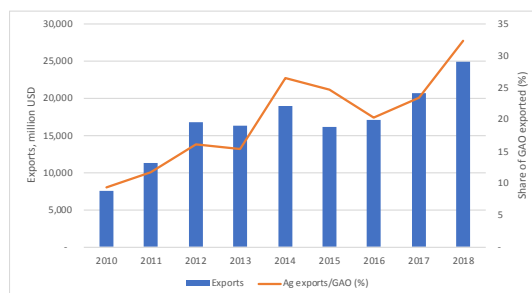
The measurable objectives of Russian agricultural policy include food self-reliance, production self-sufficiency and competitiveness. In addition, in recent years expansion of agri-food exports has been an important economic development policy target. Measured against these goals, Russia’s overall agricultural policy approach can be viewed as successful, reversing years of earlier stagnation. Policy choices have delivered on considerable production growth and improved self-sufficiency in several subsectors, most notably pork and poultry (Table 1). Exports of grains and oilseeds have been the key drivers responsible for agricultural growth, supported by international market forces: favorable prices and comparative advantage (Figure 1).

Table 1. Production growth and import reduction in Russia, 2013–2018

Subsector	Production (1,000 tons)		Import (1,000 tons)	
	2013	2018	2013	2018
Beef/veal	580	637	831	436
Pork	1,666	3,010	746	66
Poultry meat	3,748	5,059	550	224
Cheese and products	449	489	416	201

Source: Calculations based on Rosstat-Balances 2014, 2017, 2019 (www.gks.ru).

Figure 1. Russian agricultural exports and the share of gross agriculture output exported, 2010–2018



Source: Rosstat database (www.gks.ru).
Note: GAO = gross agriculture output.

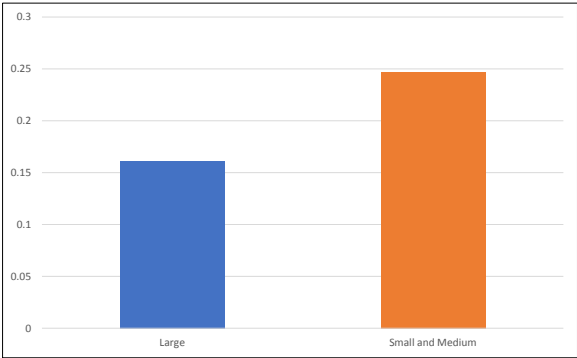
Productivity and production growth have been fueled by investments in technology, such as high-quality seeds and agricultural machinery, improved production practices. In addition, limited competition due to restrictive trade measures and favorable agricultural support measures have spurred domestic demand and this remarkable production growth (World Bank 2017). While examples of innovative practices and modern production methods are abundant (precision technologies, unmanned farm machinery, modern seed and breed varieties), there are still questions as to whether Russian agriculture is innovating enough, or it is relying on importation and adoption of technologies developed elsewhere. If going forward Russian agricultural sector is to position in the global agri-innovation space and play important role in global agri-food exports, new and improved agricultural policies need to realign the incentives to spur such innovation and export-competitiveness.

Besides trade restrictions, agricultural policy instruments have focused on the provision of interest rate subsidies for loans, investment subsidies (matching grants) for new equipment or construction, and area-

based payments. In contrast, a relatively smaller share of the public expenditures in agriculture are spent on the so-called general services. These include agricultural advisory services, infrastructure, food safety, and animal health (detailed discussion follows). Support for such public goods that can boost the productivity and competitiveness of agri-food production, and build resilience in the sector, has been relatively low. It has also been not very effective. Russian agricultural producers continue to rely on imported technology and inputs, such as seeds and breeding stock.

This report complements the World Bank’s report *Russian Federation— Agriculture Support Policies and Performance* of November 2020, which provided a detailed review of the main directions of agricultural sector development and agricultural policy performance. It presented the history of the State Program for Agriculture Development and detailed the ways in which the state support measures have been predominantly focused on extending public support to large agri-enterprises and vertically integrated agroholdings while putting less emphasis on supporting public goods to create an enabling environment for a more broad-based development of agriculture. Even though large agroholdings have been the main beneficiary of state support measures, the results of agri-enterprise and farm performance analyses demonstrate that smaller agri-enterprises and farms have been more efficient (Figure 2).

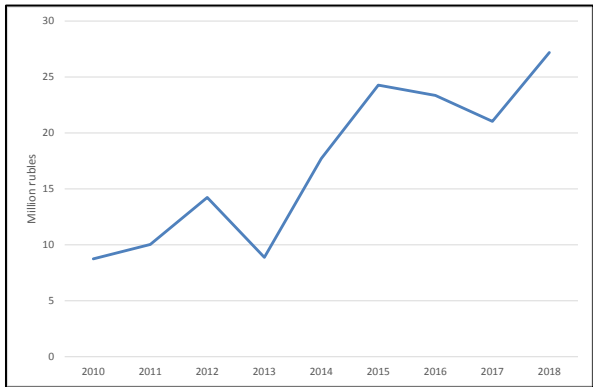
Figure 2. Distribution of capital productivity, 2010-2018.



Source: Calculations based on data from RUSLANA database.

Note: Small and medium farms are agri-enterprises with up to 50 employees, large are those with more than 50 employees.

Figure 3. Average profits of agri-enterprises and farms.



Source: Calculations based on data from RUSLANA database

This report – *Russian Federation - Agriculture Sector Subsidies and Resilience* discusses the impacts of state support measures and agricultural policy instruments on productivity, production, and profits of agri-enterprises and farmers. This report concludes that subsidies financed through public funds have not contributed to productivity increase at the agri-enterprise or farm level, contrary to the objectives of the State Program for Agricultural Development (2013–2025). Moreover, the analyses conclude that agri-enterprises and farms increased production and profitability primarily due to favorable market prices and weather conditions. While overall yields have increased significantly since early 2000s, the analyses in this report did not find direct linkages between the state support measures and yield increases.

When agri-enterprises and farms are asked to describe vulnerability factors that affect their business— they generally list those factors that are outside of the control of individual firms, e.g. zoonotic diseases, infrastructure, climate change and others,. Such factors are generally addressed through the provision of public goods. Respondents reckon that often they develop their own response measures to vulnerabilities (e.g. switching to no-till technologies to protect land or finding optimal marketing routes to overcome infrastructure limitations), even though such vulnerability factors could be addressed through state support measures.

The findings and discussions in the following sections attempt to raise the awareness of policy makers of the disconnect between the agricultural policy and its outcomes. The report argues that agricultural policy objectives, especially those related to competitiveness of agri-food production, could be addressed through improving the provision of public goods. The findings are expected to help policy makers to design informed- and results-oriented policies, and to guide the policy design process to the direction of delivery of public goods. Hence, the report looks at these aspects from a perspective of the impact of state-support measures on productivity of agri-food production and resilience of agri-enterprises and farms, using both aggregate data from federal level and granular interview based insights from regional level.

In addition to the analyses presented in this report, a digital Russia agriculture dashboard¹ has been prepared as an online reference tool. The dashboard combines various data resources on Russia's agriculture sector performance, subsidies and financial performance of agricultural producers, and provides easy access and comparison options on the information for each Russian region. It can be accessed here:

https://public.tableau.com/profile/stefan.englmeier#!/vizhome/Russia_16185156623240/RussiaAgricultureDashboard

In order to judge the efficacy of the agricultural policy and state support measures at the agri-enterprise or farm level, this report uses a conceptual model to assess factors that describe the resilience of agri-enterprises to various shocks, as well as factors that are perceived by industry stakeholders to lead to vulnerabilities. Such conceptual *vulnerability and resilience model* was employed to identify the pathway of various impacts (see Annex 1). Productivity was identified as the key resilience indicator, and the analyses were constructed to assess the vulnerability factors that reduce the strength of this indicator.

This report provides in Chapter 2 a brief overview of the current public agriculture support measures in Russia. In Chapter 3, it describes the results of a qualitative analysis that was conducted in Tambov Oblast through interviews of agri-enterprises and agricultural policy experts. This study examined the perceptions of vulnerability in agriculture and of how the causes of vulnerability were being addressed through policy instruments and state support measures. This study also reviewed the impacts of the COVID-19 pandemic on agri-enterprise performance. The analysis was conducted for Tambov Oblast but its findings could be relevant when assessing the overall performance of agriculture sector policy in the Russian Federation as these shed light on key agri-enterprise and farm level vulnerabilities that are not or only partially addressed by policy instruments currently in place.

Chapter 3 provides a regional angle to the discussions and provides a number of insights. First, it represents the results of engagement with a regional administration during the formation of a new regional agricultural development strategy. In this context, the more granular results and findings of the

¹ A product of collaboration with the DxHub and Master of Quantitative Economics Students of CalPoly University, USA.

study will contribute to refining and formulation of the regional agricultural development strategy of Tambov Oblast. Second, the study's focus at sub-national level helped assess how recipients view the impact of federal and regional support measures. Third, the study was an opportunity to engage with clients amid COVID-19 crisis and learn first-hand how agricultural producers cope with the crisis, as well as how regional policy makers have been addressing the sector vulnerabilities.

Chapter 4 discusses the results of a set of econometric analyses of agricultural performance using conditional convergence models. A similar recent study investigating the relationship between the European Union's agricultural subsidies and labor productivity growth was published by Garrone et al (2019). The models presented in Chapter 4 examine the impacts of Russia's crop-targeted subsidies on land productivity for key crops: winter wheat, barley, soybeans, and corn. The analysis also examines whether subsidies affected the productivity of individual family farms differently from that of agri-enterprises. The results show that agricultural subsidies overall contributed to the profitability of farms (*profitability boost*) (Figure 3), in addition to favorable market conditions (good weather, rising prices), but fell short of contributing to productivity improvements (yields). The study used federal and regional level aggregate data sets. While more granular data might have yielded different results for any specific region, these overall findings nevertheless can inform the design of federal agricultural policy and help guide policy makers in strengthening those policy instruments that can boost productivity and efficiency of agri-enterprises and farms in the Russian Federation.

The quantitative analyses presented in Chapter 4 determined that favorable market prices and weather have been the key drivers of profitability across all farm types. Interviews with agri-enterprises and agricultural policy experts in Tambov Oblast highlighted that the COVID-19 pandemic impacted farm performance through higher market prices, increased demand for agricultural commodities, greater government attention (federal and regional), and accelerated investments in technology, including in digital technology and farm robotization. Higher prices and good weather in the 2020–2021 growing season resulted in a significant profitability boost for farmers. This trend of high prices and good weather has been beneficial for farm performance across the Russian Federation.

The analyses find that the impact of subsidies on productivity was mixed. For most crops, the model estimations show that the impacts of subsidies on productivity were either negative or insignificant, suggesting that subsidies did not deliver productivity gains. On the other hand, interviews with agri-enterprises and agricultural policy experts expose vulnerabilities that affect agricultural production that are outside of control of individual firms (e.g. zoonotic diseases, infrastructure, climate change and others) and which are generally addressed through the provision of public goods.

While recognizing the significant achievements of Russian agricultural policy in terms of improved production, expanded exports and improved self-sufficiency, the report provides analytical evidence that could guide policy makers towards designing agricultural policies to boost productivity and improve resilience of agricultural producers.

2 SUBSIDIES AND AGRICULTURAL POLICY IN THE RUSSIAN FEDERATION

Agricultural policy instruments

Three program documents define agricultural and rural development policy in the Russian Federation: the State Program for Agricultural Development (2013–2025, updated every year), the State Program for

Comprehensive Development of Rural Areas, and the Federal Science and Technology Development Program for Agriculture (2017-2025, updated every year). In addition to these programmatic policy documents, agricultural support in the Russian Federation is composed of an import embargo for food items from mostly Western countries that was imposed in response to economic sanctions after 2014 and other various tariff and non-tariff trade policy measures.

Hence, agricultural support overall is provided through the following four instruments:

- Support from consumers who pay higher prices for food in Russia than in in world markets (through trade restricting measures);
- Various subsidies to agricultural producers;
- Budget support to agricultural public services such as technical extension services, veterinary and phytosanitary services, land reclamation, and irrigation services; and
- Subsidies to certain socially important agri-food processors (such as mills and sugar and oil processors) to ensure low domestic prices of certain food products.

Agricultural subsidies are the main instrument for agricultural support and are described and budgeted under the State Program for Agricultural Development. The most significant update of this policy document in recent years has been the streamlining of the subsidy support measures and consolidating them into 15 categories. Each category of the subsidies within the 15 is regulated by a government decree, which sets forth the rules and conditions for subsidy eligibility, application, and monitoring. The decrees may change from time to time to update the rules and conditions.

The Ministry of Agriculture divides the 15 categories into two forms of subsidies: stimulating and compensating subsidies, and into six directions that present the priority areas. In addition to federal allocation, each region has its own budgetary allocation of subsidies.² On average, more than 80 percent of subsidies are provided by the federal budget and less than 20 percent are provided by the regional budgets, but each subsidy category has its specific co-financing requirements.

For each direction of the subsidy, the ratio between federal and regional may change, depending on (1) regional priorities and (2) resource availability in regional budgets. As a rule, federal allocation is provided to the regions, which then implement support measures for agricultural producers. For this purpose, the federal government provides subsidy allocations to a region only if the region demonstrates available budget for co-financing its share.

In addition to subsidies under the State Program for Agricultural Development, additional subsidies are provided through the State Program for Comprehensive Development of Rural Areas. The basic notion of this rural development pillar is to promote the investments in rural areas through federal-regional and private sector collaboration. In recent years, this pillar has been successful in promoting investments in many rural areas where local agribusiness and regional governments co-financed such investments, leveraging federal money.

Table 3 summarizes the subsidy data from the Ministry of Agriculture for 2020, using the above categorization. Because the Ministry streamlined the subsidy categorizations and allocations in 2021, the

² Based on information extracted from the presentation on the Deputy Minister of Agriculture during the 12th International Conference for agricultural producers and suppliers of agricultural inputs and services. February 12, 2021. Moscow, Russian Federation.

data for 2020 are somewhat different from what is described above. Nevertheless, the table presents the overall structure and direction of the state support instruments and policy priorities.

Table 2. Subsidy categorization for 2020 federal and regional budget allocations

Subsidy Groupings in 2020	Federal Budget (thousand rubles)	Regional Budget (thousand rubles)	Total (thousand rubles)	Allocation between Federal and Regional Budgets		Share in total (percent)
				Federal Budget (percent)	Regional Budget (percent)	
Stimulating subsidies						
Development of branches of the agro-industrial complex	61,437,901	14,785,560	76,223,461	80.6	19.4	49.1
Subsidy to stimulate increased production of oilseeds	3,266,594	109,265	3,375,859	96.8	3.2	2.2
Compensating subsidies						
Promotion of investment activities in the agro-industrial complex	30,012,641	2,611,439	32,624,080	92.0	8.0	21.0
Land reclamation for agricultural land in Russia	8,514,311	1,591,063	10,105,374	84.3	15.7	6.5
Rural development pillar						
Integrated development of rural areas	22,688,241	6,184,131	28,872,372	78.6	21.4	18.6
Creation of a support system for farmers a rural cooperative	3,831,928	339,554	4,171,482	91.9	8.1	2.7
Total	129,751,616	25,621,012	155,372,628	83.5	16.5	

Source: Authors' calculations based on data from the Ministry of Agriculture (www.specagro.ru).

The consolidation of subsidies into two groups—stimulating and compensating—aims at simplifying the mechanisms of subsidy provision as well as at making the monitoring of subsidy impacts easier. This is a major concern of the federal government. Therefore, it would be important to continue to study the dynamics of policy changes and to aid the government in evaluating and assessing the impacts of subsidies in terms of both meeting their immediate objectives and their efficacy and contribution to the higher-level objectives set forth by the federal policies.

Stimulating subsidies (42 percent of the total subsidies) are aimed at promoting agricultural production in selected priority areas that demonstrate market potential but lag in production volumes. These include, for example, the production of hemp, sheep and goats, grapes, vegetables, dairy products, grains, and legumes. Stimulating subsidies also include specific allocations for small farms aimed at supporting small-

farm-based agricultural production. Stimulating subsidies are provided in the form of interest rate subsidies, per hectare or per head payments, and matching grants.

Compensating subsidies (58 percent of the total) are aimed at compensating for a portion of production costs in selected federal priority subsectors. Most compensating subsidies are provided in the form of interest rate subsidies and matching grants (i.e., grants to producers to compensate for a portion of capital investments), grants to agricultural producers for research and development activities, subsidies for transportation of agricultural commodities, subsidies for promoting exports, and subsidies to certain socially important agri-food producers to ensure low prices in domestic markets.

In terms of the significance of subsidy instruments, concessional loans and interest rate subsidies remain the main instrument. They comprise the largest share of the total subsidy allocation. In 2021, the amount budgeted for concessional loans and interest rate subsidies was 80.2 billion rubles, of which 22.5 billion rubles were directed to short-term working capital financing and 57.7 billion rubles to long-term investment financing. According to the Ministry of Agriculture, 1 ruble invested in concessional loans and interest rate subsidies yielded 15 rubles in 2019 and 39 rubles in 2020 in short-term credits, and 8 rubles in 2019 and 6.1 rubles in 2020 in long-term credits.

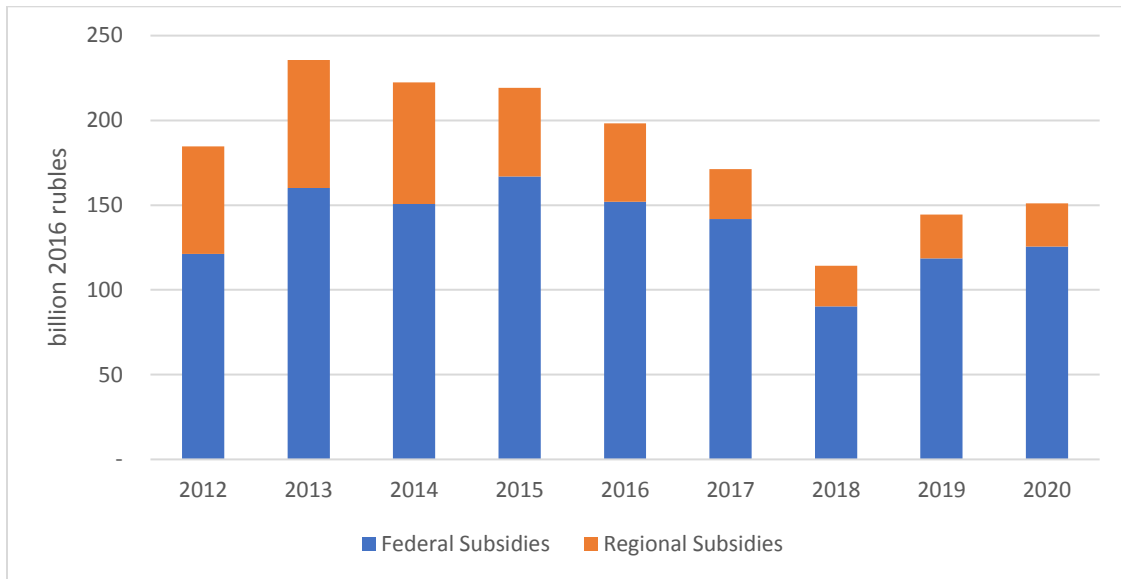
The structure of agricultural subsidies

Figure 4 shows the total value of subsidies to agriculture from 2012 to 2020. The values have been adjusted to account for inflation. Federal and regional subsidies increased in 2013, reaching nearly 24 billion 2016 rubles. Total subsidies declined slowly, dipped significantly in 2018, and then rebounded to about 15 billion rubles in 2019 and 2020. The share of total subsidies provided through regional budgets fell steadily from about 34 percent to 17 percent during the same period.

The aggregated data masks changes in the way subsidies were allocated to programs over time. For most of the study period, much of the subsidy budget was allocated to interest rate subsidies; for example, in 2017, 48 percent of the budget went to interest subsidies of one kind or another. In recent years, especially 2019 and 2020, the reported data contain less programmatic detail. This is partly due to the elimination of some smaller categories or their consolidation into larger programs. There has also been a trend to reallocate subsidies into related downstream sectors, such as storage and processing (Figure 5).

Subsidy expenditures are distributed broadly and relatively evenly throughout all parts of Russia. Ranking regional governments by subsidy expenditures shows that, for the study period, the top 10 regions account for about 37 to 38 percent of total expenditures for Russia (Table 3). Historically, about half of expenditures are concentrated in the top 17 to 18 areas, but all areas, except for the city of Moscow, usually receive some budget allocation.

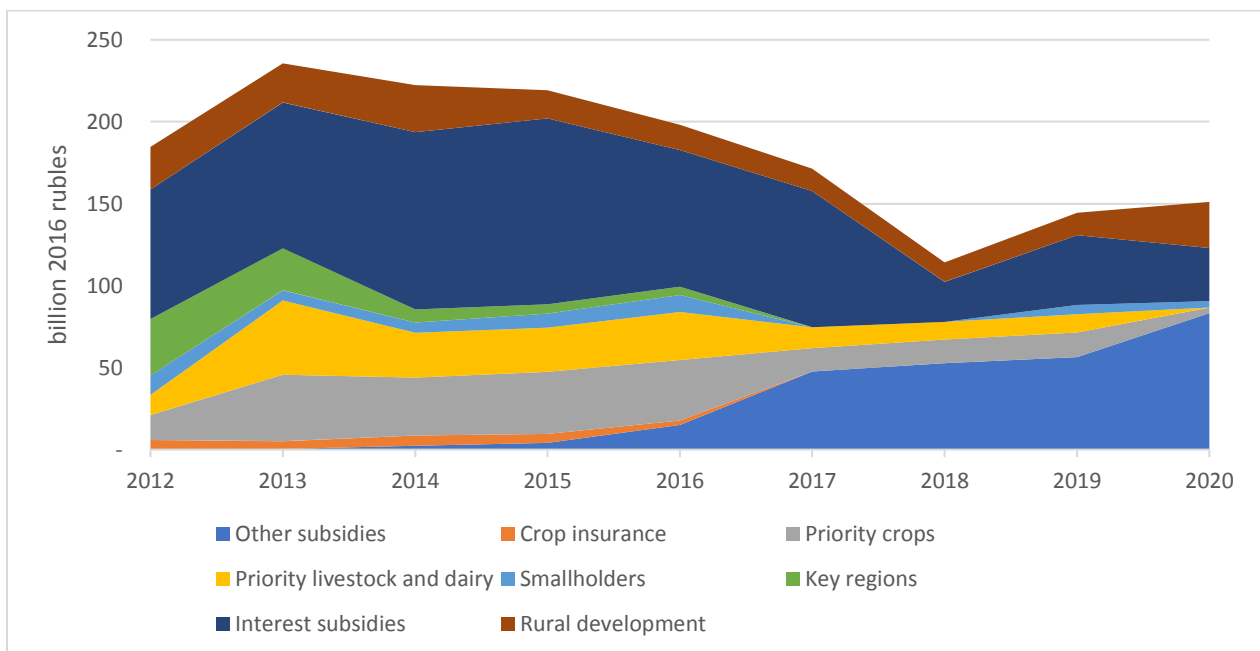
Figure 4. Federal and regional subsidies to agriculture have been declining in the recent years, 2012–2020.



Source: The data on subsidies were taken from the Ministry of Agriculture; the Russian Federation GDP deflator was reported by the World Bank (2021).

Note: Subsidy values are deflated by the Russian Federation GDP deflator (World Bank 2021).

Figure 5. Composition of subsidies by categories, 2012–2020



Source: The data on subsidies were taken from the Ministry of Agriculture; the Russian Federation GDP deflator was reported by the World Bank (2021).

Note: Subsidy values are deflated by the Russian Federation GDP deflator (World Bank 2021).

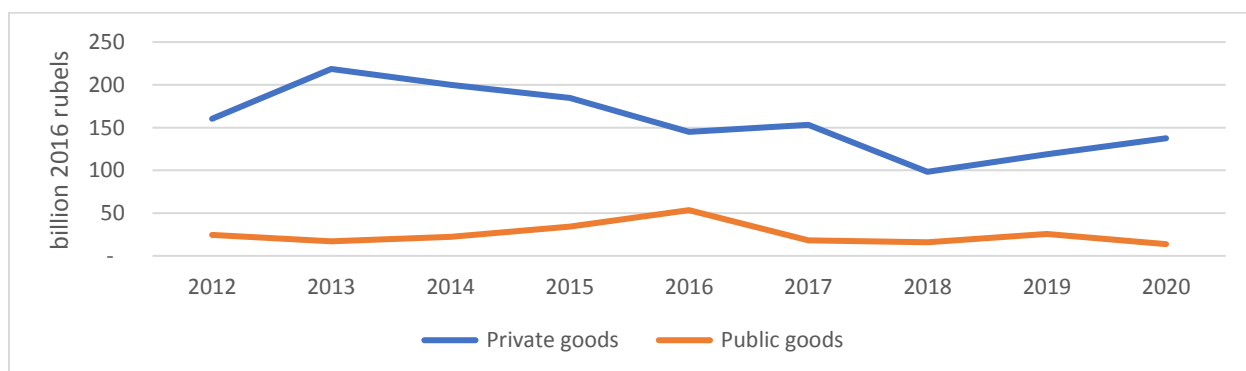
Table 3. Top 10 regional areas receiving subsidy payments.

Rank	2012–2014	Share of total (percent)	2015–2017	Share of total (percent)	2018–2020	Share of total (percent)
1	Rep. of Tatarstan	7.56	Rep. of Tatarstan	5.71	Bryansk Oblast	6.52
2	Belgorod Oblast	7.18	Belgorod Oblast	5.45	Voronezh Oblast	5.07
3	Voronezh Oblast	3.84	Bryansk Oblast	4.83	Rep. of Tatarstan	4.83
4	Rostov Oblast	3.20	Voronezh Oblast	4.65	Belgorod Oblast	3.74
5	Bryansk Oblast	3.19	Krasnodar Kray	3.30	Krasnodar Kray	3.53
6	Krasnodar Kray	3.01	Stavropol Kray	3.14	Stavropol Kray	3.21
7	Altai Kray	2.53	Kursk Oblast	2.97	Kursk Oblast	2.53
8	Tambov Oblast	2.52	Rostov Oblast	2.90	Rep. of Bashkortostan	2.52
9	Stavropol Kray	2.52	Rep. of Bashkortostan	2.71	Rostov Oblast	2.39
10	Rep. of Bashkortostan	2.49	Lipetsk Oblast	2.37	Rep. of Dagestan	2.36
	Combined share	38.04		38.03		36.70

Source: Authors' calculations based on the data on subsidies taken from the Ministry of Agriculture.

A large share of subsidies is directed to financing the private sector or for investments in private goods. Figure 6 shows the composition of public subsidies to agriculture between public and private goods. The private-goods category includes investments and activities that the private sector is motivated to undertake given that input, output, labor, and credit markets work well. The public-good category includes money spent on social programs to improve living conditions in rural areas and to help smallholder farmers and novice farmers; funds directed to universities and public sector organizations for research and development and extension; as well as some funds that do flow to private commercial farms, including money for extension services and incentives to improve crop and animal productivity through breeding programs and facilities. For the 2012–2020 period, public-good expenditures averaged just under 14 percent of total expenditures.

Figure 6. Public expenditures on private and public goods, 2012–2020



Source: Authors' calculations based on the data on subsidies taken from the Ministry of Agriculture.

The fiscal impact of agricultural policy

In 2019, the Organisation for Economic Co-operation and Development (OECD) estimated the total support to agriculture in the Russian Federation at 673.6 billion rubles (~US\$11 billion), which was 13 percent of gross agricultural output (GAO) or 0.6 percent of gross domestic product (GDP).

The OECD's producer support estimate is the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm-gate level, arising from policy measures that support agriculture—regardless of their nature, objectives, or impacts on farm production or income.

A notable element of support to producers in the Russian Federation has been the market price support through import tariffs and non-tariff barriers to food imports. These measures transfer revenue from consumers to producers because of differences between domestic and international prices.

The OECD's general services support estimate (GSSE) is the annual monetary value of gross transfers arising from policy measures that create enabling conditions for the primary agricultural sector through the development of private or public services, and through institutions and infrastructures regardless of their objectives and impacts on farm production and income, and regardless of the consumption of farm products. The GSSE includes policies where primary agriculture is the main beneficiary but does not include any payments to individual producers. The key principle of the GSSE is that it does not directly alter producer receipts, costs, or consumption expenditures, while promoting enabling conditions for competitiveness.

The OECD's consumer support estimate reflects the annual monetary value of gross transfers to consumers of agricultural commodities, measured at the farm-gate level, arising from policy measures that support agriculture regardless of their nature, objectives, or impacts on consumption of farm products (Figure 6). Negative consumer support estimates demonstrate that consumers are indirectly paying for agricultural policy measures, through higher domestic prices.

While over the last decade the production-linked support measures dominated the subsidy envelope, in recent years, the government has announced that it would shift producer support measures toward decoupling from output volumes and/or input use.

Much of the support to producers is provided through low-interest credit, which has resulted in considerable build-up of new and efficient fixed assets (machinery, production facilities, etc.). At the same time, support for public goods that boost productivity and competitiveness of agri-food production is relatively low and not very effective, as demonstrated by continuous reliance of agricultural producers on imported technology and inputs (such as seeds and breeding stock).

Figure 7. Producer support estimates as reported by the OECD, average of 2000-2002 vs average of 2017-2019

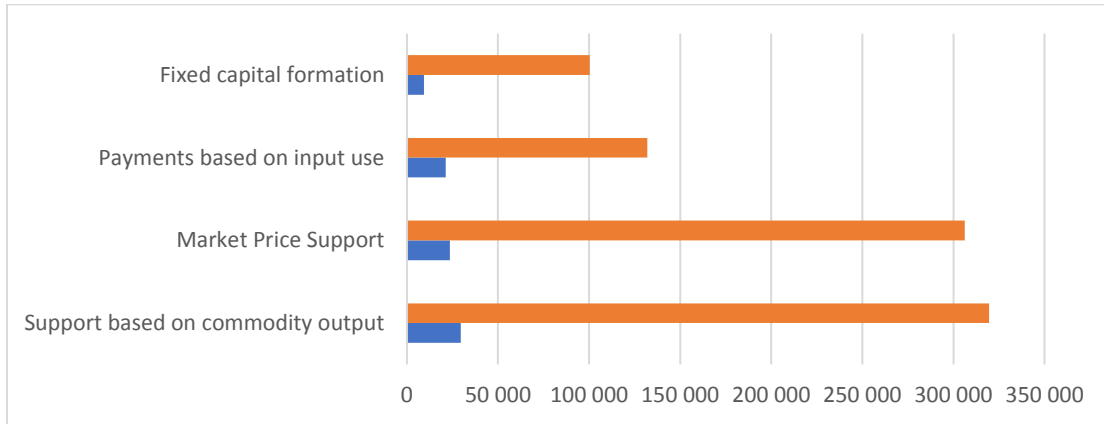


Figure 8. General services support estimates as reported by the OECD, average of 2000-2002 vs average of 2017-2019.

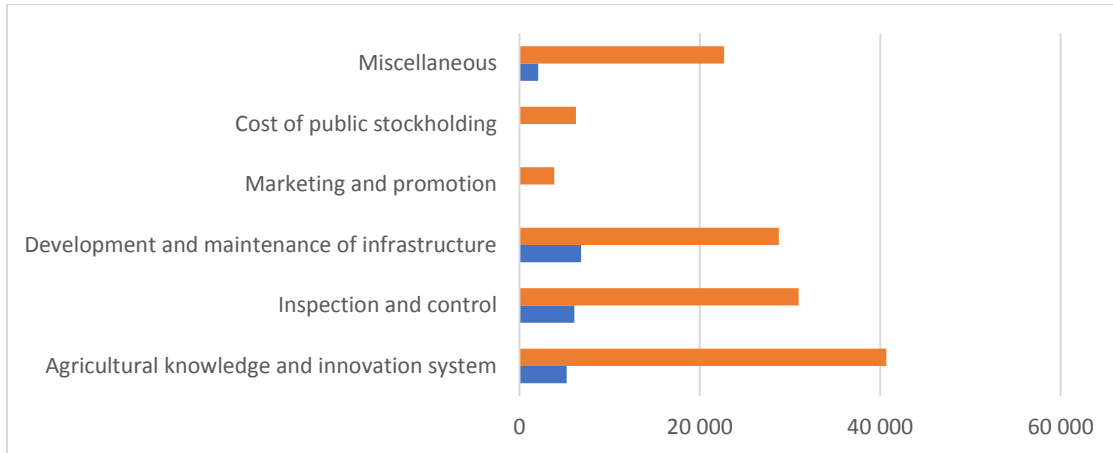
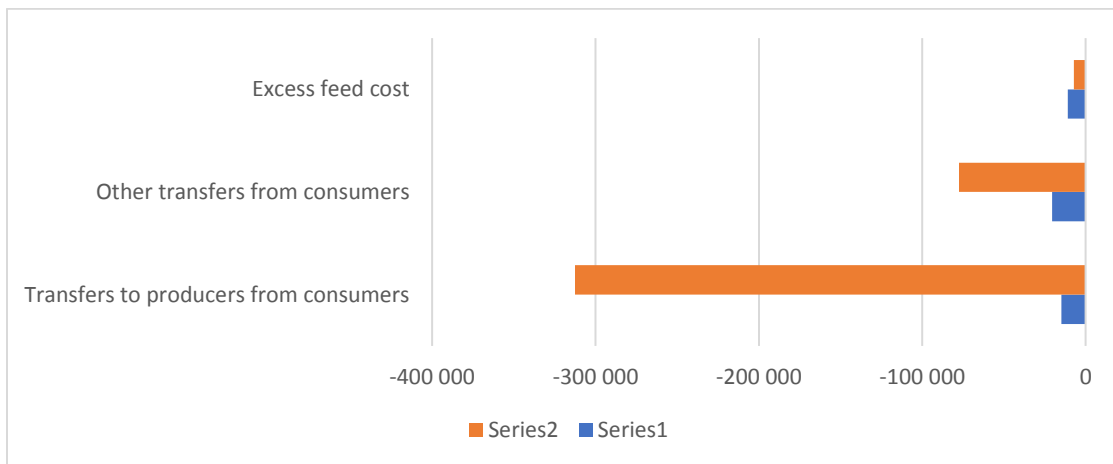


Figure 9. Consumer support estimates as reported by the OECD, average of 2000-2002 vs average of 2017-2019.



Source: OECD Database of Agricultural Support Estimates (www.oecd.org)

Impact of subsidies (evidence from other countries)

A few recent studies have analyzed the impact on subsidies on agricultural sector performance. Several examples of relevant findings are summarized here. In Slovakia, Vozarova and Kotulic (2016) found a statistically significant correlation between subsidies and agriculture production—this is evidence that agricultural subsidies can have a positive effect on agricultural production. The magnitude of effect that subsidies have differs over how and where they are complemented. In India, low-income states have been shown to benefit far more for each additional dollar spent in subsidies than medium- and high-income states (Bathla, Joshi, and Kumar 2019). Another study in Slovenia by Bojnec and Latruffe (2013) found that the farm sizes also have a significant impact on the effectiveness of subsidies. The literature indicates that subsidies can boost agricultural production but are dependent upon farm and state level characteristics. Farm types and agrarian structure in Russia are presented in Box 1.

The literature also documents negative-to-insignificant effects of subsidies on agricultural productivity across countries. For example, subsidies negatively impacted the productivity of European Union (EU) farms before decoupling (Rizov, Pokrivcak, and Ciaian 2013). Crop subsidies had a similar negative impact on technical efficiencies in Germany yet had an insignificant effect in the Netherlands (Zhu and Lansink, 2010). US subsidies in 1987 were found to have caused a dead-weight loss of \$45 billion (Degorter and Fisher 1993). In Russia, evidence suggests firm growth can be attributed to changes in technology and improved practices—not to government support such as subsidies (Rada, Liefert, and Liefert 2020). Across the various studies and countries, the statistical significance (positive, negative, or insignificant) of the impact of subsidies on technological efficiency is sensitive to the ways in which subsidies are entered into econometric models; the difference in methodologies may explain the contradictions and mixture of results (Minviel and Latruffe 2017).

This Chapter demonstrated that agricultural support measures have been dominated by subsidies directed to financing private sector activities or private goods. While these support measures, combined with various trade limiting factors and measures have been the drives of agri-food sector transformation, including investments in technology and improved farming practices, it remains to be analyzed to what extent these measures contributed to productivity growth. Since in addition to boosting production, Russian agricultural policy objectives include export competitiveness, understanding the impact agricultural policies on productivity is important for designing or redefining policies to better meet these objectives. The next Chapter looks at the vulnerabilities at the enterprise or farm level as identified by qualitative survey respondents. In this context, productivity has been identified as the key resilience indicator, and the analyses of the survey responses help assess and understand those vulnerability factors that reduce the strength of this indicator.

Box 1. Farm types in Russia

The structure of agricultural production by type of farm has changed substantially since the early years of the post-Soviet period. During the 1990s, production in large agri-enterprises declined sharply as a result of outdated technology and lack of investment. Production on predominantly noncommercial household plots was more stable during that period. As a result, in the period 1991–2002, the share of household plots in overall production increased from 40 percent to 65 percent. In the 2000s, however, growth in the agriculture sector was supported by production in both household plots and agri-enterprises. After 2010 there was a shift toward commercial production driven by investments, government programs, and

increasing demand. Such growth of commercial production was predominantly led by agri-enterprises (former *kolkhoz* and *sovkhoz* enterprises and new corporate agribusinesses) and an emerging new class of family farms. The role of household plots in total agricultural production therefore started to decline. A share of households registered as family farmers, but others exited agricultural production because of an aging population, health issues, migration, and the refusal of younger generations to do manual work on their own household plots.

The agrarian structure in Russia today is based on three types of farms: (1) agri-enterprises—large industrial farms with extensive land and livestock holdings that collectively control roughly 80 percent of all agricultural land and produce roughly 45 percent of agricultural GDP; (2) emerging family farms—individual farms operated by family farmers and limited hired labor that collectively control roughly 10 percent of all agricultural land and produce roughly 5 percent of agricultural GDP; and (3) household plots—small land plots adjacent to rural homes that collectively control roughly 10 percent of all agricultural land and produce roughly 50 percent of agricultural GDP. Although many agri-enterprises are nearly the same in area farmed, management, and technology as collective farms from Soviet times, since 2000 some have become much more modern in terms of their market orientation, in their approach to farm management, and in the technologies that they employ.

Source: Authors, using Rosstat data (www.gks.ru).

3 VULNERABILITY AND RESILIENCE FACTORS IN TAMBOV OBLAST

This chapter describes the results of the qualitative analysis that was conducted in Tambov Oblast through a semi-structured survey of agricultural enterprises and agri-food policy experts. The study examined perceptions of agricultural stakeholders of the various risks and of how such risks are being addressed via policy instruments and state support measures. The study also analyzed the impact of the COVID-19 pandemic on agri-enterprise performance. Respondents were representatives (managers, owners) of agri-enterprises and regional administration and expert groups. Overall, sixteen respondents were interviewed, of which seven represented the farm sector (agri-enterprise) and nine represented the expert community.

Tambov Oblast is relevant for studying agriculture policy performance and agri-enterprise level vulnerabilities because it is one of the specialized agricultural regions of Russia and has a strong commodity-oriented agricultural sector. At the same time, it does not have mineral resources or major industrial production, and therefore has limited budget resources to cross-subsidize its agriculture sector. Tambov Oblast is looking for ways to improve the efficiency of its agricultural policies and state support measures. In this context, this study coincided with the process of updating of the Regional Agricultural Sector Development Strategy of Tambov Oblast, and its findings are expected to contribute to the design and formulation of this strategy.

The following analysis is focused on: (a) understanding the level and impact of various vulnerability factors faced by agricultural producers; (b) analyzing the impact of the pandemic on agricultural producers (because many risk factors are activated during crises such as the COVID-19 pandemic); (c) understanding vulnerability factors of agricultural producers, considering the various risks they face; and (d) developing proposals for measures that could improve the agriculture sector resilience to risks.

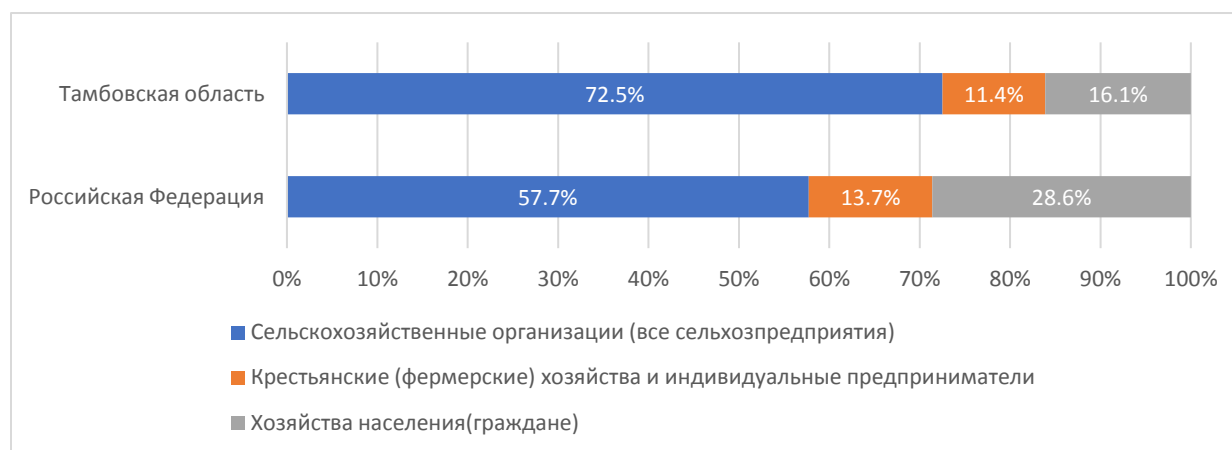
Brief overview of agriculture in Tambov Oblast

Conditions for the development of agriculture in Tambov are favorable. Both soil and climatic potential allows the development of most areas of crop production: growing cereals, sugar beets, sunflower, perennial herbs, and others.

Agricultural production in Tambov in 2020 amounted to 167.3 billion rubles (9th place among the regions of Russia, 2.7 percent of products in the country as a whole) (Rosstat). Tambov Oblast is a specialized agricultural production region where agriculture’s importance for the regional economy exceeds the national average. Tambov’s agriculture sector contributes to around 26 percent of the regional gross value added (regional GVA)—almost six times more than the contribution of agriculture to the country’s economy (4.1 percent). Agriculture is also the largest employer in the region, with more than 22 percent of employment in 2019. Hence, agriculture’s share in regional employment is three times higher than the national average.

Crop production dominates agricultural output, although livestock production has seen impressive growth over the years. As an agricultural powerhouse, almost three-quarters of its agricultural production is produced by large-scale industrial farms—agri-enterprises. Individual or family farmers and household farms constitute a visibly lower share in the agricultural production of Tambov Oblast (Figure 10).

Figure 10. Agricultural production structure: Agri-enterprises dominate agricultural production, 2019



Source: Rosstat database (www.gks.ru).

Gross agricultural output

In recent years, Tambov has shown very high agricultural growth rates. In 2020, because of favorable weather and market factors—the growth rate of gross agricultural production was at record 23 percent and crop production growth was at 38.5 percent (Table 4).

Table 4. Agricultural production of Tambov Oblast: Impressive growth in farms of all categories (in actual prices), billion rubles, 2018–2020

Category	2018	2019		2020	
	Value of Production	Value of Production	Growth index 2019 by 2018	Value of Production	Growth index 2020 by 2019

Agricultural production	127.3 billion rubles	136.2 billion rubles	107	167.3 billion rubles	123
Crop production	70.9 billion rubles	78.8 billion rubles	111	109.1 billion rubles	138.5
Share of crop production in agricultural products, percent	55.7	57.9		65.2	

Source: Rosstat database (summary figures provided by the Tambov Regional Agricultural Department).

Regional agricultural exports

The combination of two factors—the increase in world prices for food commodities and considerable production growth of grains and oilseeds allowed Tambov Oblast to show very high growth in agricultural exports in 2020 (Table 5). As exports are a key federal priority, the expansion of regional exports has also been fueled by significant support from regional and federal authorities.

Table 5. Main agri-food exports of Tambov Oblast show impressive growth, US\$, millions

Commodity	2018	2019	2020	Share of Total
Grains	82.3	46.8	124.0	34.9%
Oilseeds	0	1.3	62.5	17.6%
Vegetable oil	11.3	16.9	22.0	6.2%
Meat products (poultry and pork)	21.3	34.4	60.7	17.1%
Processed product (sugar, molasses, confectionery)	30.3	34.7	61.2	17.2%
Other	24.6	21.4	24.5	7.0%
Total	169.8	155.5	354.9	100%

Source: Data provided by the Tambov Regional Agricultural Department.

Impact of the COVID-19 pandemic

According to the stakeholder' unanimous response, the pandemic had little impact on agri-enterprises. Some difficulties arose in the first months of the pandemic (the need to isolate workers, the need to restructure the production and marketing systems) and during the harvest period (an inability to attract unskilled labor for field work). In addition, family farms faced some problems, especially with regard to restructuring their main sales channels, because traditional sales through open markets and neighborhood stores were halted. There is evidence from other parts of Russia that family farms were able to use digital marketing platforms and internet channels to sell directly to consumers during the lockdown, as the demand for farm-fresh food soared in that period (Box 2).

Box 2. Transformation of a Farm's Marketing System Prompted by the COVID-19 Pandemic

Semeynaya Eco-Farm in Leningrad Oblast is producing beef and dairy products. Before the COVID-19 pandemic, it used to sell natural products to end consumers through stores, its own sales van, or through a third-party online store. According to the farm owner, during the first months of the pandemic, the volume of the farm's sales decreased three to four times because some retail stores terminated their purchase orders. At the same time, the farm owners observed increased demand for farm grown food delivered directly to customers. Semeynaya Eco-Farm decided to capitalize on this increased demand and developed its own e-commerce strategy. Within a few weeks of opening its e-commerce platform, the sales recovered to the pre-crisis level. While this was a short-term response to the crisis and an opportunity to bring the sales to the previous level, the farm now looks to develop a long-term strategy of direct sales to customers.

Source: Adopted from Nesterenko N., and Meloyan S. "Transformation of a Farm's Marketing System Prompted by the COVID-19 Pandemic", 2021 (forthcoming).

Agriculture sector vulnerabilities at the agri-enterprise level

This section describes agriculture sector vulnerabilities at the agri-enterprise level as assessed by interview respondents. Box 3 summarizes the methodological approach and respondent profile.

Box 3. Agricultural sector vulnerabilities at the agri-enterprise level.

Vulnerability factors were analyzed based on interviews, yielding interesting and in many ways unique results (a detailed report on the preparation, conduct and evaluation of the field interviews is presented in Appendix A). In-depth interviews were conducted with two groups of respondents: (1) representatives of the Tambov Regional Agricultural Department, other agricultural policy experts (hereafter "agricultural policy experts"), and (2) owners/managers of selected agri-enterprises (hereafter "agri-enterprises"). Of the total of sixteen in-depth interview respondents, nine were agricultural policy experts and seven were agri-enterprises. Semi-structured open-ended questions delved deep into understanding the respondents' perceptions of the impacts of selected vulnerability factors for the overall agri-food sector and for agri-enterprises. In addition, the respondents were asked to select on a 10-point scale the degree of influence of each vulnerability factor (1 = weak influence, 2–9 = moderate influence, 10 = strong influence). While the selected sample of respondents was not statistically representative, its qualitative results shed some light on the understanding of the agriculture sector vulnerabilities at the agri-enterprise level.

Source: Authors.

The following pattern can be noted: there seems to be convergence of perceptions toward high-vulnerability factors between both groups. For factors that are assessed to be of moderate vulnerability, there is a slight level of divergence in perceptions of both groups. And there seems to be disagreement between both groups on factors that are considered low vulnerability. Table 6 presents the vulnerability factors identified by respondents and the relevant grouping of the factors.

Table 6. Grouping and ranking risk factors based on scores given by respondents.

Factor Assessment	Vulnerability Factor	Qualitative Score given by Agricultural Policy Experts	Qualitative Score given by Agri-Enterprises
Vulnerability factors where both groups of respondents are in full agreement. Note: See comment for Factor 5.	1. Climate change and adverse weather events	7.25	9.5
	2. State support for agriculture	8.5	7.33
	3. Input prices (fuel, seeds, fertilizer, plant protection)	7.5	8.17
	4. Restrictions on the export of agricultural products (grain, sunflower, soybeans, etc.)	7.75	7.83
	5. Epizootic situation (avian flu, African swine fever, others) ^a	10	5.0
	6. Exchange rate and availability of imported inputs and technology	6.75	8.17
	7. Export infrastructure development	7.0	7.5
	8. Domestic consumer demand	8.25	6.0
Vulnerability factors where both groups of respondents are of moderate level of agreement.	9. Skilled labor	7.25	6.0
	10. Indebtedness of agri-enterprises	6.0	7.0
	11. Land degradation	7.5	5.17
	12. Availability of long-term loans	7.0	5.33
	13. Labor productivity	6.25	4.67
	14. Availability of migrant labor	3.25	3.17
Vulnerability factors where both groups disagree.	15. Wages for agricultural workers	7.75	5.0
	16. Availability of short-term loans	7.5	4.17
	17. Remoteness from main markets and/or downstream processors.	7.5	4.17
	18. Development of digital trading platforms	5.75	3.83
	19. New requirements to ensure traceability of grain production and sales	5.75	3.67
	20. Import restrictions on agri-food products from certain countries (milk, cheese, meat, vegetables, fruits, etc.)	7.0	1.33

	21. Excessive number of inspections by regulatory authorities	n.a.	8.0
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Source: Authors' calculations based on the results of the interview.

Note: n.a. = not applicable.

a. The strong discrepancy in the assessment of the importance of the epizootic situation between the agricultural policy experts and agri-enterprises occurs because the agri-enterprise respondents represented predominantly crop-growing farms. It is conceivable that the inclusion of livestock farms would dramatically increase the importance of this factor for agri-enterprises.

Vulnerability factors where both groups of respondents are in agreement.

Agricultural policy experts and agri-enterprises believe that eight factors in the first group in Table 6 describe the key vulnerabilities of the sector. Analysis of the results of the interview allows for an understanding of the reasoning of the stakeholders.

Factor 1: Climate change and adverse weather events

Tambov Oblast is in a geographic zone with a favorable climate for the development of agriculture; it also has highly fertile black earth. Nevertheless, extreme weather effects, such as severe winters or more humid than usual spring and summer can cause serious crop losses. Soil conditions overall are good, but in certain areas soils have been degraded by heavy use agricultural machinery, improper irrigation, and/or lack of cultivation in recent years. Many agri-enterprises employ long-term crop rotation planning, and some use no-till methods of cultivation to protect the soil. According to survey respondents, partial elimination of severe climatic impacts could be achieved by developing soil reclamation to mitigate the impacts of degrading soils. In addition, vegetable and berry growers can mitigate the worst effects of adverse weather by increasing the areas under greenhouses. The respondents also conclude that economic impact of adverse weather events on crop farms can be mitigated by developing the crop insurance system.

Factor 2: State support for agriculture

Agri-enterprises value subsidies that are directed to co-financing capital expenditures and reducing interest rates on loans. According to the respondents, such subsidies help accumulate capital assets and invest in modern technology (including agricultural machinery, better genetic material, etc.). Agri-enterprises also noted that, in 2020, in the context of the pandemic, all planned types of agricultural support measures were received. Furthermore, in 2020, the procedures for receiving subsidies (especially interest rate subsidies) were simplified. On the other hand, decoupled subsidies—such as per hectare payments—remain unattractive for agri-enterprises, as the level of payments is very low compared with the amount of work required to submit the paperwork for subsidy allocation.

Factor 3: Input prices (fuel, seeds, fertilizer, plant protection)

The increase of input prices occurs continuously and for all inputs, including equipment (both purchase and maintenance), seeds, fertilizers, feed, plant protection products, and so on. As a result, the cost of production increases from year to year and, according to the respondents, there is a constant risk of low or negative profitability. The effect of this factor is compounded by the fact that many producers use imported inputs, such as seeds, genetic resources, plant protection products, equipment, and spare parts, and thus are dependent on exchange rate fluctuations. Recent devaluations of the ruble considerably affected the costs of inputs and added a degree of uncertainty for producers.

To reduce risks of rising input prices, agri-enterprises employ several strategies. They:

- Diversify production and shift to higher value crops, such as corn, soybeans, rapeseed, and hemp;
- Constantly try to identify better marketing alternatives and more direct sales channels;
- Invest in their own storage capacity; and
- Invest in digitalization and robotic production to eliminate the impact of labor costs and unavailability of seasonal labor, to reduce costs of production per hectare, and to improve precision cultivation, which could improve yields.

Factor 4: Restrictions on the export of agricultural products (grain, sunflower, soybeans, etc.)

Since grains, sunflower seeds, and soybeans are the leading export crops of Tambov Oblast, and the measures carried out by the government to introduce floating duties affect the export of grains, sunflower, soybeans, and so on (and the list of products covered by the new customs policy can be expanded), these measures and the risks they cause are of serious concern to both business and agricultural policy experts. Agri-enterprises reckon that these measures would affect their revenues and profitability and add a degree of uncertainty in planning and preparing for the marketing season.

Factor 5: Epizootic situation (avian flu, African swine fever, others)

Production of pork and poultry in Tambov Oblast is concentrated in large industrial complexes. For this reason, the agricultural policy expert assigns this vulnerability factor a maximum estimate of 10 points. The strong discrepancy in the assessment of the importance of the epizootic situation between the agricultural policy experts and agri-enterprises occurs because the agri-enterprise respondents represented predominantly crop-growing farms. If livestock farms were included, agri-enterprises might also express concern in this regard.

Factor 6: Exchange rate and availability of imported inputs and technology

This vulnerability factor is assessed high by agri-enterprises and slightly lower by agricultural policy experts. For producers whose business depends on importing inputs—new technologies, imported seeds, genetic stock, agricultural machinery, and some means of plant protection—the weakening of the ruble results in unpredictable increases in costs and investment costs. The situation is designed to be corrected by leasing, which, according to agri-enterprises, works in Tambov Oblast quite effectively. But the leasing provides equipment supplied by Russian manufacturers, which does not suit all farmers.

Factor 7: Export infrastructure development

The lack of modern export infrastructure (export ecosystem) is noted as an important factor in the further development of agricultural exports. This factor is significant for the agricultural policy experts, as export targets are the key performance indicators of the regional administration. Agri-enterprises also consider this factor as important with a caveat that they have been able to adjust to the existing infrastructure and use any available channels for exports, when they are engaged in exports.

Factor 8: Domestic consumer demand

The economic downturn in Russia entails an overall decline in employment and, ultimately, a decline in disposable incomes and a contraction of the domestic consumer market. At the same time, according to Rosstat, the pandemic accelerated the decline in disposable incomes of the population during the 2–4 quarters of 2020 and 1 quarter of 2021.

This fact has already been felt, and, in 2020, those manufacturers that produce products not classified as “essential products,” for example, producers of berries and fruits, felt the drop in consumer demand keenly.

Vulnerability factors where both groups of respondents are of moderate level of agreement.

Factor 9: Skilled labor

The staffing problem is growing rapidly: all agri-businesses point to the aging of their personnel, the low level of training of graduates of secondary and higher education institutions, and the difficulty in filling vacancies that require skills. Farm managers emphasize that, in addition to specialists with an agricultural profile—technicians, agronomists, veterinarians—there is a shortage of qualified economists and accountants. Note that most agri-enterprises interviewed were large industrial operations, which employ staff with a range of qualifications and skills. Agri-enterprises provide various forms of benefits to their workers, including housing and health care, and they maintain a level of pay at the industry average or slightly higher. Agri-enterprises also contribute to rural infrastructure development, such as local clinics, kindergartens, and schools, in order to attract qualified labor to their rural areas. But all these measures often do not speed up the process of finding the required personnel.

Interestingly, agri-enterprises did not highlight migrant labor as an alternative for skilled labor. This is because of the structure of agri-industry in Tambov Oblast, which is dominated by large agri-industrial farms that are highly mechanized and cultivate large areas for commodity production. In this context, migrant labor, which is predominantly unskilled, is not seen as an alternative source for labor problems.

Factor 10: Indebtedness of agri-enterprises

There is some discrepancy in the perceptions of agri-enterprises and agricultural policy experts with regard to the importance of this vulnerability indicator. The agricultural experts consider the importance of indebtedness low for most crop farmers, as demonstrated by their relatively low level of debt. Exceptions are farms that specialize in the production of potatoes and vegetables. These farms have benefited from recent state support measures (interest rate subsidies and concessional loans) for boosting potato and vegetable production and have accumulated significant debt, according to experts. Agricultural policy experts contend that livestock farms generally have a higher level of debt and are more vulnerable to the impacts of this indicator. This is again confirmed by the fact that state support measures in recent years have been favoring livestock sector production increases through interest rate subsidies and grants for capital expenditures.

Factor 11: Land degradation

The risk of degradation of agricultural land is of concern to agri-enterprises. They take preventive steps to address this risk, such as scientifically based crop rotation, no-till cultivation, and long-term agronomical planning. The issue of land degradation was also raised during the discussion of Factor 1: Climate Change. While a mixed response to this topic as a priority is noted, the respondents’ views converge on the measures to combat land degradation and to mitigate effects of climate changes as high priority actions.

Factor 12: Availability of long-term loans

Despite a large portion of subsidies for concession loans and interest rates are being directed to promoting long-term investment financing, according to the Ministry of Agriculture, agri-enterprises point out that access to such financing continues to remain a problem. As a result, agri-enterprises use their own resources to finance long-term investment needs.

Factor 13: Labor productivity

Several farm managers note that, in the long term, they see prospects of improving labor productivity through the development and implementation of digital, unmanned, and robotized agricultural machinery and systems. Agri-enterprises with an annual turnover of more than 400 million rubles noted that they were currently using such systems. Most popular are systems that allow the precision operation of agricultural machinery, monitor fuel consumption by machinery, and use geographic positioning systems for precision plowing and harvesting. Some farm managers noted that their demand for such precision systems is much higher than what is available on the market currently. The main motivation for such high demand for digital technologies is related to the issue of the lack of skilled labor. As available skilled specialists retire, the agri-enterprises are considering digital and unmanned technologies for their replacement.

Factor 14: Availability of migrant labor

The need to attract migrant labor in Tambov Oblast is insignificant. According to the deputy head of the Department of Agriculture, the region requires 300–500 migrants per year, mainly for the period of harvesting fruits and berries.

Vulnerability factors where both groups disagree.

Factor 15: Wages of agricultural workers

This factor is assessed as being significantly higher by the agricultural policy experts. The reason for the high assessment may be the fact that the level of pay is one of the key performance indicators for the regional administration, and hence they are more interested in maintaining high wages for agricultural workers. Farm managers, for their part, consider this factor to be of average importance, as they monitor the level of wages in the countryside and the average in the region and have the opportunity to maintain the level of pay in their farms at a competitive level.

Factor 16: Availability of short-term loans

Interviewing agri-enterprises has shown that low-interest and affordable loans are one of the most important factors in ensuring the sustainability of agricultural enterprises. At the same time, the score of this factor is below average. Obviously, this somewhat paradoxical phenomenon is explained by the fact that agri-enterprises, whose farms have a good credit history, have established good relations with banks and have a smooth access to credit. It is also explained by the relatively wide availability of low interest/subsidized credit for agricultural production. In such a situation, the problem of access to credit is one of the solved problems and it is as if relegated to the background. Note that the importance of long-term loans is assessed by agri-enterprises as much higher, as this issue continues to remain—most agri-enterprises do not have access to cheap “long” money and implement investment projects at their own expense.

Factor 17: Remoteness from main markets and/or downstream processors

Agri-enterprises have developed their own channels of sales and built successful relationships with intermediaries and traders. They are not completely satisfied with downstream sales channels, though, as they believe that intermediaries and traders pay lower prices than they can get in the market. Nevertheless, agri-enterprises try to address potential impacts of low (seasonal) prices by investing in

their own storage facilities. They also try to diversify sales channels, monitor the market, and search for more convenient buyers.

Factor 18: Development of digital marketing platforms

Digital marketing platforms have not yet found wide application among large agri-enterprises. There is evidence that small and medium family farms have benefited from digital platforms during COVID-19, as they were able to directly sell to consumers during the lockdown. Large commodity producers use traditional buyers and traders for their sales, though they use price and weather monitoring services to monitor relevant market information.

Factor 19: New requirements to ensure traceability of grain production and sales

The new requirements to ensure traceability of grain production and sales went into force in 2020. These requirements provide for the launch of a grain monitoring system over the entire value chain: production-storage-implementation. The attitude to these requirements is different. Agricultural policy experts understand that these requirements will force producers to bear additional costs and will require some organizational efforts, but, at the same time, they believe that the formation of a system of grain control will improve the management of the grain industry of agriculture. Agri-enterprises, on the other hand, are accustomed to the gradual strengthening of state control of production and sales processes and treat this as unavoidable. According to one farm manager,

“This is an additional burden on agri-enterprises, red tape. We are not familiar with the new monitoring system, but we are ready to launch it if necessary. The experience of servicing similar systems already exists, for example, we use Mercury³ to track grain.”

Factor 20: Import restrictions on agri-food products from certain countries (milk, cheese, meat, vegetables, fruits, etc.)

For this factor the assessments of its importance among representatives of the agricultural experts and the agri-enterprises differ substantially. Agri-enterprises do not assess food imports as a significant competitive factor. At the same time, the agricultural policy experts monitor the balance of self-sufficiency and do treat these imports as significant.

Vulnerability factors and the extent to which interest groups are able to address them.

As a result of the study, the key vulnerability factors for the agricultural development of the Tambov Oblast were identified and analyzed. Based on the analysis, it is possible to formulate conclusions and recommendations addressed to the main stakeholders of the process: federal authorities, regional authorities, and agricultural businesses (agri-enterprises, farmers). However, the capabilities and competencies of each of the stakeholders should be determined in advance in order to outline their areas of responsibility and to understand how each of the stakeholders can affect the elimination of a risk factor. Table 7 visualizes this.

Table 7. Vulnerability indicators and the extent by which interest groups are able to address them

Factor Assessment	Vulnerability Factor	Federal Authorities	Regional Authorities	Agricultural Business
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³ Mercury is an electronic cargo certification system for goods that are regulated by the state veterinary control of the Russian Federation.

Vulnerability factors where both groups of respondents are in full agreement. Note: See comment for Factor 5.	1)	Climate change and adverse weather events	Strong	Weak	Weak
	2)	State support for agriculture	Strong	Moderate	Moderate
	3)	Input prices (fuel, seeds, fertilizer, plant protection)	Moderate	Weak	None
	4)	Restrictions on the export of agricultural products (grain, sunflower, soybeans, etc.)	Strong	Weak	None
	5)	Epizootic situation (avian flu, African swine fever, others) ^a	Moderate	Weak	None
	6)	Exchange rate and availability of imported inputs and technology	Strong	None	None
	7)	Export infrastructure development	Strong	Weak	Weak
	8)	Domestic consumer demand	Strong	Weak	None
Vulnerability factors where both groups of respondents are of moderate level of agreement.	9)	Skilled labor	Moderate	Moderate	Moderate
	10)	Indebtedness of agri-enterprises	Moderate	Weak	Strong
	11)	Land degradation	Moderate	Moderate	Moderate
	12)	Availability of long-term loans	Strong	Weak	Weak
	13)	Labor productivity	Weak	Weak	Strong
	14)	Availability of migrant labor	Strong	None	None
Vulnerability factors where both groups disagree.	15)	Wages for agricultural workers	Weak	Weak	Strong
	16)	Availability of short-term loans	Strong	Moderate	Moderate
	17)	Remoteness from main markets and/or downstream processors.	Moderate	Moderate	Moderate
	18)	Development of digital trading platforms	Weak	Weak	Moderate
	19)	New requirements to ensure traceability of grain production and sales	Strong	Moderate	Weak
	20)	Import restrictions on agri-food products from certain countries (milk, cheese, meat, vegetables, fruits, etc.)	Strong	Moderate	None
	21)	Excessive number of inspections by regulatory authorities	Strong	Moderate	None

Legend: the extent to which the stakeholders may have an impact on addressing the vulnerability

Strong	Strong
Moderate	Moderate
Weak	Weak
None	None

Source: Original table for this publication.

Note: The strong discrepancy in the assessment of the importance of the epizootic situation between the agricultural policy experts and agri-enterprises occurs because the agri-enterprise respondents represented predominantly crop-growing farms. It is conceivable that the inclusion of livestock farms would dramatically increase the importance of this factor for agri-enterprises.

Resilience of agricultural industry

The study revealed interesting discrepancies between the statistical data presenting the dynamics of production, the financial and economic stability of enterprises, and the qualitative assessment by agricultural policy experts and agri-enterprises of the region (Table 8).

Table 8. Consolidated assessment of the dynamics and potential of the development of certain sectors of the agricultural complex in Tambov Oblast, 2020

Subsector	Investment Potential of the Agro-Industrial Complex (for Russia as a whole)	Dynamics of Agricultural Production in the Tambov Oblast in 2020 (Based on Rosstat)	Financial and Economic Resilience of Firms in 2019 (Based on RUSLANA)	State Support in Tambov Oblast in 2020 (Based on Budget Expenditure Assessment)	Attractiveness Assessment (Based on Interviews)
Grains	Moderate	Positive	Stable	High priority	High
Oilseeds	High	Positive	Stable	High priority	High
Sugar beets	Low	Negative	Stable	Moderate priority	Moderate
Pork production	Low	Positive	Stable	Priority	High
Poultry meat production	Moderate	Positive	Moderate	Priority	High
Egg production	Moderate	Negative	Moderate	Moderate priority	Moderate
Dairy farming	Moderate	Neutral	Unstable	High priority	High
Greenhouse vegetable production	High	Positive	Unstable	Priority	High
Horticulture	High	Positive	Unstable	High priority	High
Oil and fat products	Moderate	Positive	Stable	Moderate priority	High

Source: Authors' assessments based on budget allocations of agricultural state support measures and interviews with agricultural policy experts and agri-enterprises.

The most systematic perception is the perception of priority of the production of grains, oilseeds, and sugar beets. These sectors show positive dynamics, and specialized enterprises in these sectors are the most profitable and financially sustainable.

In all other areas, it is useful to talk about differences in objective indicators and assessment of priority:

Pork production is rated by respondents as a sector with high potential. Production volumes continue to grow, and producers are financially sustainable. At the same time, the long-term growth prospects of the sector in the Russian Federation depend on export competitiveness, as domestic self-sufficiency has been achieved. The sector development also depends on improving the epizootic situation as the sector is vulnerable to animal health crises, such as African swine fever.

Poultry production is rated by respondents as a priority, although the amount of government support is not key. At the same time, profitability in the sector is quite low (1.7 percent in 2019 according to RUSLANA), and the indebtedness of enterprises is relatively high—this makes the sector very vulnerable to various shocks, including rising input prices, worsening epizootic situations (Avian flu) and declining purchasing power of the population.

Dairy farming is the most controversial area of the agro-industrial complex of Tambov Oblast. On the one hand, there is a long-term trend to reduce production volumes (in 2020 there was stabilization after a long reduction in livestock numbers during 1990s). Businesses are characterized by a risky financial and economic situation: the sector has low productivity, negative profitability (–2.0 percent in 2019, according to data from RUSLANA). The indebtedness is not critical but remains quite high (debt to revenue was, on average, 37 percent in 2019, according to data from RUSLANA). At the same time, the sector is perceived as a priority and is one of the largest recipients of state support in the region.

Greenhouse vegetable production and *horticulture* in recent years have shown positive dynamics both in the Tambov Oblast and in the country overall. Respondents perceive these sectors as having high potential. However, in recent years, enterprises specializing in these areas have proved to be financially unstable. In 2019, vegetable production was unprofitable, and indebtedness was very high (a debt-to-revenue ratio >10, according to data from RUSLANA). At the same time, these sectors record small volumes of revenue compared to assets. Nevertheless, in 2020, horticulture was one of the sectors with the highest amount of government support.

These discrepancies show that state support measure for the agri-industrial sectors in Tambov Oblast can be transformed in view of the financial and economic sustainability of enterprises and the long-term investment potential of the sectors. Indicators of sustainability are shown by sector and subsector in Table 9.

Table 9. Indicators of sustainability of agri-enterprises in Tambov Oblast by value chains, 2019

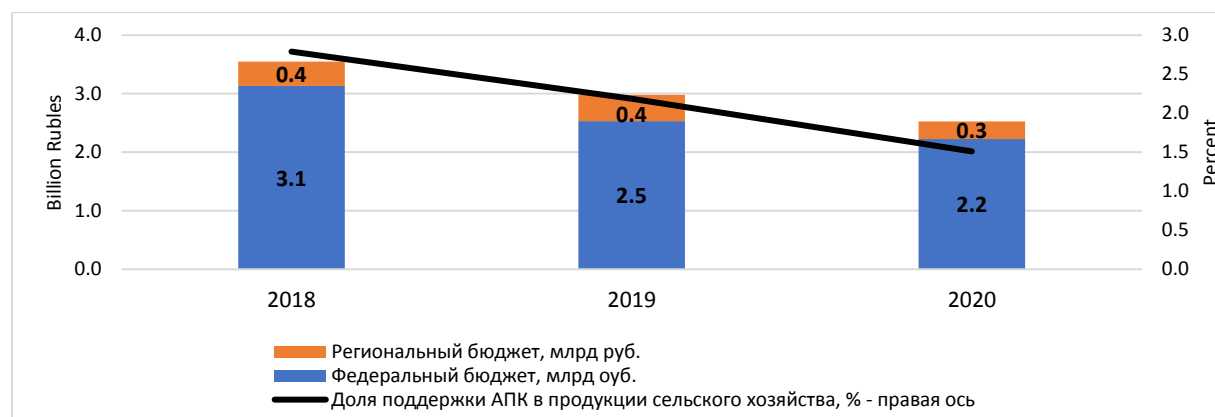
Sector	Subsector	Number of Companies	Revenue (Sales Turnover), Million Rubles	Total Profit/Loss Before Tax, Million Rubles	Average Labor Productivity (Revenue/Number of Employees), Million Rubles/Person	Average Cost of Sales/Sales Revenue, Percent	Profitability (Profit/Sales Revenue), Percent	Return on Assets (Sales Revenue/Assets), Percent	Indebtedness (Total Debt/Sales Revenue), Percent
Crop	Grains	375	47,257.7	5,783.6	3.8	78.9%	12.2%	67.7%	29.1%
	Sugar beets	15	41,778.1	2,382.6	15.3	84.7%	5.7%	84.0%	2.6%
	Feed crops (annual)	31	4,350.4	611.8	2.9	79.0%	14.1%	53.9%	14.9%
	Horticulture	21	974.8	209.7	1.6	74.8%	21.5%	36.5%	18.4%
	Oilseeds	6	659.9	27.5	47.1	93.5%	4.2%	430.2%	2.7%
	Vegetables	4	651.6	-168.5	1.2	95.3%	-25.9%	8.2%	1081.4%
	Potatoes (and other root vegetables and tubers)	3	376.6	37.7	1.6	84.5%	10.0%	21.6%	347.5%
Livestock	Pork	3	26,707.7	2,973.0	5.0	82.6%	11.1%	57.2%	44.6%
	Poultry	6	25,779.4	445.3	4.7	89.1%	1.7%	76.5%	45.9%
	Livestock (mixed)	29	6553.3	34.8	19.1	93.8%	0.5%	464.1%	10.5%
	Dairy	23	2,666.6	-52.1	2.7	91.9%	-2.0%	76.6%	37.0%

Source: Authors' calculations based on RUSLANA data.

State support to agriculture in Tambov Oblast

Against the background of the growth of agricultural production, the volume of state support for the Tambov Oblast agricultural sector is declining, which corresponds to the overall trend in the Russian Federation (Figure 11). In 2020, the share of state support in the gross regional agricultural value added decreased to 1.5 percent.

Figure 11. State support to agriculture in Tambov Oblast, 2018–2020



Source: Ministry of Agriculture of the Russian Federation.

In overall agricultural support measures, the federal budget support is 88 percent. Over 90 percent of the total support measures are directed toward the following three categories: interest rate subsidies and concessional loans (48 percent of total financing), compensating state support measures (23 percent of total financing), and stimulating state support measures (20 percent of total financing).

According to the agri-enterprises (survey respondents), the most significant support measure is the interest rate subsidies and concessional loans. These instruments have been recognized by respondents as most efficient because they have led to the accumulation of additional capital assets through investments. According to the data presented by Tambov Agricultural Department, every 1 ruble of subsidy attracted about 23 rubles of additional investment loans (long-term loans) and every 1 ruble of subsidy attracted 54 rubles of short-term working capital loans.

In determining the directions of state support, the regional administration is guided by the following criteria:

- Support for those agricultural industries that contribute the most to gross agricultural output, namely commodities (grains and legumes, oilseeds);
- Support for sectors that promote unique brands in Tambov Oblast (Michurin apples);
- Support for the sectors producing products that the region is currently importing (milk);
- Development of the sectors that provide employment for the rural population (small and medium farms, cooperatives).

However, a number of unresolved problems and new challenges related to the increasing role of government regulation and the deterioration of the macroeconomic situation in the country under the

influence of sanctions and the COVID-19 pandemic dictate the need to strengthen work on certain areas of government support.

According to survey respondents, agricultural productivity and yields are relatively low in the Tambov Oblast. Among the regions of the Black Earth zone, Tambov Oblast is characterized by the lowest productivity indicators. For example, in 2019, the yield of cereals in Tambov Oblast lagged behind the yield in the Voronezh region by 9 percent, sugar beets by 10 percent, and sunflower by 15 percent (Table 10).

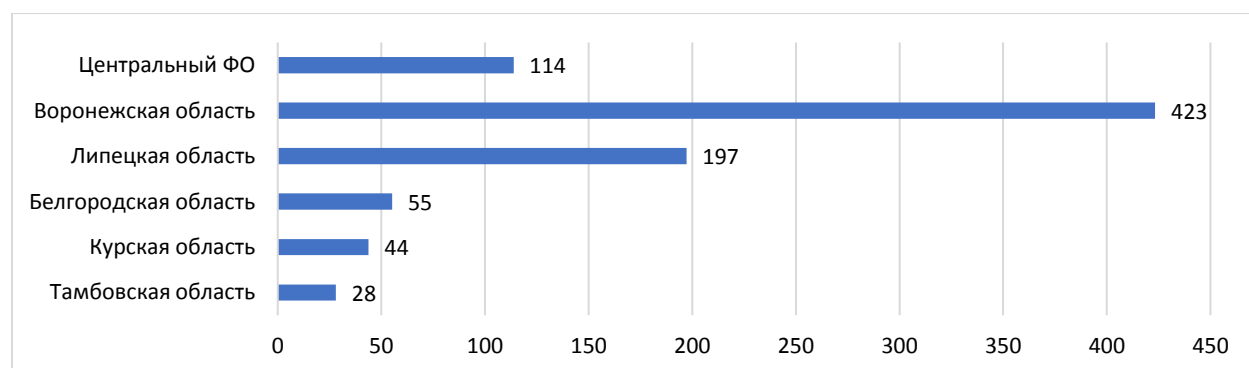
Table 10. Production of agricultural products per hectare of acreage and per employed person in the Central Federal District and regions of Black Earth, 2016–2019

Region or District	Agricultural Production per Hectare, 1,000 Rubles per Hectare				Agricultural Production per Person Employed in Agriculture, Thousand Rubles per Person			
	2016	2017	2018	2019	2016	2017	2018	2019
Central Federal District	85	84	95	100	1,286	1,359	1,558	1,728
Belgorod	158	159	181	186	2,157	2,438	2,803	2,739
Voronezh	79	74	85	84	1,354	1,322	1,486	1,634
Kursk	76	81	91	97	1,955	2,182	2,503	2,604
Lipetsk	80	76	91	100	1,601	1,582	1,855	2,181
Tambov	66	63	74	76	933	979	1,178	1,339

Source: Rosstat database (www.gks.ru).

In many respects, low productivity is associated with a lack of attention to the so-called general services. For example, support for land reclamation per hectare in Tambov Oblast is the lowest not only in the regions of Black Earth, but also among many other subjects of the Central Federal District (Figure 12).

Figure 12. Funding for reclamation activities per hectare of acreage in the Central Federal District (rubles per hectare), 2020



Source: Ministry of Agriculture of the Russian Federation.

This section identified and discussed vulnerability factors that influence agri-enterprise or farm level results. Most of the vulnerability factors identified by survey respondents fall outside of the influence of the agricultural policy instruments, and hence are addressed by agri-enterprises and farmers without

state support. Many of such factors, such as climate and whether risks, infrastructure quality or marketing challenges, could be addressed by well-structured public programs and agricultural policies to augment the results at farm or agri-enterprise level. Public policies, for example, could focus on boosting innovation and technology adoption for better land improvement, expanded use of climate-smart practices, such as no-till cultivation methods, investments in agricultural storage and marketing infrastructure etc. Next Chapter uses quantitative methods to estimate whether current agricultural policies have supported productivity growth.

4 THE IMPACTS OF SUBSIDIES ON PRODUCTIVITY AND FIRM FINANCIAL STRENGTH

A key policy question is how state and federal subsidies to the agricultural sector directly affect average crop productivity at the regional level. This chapter describes the results of econometric models that examine the impacts of real subsidy expenditures and crop-targeted subsidies on land productivity at the crop subsector level, and also for key individual crops: winter wheat, barley, soybeans, and corn. The chapter also examines whether subsidies affected the productivity of small farms differently from large farms. In order to distinguish between small and large farms, the analysis assigns family or individual farm types as small farms and agri-enterprises as large farms.

In most cases, the econometric results indicate that aggregate subsidies have provided little measurable impact on productivity when examined using data reporting overall crop subsector outcomes. This held regardless of whether the subsidies are funded by federal or regional governments. The same is largely true when disaggregated category or program subsidies are used. Measured impacts at individual crop level are more varied, and, in some cases, targeted subsidies produced measurable benefits: for example, a short-lived program that subsidized crop insurance was linked to yield gains in winter wheat and barley on both large farms and small farms.

A separate set of convergence models was estimated to examine the relationship between subsidy expenditures, firm profitability, and firm cash-flow. This round of analysis provided strong evidence that subsidies lifted average profits, measured at the region level, and increased the share of farms that are profitable in any given year. See Box 4 for empirical model description.

Box 4. Empirical model description

The study developed a conditional convergence model to measure productivity impacts, an approach that has been applied to study economic and productivity growth in a variety of setting, including a recent study of the effects of Common Agricultural Policy (CAP) expenditures on productivity in the European Union (Garrone et al. 2019).

The basic notion behind the model is that current technologies set an upper limit to factor productivity, creating greater opportunities for growth in places where factor productivity is low and less opportunity where productivity is constrained by technology. Consequently, productivity gains potentially converge to the limits set by technology and endowments, conditional on additional factors, including policy. Conceptually, under the right conditions, all areas converge to their potential.

This class of models is based on theoretical neoclassical growth models (Solow 1956, 1957; Swan 1956). Applied versions focus on explaining growth and testing for indications of convergence. Early development of the applied model is given in Barro (1991); Barro et al. (1991); and Barro and Sala-i-Martin (1995). The already mentioned paper by Garrone et al. (2019) provides a good review of the approach and its applications.

Most often, convergence models are structured to explain growth rates in panel settings to normalize cross-country outcomes, that is:

$$\dot{y}_{it} \equiv \ln y_{it} - \ln y_{it-1} = \beta y_{it-1} + h(s_{it-1}; x_{it-1}) + \varepsilon_{it} \text{ (EQ 1)}$$

where y is the measured productivity outcome in region i and time t ; β is the convergence term, which, from theory, is expected to be negative in value. In many applications, testing whether estimates of β are negative is central to test that convergent growth is occurring and measurements of the speed of convergence; hence this class of model is often referred to as β -convergence models (Harris 2011). The function h in 1) determines how the policy vector, s , and additional covariates, x , condition convergence. The remaining term, ε_{it} , accounts for additional contemporaneous effects, including random ones. In the application here, contemporaneous effects will include weather, which varies spatially and temporally, and international grain prices, which vary temporally.

Because the focus is on average land productivity across time and regions in the application, a measure that is already scaled, harmonization is less needed. Consequently, the lagged productivity measures to the right of the equality are recollected, so that the applied model can be written as:

$$\ln y_{it} = (1 + \beta) \ln y_{it-1} + h(s_{it-1}; x_{it-1}) + \varepsilon_{it} \text{ (EQ 2)}$$

From a statistical perspective, the specification has the advantage that the lagged productivity measure enters the model exclusively as a regressor.

In the next sections, the model given by equation 2 is adapted to explain subsector-level differences in crop productivity, average firm profits, and crop-level yields.

Source: Authors

Data and variables

The analysis examines three types of productivity: the value of regional production per hectare of major grain-crop area; average firm profits; and yields for wheat, barley, soybeans, and corn. Figure 10 demonstrates that in real terms, crop production value grew from 2012 to 2016, and declined slightly since.

The analysis looks at crop yields to understand the impact of subsidies to provide a physical quantity measure of land productivity, to complement the analysis based on production value. Figure 13 shows average crop yields for the sample. In line with average crop production values, yields rose from 2012 to 2016 or 2017, depending on the crop, and have fluctuated since.

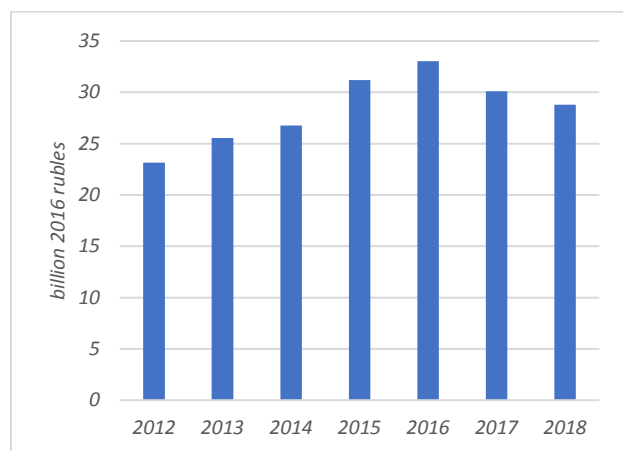
Russia is an active exporter of grains, and changes in international commodity markets influence the value of production and decisions about producing. Figure 14 shows how international soybean, barley, corn,

and wheat prices have fluctuated during the last 20 years. For the study period, prices retreated from highs until 2015 and have remained stable by historical standards.

After accounting for exchange rate movements and inflation, real grain prices still reflect international movements (Figures 15 and 16). Soybean prices show a distinctive peak around 2016, but the other prices remained constant during the study period.

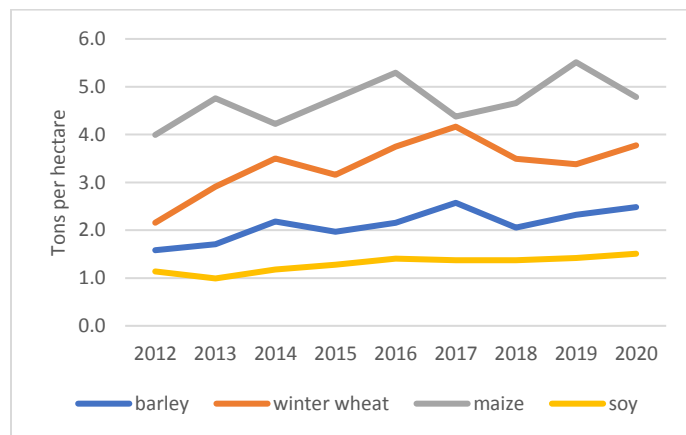
Crop production in Russia is primarily rainfed and weather outcomes are important for yields. Monthly data on precipitation and rainfall were used to construct indicators for each phase of the crop cycles: planting, growing, and harvesting.⁴ Monthly data from 1941 forward were used to calculate crop-phase averages for temperature and precipitation indicators for each growing season. Because production decisions are made in advance, before weather outcomes are known, decisions are largely shaped by past weather—that is, by climate. To account for this, planting-phase, growing-phase, and harvest-phase average were calculated for all crop years from 1941 to 2020. The years were then sorted into quintiles—that is, five ranked classes for each region. For example, the top temperature quintile for the barley growing season marks the highest average temperatures for April to June for each region over the entire sample. The weather variables enter the regressions as corresponding line segments—that is, “very hot” April-June temperatures enter as a variable different from “average” April-June temperatures in the barley yield equation.

Figure 13. Total value of crop production in Russia, 2012–2018



Source: Rosstat database(www.gks.ru).

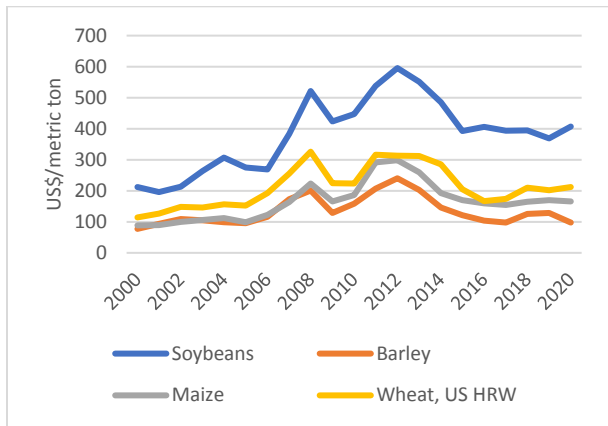
Figure 14. Average crop yields, 2012–2020



Source: Rosstat database(www.gks.ru).

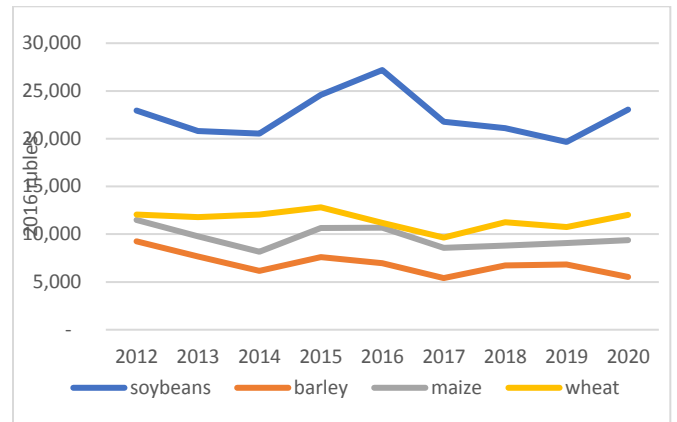
⁴ The data were made available to the public by the Climate Research Unit at East Anglia University (2021).

Figure 15. International soybean, barley, corn, and wheat prices, 2000–2020



Source: World Bank Commodity Markets 2021.
Note: HRW is hard red winter wheat

Figure 16. International commodity prices in 2016 rubles, 2000–2020



Source: Authors' calculations based on World Bank Commodity Markets 20201 and World Bank World Development Indicators 2021.

Besides improving the accuracy of the regression models, the process also shows how the climate has been changing in Russia. Table 11 shows outcomes from 2012 to 2020 for wheat and soybean/corn seasons. To simplify the presentation in the table, the growing phases are combined into a crop season. Russia is a large country, which allows for considerable spatial variation in weather outcomes.

The table shows a count of weather outcomes from each regional area by quintile class and shows the extent to which growing seasons have warmed in Russia. The trend is especially noticeable for winter wheat, which includes a dormant winter phase. In 2017 27 regions reported cooler than normal temperatures for the wheat crop year and one region reported below average temperatures in 2018. At all other times and places, temperatures were normal or warmer than normal. By historical standards, 2014, 2019, and 2020 were abnormally warm.

The soybean/corn growing season includes spring, summer, and fall months. Excluding winter softens the change in growing conditions, but still suggests a “new normal” of warmer seasons. The changes in precipitation are less stark but shows a trend toward wetter growing seasons.

Table 11. Regional weather experiences compared with historical averages, 2012–2020

Year	Temperature					Precipitation				
	Coldest	Cool	Normal	Warm	Hot	Driest	Dry	Normal	Wet	Wettest
Winter wheat growing season										
2012	0	0	6	10	65	11	12	13	23	22
2013	0	0	7	21	53	5	5	12	26	33
2014	0	0	0	3	79	1	11	28	27	15
2015	0	0	8	52	22	22	19	21	10	10
2016	0	0	0	1	81	5	12	14	18	33
2017	0	27	28	14	13	6	7	14	18	37
2018	0	1	14	32	35	7	18	21	24	12
2019	0	0	0	2	80	21	21	15	11	14
2020	0	0	0	2	79	10	16	14	16	25
Soybean and corn growing season										
2012	0	0	0	11	70	14	9	10	10	38
2013	0	0	8	23	50	7	11	11	18	34
2014	0	9	10	27	36	26	21	19	12	4
2015	0	0	7	46	29	19	21	20	9	13
2016	0	1	3	6	72	8	12	11	13	38
2017	4	17	24	11	26	2	10	15	25	30
2018	0	0	7	10	65	31	16	18	9	8
2019	0	0	3	32	47	15	23	18	14	12
2020	0	0	0	20	61	13	25	15	14	14

Source: Original calculations, based on data from Climate Research Unit 2021.

The next section presents results from the three groups of models. For ease of interpretation, all estimated coefficients have been recalculated as mean-value elasticities.

Crop subsector productivity

Table 12 shows the results for the model testing the aggregate impact of subsidies on crop subsector productivity, by farm type. For each type, large farms, small farms, and all farms combined, the elasticity of lagged productivity is significant and less than one, a result consistent with convergence theory. In all cases, the collective impact of the weather variables is statistically significant. Average financial strength in the region has no discernible impact. Contemporaneous global grain prices are positively correlated with productivity for family farms and for the composite all farms, but only statistically significant for all farms. In the case of large farms, the estimated elasticity for grain prices is quantitatively small, negative, and statistically indistinguishable from zero.

To summarize, in this model, the variation in productivity at the crop subsector level is largely explained by past outcomes, weather variations, and, to a degree, international prices.

Table 12. Impacts of untargeted subsidies on crop-sector productivity.

Variables	Elasticity	Standard Error	z-score	P> z
All farms				
Lagged productivity	0.976	0.01	146.19	0.00
All subsidies	0.003	0.01	0.35	0.72
Regional subsidy share	0.010	0.019	0.51	0.61
Financial strength	-0.004	0.003	-1.43	0.15
International grain prices	0.228	0.104	2.19	0.03
Large farms				
Lagged productivity	0.784	0.044	17.76	0.00
All subsidies	0.050	0.044	1.13	0.26
Regional subsidy share	0.098	0.109	0.90	0.37
Financial strength	0.007	0.017	0.40	0.69
International grain prices	-0.291	0.598	-0.49	0.63
Small farms				
Lagged productivity	0.955	0.006	157.17	0.00
All subsidies	0.012	0.010	1.19	0.24
Regional subsidy share	-0.009	0.024	-0.36	0.72
Financial strength	-0.003	0.004	-0.94	0.35
International grain prices	0.204	0.134	1.53	0.13
Test of weather impacts	$\chi^2(15)$	Prob>χ^2	n.a.	n.a.
All farms	53.24	0.00	n.a.	n.a.
Large farms	50.11	0.00	n.a.	n.a.
Small farms	32.75	0.01	n.a.	n.a.

Source: Authors based on model estimation results

Note: n.a. = not applicable.

The model was re-estimated using subcategories of subsidy payments, including those that specifically target crop producers. The results are given in Table 13. As was the case when untargeted subsidies were included as determinants, all estimated lagged productivity elasticities were negative, less than zero, and statistically significant. And, collectively, the weather variables were statistically significant.

In the all-farm sample, the lagged financial strength elasticities and the contemporaneous grain price elasticities were statistically significant. As might be expected, higher grain prices boosted profits and productivity; however, regions with lower average profits showed greater productivity levels. Turning to the subsidy variables, the short-lived program of providing crop insurance subsidies boosted productivity, but not by much; a one percent increase in crop insurance subsidies is expected to yield a 0.014 increase in yields. Subsidies to priority subsectors had a small but statistically measurable adverse impact on productivity, most likely because the programs focused on dairy, livestock, and less established crops. Other types of subsidies showed little explanatory power.

In the case of the large-farm sample, no determinants other than lagged productivity and weather had a statistically discernible impact on productivity. Results from the family-farm sample, the results showed

a small positive impact for crop insurance subsidies and a small negative impact for priority-subsector subsidies were like those using the all-farm sample.

Table 13. Impacts of targeted subsidies on crop-sector productivity.

Variables	Elasticity	Standard Error	z-score	P> z
All farms				
Lagged productivity	0.975	0.007	139.80	0.00
Other subsidies	0.000	0.013	-0.04	0.97
Subsidies to priority sub-sectors	-0.014	0.008	-1.88	0.06
Crop insurance subsidies	0.014	0.004	3.44	0.00
Subsidies to smallholders	0.003	0.006	0.57	0.57
Subsidies to targeted regions	0.003	0.006	0.53	0.60
Interest rate subsidies	-0.002	0.006	-0.31	0.76
Regional subsidy share	-0.001	0.020	-0.05	0.96
Financial strength (profits)	-0.008	0.003	-2.30	0.02
International grain prices	0.209	0.108	1.93	0.05
Large farms				
Lagged productivity	0.760	0.047	16.17	0.00
Other subsidies	0.068	0.071	0.95	0.34
Subsidies to priority sub-sectors	-0.064	0.049	-1.31	0.19
Crop insurance subsidies	0.010	0.026	0.39	0.70
Subsidies to smallholders	0.023	0.037	0.62	0.54
Subsidies to targeted regions	-0.023	0.039	-0.58	0.57
Interest rate subsidies	0.038	0.037	1.04	0.30
Regional subsidy share	0.101	0.123	0.82	0.41
Financial strength (profits)	0.010	0.020	0.52	0.61
International grain prices	-0.364	0.629	-0.58	0.56
Small farms				
Lagged productivity	0.952	0.006	147.97	0.00
Other subsidies	0.015	0.016	0.94	0.35
Subsidies to priority sub-sectors	-0.022	0.011	-2.09	0.04
Crop insurance subsidies	0.016	0.006	2.73	0.01
Subsidies to smallholders	-0.006	0.008	-0.73	0.47
Subsidies to targeted regions	0.008	0.009	0.93	0.35
Interest rate subsidies	0.002	0.008	0.24	0.81
Regional subsidy share	-0.018	0.027	-0.68	0.50
Financial strength (profits)	-0.006	0.004	-1.32	0.19
International grain prices	0.191	0.139	1.37	0.17
Test of weather impacts				
	$\chi^2(15)$	$P>\chi^2$	n.a.	n.a.
All farms	53.61	0.00	n.a.	n.a.
Large farms	50.63	0.00	n.a.	n.a.
Small farms	31.65	0.01	n.a.	n.a.

Source: Authors based on model estimation results

Note: Determinants are lagged, with exception of grain prices. n.a. = not applicable.

One more version of the model was estimated to explore the relative impacts of subsidies targeting public goods. The estimated elasticities are reported in Table 15. Consistent with earlier results, all lagged

productivity impacts were positive, significant and less-than-one. The coefficients on international grain prices were positive and significant for family farms and in the composite regression of all farms. The impacts of the subsidy expenditures themselves were not discernible in a statistical sense, although for small farms tests for significance fell just beyond normal standards, with confidence levels a tad shy of 90 percent.

Table 14. Impacts of public and private-good subsidies on crop-sector productivity.

All farms	Elasticity	Std. Err.	z-score	P> z
Lagged productivity	0.976	0.007	145.90	0.00
All subsidies	0.004	0.008	0.57	0.57
Public-good share	0.011	0.012	0.90	0.37
Financial strength (profits)	-0.004	0.003	-1.43	0.15
International grain prices	0.243	0.105	2.31	0.02
Large farms				
Lagged productivity	0.786	0.044	17.68	0.00
All subsidies	0.056	0.045	1.24	0.21
Public-good share	0.039	0.069	0.56	0.58
Financial strength (profits)	0.006	0.017	0.37	0.71
International grain prices	-0.225	0.603	-0.37	0.71
Family farms				
Lagged productivity	0.955	0.006	157.83	0.00
All subsidies	0.015	0.010	1.55	0.12
Public-good share	0.025	0.015	1.62	0.11
Financial strength (profits)	-0.003	0.004	-0.84	0.40
International grain prices	0.230	0.134	1.71	0.09
Test of weather impacts	$\chi^2(15)$	P> z 		
All farms	53.98	0.00		
Large farms	52.32	0.00		
Small farms	35.42	0.00		

Source: Authors based on model estimation results

Crop-farm financial strength

The relationships between subsidies and financial outcomes were also examined for crop-producing farms using the same class of convergence model. Two indicators of financial health were used: the average profit of crop-growing farms in the region and the share of regional farms showing a positive cash flow. Table 15 shows the results from both indicators.

In both cases, the results are statistically robust and intuitively appealing. The elasticities associated with lagged financial outcomes are positive, statistically significant, and estimated to be positive, but less than one. In both models, weather impacts were statistically significant; the impacts of international grain prices were large and statistically significant.

The elasticities associated with subsidy payments were quantitatively and statistically significant. In the first model, a 1 percent increase in subsidies were estimated to boost average profits by 0.24 percent; the second model predicts that a 1 percent increase in subsidies would increase the share of profitable crop-farms by 0.18 percent. In neither case was any relationship detected between the source of the subsidies,

federal or regional budgets. Results from the first model do not indicate that the type of farm matters; that is, the variable showing the share of large farms in the region did not show any explanatory power. By contrast, the share of large farms in the region was positively associated with the share of crop-farms that were cash positive.

Table 15. Impacts of subsidies on farm financial outcomes.

Variable	Elasticity	Standard Error	z-score	P> z
Financial strength (average profits)				
Lagged profitability	0.901	0.028	31.76	0.00
All subsidies	0.244	0.074	3.30	0.00
Regional subsidy share	0.226	0.169	1.33	0.18
Share of large farms	-0.039	0.230	-0.17	0.87
International grain prices	3.062	1.019	3.00	0.00
Test of weather impacts	F(16,402)	P> z 	n.a.	n.a.
	2.46	0.001	n.a.	n.a.
Share of farms showing positive cashflow				
Lagged share of cash-positive farms	0.608	0.038	16.07	0.00
All subsidies	0.184	0.087	2.12	0.03
Regional subsidy share	0.207	0.228	0.91	0.36
Share of large farms	0.668	0.279	2.39	0.02
International grain prices	3.367	1.238	2.72	0.01
Test of weather impacts	F(16,401)	P> z 	n.a.	n.a.
	2.13	0.01	n.a.	n.a.

Source: Authors based on model estimation results

Note: Determinants are lagged, with exception of grain prices. n.a. = not applicable.

The model was re-estimated, distinguishing between subsidies spent on public and private goods. The results are given in Table 16. Consistent with the previous model, the results are consistent with the notions directly affect the profitability and cash flow of commercial farms, with the caveat that this is only true for subsidies for private goods. Turning first to the profitability regression, the subsidy elasticity of 0.214 is approximately equal to the absolute value of the public-good share elasticity of -0.206. Consequently, the impact of subsidies expenditures on average profits goes to zero as the share spent on public goods goes to one.

This relationship, where the impact of subsidies on financial outcomes relies on the share spent on private goods is more pronounced when looking at cashflows. In this case, the absolute value of the public-share elasticity is nearly two-thirds larger than the subsidy elasticity. Consequently, the positive effect on subsidies on the share of firms with a positive cash flow in an oblast quickly evaporates as expenditures shift to public goods.

Taken together, both results are consistent with the notion of Russian subsidies are resource transfers that impact the financial health of commercial farms rather than providing solutions to overcome productivity hurdles.

Table 16. Impacts of private and public-good subsidies on farm financial outcomes.

Test of Financial strength (average profits)	Elasticity	Std. Err.	z-score	P> z
lagged profitability	0.897	0.028	31.68	0.00
All subsidies	0.214	0.077	2.77	0.01
Share of subsidies on public goods	-0.206	0.116	-1.77	0.08
Share of large farms	-0.026	0.231	-0.11	0.91
International grain prices	2.887	1.025	2.82	0.01
Test of weather impacts	F(16,42)	P> z 		
	2.18	0.01		
Share of farms showing positive cashflow				
lagged share of cash-positive firms	0.598	0.037	16.20	0.00
All subsidies	0.146	0.089	1.65	0.10
Share of subsidies on public goods	-0.239	0.140	-1.70	0.09
Share of large farms	0.703	0.280	2.51	0.01
International grain prices	3.186	1.241	2.57	0.01
Test of weather impacts	F(16,401)	P> z 		
	1.80	0.03		

Source: Authors based on model estimation results

The impact of subsidies on wheat, barley, soybean, and corn yields

The relationships between subsidies and crop yields were analyzed by applying the same type of convergence model to data on crop yields for winter wheat, barley, soybeans, and corn. Table 17 reports elasticities based on estimated parameters and the results from a test of the collective significance of the models' weather variables. Large farms and small farm equations were estimated together using a seemingly unrelated regression estimator. Each crop-pair was estimated separately to preserve observations, since all four crops are not grown in every region.

Overall, the estimated results are consistent with the model choice. All eight of the lagged-yield elasticities are positive and less than one, indicated a negative β . The crop-area elasticities are all positive and statistically significant as well. The estimated values range from 0.03 (small-farm corn) to 0.068 (large-farm soybeans), indicating economies of scale for the grain subsectors. Except for the family-farm corn equation, weather helped explain yield outcomes in a statistically significant way. In general, rising international prices were associated with yield gains, although negative price elasticities were estimated for barley.

Turning to subsidies, the estimated impacts were decidedly mixed, depending on farm type and crop. To start, the set of estimated crop-insurance elasticities were positive for large-farm wheat and barley and for family-farm barley; the remaining crop-insurance elasticities were indistinguishable from zero. At the same time, the estimated elasticities were quantitatively small, ranging from 0.02 to 0.05.

Interest-rate subsidies account for a large portion of subsidy expenditures, especially in the early years of the sample. Furthermore, interviews from Tambov market participants identified interest-linked subsidies as important for them. The estimated elasticities are positive and statistically significant for yields on large-farm wheat and family-farm wheat and barley; however, the elasticities are quantitatively small, ranging from 0.02 (large-farm wheat) to 0.03 (family-farm barley).

The impact of subsidies delivered under priority-subsector programs were mixed. For most crops and crop types, the elasticities were negative or insignificant. Most likely this is because the programs have targeted beef and dairy production in recent years. For example, negative impacts were identified for large-farm wheat, barley, and soybeans and small-farm wheat and barley. For large and small corn growers, a product that is used most often as feed rather than food, the elasticities were positive. Subsidies targeting household farmers (not family farms or agri-enterprises farms) produced small negative spillovers for large-farm and small-farm barley and corn yields and positive spillovers for family-farm soybean yields. Subsidy targeting special regions had a positive impact on small-farm soybean yields, generating an estimated elasticity of 0.09, but otherwise generated no statistically discernible impacts. The balance of subsidy expenditures also produced no statistically significant elasticities, apart from family-farm soybeans.

Table 17. Estimated crop elasticities.

	Wheat		Barley		Soybeans		Corn	
	Elasticity	P> z	Elasticity	P> z	Elasticity	P> z	Elasticity	P> z
Large farms								
Lagged yields	0.375	0.00	0.596	0.00	0.253	0.00	0.417	0.00
Crop area	0.064	0.00	0.046	0.00	0.068	0.00	0.019	0.32
International prices	0.138	0.51	-0.682	0.00	0.814	0.00	0.423	0.20
<u>Subsidies</u>								
Crop insurance	0.013	0.06	0.025	0.00	-0.003	0.78	0.039	0.18
Interest rates	0.022	0.02	0.011	0.33	0.012	0.41	0.015	0.21
Priority subsectors	-0.038	0.01	-0.039	0.01	-0.042	0.05	0.035	0.03
Smallholders	-0.013	0.21	-0.025	0.03	0.010	0.60	-0.054	0.02
Targeted regions	0.000	0.99	0.018	0.16	-0.014	0.42	-0.010	0.62
Other	0.014	0.36	0.022	0.19	0.018	0.51	0.000	0.99
Test of weather impacts	$\chi^2(14)$	P> χ^2	$\chi^2(14)$	P> χ^2	$\chi^2(14)$	P> χ^2	$\chi^2(14)$	P> χ^2
	51.18	0.00	48.10	0.00	119.26	0.00	28.33	0.01
Small farms								
Lagged yields	0.450	0.00	0.571	0.00	0.599	0.00	0.303	0.00
Crop area	0.057	0.00	0.014	0.06	0.050	0.04	0.026	0.08
International prices	0.259	0.26	-0.767	0.00	1.673	0.00	0.668	0.09
<u>Subsidies</u>								
Crop insurance	0.011	0.16	0.021	0.01	0.019	0.36	0.054	0.11
Interest rates	0.023	0.02	0.026	0.02	0.041	0.18	0.021	0.13
Priority subsectors	-0.046	0.00	-0.037	0.02	0.001	0.98	0.048	0.01
Smallholders	0.007	0.53	-0.020	0.08	0.085	0.04	-0.086	0.00
Targeted regions	0.001	0.94	0.010	0.45	0.087	0.02	-0.004	0.86
Other	0.013	0.45	0.017	0.31	-0.135	0.02	0.000	0.99
Test of weather impacts	$\chi^2(14)$	P> χ^2	$\chi^2(14)$	P> χ^2	$\chi^2(14)$	P> χ^2	$\chi^2(14)$	P> χ^2
	62.50	0.00	71.56	0.00	49.48	0.00	11.31	0.66

Source: Authors based on model estimation results

Note: Determinants are lagged, with exception of grain prices. n.a. = not applicable.

5 Conclusions and policy implications

The report examined the impacts of state support measures and agricultural policy instruments on productivity, production, and profits of agri-enterprises and farmers in two ways. First, it summarized the insights from semi-structured qualitative interviews of agri-enterprises and agricultural policy experts in Tambov Oblast. Second, it used econometric models and data from federal and regional statistics to estimate the impact of subsidies on land productivity. Two major conclusions can be drawn as a result of these analytical exercises.

First, agri-enterprises describe key vulnerability factors that affect their business as those factors that are outside of their control (e.g. zoonotic diseases, infrastructure, climate change and others) and which are generally addressed through the provision of public goods. In absence of dedicated state support measures, agri-enterprises and farms develop their own response measures to vulnerabilities (e.g. switching to no-till technologies to protect land or finding optimal marketing routes to overcome infrastructure limitations), even though state support measures could target programs that address such vulnerability factors (e.g. improved animal health services, agricultural advisory programs and services, farmer education etc.).

Second, this report looked for evidence that subsidies did in fact boost productivity in the crop subsector, examining productivity as measured by value per hectare and by looking at crop yields for winter wheat, barley, soybeans, and corn. The analysis revealed a slow convergence process in which less-productive areas closed productivity gaps, but it provided only weak and inconsistent evidence that this process is driven by subsidy payments. In general, outcomes could be largely explained by international price movements and weather outcomes. By contrast, the analysis provided strong evidence that subsidies buoyed farm profitability and improved the short-term financial strength of farms, especially when, as is currently the case, the subsidies are directed to private goods, rather than public goods.

The findings of the report have several implications for policy, although several caveats should be mentioned. It should be emphasized that crop productivity is not the only stated goal motivating federal and state subsidies to agriculture. As noted earlier, the federal agricultural policy objectives have been focused on food self-reliance, production self-sufficiency and competitiveness. From the point of view of food self-reliance and production self-sufficiency, perhaps the agricultural policies have been successful and accomplished their objectives. In addition, the analysis did not examine productivity and farm performance beyond the crop sector, which accounts for more than half of agricultural production by value. And finally, the quantitative analysis relies on aggregated data, exploiting differences among average firm outcomes across time and regions, and therefore it can say little about productivity drivers at the farm level. While the qualitative interviews were only focused on Tambov Oblast.

With all the limitations above, the following general conclusions and policy implications are discussed.

The findings can serve **as a starting point for looking at the agricultural policy from the perspective of, what OECD (2021) calls a “food system” approach to address the “triple challenge”** of providing food security and nutrition for a growing world population; providing livelihoods for hundreds of millions of people involved in agricultural and food production; and contributing to environmental sustainability. In this context, the key policy question would be how to repurpose state support measures and strengthen agricultural policy goals to in order to pave the road to the “food system” approach?

That said, the analyses suggest **that policy makers should look closely to understand the factors that drive crop productivity gains at the agri-enterprise or farm level.** Productivity is an important indicator of resilience to various shocks and is a key factor for the competitiveness of agricultural sector. Farm financial strength, including profitability is another important indicator of resilience. In this context, subsidies that boost a farm's financial strength can be constructive when the subsidies address market hurdles—for example, imperfections in credit markets. By contrast, agri-enterprises or farms that come to depend on subsidies remain viable only as long as subsidies are provided. So, an additional step in understanding the role of subsidies is to look at agri-enterprise or farm level vulnerabilities, as well as at evolution of the agri-enterprises or farms that receive them. Do they take advantage of the support to become financially stable, do they improve their agricultural practices, invest in new technologies, learn new skills or do they remain static through time?

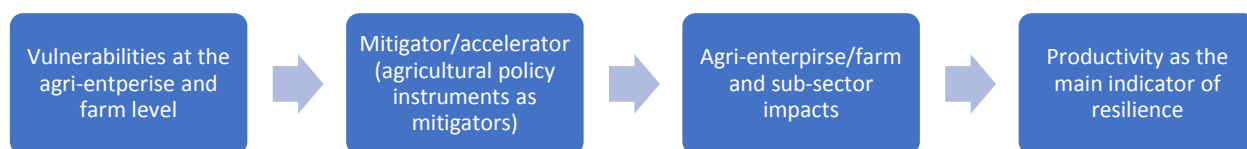
From this perspective there is **opportunity to revisit the focus of agricultural policies, avoiding those policy measures that could be distorting producers' incentives to improve productivity.** Such policies and state support measures could also limit the flexibility of agricultural producers, by limiting them to one type of investment and/or limiting them to specific commodity group, and hence reducing the resilience of producers to adapt to new technologies, changing consumer demands, and climate change. Recognizing the importance of agricultural policies to support important federal objectives, **much could be learned from interviews from farmers and agri-enterprises on the vulnerability factors that affect them** or on the actions they undertake to improve resilience of their farms.

There is strong evidence from other countries that suggests that government expenditures are best spent on public goods, such as research, animal and plant health systems, information systems, food safety systems, and support to underlying soil and water resources. These are also areas where interview respondents highlight the most vulnerabilities, and possibly require more government support. Subsidies can also play a role in addressing inequities in rural areas. However, to a degree, a strong agricultural sector is one that can adapt and evolve to market conditions, isolating farms from market conditions rather than preparing them to navigate market challenges can lock resources in less productive uses.

ANNEX 1: ANALYTICAL APPROACH

In order to judge the efficacy of the agricultural policy and state support measures at the agri-enterprise or farm level, this report employs a conceptual model to assess factors that describe the resilience of agri-enterprises to various shocks, as well as factors that are perceived by industry stakeholders to lead to vulnerabilities. The study proposes to use the *vulnerability and resilience model*, which was employed to identify the pathway of various impacts (Figure A1). Productivity has been identified as the key resilience indicator, and the analyses were constructed to assess the vulnerability factors that reduce the strength of this indicator.

Figure A1. Vulnerability and resilience analysis pathway: Productivity is the main chosen indicator of resilience.



Source: Original diagram for this publication

The following agri-enterprise or farm-level vulnerabilities can be assumed to be typical in the Russian agriculture sector:

Profitability, which is both a measure of past impacts and a forward measure of a fundamental comparative advantage that helps mitigate various kinds of economic threats (e.g., changes in price or market demand), but profitability does not protect against short-term losses due to natural risks.

Indebtedness, which makes agri-enterprises or farms more vulnerable to a credit/banking crisis;

Distance from markets or weak agri-logistics infrastructure, which make agri-enterprises or farms vulnerable to problems in the agri-logistics sector or exposes them to high transport costs;

Labor force dependence, which indicates vulnerability to COVID-19 health risks in the context of the pandemic, but also more generally indicates vulnerability to the availability of skilled labor, and is also a driver for digital transformation and robotizations; and

Subsidy exposure, which indicates dependence on state support measures at the agri-enterprise level, as well as a direction of policy priorities.

Hence, the analysis of vulnerabilities follows the approach summarized in Table 2.

Table 18. Description of vulnerabilities and the analytical approach to address them

Vulnerability	Indicator	Available data source	Analysis

Productivity	Revenue per worker	Ruslana	Descriptive
	Yields of key crops/livestock (rayon level)	Rosstat	Descriptive, conditional convergence models
Profitability	Profit	Ruslana	Descriptive
Indebtedness	Debt to sales revenue	Ruslana, interviews	Descriptive
Location Subsidy distribution overlaid with productivity (rayon or oblast level)	Distance from port or main market	Geospatial, interviews	Map/descriptive
	Map	Rosstat	Map descriptive ^a
Subsidy exposure of agri-enterprises or farms	Share of subsidies in agri-enterprise or farm gross receipts	Interviews ^b	Descriptive
Labor	Availability of skilled labor, labor dependence, digital transformation and robotization	Interviews	

Source: Original table for this publication.

Note: a. Russia agriculture dashboard has been prepared as an online reference tool and is available as part of the report. It can be accessed here: [/LINK/](#)

b. Agri-enterprise or farm level quantitative data may not be available; hence the analysis will use qualitative information from interviews.

Based on the aforementioned, the analysis focuses on the following question: To what extent do agricultural policies and support measures mitigate these vulnerabilities?

ANNEX 2. METHODOLOGY AND ARRANGEMENTS OF FIELD STUDIES IN TAMBOV OBLAST

The study included field studies as a separate set of works. Experience suggests that field studies produce interesting and rich factual evidence that is a useful complement to desk research outcomes. In addition, field studies help to verify initial hypotheses that are developed at the pre-design stage of the Project. Some evidence obtained during field studies is unique and cannot be obtained by any other means. Finally, field studies boost project performance and help to build trust between work performers and external reviewers – as represented by the Tambov regional administration.

The goals of the field studies were aligned with the Project objectives.

i) Identify risk factors and sustainability of agricultural sector at the farm level.

In the course of preparation for the field studies two groups of endogenous risk factors were identified: natural and systemic (generated by government regulations of agro-industrial complex). Hypotheses on the impact of such factors on farms and regional agro-industrial complex were developed.

The first task under the field studies was to assess (rank) the importance of such factors based on a survey. Initial hypotheses were also to be verified.

ii) Since many risk factors intensify during crises, study and formulate anti-crisis national and subnational policy measures as viewed by producers, consumers, and the trade sector as well as in terms of enhancing food security.

The second task under the field studies was to look at whether the COVID-19 pandemic coupled with other systemic factors resulted in (aggravated) crisis phenomena in the regional agriculture sector. Both microeconomic (at the farm level) and macroeconomic (at the agro-industrial complex level) risks were considered.

iii) Analyze long-term implications of farms' vulnerability for the agriculture sector.

Assuming a long-term impact of the factors, the third task under the field studies was to assess the behavior of farmers in case the crisis persists.

iv) Come up with proposals regarding the development and implementation of anti-crisis measures to make the agriculture sector more sustainable.

The fourth task was to solicit respondents' opinions on the expediency of extraordinary financial and non-financial support measures targeting farmers.

The study method: In-depth interviews with representatives of administration, farmers, and agriculture experts of Tambov Oblast

In-depth interviews were selected as the study method. In this case, the approach is more efficient than quantitative surveys. Interviews appear to be more flexible, thus making it easier to verify initial hypotheses; quantitative surveys require a lot of logistics in terms of developing questionnaires, producing lists of respondents, mailing the questionnaires, collecting filled-in questionnaires, and processing them. Such logistics dramatically increase the cost and time of the Project work while not guaranteeing the quality of the study.

In-depth interviews were planned for all major stakeholder groups present in the agricultural sector:

- Top-level and mid-level officials at the Department of Agriculture of Tambov Oblast;
- A group of farm managers from Tambov Oblast; and
- A group of agriculture experts from Tambov Oblast.

The list of respondents is presented below in the Interviews Outcomes section.

Comprehensive and kind support was provided by the Tambov regional administration in the course of respondents list development and interviews preparation.

Development and testing of questionnaires for respondent groups

Prior to the study launch, a questionnaire aligned with the study tasks was developed. The questionnaire comprised a table to be filled in by respondents: Table B1. Assessment of Impacts of Various Factors on Sustainability of Agricultural Organizations/Farms. Respondents used a 10-point scale to assess the extent to which factors mentioned in the table affected sustainability of agricultural organizations/farms (Appendix B).

The questionnaire was tested in interviews with entrepreneurs and a representative of the regional Department of Agriculture.

Upon completion of test interviews and receiving a response from the regional Department of Agriculture regarding government support areas, some marginal amendments were introduced to the questionnaires. The most significant change was the addition of a table to the questionnaire for entrepreneurs: Table B2. Assessment of Impact of Various Government Support Measures on Sustainability of Organization/Farm (Appendix B). When filling in the questionnaire, farm managers used a 10-point scale to assess the extent to which sustainability and performance of his/her organization was impacted by government support measures it received in 2019–2020.

The final (working) versions of the questionnaires are presented in Appendix B.

The interviews were conducted between late February and early April 2021. In total, 16 interviews were conducted, of which 14 were conducted via Zoom and 2 over the phone (when Zoom sessions were impossible due to technological reasons). Zoom-based interviews were recorded on video; telephone interviews were transcribed and added to general materials.

Respondents by group

Table A2. The Department of Agriculture of Tambov Oblast

	Respondent	Contact information
1.	Alexandr Aksenov Deputy Head of Department of Agriculture, Chief of Crop Farming and Technical Policy Unit	aav@agro.tambov.gov.ru 8 915 888 0053
2.	Igor Vurikov Deputy Head of Department of Agriculture,	Vip@agro.tambov.gov.ru 8 909 234 7517
3.	Ekaterina Ershova Head of Government Support to Agro-Industrial Complex Unit, Department of Agriculture	eeg@agro.tambov.gov.ru 8 902 725 3061
4.	Alexander Pudovkin Head of Food and Processing Industry Development Unit, Department of Agriculture	paa@agro.tambov.gov.ru 8 962 235 5559
5.	Anastasia Yasurenko	zap@agro.tambov.gov.ru.

	Head of Economics Unit, regional Department of Agriculture	+7 953 729 4867
6.	Vera Kazakova Head of Small Farms Development Unit, Department of Agriculture	dvv@agro.tambov.gov.ru +7 910 856 0357

Table A3. Managers of agricultural organizations/farms of Tambov Oblast

	Respondent	Contact information
7.	Tatyana Peredryi Chair, Association of Farms and Agricultural Co-ops of Tambov Oblast	Perederiy.t@mail.ru 8 961 628 4333
8.	Valery Gritzienko Chair, Agro-Industrial Union of Tambov Oblast; CEO, OOO Zolotaya Niva	zoloto9683@yandex.ru 8 4752 49 33 33
9.	Valery Solopov CEO, PRIVOLYE group of companies	valerrii.solopov@mail.ru 8-915-888-8887
10.	Alexandr Chetyrin Tambov Organic Products Co-Op	spektrtambov@mail.ru 8-910-756-02-55
11.	Andrey Sedykh CEO, Uchkhoz-Komsomoletz stud farm	sedykh68@yandex.ru 8 (906) 599-66-54
12.	Sergei Sadov COE, OOO Lipovka, Pichaevesky district	Lipovkapich@rambler.ru 8 915 664 5686
13.	Sergei Fatyanov CEO, AO Kamenskoye	aokamenskoe@yandex.ru 8 910 759 14 36
14.	Anna Kyrzhynova Farm manager	Milany.89@mail.ru +358 45 2165080

Table A4. Agriculture experts from Tambov Oblast

	Respondent	Contact information
15.	Vasily Kuldoshin Head of branch, FGBU Russian Agricultural Center	Rsc68sdvizshkov@mail.ru
16.	Olga Antziferova Director, Institute of Economy and Management, Michurin State Agrarian University	Anciferova-olga-70@mail.ru 8 910 750 86 04

ANNEX 3. QUESTIONNAIRE

I. Questionnaire for interviewing experts and representatives of executive authorities

Dear colleagues,

In the 1st quarter of 2021, the World Bank jointly with the Tambov Oblast Administration will conduct a survey **to understand problems in supporting the viability of agricultural producers during the COVID-19 crisis.**

The survey objectives are as follows:

- i) to identify risk factors and measure the viability of the agricultural sector at the level of an agricultural organization and a rural household farm;
- ii) to explore and formulate crisis response policy options for the government and regional administrations with a focus on benefits for producers, consumers and trade as well as food security gains, in view of the fact that many risk factors are triggered at the time of a crisis;
- iii) to assess longer-term consequences of the vulnerability of agricultural organizations and household farms for the entire agricultural sector; and
- iv) to put together a package of proposed actions to enhance and take measures in response to the crisis in order to improve the resilience of the agricultural sector.

The survey results will be published as a publicly accessible report, containing recommendations on how to improve the support to agricultural organizations during the crisis. The report will be available for the survey participants (respondents).

Representatives from agricultural organizations, executive authorities and research community of the Tambov Oblast will be interviewed as part of the survey.

The questionnaire is tailored in accordance with the survey objectives to consist of the following three sections:

1. Questions to assess the situation in the Tambov Oblast's agribusiness in 2020

2. Questions to identify factors affecting the viability and performance of agricultural producers

3. Questions about public support to the Tambov Oblast's agribusiness.

We would appreciate it very much if you, kindly, answer the attached questions.

1. Full name of the respondent
2. Name and functions of the organization represented by the respondent
3. Position of the respondent
4. Scope of functional responsibilities of the respondent.

1. Questions to assess the situation in the Tambov Oblast's agribusiness in 2020

5. How would you describe the general situation in the Tambov Oblast's agribusiness in 2020? According to preliminary estimates, Russia's agricultural output increased by about 2%.
 - 5.1. And what about the Tambov Oblast – did it have an increase or decline in production?
 - 5.2. Perhaps, the changes were sector-specific, some sectors and areas demonstrated growth while others declined – is it really so?
 - 5.3. Was COVID-19 a key (major) agent of change in the outputs or not? What other factors contributed to the change?

- 5.4. In 2020, the Government of the Russian Federation launched and implemented policies to support people and businesses. How would you characterize these measures in terms of their effectiveness:
 - 5.4.1. were they sufficient or insufficient?
 - 5.4.2. was the support easily accessible or was its access procedure too complicated?
 - 5.4.3. did agribusiness feel as a beneficiary (recipient of benefits) from these support measures?
- 5.5. In 2020, the Tambov Oblast Administration took measures to support business, in particular, through providing advisory assistance. How would you characterize these measures in terms of their effectiveness:
 - 5.5.1. were they sufficient or insufficient?
 - 5.5.2. was the support easily accessible or was its access procedure too complicated?
 - 5.5.3. did the region's agribusiness feel as a beneficiary (recipient of benefits) from these support measures?
6. The economic and social analysis of small and medium-sized agricultural producers draws on the statistics provided by them. Are any additional studies/surveys of the region's agricultural producers conducted by the Tambov Oblast Administration and/or independent organizations? If so, please, specify the types of such surveys and their periodicity.
7. If the agricultural producers are divided into the following three groups: stable performers , unstable (stagnating) performers and failing performers (i.e. those at the point of bankruptcy), it would be possible to undertake the following qualitative assessment:
 - 7.1. What is, in your opinion, the share of each of these groups in the total number of agricultural producers in small agribusiness?
 - 7.2. How did their shares change (upward and downward) during 2020?
 - 7.3. Are any efforts made to analyse the causes of transitions from a better-performing to a worse-performing group?
 - 7.4. Are 'failure cases' developed (i.e. scenarios leading producers to bankruptcy)?
 - 7.5. Are 'success cases' developed (i.e. scenarios enabling producers to improve their performance during a crisis)?
 - 7.6. Are failure or success cases found more revealing and useful by the authorities? Are failure or success cases found more revealing and useful by agricultural producers?
 - 7.7. Is it possible to replicate these cases?
8. Does the Tambov Oblast maintain an e-cadastre of agricultural land areas (an e-Field)? Does this cadastre enable to forecast agricultural outputs?

2. Factors defining viability and performance of agricultural producers

9. In addition to natural (site) conditions, there are other external factors substantially affecting the performance of agricultural producers which may be classified into two groups: system-wide and specific (induced by the COVID-19 pandemic) factors. Which of the below listed factors will have significant impact on the performance of agricultural producers and agribusiness development in 2021, in your opinion?
 - 9.1. The federal authorities gave assignments to the regions for increasing agricultural exports.
 - 9.1.1. Indicate the products to be increasingly exported by the Tambov Oblast?
 - 9.1.2. Will small and medium-sized agricultural producers be able to contribute into increasing the exports? If so, will they be able export and how much?
 - 9.1.3. How to encourage and support producers' efforts to increase exports? What is the role of the federal support measures in this?
 - 9.1.4. Is it feasible to develop regional export-oriented distribution infrastructure? To what extent is it important?
 - 9.2. Since June 2021, the federal government will levy a variable export duty for grain exports with partial reimbursement of the farmers' costs of production and sale of exported products (out of regional

- subsidies). Similar measures are likely to be taken to encourage sunflower cultivation and vegetable oil production.
- 9.2.1. Is not this decision to introduce the variable export duty in conflict with the assignments to increase agricultural exports?
 - 9.2.2. How will the introduction of the variable export duty influence the export? Are the exports more likely to decline or to grow in the context of the Tambov Oblast where grain exports account for up to one third of the total export?
 - 9.2.3. If the variable duty is cancelled or reduced, can the regional producers of grain crops be expected to sustain for 1-2 years? What is the likelihood of conversion of grain crop farms or change in the cropping patterns?
- 9.3. The federal government is implementing policies to contain prices for socially important food products. In particular, in 2021, the fixed producer price for sugar was set at RUR 36 per kg of sugar sold.
- 9.3.1. What impact will it have on the economic situation of sugar beet producers and sugar mills and refineries?
 - 9.3.2. Cannot this lead to a significant shrinkage in sugar beet crop areas and decline in sugar production?
- 9.4. Federal Law 520-FZ of December 30, 2020, *On Grain* presupposes putting in place a system of official grain monitoring to ensure traceability of the grain field-storage-sale chain. It includes the requirement to producers to keep e-records of each sold grain lot.
- 9.4.1. To what extent is it realistic to introduce a monitoring procedure at the farm level by the middle of 2021 as required by law?
 - 9.4.2. What impact will it have on grain producers and on the grain sector as a whole?
- 9.5. In 2021, new sanctions may emerge.
- 9.5.1. What kind of sanctions is most painful for agricultural producers (those which make agricultural technology more expensive, those which hinder access to international markets for the products, other sanctions)?
- 9.6. The COVID-19 pandemic-induced crisis acts as a specific factor.
- 9.6.1. What kind of problems did agricultural producers face during the COVID-19 pandemic in 2020?
 - 9.6.2. Would agricultural producers suffer from the same problems again in the case of new outbreaks of the disease in 2021, or have they got adapted to them and know how to respond?
 - 9.6.3. Your ideas about support measures which should be taken in response to the pandemic-caused crisis in addition to the existing policies.
- 9.7. The EU countries are preparing to a transformational revision of the agricultural policy to increase production and consumption of 'green' agricultural products. In 2020, Russia launched the process of drafting regulations on 'green' agriculture development. The law on organic crop farming became effective.
- 9.7.1. Can these developments (production of 'green' and organic products) boost the agribusiness growth in the Tambov Oblast?
 - 9.7.2. What is your opinion about Tambov farmers' capacity to produce and process 'green' and organic products?
10. In view of the grave problems for region-specific traditional crop-growing subsectors in the Tambov Oblast, how would you assess chances for a major structural shift in agricultural production, e.g. a significant increase in vegetable and fruit outputs or for development of high-tech storage facilities for vegetables and fruit?
11. Successful operation of small and medium-sized agricultural producers depends, to a great extent, on the situation in related domains interacting with the producers. Which of the following domains must be provided with additional support during crises:
- 11.1. Agricultural infrastructure (storage, processing, transportation, equipment maintenance services, etc.);

- 11.2. Processing;
 - 11.3. Trade;
 - 11.4. Financial institutions;
 - 11.5. Manufacturers/suppliers of means of production (equipment/machinery, seed, services, etc.).
 - 11.6. Providers of services (maintenance of means of production, harvesting services, animal health services, consulting, etc.).
 - 11.7. Educational organizations and training and retraining centres.
12. Can the development of agricultural cooperation help agricultural producers during a crisis? Which of the following cooperation arrangements are most appropriate?
 - 12.1. Agricultural Consumer Cooperatives.
 - 12.2. Associations of Producers enabling to construct production-transportation-storage-processing-sale chains.
 13. There is an opinion that rural towns (e.g. centres of municipalities) should be developed as servicing centres for small and medium-sized agricultural producers. Do you share this point of view?
 - 13.1. If not, why?
 - 13.2. If so, how do you see an “ideal” agricultural service town?
 14. How important is it to analyse current incomes and changes in incomes of individuals and/or households in order to design support measures for the agricultural sector.
 15. Is agricultural workers’ personal income analysis conducted?
 - 15.1. If so, how?
 - 15.2. If not, why?
 16. What factors of high importance for this study are missing here?

3. Current and potential promising public support policies for agribusiness in the Tambov Oblast

17. Agricultural producers are provided with public support out of the federal and regional budgets.
 - 17.1. What criteria are used to select priority areas for granting subsidies from the federal budget to support the development of agriculture in the Tambov Oblast? Was the revision of priorities influenced by the budget sequestration and the cut of federal spending on support of agriculture by 10% in 2021?
 - 17.2. Which of the federal support areas were of the highest relevance for the Tambov Oblast and why (as highly sought by the business community, yielding maximum benefits for the region, best administrated, etc.)?
 - 17.3. Which of the support areas may be truncated?
 - 17.4. What federal support areas are missing though needed for accelerating the development of agriculture in the Tambov Oblast and why?
18. Additional regional support for agricultural producers.
 - 18.1. What kind of additional support is currently provided?
 - 18.1.1. Human resource training/retraining.
 - 18.1.2. Consultations on how to receive financial and non-financial (e.g., advisory, educational) support. Face-to-face or remotely.
 - 18.1.3. Live call-ins with agricultural producers.
 - 18.1.4. Maintenance and regular updating of the information page at the Administration’s web-portal.
 - 18.1.5. Other support.
19. Is targeted support provided to family farms, young farmers, business women in the Tambov Oblast?
20. Are measures to provide support to agricultural producers (both required by law and taken additionally) monitored and evaluated?
 - 20.1. If so, please, describe the monitoring procedure.
 - 20.2. If not, why?

21. Unless additional support is provided to agricultural producers or if it is provided irregularly, please, indicate the problems preventing from doing it properly.
- 21.1. Lack of budget funds for these purposes.
 - 21.2. Impossibility to mobilize funds from extrabudgetary sources to support producers.
 - 21.3. Communication problems (it is difficult to maintain contacts or to engage with agricultural producers).
 - 21.4. Lack of competence or lack of specialists who could reach and liaise with agricultural producers.
 - 21.5. Other problems.
22. What important aspects of support for agricultural producers were left unconsidered here?

The attached table may be filled before the interview while reading the questionnaire

Table B1. Please, rate the impact of various factors on the viability of agricultural enterprises on the scale from 1 to 10 where 1 is the weakest impact and 10 is the strongest impact:

Factors	Their scores
1) Epizootic situation (avian flu, African swine fever, etc.)	10
2) Climate change and adverse weather phenomena	5
3) Land degradation	3
4) Rouble exchange rate and access to imported means of production (machinery and equipment) and inputs (seed, crop protection products, mineral fertilizers)	5
5) Prices for inputs (petroleum, oil and lubricants, forage, fertilizers, crop protection products)	7
6) Labour productivity	4
7) Workforce skills	5
8) Labour migrants	1
9) Remuneration in agribusiness	8
10) Domestic consumer demand	6
11) Debt burden of agricultural enterprises	2
12) Access to long-term credits	5
13) Access to short-term credits	3
14) Quotas on agribusiness imports (milk, cheese, meat, vegetables, fruit, etc.)	4
15) Quotas on agribusiness exports (grain, sunflower, soya, etc.)	9
16) Export infrastructure development	6
17) Remoteness of processing enterprises and markets	5
18) Development of e-commerce sites	4
19) New regulations on support	5
20) Public support to agriculture	8

Please, list other factors which, in your opinion, strongly influence the viability of agribusiness, but are not listed above

21)	
22)	
23)	

Table B2. Assessing the impact of different types of government support on the sustainability of organizations and/farms

The attached table contains the types of state subsidy and grant support for agricultural producers, which were used in Tambov Oblast in 2019-2020. If your organization/household received some types of support during these years, you could not estimate on a ten-point scale to what extent these support measures have affected the sustainability of your organization/farm activities (estimates: 1 - with little impact, 2-9 - influenced to varying degrees, 10 - affected to a critical extent).

Kind of state support	2019	2020
1. Subsidy support		
1. Unrelated Support/Agrotechnical Works		
2. Support for elite seed production		
3. Laying perennial plantings		
4. Uprooting old gardens		
5. Encouraging oilseed production		
6. Unrelated support (vegetables)		
7. Increase in crop production		
8. Reimbursement of part of the cost of interest on investment loans		
9. Milk support		
10. Acquisition of breeding cattle of the dairy direction		
2. Grant support for start-ups		

Table B3. The amount of state support is on the scale of the organization/management

We would appreciate it if you fully filled out the attached table. If, however, the provision of information about the amount of state support received is an intrusion into trade secrets, please fill only the last column - for 2019 and 2020, that is, specify: The amount of state support received - as a percentage of the revenue.

Kind of state support	2019	2020
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		The amount of state support received, thousands of rubles	Amount of state support received, as a percentage of revenue	The amount of state support received	Amount of state support received, as a percentage of revenue
1.	Subsidy support				
	1. Unrelated Support/Agrotechnical Works				
	2. Support for elite seed production				
	3. Laying perennial plantings				
	4. Uprooting old gardens				
	5. Encouraging oilseed production				
	6. Unrelated support (vegetables)				
	7. Increase in crop production				
	8. Reimbursement of part of the cost of interest on investment loans				
	9. Milk support				
	10. Acquisition of breeding cattle of the dairy direction				
2.	Grant support for start-ups				

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