

# Food Security in Eurasia 2018

Case studies



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## Foreword

*This publication is a compilation of case studies on various food security issues facing Eurasian countries. The topics of the studies range from general agribusiness development issues in a number of countries to narrow aspects of food security that are relevant for the entire region. This publication is the third in a series of case studies on food security prepared by the Eurasian Center for Food Security at the Lomonosov Moscow State University in conjunction with the World Bank.*

*The progress of economic development in Eurasian countries is largely defined by sociopolitical stability, which creates an enabling environment for the steady implementation of development plans, including those that involve food security. All the countries in the region, including the Russian Federation, have national food security programs or policies in place. That said, there are also constraining factors such as unequal water distribution and suboptimal water utilization for farm irrigation needs. These issues are especially relevant for countries in Central Asia.*

*A landmark event in the Eurasian region has been the creation of the Eurasian Economic Union (EAEU). This international institution, which brings together five states (Armenia, Belarus, Kazakhstan, the Kyrgyz Republic, and Russia), seeks to shape a common market for commodities, services, capital, and labor; to promote across-the-board modernization and cooperation; and to enhance the competitiveness of the national economies.*

*In agribusiness, EAEU countries are consistently pursuing a coordinated policy. Through their integration, countries aim to achieve a balanced market, promote the joint development of seed farming and livestock breeding, make government farm subsidies more efficient, develop common information resources, carry out joint research, and grow the export potential of agribusiness.*

*A special focus in the integration agenda is placed on food security. In this context, the “Eurasian Five” regularly produce demand and supply projections for major agriculture commodities, which help to analyze trends in agribusiness production, trade, and the extent of self-sufficiency for the EAEU both as a whole and in each country individually. Regrettably, this analysis is far from comprehensive because there are a number of important remaining gaps in areas such as food safety and security, nutrition, and stability of food supply.*

*Supply and demand projections drive inter-regional farm trade in the EAEU; they also guide agricultural production and export to third countries. Domestic supply in EAEU member states fully meets the demand for most agricultural products, except fruit and beef. Some progress is being made in EAEU countries in developing national agribusiness sectors and providing food security. Nevertheless, a number of common EAEU challenges remain: heavy dependence on imported crop protection agents and genetic materials for agriculture; unaffordable farm staples due to the slow growth of real incomes; and stiffening competition in the common market.*

*To address these concerns, the EAEU integration agenda would need to be bolstered by stronger economic collaboration and the creation of effective value chains for the joint production of high-tech products, including active collaboration in innovative development and the adoption of digital technologies. Furthermore, it would be advisable to regularly monitor food security in the EAEU and agree on collective actions to be taken in the face of food security threats.*

*The above challenges call for collective solutions engaging public authorities, academia, and the private sector. Case studies that look at specific food value chain issues can serve as a valuable resource in addressing these topics. The authors of the studies are well informed about the subject and are aware of the region's unique features; based on their analysis, they seek to formulate recommendations for the topic in question. Thus the case studies contain factual material for analysis, an academic discussion, and findings followed by recommendations. Besides being a product of research, they recommend priorities and approaches and inform policy decisions, and may also be used as teaching material for food security basics.*

*Of the seven cases presented, two deal with horticulture production—one looking at Uzbekistan and the other at the Kyrgyz Republic. These countries have enormous potential and capacity for growing vegetables and fruit, which are in high demand in the northern parts of Eurasia. That said, both countries face challenges in building effective production value chains that cause huge losses at various stages of the chain (transportation, storage, processing, marketing, etc.). The case studies contain specific recommendations on how to improve the horticultural value chain infrastructure, properly account for and identify the reasons for losses, and minimize costs.*

*One case study on Armenia presents an analysis of the country's wheat value chain. Streamlining production and consumption of this commodity would require multiple actions: efforts to secure quality seed material, cut losses and waste in the food chain, de-monopolize the market, develop an information network, and provide marketing support. Another study analyzes the wild harvesting value chain in Armenia and discusses the challenges at the gathering, processing, and marketing segments of the value chain. This topic seems relevant for all Eurasian countries.*

*Another case study deals with the unique aspects of agribusiness in Yakutia (Russian Federation), whose climate is in stark contrast to that of Central Asian countries. The agribusiness sector in the Far North is defined by a combination of large companies and small farmers preserving the traditions of small and indigenous communities. Factors constraining efforts to streamline food security in the region are its shortage of financial resources and its lack of effective innovations. The case study on organic farming in Uzbekistan discusses opportunities for this sector's development and the level of government support needed. A financial analysis model for an Uzbek pilot farm that can be used for student instruction is presented. The case on childhood nutrition in the Kyrgyz Republic examines what policies are needed to expand programs for school meals and establish efficient supply chains that engage local producers.*

*It is hoped that the research materials included in this publication will be applied in practice and will inform managerial decisions in the Eurasian community, as well as build a foundation for further in-depth research.*

**Sergei Shoba**

**Director,  
Eurasian Center for Food Security  
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# Ensuring Sustainable Development of the Agri-Food Sector in the Russian Far North: The Case of Yakutia

*Alexey Naumov, Daria Sidorova*





## Executive Summary

Supplying food to the regions of the Russian Far North is a difficult and complex task that requires a great deal of money. Its solution, despite difficult natural and geographic conditions, is necessary to ensure food security and provide northern residents with food that is consistent with their physical needs and with modern standards of quality of life, to preserve economic and cultural traditions, and to promote the harmonious development of rural territories.

This case study aims to determine policy measures that would ensure the sustainable development of agribusiness in the Republic of Sakha (Yakutia), the largest constituent territory of the Russian Federation. Yakutia has a population of around 1 million people; it stretches from the Arctic coast to the South Siberian mountains and can be considered a pilot region of the Far North.<sup>1</sup> Yakutia's agribusiness comprises both large enterprises and small farms; traditional types of agriculture in which the Yakuts and indigenous minorities engage play an essential role. This variety of production forms and geographic differences predetermine multiple solutions for ensuring food security in Yakutia. Completing this task is associated with a number of issues because of the region's harsh climate, a shortage of investments, inadequate application of efficient global practice, and local innovation initiatives.

Successful development of agribusiness in Yakutia hinges on government support, which is critical both for sustaining the operation of businesses without losses and for rural social development. Key policy options in support of this goal are related to institutional (strategy development and its legislation support), economic (targeted subsidies to producers, public-private partnership), and environmental (efficient use of natural resources) measures. Preserving economic traditions of indigenous communities, developing transportation and logistics networks, and generating and disseminating knowledge are

also of paramount importance. The implementation of such policy options is aimed at improving food self-sufficiency and includes interaction between stakeholders at different levels—from federal and regional authorities to local business—while all groups of food producers and consumers should benefit.

## Background

A large portion of the territory of the Russian Federation—more than 11 million square kilometers—belongs to the Far North and similar areas.<sup>2</sup> By and large, these are high-latitude areas with climatic conditions unfavorable to human life, although the traditional lifestyle of indigenous peoples is adapted to such conditions. The development of oil and natural gas fields and the extraction of non-ferrous metal ores, gold, diamonds, and other natural resources have brought settlers to these cold frontier regions. According to the Russian Federal State Statistics Service (Rosstat), the Arctic Zone of the Russian Federation alone is home to more than 2 million people (Rosstat 2017),<sup>3</sup> while the Far North and similar areas to some 10 million (Rosstat 2015). Of the four largest cities of the world above the polar circle, three are in Russia: Murmansk, Norilsk, and Vorkuta, with populations of 298,000, 178,000, and 58,000, respectively. Yakutsk is the most populated city in the Russian Far North (62° northern latitude) with 312,000 people (Rosstat 2018). Exploration and development of the North is one of Russia's strategic priorities (Ministry of Regional Development 2013); this would require a special approach to improving the quality of life of the people living in the northern regions (Попов, Мыреев, and Васильева 2015, in Russian), addressing, among other things, the food security issue.

Given the natural and geographic conditions of the Far North, its remoteness from the “mainland” where the largest share of agricultural output is produced, and in light of the heightened demand of northern

<sup>1</sup> A pilot region is one where new technologies and/or laws are tested.

<sup>2</sup> A list of Far North and similar territories adopted by the USSR Council of Ministers on November 10, 1967, as revised and amended, is available at [http://www.consultant.ru/document/cons\\_doc\\_LAW\\_403/](http://www.consultant.ru/document/cons_doc_LAW_403/) (in Russian).

<sup>3</sup> The Arctic Zone of the Russian Federation is that part of the Arctic territory over which the Russian Federation has sovereignty, sovereign rights, and jurisdiction. It includes areas (parts thereof) of constituent territories of the Russian Federation, lands and islands in the Arctic Ocean north of the coast of the Russian Federation to the North Pole, and within the demarcated lines defined by international treaties of the Russian Federation and the legislation of the Russian Federation, as well as inland seas and territorial sea of the Russian Federation, air space above the said territories and waters, exclusive economic zone of the Russian Federation, and its continental shelf. For details, see <http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=PRJ&n=149389#05253750094450114> (in Russian). The figure 2,000 million is the estimated size of the residential population of the Arctic Zone as of January 1, 2018, and the average population in the previous year.

communities for highly nutritious and fresh food, addressing this task is quite difficult. On the one hand, it would require arranging uninterrupted supplies via both the Northern Supply Haul along the rivers and the Northern Sea Route during a short navigation season. On the other hand, it calls for maximizing local production of vegetables, fruit, meat, and milk, including “exotic” Northern foods such as reindeer meat, fish, wild berries, and mushrooms. Therefore the key food security challenge for the Far North territories is to strike an optimal balance between food supplies from other Russian regions and foreign imports on the one hand, and local food production on the other.

Despite their natural constraints, Russian northern territories hold significant agri-food potential that is still untapped (Annex 1; see Box 1 for a historical description of northern farming potential).

There are several types of agriculture in the Russian Far North. The *first type* comprises traditional indigenous livelihood activities, such as reindeer breeding, which is widespread from the Kola Peninsula to Chukotka, and horse herding, which is found primarily in Yakutia. The *second type* is common in the areas of peasant colonization of the so-called Russian North; this type of agriculture started in

the 10<sup>th</sup> and 11<sup>th</sup> centuries, when people first began to grow cereals and vegetables and then potatoes and when dairy farming was developed as well. The *third type* emerged in Soviet times during industrial development when mining factories set up large subsistence farms. The *fourth type* owes its creation to the development of innovative urban agriculture technologies (vertical greenhouses that use artificial lights and hydroponics).

Each type of agriculture is attributed to various historic, socioeconomic, institutional, and geographic factors. All these factors are important for guaranteeing food security in the Russian Far North where a system of market-based food production is developing. The development of all “northern types” of agriculture, and the agri-food value chains created on their basis, requires the implementation of advanced technologies based on effective local and international practices that have stood the test of time.

The Republic of Sakha (Yakutia) (hereinafter referred to as *Yakutia*) has been chosen as the pilot region for this study of the food security issue in the Russian Far North regions. It is the largest constituent territory of the Russian Federation by area (3,084,000 square kilometers). The entire territory of Yakutia is referred to the *Far North*. The Northern Hemisphere Pole of Cold is located here, and permafrost is a common feature. Five *uluses* (administrative districts) of Yakutia border the Arctic Ocean and belong to the Russian Arctic Zone (Figure 1). The southern part of the republic has extreme continental climate with annual temperature ranges of up to 100°, short and hot summers, cold winters, and annual precipitation of not more than 250 millimeters (Figure 2). But even such agroclimatic conditions are suitable for growing cereals (barley, oats, rye, spring wheat), potatoes, vegetables, and even melons in the fields, provided quickly ripening varieties and artificial irrigation are used (Рожин and Чинигаров 2006, in Russian).

The average density of population in the vast area of Yakutia is 0.31 residents per square kilometer. The economy is dominated by the diamond industry, oil, natural gas, coal, and non-ferrous and rare metals, which explains the patchy settlement patterns. The population of Yakutia (964,000 people in total; Sakha(Yakutia)Stat, no date, in Russian) is concentrated in the Tuymaada Valley on the left bank of the Lena River where Yakutsk, the capital of

### Box 1: The Promising Future of Agriculture in the Far North

In the 1930s the academician N. I. Vavilov believed that northern farming held big promise. He believed that “*Vegetable farming, root crop and fodder grass production could reach as far as the northern boundaries of the Eurasian continent . . . it is about promotion of farming across several areas in the far north and in certain far northern locations, i.e. it is about developing subarctic farming. Supplying hard-to-deliver farm produce to the far north, developing farming outposts in the far north is becoming a high priority. . . . We see farming in the far north as a highly intensive business based on wide application of fertilizers, drainage, mechanization, and electric power. One day swampy areas and wastelands will turn into vast drained and fertilized meadows. City suburbs will see enormous glass-covered greenhouses and hotbeds running not only on sunlight and manure but on electricity which will heat and prolong the crop season... Small fruit acreage is set to grow*” (Vavilov 1931, in Russian).

the republic (312,000 people), is located, in mining towns of Neryungri and Mirny (57,000 and 35,000 people), and in other settlements and administrative districts—that is, *uluses*. At the same time, there is a high proportion of rural residents in Yakutia—almost 35 percent—which is unusual for northern regions of Russia.

Besides natural and climatic factors, the biggest challenges to food security in Yakutia include an underdeveloped transport infrastructure (there are just 11,900 kilometers of paved roads in Yakutia; Rosstat 2017, in Russian) and the poor connectivity of many districts, which is the result of seasonal factors. Another unique feature of Yakutia's agri-food sector is the traditional livelihood activities of the Sakha (Yakuts) ethnic group, which accounts for half of the total population of the republic, and of the northern indigenous communities, of about 40,000 people (Rosstat 2010, in Russian).

Yakutia embraces all northern types of agriculture. It produces a wide range of food types, from reindeer meat to watermelons; in the 1960s the republic was even self-sufficient in grain. Geographic specifics determine substantial differences between the districts in terms of the nature of their agriculture and the values of integrated agricultural output indicators. There are five nature-and-agricultural zones in Yakutia: reindeer-breeding and hunting on the banks of the Arctic Ocean, livestock farming and hunting in the mountainous taiga regions, livestock farming in the Viluy River basin, livestock and crop farming in the southeast and southwest of the republic, and the suburban areas of Yakutsk (Аммосова 2015, in Russian). Agriculture is most developed in uluses located in the middle reaches of the Lena River and near the main mining towns (Figures 3 and 4). It is represented by large farms created on the basis of former collective farms and farms owned by mining companies, along with smallholder farms.

Yakutia is one of the leaders of all the Russian regions, not only the northern ones, in terms of the amount it receives in state support for agriculture; a high level of regulatory and legal support of agri-business operations sets this republic apart. Since 2002 the State Assembly (Il Tumen of the Republic of Sakha [Yakutia]) has been regularly adopting laws that set guidelines for developing this sector. Programs for supporting peasant farms and smallholder farms and traditional forms of economy of the

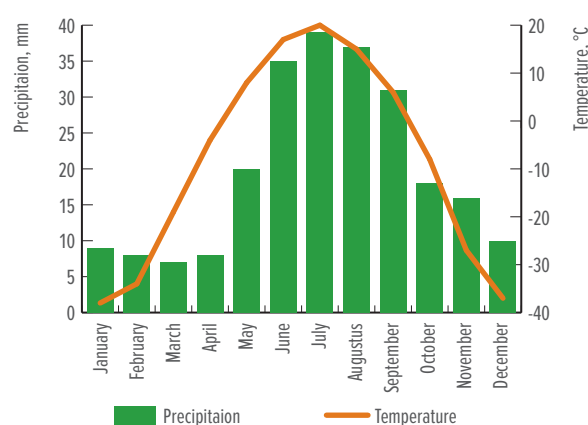
**Figure 1: Yakutia: Administrative Divisions and Communities**



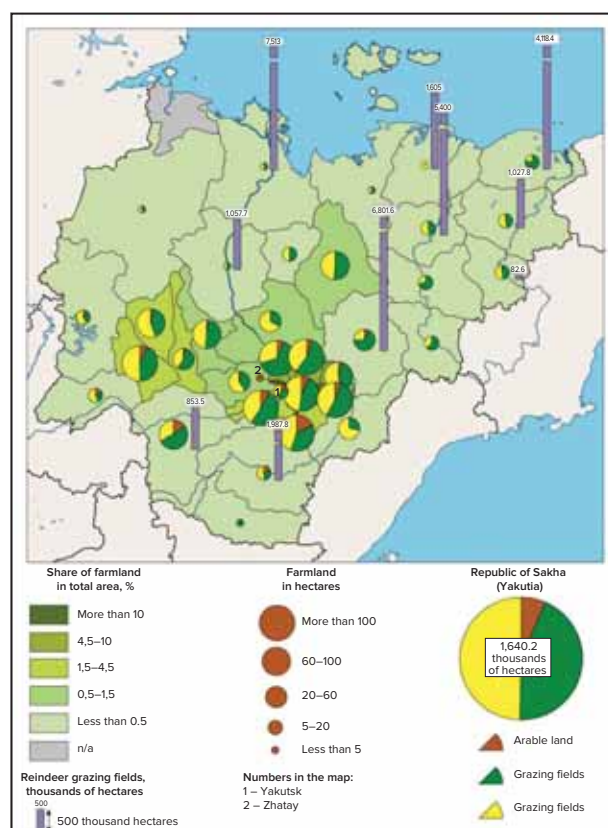
Source: Compiled by the authors, based on Sakha(Yakutia)stat. <http://sakha.gks.ru/>

Note: See also [https://en.wikipedia.org/wiki/Administrative\\_divisions\\_of\\_the\\_Sakha\\_Republic](https://en.wikipedia.org/wiki/Administrative_divisions_of_the_Sakha_Republic) for a map with English-language names..

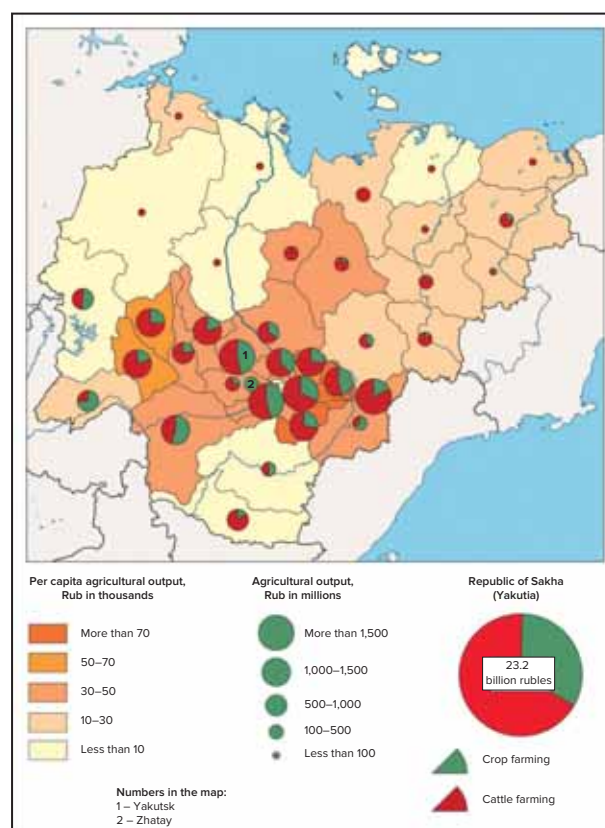
**Figure 2: The Yakutsk Climate**



Source: Compiled by the authors, based on <http://www.pogodaiklimat.ru/climate/24959.htm> (in Russian).

**Figure 3: Yakutia: Farmland Area by Ulus, 2016**

Source: Compiled by the authors based on Sakha(Yakutia)stat.  
<http://sakha.gks.ru/>

**Figure 4: Yakutia: Gross Agricultural Output by Ulus, 2016**

Source: Compiled by the authors, based on Sakha(Yakutia)stat.  
<http://sakha.gks.ru/>

indigenous population are being implemented. At the same time, Yakutia's agricultural food market is far from perfect. A number of issues impede its sustainable development, and their resolution depends on various stakeholders, including authorities and executive bodies at the federal level and the level of the republic. Best practice of creating agricultural production and agricultural processing value chains that has shown good results in northern areas of other countries and other northern regions in Russia has not been fully adopted.

The current study relies on statistical data provided by the Center of Strategic Studies and the Ministry of Agriculture of the Republic of Sakha (Yakutia) as well as data published on government websites, such as Sakha(Yakutia)stat and sites of other core ministries and agencies, as background information. More than 20 research publications on various aspects of issues in question were reviewed. During a working trip to Yakutia from July 1 to July 7, 2018, the authors conducted 25 in-depth interviews with representatives

of the republic level and municipal executive bodies, enterprises, farmers, and researchers.

## Policy Issues

A resolution of the issues in Yakutia's agri-food sector will be determined by the answer to the following question: **How costly is agricultural production in the region and does the region have adequate financial resources for its support?**

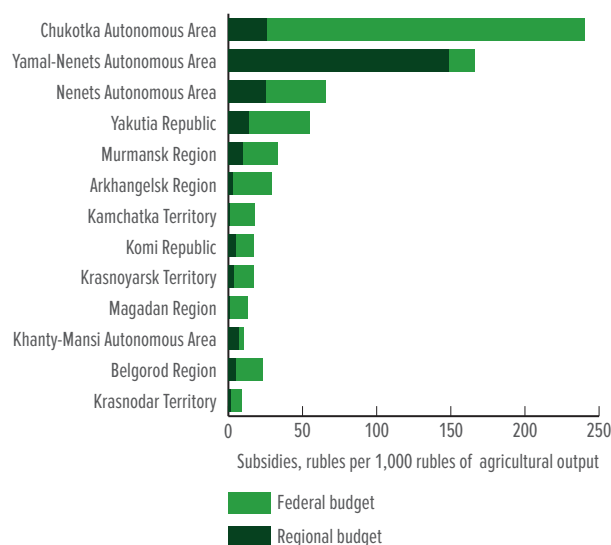
Production costs of most types of food in Yakutia are objectively higher than the costs of similar food in Russia's key farm regions. In terms of the amount of agricultural subsidies per capita, Yakutia ranks in the top five Russian regions (Figure 5). Funds allocated for subsidies account for half of the cost of agricultural output in Yakutia. Despite an increase in total federal equalization transfers to Yakutia, which amounted to almost 44 billion rubles in 2018



(Yakutia ranked second among all Russian regions),<sup>4</sup> farm subsidies dropped from the previous year by 3 billion rubles and amounted to 7 billion rubles. Subsidies are provided primarily to compensate for the costs to produce and process milk, to construct industrial livestock farms, and to breed stock. Because of subsidies, in 2015 the purchasing price for cow milk in Yakutia was 38.2 rubles per kilogram (45 rubles in 2018, with 35 rubles compensated by subsidies) while in most Russian regions the price was only around 20 rubles.<sup>5</sup> The ongoing state program of Yakutia includes 21 areas of subsidized agricultural production and rural development (Annex 2); all large companies and every third farm (out of 2,500) of the republic receive support.<sup>6</sup> Soon it is expected that the procedure for receiving subsidies will become more complicated and the number of subsidized areas will be reduced, which will affect many of the republic's programs.

Yakutia has declared the goal of achieving a self-sufficiency ratio of 28 percent for meat, 60 percent for milk, 66 percent for potatoes, and 49 percent for vegetables by 2020.<sup>7</sup> Achieving this target will not be easy because the population has been increasing. In the period from 2003 to 2007 it increased from 949,000 to 959,000, which leads to a reduction in per capita meat and milk output indicators (Figure 6).

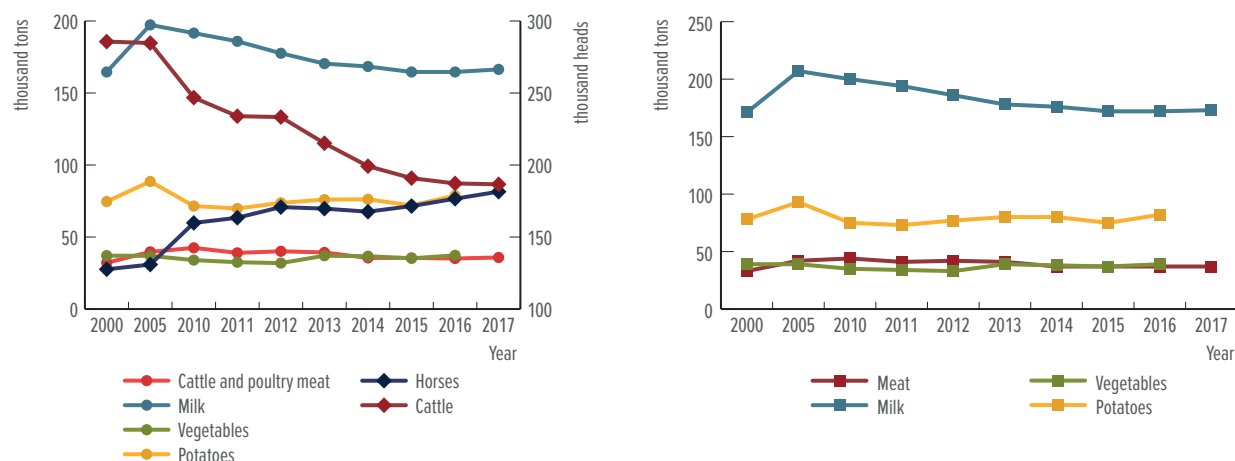
**Figure 5: Agricultural Subsidies in Northern Regions of Russia, Compared with Belgorod and Krasnodar, 2017**



Source: Compiled by the authors, based on the data from the information book on measures and areas of state support provided to agribusiness of the Russian Federation. <http://www.gp.specagro.ru/>

And whereas dependence on imported vegetables and potatoes in crop farming was reduced, the situation with meat is worse than in 1990 (Figure 7).

**Figure 6: Production of Main Food Products in Yakutia: Gross Production (left) and per Capita Production (right)**



Source: Compiled by the authors, based on Sakha(Yakutia)stat. <http://sakha.gks.ru/>

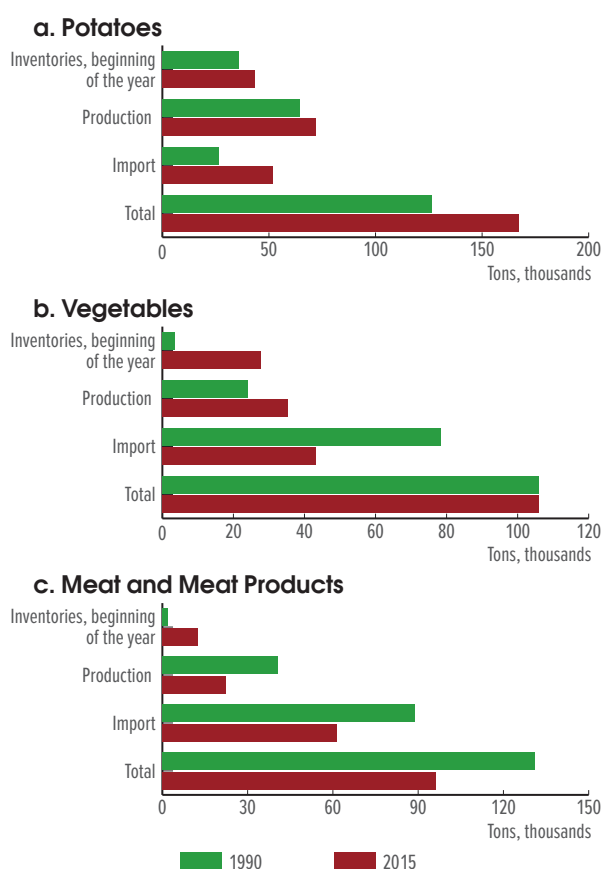
<sup>4</sup> In 2018 Yakutia received the largest increase in subsidies. See <http://www.isn.ru/198917.html> for details (in Russian).

<sup>5</sup> See <https://agrovesti.net/lib/industries/dairy-farming/molochnaya-otrasl-rossii-2017-god.html> for details (in Russian).

<sup>6</sup> Tatyana Osipova, First Deputy Minister of Agriculture and Food Policy of the Republic of Sakha (Yakutia), interview with the authors, July 2018.

<sup>7</sup> See the state program of the Republic of Sakha (Yakutia) "Development of agriculture and regulation of the markets for agricultural produce, commodities and food for 2012–2021" available at <http://docs.cntd.ru/document/473509401> (in Russian).



**Figure 7: Balance of Food Staples Produced in Yakutia, 1990 and 2015**

Source: Compiled by the authors, based on Sakha(Yakutia)stat.  
<http://sakha.gks.ru/>

**Figure 8: Farmer's Vegetables from the Village of Zhaltai in a Marketplace in Yakutsk**

Source: Authors, July 1, 2018.

The drive for self-sufficiency does not take into account economic viability and contradicts concepts and advantages of geographic division of labor. In Siberia and the Far North, the regions with the best natural conditions—the Altai Krai and the South of the Krasnoyarsk Krai—are the most viable for development of agriculture. These regions are considered to be the main suppliers of food for other regions, including Yakutia. Suppliers of cheaper food brought from other regions a priori have more chances to win tenders conducted by local state budget institutions (Figure 8). Without state support, most food products produced in Yakutia cannot compete with food brought from major key agricultural regions of Russia or imported from other countries.

One of the critical challenges in Yakutia's agri-food sector is the **poor development of most of its food value chains, including retail distribution channels**. This is attributed to the technological backwardness of most agricultural enterprises and their weak links with the food industry and commercial and distribution channels. Large industrial livestock farms and food processing factories in Yakutia, such as the Yakutsk city milk factory, were commissioned in the Soviet era and were oriented toward the centralized delivery of raw materials from other regions. Huge distances and an underdeveloped transport infrastructure also come into play.

**Problems with transport and logistics** are particularly relevant in remote parts of Yakutia—particularly in the Arctic area. And problems with storage of agricultural products are very acute even in the most densely populated parts of the republic: there is a shortage of potato warehouses in the suburbs of Yakutsk (see Box 2 for a short discussion of the food distribution chain in Yakutsk). Because of the cold climate, construction costs are very high and electrical heating is expensive.<sup>8</sup>

At the same time, there are examples of random development of **agri-food value chains out of small and medium farms in Yakutia**. A case in point illustrating this type of initiative is the central market in Yakutsk called *Saysary*, where mostly local products—such as horse and reindeer meat, fish, dairy products, and wild berries—are sold (Figure 9).

<sup>8</sup> For example, during the construction of the first phase of the greenhouse complex owned by JSC Sayuri, 95 million rubles were invested, and another 1.3 million rubles are required for the second phase. It is clear that despite a high retail price for the product (up to 300 rubles per kilogram of tomatoes), these costs will not be repaid. For details see [https://news.rambler.ru/other/37504818/?utm\\_content=rnews&utm\\_medium=read\\_more&utm\\_source=copylink](https://news.rambler.ru/other/37504818/?utm_content=rnews&utm_medium=read_more&utm_source=copylink) (in Russian).

Food culture in Yakutia is based on intake of protein food of animal origin (meat, dairy products) and both cooked and raw fish (slices of frozen fish or meat served cold). In cold climates a human body needs a higher calorie intake;<sup>9</sup> there is a distinct a “northern” type of metabolism that requires protein, fat, and starch to predominate in the diet (Еганян 2013, in Russian).

Food habits of the local population are maintained by the development of traditional types of economic activities such as horse and reindeer herding. Regarding the horse population, Yakutia occupies 1st place in Russia, with around 180,000 horses (Sakha(Yakutia) Stat 2017, in Russian). In summer horses and cattle are kept in sailyks—that is, grasslands scattered across vast areas (Figure 10). This practice supports life in remote rural areas. Yakutia also keeps a large number of domesticated reindeer (it ranks third among

### Box 2: Yakutsk Food Distribution Chain

According to V.I. Kondratieva, Head of the Yakutia Center for Strategic Research, Yakutsk has a well-developed distribution chain for local food products: electronic payment systems, social media, and Internet services are widely used. Many urban residents pay for calves, colts, and reindeer that are grown for them by rural residents; they then hoard meat for the long winter. At the same time, the population engaged in a subsistence economy does not use commercial opportunities to the full (Протопопова and Даянова 2016, in Russian).

Russian regions), though the reindeer population has diminished compared with 1990 by three times, dropping from 385,000 to 134,000 (Винокурова and Прохорова 2013, in Russian).<sup>10</sup>

**Figure 9: Farmers' Market *Saysary* in Yakutsk Selling Wild Berries, Reindeer and Colt Meat, and Dairy Products**



Source: Authors, July 1, 2018.

<sup>9</sup> Individuals working in the Far North consume 15 percent more energy and have a proportionately higher demand for protein, fats, and carbs. For details about biological energy and nutrient needs of various population groups in the Russian Federation, see [http://www.tcp.ru/diet/m/mr\\_2\\_3\\_1\\_2432-08\\_normy\\_fiziol\\_potrebnostey.pdf](http://www.tcp.ru/diet/m/mr_2_3_1_2432-08_normy_fiziol_potrebnostey.pdf) (in Russian).

<sup>10</sup> The overall number of reindeer in the entire Russian Federation has decreased from 2,304,000 to 1,234,000.

**Figure 10: The Tuymaada Valley near Yakutsk Fully Covered by Grasslands**



Source: Google Earth, 2018.

Despite the fact that the share of agricultural lands in the total area of Yakutia is small, a number of environmental issues impede development of the agricultural sector. Horse grazing is not controlled: local people say, “they walk where they want” (Figure 11). The burden on the grasslands near Yakutsk characterized by grasslands degradation is especially heavy. High demand for colt and horse meat as the population increases will make this issue more acute.

A **shortage of irrigation water** for farmland and inefficient use of irrigation methods such as sprinkler and inundation irrigation is also an issue.<sup>11</sup> The republic’s

**Figure 11: A Grazing Herd of Horses, Khangalassky Ulus**



Source: Authors, July 3, 2018.

<sup>11</sup> The authors saw drip irrigation in the fields of only one farmer.

<sup>12</sup> This refers to the impact of climate change on the traditional way of life and traditional economic activity in the areas inhabited by indigenous small communities of the Far North. For details see [https://www.s-vfu.ru/universitet/rukovodstvo-i-struktura/instituty/unesco/news\\_detail.php?ELEMENT\\_ID=101173](https://www.s-vfu.ru/universitet/rukovodstvo-i-struktura/instituty/unesco/news_detail.php?ELEMENT_ID=101173) (in Russian).

<sup>13</sup> Together there are around 40,000 persons, including 214 nomadic households (the number of nomadic families in Yakutia has been rapidly decreasing). For details see <https://yakutiamedia.ru/news/509800/> (in Russian).

authorities spend heavily on the construction of irrigation systems for large farms; small farmers and owners of subsistence plots water their fields from nearby water reservoirs, with no metering of water consumption. Resalinization of soils is common.

Like many other Far North territories, Yakutia is affected by **global warming**. Forecasts of global warming effects on Russian agriculture are too general to make detailed plans to mitigate their effect in different regions, especially such huge regions as Yakutia (Алкамо, Дронин, and Ендиян 2004, in Russian). However, it is already clear that in Yakutia rising average annual temperatures threaten areas inhabited by indigenous communities of the North,<sup>12</sup> while melting of permafrost will lead to the waterlogging of agricultural lands.

## Stakeholder Groups

### Population

**Consumers.** Rural people prefer traditional products (for example, cream and sour cream), whereas city residents demand a more diverse product line, including products for a healthy diet. Rural residents have economic incentives to increase agricultural output, while urban residents want to buy quality products at affordable prices.

Residents of other Russian regions and foreign countries constitute a potentially important group of consumers; however, supplies of food products to the regions outside Yakutia are still very small.

**Indigenous peoples of the North.** Historically, Yakuts engage in horse herding; even when they move to cities, they continue drinking mare milk (*koumiss*) and eating colt meat; given the growing population of the ethnic group (Figure 12), this factor is driving up demand for horse products.

Reindeer herding, fishing, and wild plant gathering is the basis of the lifestyle and the main source of income for the indigenous peoples of the North;<sup>13</sup>

these include the Evenks, Evens, Dolgans, and Yukaghirs. Their right to maintain their traditional forms of economy is formalized in legislation.<sup>14</sup>

## Government Entities

**Federal authorities.** These authorities regulate and support development of the agri-food sector in the Russian regions (RIA 2015),<sup>15</sup> and they supervise the use of land and water resources. Development of agribusiness is on the national priority list (TASS 2018).

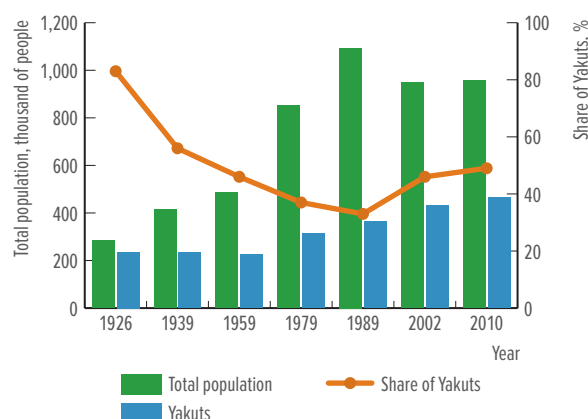
**The republic's authorities.** These authorities are responsible for the social and economic development of their regions and are interested in improving the self-sufficiency of local people in staple foods. These authorities are responsible for developing the regulatory and legal framework for regional agribusiness and drafting sector-specific programs. They report to the federal center for efficient use of subsidies. The Yakutia authorities pay a great deal of attention to the development of agribusiness (Annex 3).

**Core ministries and agencies.** The Ministry of Agriculture of Yakutia supervises and regulates the activities of agribusiness enterprises and allocates subsidies based on an evaluation of their efficiency. The State Arctic Committee contributes to the preservation of the lifestyles of indigenous peoples of the North and supports their traditional economic activities, such as reindeer herding, fishing, and hunting.

## Environmental Movements

Environmental activities in Yakutia are coordinated by government authorities. The focus of these activities is the adverse consequences of mineral extraction, the preservation of biodiversity, and the creation of specially protected natural areas. Involvement of the population in addressing environmental issues associated with the agricultural food sector is low.

**Figure 12: Population of Yakutia, 1926–2010**



Source: Authors' calculations, based on the All-Russia Population Census data for 1926–2010.

## Production Sector

**Large enterprises** operate under the conditions of public-private partnership; at the same time, they are market players and elements of the centralized administrative system. Many such enterprises have been set up on the basis of former state collective farms. There are up to several thousand head of horses and cattle in animal farms.

**Mining companies** invest in the development of agriculture and are often shareholders or owners of agricultural enterprises.<sup>16</sup> Mineral deposits are often extracted in the areas of traditional use of natural resources by indigenous minorities; therefore, interests of these parties have to be coordinated.

**Farmers** have a lot of freedom in decision making (Figure 13). They work on small plots (from 20 to 200 hectares) leased from municipalities; lease contracts are signed for one year. Farmers have a difficult time operating a successful farm because of inadequate funds of their own to do business, loans are unaffordable, and they face a shortage of workers,<sup>17</sup> as well as a lack of professional knowledge and working experience in agriculture (many farmers used to work in trade or education). Despite all these

<sup>14</sup> Federal Law # 82-FZ of April 30, 1999, On Guarantees of the Rights of Small-Numbered Peoples of the Russian Federation (as amended); see <http://constitution.garant.ru/act/right/180406/>

<sup>15</sup> See the state program for the development of agriculture and regulation of markets for agricultural products, agricultural commodities and food for 2013–2020. <http://docs.cntd.ru/document/902361843> (in Russian).

<sup>16</sup> JSC Anabar Almazy has four subsidiary agricultural enterprises.

<sup>17</sup> The farmer A.G. Em, who works on 200 hectares not far from Yakutsk, hires up to 150 people in summer—mostly workers from Central Asia and southern regions of European Russia—paying them wages, providing rustic housing in the fields, and compensating them for a round trip air ticket.



**Figure 13: The Tuymaada Valley in Central Yakutia**



Source: Google Maps, 2018.

Note: Authors have visited farms, companies, and research institutions in this valley.

obstacles, farmers succeed in collecting better harvests than large agribusiness companies and even grow warm-weather crops such as peppers, aubergines (also called *eggplant*), and watermelons in the harsh climate.

**Small innovation enterprises** process wild berries or specialize in biotechnology, producing dietary supplements made of reindeer lichen and fermented tea made of willow herb (*Epilobium angustifolium*). They are not classified as agricultural companies, which are eligible for government subsidies; they are therefore short of financing. Although these enterprises participate in grant competitions,<sup>18</sup> such grants are not enough to launch production (the total number of awarded grants in 2017 was 19).

**Figure 14: Currants in the Experimental Orchard of the Yakutia Research Institute of Agriculture in Pokrovsk, 78 km SW of Yakutsk**



Source: Authors, August 3, 2018.

<sup>18</sup> In the grant competition for young scholars, specialists, and students, grants in the amount of 300,000 rubles are awarded by the Head of the Republic. The Ministry of Economy of the Republic of Sakha (Yakutia) calls for proposals to support innovation projects through grants from the Head of the Republic of Sakha (Yakutia).

## Processors of Agricultural Products and Food Industry

**Large food producers** (such as the Yakutsk city dairy plant, the Khoty-As meat packing plant, and the Scythian meat packing plant) seek to retain markets for their produce and depend on a stable supply of dehydrated milk, beef, and pork coming in to Yakutia from other places. Their competitors are small **processing plants** in the farms working with local inputs. Both groups are interested in promoting food produced in Yakutia.

## Distribution Networks

**Trading companies.** These companies seek to offer their buyers the broadest range of products at affordable prices. They sell both products brought to Yakutia from elsewhere and local products. They have to take into account the products' limited shelf life as well as difficulties in transporting and storing some products (vegetables, fruits) in local climatic conditions; they also have to focus on consumer preferences (koumiss, horse meat).

**Research institutions.** Because of its unique natural conditions, Yakutia needs a special approach to seed breeding and stock breeding. This work is performed by the Safronov Research Institute of Agriculture, based in Yakutsk; the institute also performs trials at experimental farms in the nearby area (Figure 14),

Basic research is performed by scholars in the Ammosov North-Eastern Federal University and the Melnikov Permafrost Research Institute under the Far East Branch of the Russian Academy of Sciences.

**The education sector.** The Yakutia State Agricultural Academy and vocational schools train specialists in agriculture and the food processing industry.

## Policy Options

The future development of agribusiness in Yakutia depends, first of all, on whether and in what forms

state support continues. This is the point of view of experts, including heads of large agricultural enterprises and the republic's core ministries and agencies. In the authors' opinion, those who share this perspective are guided by the standards of economic practice that they have become used to. The example of some farmers, who have managed to create successful businesses in Yakutia without having received "start-up" subsidies, shows that other models can also work. As the experience of Scandinavian countries, Canada, and Alaska in the United States demonstrates, the development of agriculture in the Far North cannot happen without state support; this support is one of the principles of regional policy in the countries with a vast and diverse area.

Foreign experience also shows that regions of the Far North cannot achieve complete self-sufficiency in food because of the competitive advantages of regions located in less harsh natural conditions as well as the limited types of "northern" agriculture products. At the same time, Yakutia has set the task of improving self-sufficiency in locally produced food—an aim that is supported by some experts from academia as well (see Box 3). Achievement of this definitely ambitious objective will require various policy measures. First, particular attention must be paid by the government to provide economic support of the entire agribusiness in the republic.

## 1. Federal State Policy Options

Because of objective conditions in the Far North, the decision to support existing food value chains or create new food value chains in the production of dairy and meat products, fresh vegetables, and potatoes cannot be stipulated by cost efficiency alone. In Yakutia high production costs make production of most types of food (with the exception of reindeer and horse meat and fish) uncompetitive compared with food brought from other Russian regions and other countries. At the same time, priority is given to such criteria as:

- ✓ The need to provide fresh food products (milk, greens, and vegetables) to the population year-round

### Box 3. Toward Self-Sufficiency in Food

Michael Prisyazhny, First Deputy Minister of Education and Science of Yakutia, Doctor of Geographical Sciences, believes that the economy of the region, including the agricultural sector, should refocus from being subsidized in its development to being self-sufficient.

- ✓ Specific gastronomic traditions of local people (reindeer and colt meat, along with fish, form the basis of daily food intake)
- ✓ Lower burden on land resources and prevention of environmental issues (fodder production to partially replace pasture grazing of horses and cattle with stall-based maintenance of animals)
- ✓ A need to retain population in rural areas, slow down urbanization rates, and prevent outmigration in the republic
- ✓ The crucial role of traditional rural livelihoods (horse herding, reindeer herding) in preserving the ethnic identity of Yakuts and other indigenous minorities of the North

## 2. Institutional Sector Policy Options

Under these conditions, policy options associated with the **institutional sector** and aimed at articulating state support for the sector are of paramount importance. At the federal level, a food security strategy for northern regions has not yet been defined,<sup>19</sup> whereas activities of some Russian regions are largely determined by their overall economic potential and depend on the stand of regional authorities. In Yakutia the legislative framework setting forth principles of state support of agribusiness has been in force for 15 years (the first legal state regulation was adopted in 2003) and has been continuously improved. Analysis of statistical data demonstrates that state support contributed to the growth of agricultural production in the republic, but its growth rate was subsequently affected by the 2008 and 2013 crises. At the same time, a positive result is a stable size of the rural population versus the urban population in the republic in contrast to other regions.

<sup>19</sup> Since October 2017 an expert council on legislation in support of development of the North, the Far North, and the Arctic area has been working in the State Duma. The draft Law on the Arctic Zone of the Russian Federation is expected to be produced at the end of 2018.



### 3. Economic Policy Options

#### *Subsidies, public-private partnerships, access to the land*

**Subsidies** are a key instrument of agribusiness state regulation in Yakutia; without subsidies agricultural enterprises have limited or no opportunities to operate successfully.

**In large farms**, milking and processing milk and meat, including the purchase of milk and meat from the local population under contractual agreements,<sup>20</sup> are subsidized (Figure 15). These farms are the backbone of the entire agribusiness and a tool of public policy for its development. Subsidies have a positive effect on rural residents, who sell products they

produce on their own household plots to agricultural enterprises at high prices. The enterprises can pay the high prices because of subsidies. Purchases from households enable these enterprises to enlarge their raw material base for value added chains;<sup>21</sup> in turn, these purchases help build meat and milk processing plants on the farms. Allocating subsidies, the Ministry of Agriculture of Yakutia obtains an efficient tool for planning food output: if enterprises do not fulfill the procurement plan set by the ministry, subsidies have to be paid back.

**Smallholder farms** also depend on state subsidies, especially at the initial stage of their operation (Figure 16). In 2017–18, start-up subsidies for beginning farmers in Yakutia were in the amount of 1.5 to 3 million rubles and were allocated for purchase

**Figure 15: The Milk Processing Facility in the Berte Horse Plant in the Khangalassky Ulus and Its Products: Koumiss, Fermented Milk Drink Byyrpakh, Cream**



Source: Authors, July 3, 2018.

**Figure 16: Farmer A.G. Em's Field and Greenhouse in the Yakutsk Suburb of Zhatai**



Source: Authors, July 2, 2018.

<sup>20</sup> Because of subsidies, in 2018 purchasing companies bought milk from the population at 45 rubles per kilogram, spending only 10 rubles of their own money. The beef meat purchase and processing subsidy was 70 rubles per kilogram; the horse meat subsidy was 60 rubles.

<sup>21</sup> Out of 40 tons of cattle purchased by the JSC Berte Horse Plant in 2017, 11 tons were bought from the population.

of equipment, seeds, mineral fertilizers, repairs of production facilities, and purchase and repairs of vehicles. Existing rules make the receipt of even this small amount of money a rather difficult task for farmers, and many have expressed interest in more simplified procedures for document processing (in large firms this work is performed by an entire staff of specialists working full time). An increase in subsidies for farmers, which would require much less in funds than large enterprises,<sup>22</sup> could generate a quick positive effect because fresh greens and vegetables would be added to the food basket of Yakutia population. The possibility of a **long-term land lease** could become another efficient measure of state policy toward smallholder farms. Farmers need guarantees for the long-term use of fields for crop rotation purposes and for making decisions on amelioration and application of mineral fertilizers.

The total amount that Yakutia receives from the federal budget and allocates as subsidies has been increasing in recent years. However, every year it is becoming more difficult for regional authorities to justify allocating these funds to agricultural producers. The federal authorities tighten criteria for recipients, introducing various indicators such as tax efficiency of enterprises and higher wages, and at the same reducing the number of targeted subsidy programs. It is difficult for both large agricultural enterprises and smallholder farms to meet such criteria, whereas without subsidies they will inevitably become bankrupt.

Until recently, a large number of subsidy programs developed by the republic's Ministry of Agriculture have been a certain guarantee that various groups of farms will get subsidies, because funds were allocated separately for the production of various types of products, the construction of production facilities, and the creation of new farms. In the foreseeable future the federal authorities are expected to implement a single system for selecting subsidy recipients. Areas of subsidizing will be aggregated, a single online platform for applications is being created, and recipients will be selected primarily by how cost-efficient the subsidy use is.<sup>23</sup>

A clear drawback of the existing competitive selection of subsidy recipients is its disregard of geographical differences. Because of the underdeveloped transportation system and huge distances, this issue has a sense of urgency in Yakutia where producers located in places with better geographical situation are in a better position a priori. For example, it takes five hours (by ferry) to get from Churapinsky ulus, which is an agricultural district that produces meat, milk, potatoes, and which is located on the bank of the Lena River across from Yakutsk; there is no transportation communication in the off-season time (the periods when the river freezes and when it melts and generates an ice drift). Under current conditions the delivery costs of agricultural products from suburbs located on the same bank as Yakutsk to the city are substantially lower.

With a more austere budget policy, a **public-private partnership** can play an important role in supporting the operations of large agribusiness. Private shareholders can actually subsidize production, invest in capital construction, and pay high wages. In Yakutia, mining enterprises finance (often sharing costs on a co-financing or public-private partnership basis) the construction of potato and vegetable warehouses and milk and meat processing plants.<sup>24</sup> Taking into account the specific geography of Yakutia, retaining a disperse location of production and logistics facilities in the farms is more efficient than constructing large processing plants. Farm facilities require smaller investments and the repayment period is short. Jobs are created in rural areas, and investing companies resolve the issue of food supplies to their workforce, providing people with fresh meat and dairy products.

### *State support of traditional livelihood activities*

State support of traditional livelihood activities such as horse herding, reindeer herding, and fishing pursues special objectives. It is intended to retain population in rural areas and areas of traditional livelihood activities of indigenous minorities of the North and should, first and foremost, contribute to

<sup>22</sup> As reported by the Republic's Ministry of Agriculture, 81 new farmers received subsidies in 2018. The amount of subsidies was practically the same as the amount of money spent on construction of the first phase of the large greenhouse Sayuri near Yakutsk in 2016—95 million rubles.

<sup>23</sup> For more details about the new subsidy platform see <https://www.if24.ru/inna-rykova-interview/> (in Russian).

<sup>24</sup> In 2017 the Berte Horse Plant built a meat processing plant with a capacity of 2.5 tons/day and a vegetable warehouse that cost 22 and 16 million rubles, respectively; half of the cost was allocated by Almazy Anabara. Taking into account investments in the construction of cow sheds, this company gave the farm a little less money than the state subsidies it receives—that is, 33 million rubles in 2018.

the preservation of the historical image of the region and its cultural landscape (Еропов and Никифоров 2013, in Russian; see also Figure 17). Developing logistics and establishing production facilities to process and sell meat, hides, and antlers are key elements of such support. Measures for supporting the lifestyles of the households of nomadic reindeer breeders and herders who spend summers at *sailyks*—such as improving living conditions and providing access to school education and health-care—are extremely important. Many laws adopted in the republic seek to address these issues, but their implementation requires a great deal of money. The funds are allocated for the republic's budget and are spent for the intended purposes, for example, for purchasing expensive satellite phones, snowmobiles, and diesel generation units.

#### *Exports promotion: Governmental center and producer associations*

Traditional agriculture, hunting, and fishing can generate profit. For example, food such as reindeer meat, colt meat, fish (round-nosed whitefish, muksun, nelma, sturgeon), and wild berries can be sold in other Russian regions and exported to other countries. There is successful experience with the commercial production of food with the use of “northern” ingredients. For example, the Yamal-Nenets District

in Russia has created a network of mobile stations for harvesting and processing wild berries and mushrooms. In Finland, the milk-processing company Valio produces cheese with venison. The production of such food products can be considered a viable area of specialization in many districts of Yakutia;<sup>25</sup> yet their marketing outside Yakutia is constrained by administrative and legal barriers,<sup>26</sup> lack of well-merchandised brands, and insufficiently motivated business entities. It would be simpler to address these issues if a state export center and core producer associations were established in the republic.

The potential of the Yakutia internal market has not been fully tapped by local producers. Not in all shops do Yakut products occupy their rightful place on the shelves, while “Made in Yakutia” shelf practice is not common (Figure 18).

#### 4. Transportation Development Policy Options

**Development of the transportation network** is an important state policy measure. Poor transport connectivity makes this task a priority for supporting food security in Yakutia. It is necessary to arrange year-round transport communication between the left and the right banks of the Lena River as quickly as possible and improve the transport accessibility

**Figure 17: New and Traditional Animal Facilities**

- a. New Cow Sheds at the Berte Horse Plant Financed by the Almazy Anabara Company  
b. Traditional Yakut *Khotons* for Animal Maintenance in Winter

a.



b.



Source: Authors, July 3, 2018.

<sup>25</sup> In July 2018 a project of creating an enterprise to collect and process wild berries and mushrooms was discussed at the foresight session on development strategy of the Churapinsky ulus.

<sup>26</sup> Because of imperfect customs legislation, it is not possible to export horse meat that Japan and China are willing to buy.



of 13 out of 34 uluses of the republic located in the Arctic Zone or adjacent to it.

All main types of transportation networks and means of transport in Yakutia need to be developed. Highways with good (paved) road surfaces end not far from Yakutsk. As has been described in the example of the Berte horse plant, a large farm located less than 200 kilometers from Yakutsk, delivery of fresh meat and dairy products to the city takes several hours even in summer; that is why the Yakutsk market is inaccessible to this farm for all practical purposes. On the rivers that have historically served as the main transport arteries, it is necessary to restore and construct new landing stages with food warehouses and to renew the fleet of cargo boats. Yakutia, where the only way to reach remote areas is aviation,<sup>27</sup> has been affected by the reduction in the number of small airports.

Constructing new facilities of transport infrastructure requires substantial funds and can be done only through targeted financing from the federal budget.<sup>28</sup> On the other hand, developing the transport system will provide opportunities for opening yet untapped agricultural potential of many regions.<sup>29</sup> It would be a win-win situation for all groups of farms and consumers in Yakutsk and other cities. At the same time, there might be adverse implications for local producers since better transport connectivity would make delivery of food to Yakutia from other Russian regions and other countries—especially from China—cheaper.

## 5. Regional Policy Options

### *Generation and dissemination of innovations*

The first thing needed is to support regional research centers and promote both already-available and expected outputs of their activities that would respond to local natural conditions of varieties and breeds of domesticated animals. A room hydroponics unit Arctic seedbed,<sup>30</sup> created by the Yakut company

**Figure 18: Stand of the Sakhachai Company in the Ounce Tea Shop in Yakutsk**



Source: Authors, July 7, 2018.

Green Laboratory together with the resident of the Skolkovo Institute of Science and Technologies, is a promising innovation: it can provide fresh greens to residents of remote villages.

On the whole, the local system of professional education is quite successful in training human resources for agriculture and the food processing industry; however, there are no academic programs on food security or the efficient agricultural use of natural resources. The network of knowledge transfer among professional communities is practically undeveloped. A distance learning format could be used for this purpose and mobile companies and Internet providers could be engaged in the creation of mobile applications and network resources for reindeer herders,

<sup>27</sup> The importance of aviation in food security in Yakutia is demonstrated by the following fact: in accordance with the rules of the main regional airliner, in internal flights passengers are allowed to have up to three dozen eggs in their hand luggage.

<sup>28</sup> The cost of constructing a bridge for automobile and railway transport across the Lena River near Yakutsk is estimated at 70–80 billion rubles. For more details, see <https://tass.ru/ekonomika/5394588> (in Russian).

<sup>29</sup> For example, uluses on the east bank of the Lena River along the Kolyma highway.

<sup>30</sup> L.L. Popova, task leader of the project, says that, when commercialized, this unit will cost not more than 30,000 rubles.

potato breeders, and so on as sponsors. This would benefit farmers who are often not well informed about achievements of local scientists.<sup>31</sup>

Of great value for all groups of producers is the use of best practice of northern farming in other countries and other Russian regions. A list of best practices in field crop growing, greenhouses, and animal breeding that could be of interest for Yakutia is provided in Annex 4.<sup>32</sup>

### *Environmental policy*

Environmental policy is within the competence of regional authorities. It is necessary to change the attitude of the population and agricultural producers toward land resources that have been considered to be infinite. However, agricultural production development has an adverse effect on the environmental situation; the manmade burden on landscapes in the main areas of crop growing and animal breeding has reached a critical level. It is necessary to take the stock of land and water resources and create a system to supervise their use.<sup>33</sup> At an early stage this will inevitably lead to restrictions and even fines, especially for household plots that have disappeared from the government's radar screen.

It is inevitable that in the forthcoming years the focus will be on addressing environmental issues associated with global climatic changes. The experience of Canada, where complex research of the implications of a warmer climate for nature and economy has been conducted in Nunavik (Vincent, Lemay, and Allard 2017), along with a long-term territorial planning scheme the basic element of which is a network of protected natural areas, has been developed is of great use. Similar projects can become an important subject for research institutes in Yakutia.

## Assignment

1. Compare Yakutia and other northern Russian regions, using up-to-date benchmarks for

agriculture (based on the table in Annex 1). Identify key groups of regions based on agricultural production specifics, issues, and development prospects. Which of the groups includes Yakutia? Explain your answer.

2. Which of the international best practices of using innovative technology for agriculture in the Far North listed in the table in Annex 4 are the most suitable for Yakutia, in your opinion? Why? Show the places that could be used as testing grounds for such best practices in Yakutia on the maps in Figures 1, 3, and 4.
3. Relying on the information from the Additional Readings section, conduct a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis to show development opportunities for the following two major agricultural sectors in Yakutia: reindeer herding and vegetable growing in greenhouses. Compare your SWOT-matrixes: hold a discussion with each of the parties putting forward arguments in favor of giving priority to one of these two sectors in terms of their subsidization.
4. What are advantages and disadvantages of small farms versus big companies in the Far North?

## Policy Recommendations

### Recommendations Related to Institutional Development

- ✓ **At the federal level:** Articulate a strategy for developing the Far North and the Arctic Zone by law, incorporating into law provisions on food security and efficient use of land resources; include 13 *uluses* of Yakutia in the Arctic Zone of the Russian Federation; create conditions for their development using the funds from the federal center.

<sup>31</sup> Yield of potato varieties selected by the Yakutsk Research Institute of Agriculture is 160–180 hundredweight/hectare; however, few farmers who buy seeds outside the republic and collect a little bit more than 100 c/ha know about these varieties.

<sup>32</sup> For example, a project to provide milk farms for the Arctic Zone Barents farm has been developed in Norway.

<sup>33</sup> This task cannot be addressed without training specialists in geo-ecology and without the efficient use of natural resources. The Yakutsk State Agricultural Academy has no disciplines of this type in its bachelor degree and master degree programs; a possible way of addressing this issue is to develop programs for additional education and retraining of specialists.

- ✓ **At the regional level:** Develop the regulatory and legal framework for expanding the practice of public-private partnerships and attracting investments for further development of value added chains; provide support in promoting traditional products of Yakutia (reindeer and colt meat, fish, mushrooms, and wild berries) in the external market.

- ✓ **At the regional level:** Provide guidance to the republic's research centers and educational institutions; promote the adoption of best northern practices and organize a platform for transferring knowledge on the basis of modern technologies.

## Recommendations Related to Economic Development

- ✓ **At the federal level:** Take into account advantages of interregional division of labor and local needs in the allocation of subsidies in favor of the most efficient producers; implement infrastructure projects in order to widen possibilities for all groups of local producers.
- ✓ **At the regional level:** Subsidize enterprises of main life-supporting food chains, taking into account regional differences, to saturate the internal market with quality fresh products; finance the construction of transportation and logistics infrastructure facilities to develop higher links of the value added chains; allocate funds for technical equipment and to improve the lives of indigenous minorities to maintain traditional forms of livelihood and preserve their traditional lifestyles.

## Recommendations Related to Environmental Management

- ✓ **At the federal level:** Draft a program for adapting agriculture in the Far North to global climate change.
- ✓ **At the regional level:** Implement supervision and control over the use of land and water resources and reinforce an environmental protection regime in the most vulnerable areas.

## Recommendations Related to Innovation

- ✓ **At the federal level:** Coordinate and finance research related to food security in the northern regions.

## References

The Ministry of Regional Development. 2013. The Development Strategy of the Arctic Zone of the Russian Federation and National Security for the Period up to 2020. <http://www.iecca.ru/en/legislation/strategies/item/99-the-development-strategy-of-the-arctic-zone-of-the-russian-federation>

Rosstat (Federal State Statistics Service). No date. <http://www.gks.ru/> (in Russian).

———. 2010. All-Russia Population Census 2010. [http://www.gks.ru/free\\_doc/new\\_site/perepis2010/croc/perepis\\_itogi1612.htm](http://www.gks.ru/free_doc/new_site/perepis2010/croc/perepis_itogi1612.htm) (in Russian).

———. 2015. Economic and social indicators of the Far North and similar regions in 2000-2015. [http://www.gks.ru/bgd/regl/b16\\_22/Main.htm](http://www.gks.ru/bgd/regl/b16_22/Main.htm) (in Russian).

———. 2018. Official statistical data on socio-economic development of the Arctic Zone in the Russian Federation in 2017. [http://www.gks.ru/free\\_doc/new\\_site/region\\_stat/calendar1-2017.htm](http://www.gks.ru/free_doc/new_site/region_stat/calendar1-2017.htm) (in Russian).

Sakha(Yakutia)Stat. No date. Regional Office of the Federal State Statistics Service in the Sakha (Yakutia) Republic. <http://sakha.gks.ru/> (in Russian).

TASS. 2018. "May Decree – 2018." May 7. <https://tass.ru/politika/5182019> (in Russian).

Vincent, W. F., M. Lemay, and M. Allard. 2017. "Arctic Permafrost Landscapes in Transition: Towards an Integrated Earth System Approach." *Arctic Science* 3 (2): 39–64.

Алкамо Д., Дронин Н. М., Ендиян М. Оценка влияния изменения климата на сельское хозяйство России // Доклады Академии наук. — 2004. — Т. 396, № 6. — С. 819–822 (in Russian).



Аммосова Н. И. Агропромышленный комплекс Республики Саха (Якутия): динамика, проблемы развития // Госсоветник. 2015. №4 (12). <https://cyberleninka.ru/article/n/agropromyshlennyy-kompleks-respubliki-saha-yakutiya-dinamika-problemy-razvitiya> (in Russian).

Вавилов Н. И. Проблема северного земледелия. Материалы Ленинградской чрезвычайной сессии Академии наук СССР. 25-30.XI.1931 г. Ленинград, изд-во Академии наук, 1931 (in Russian).

Винокурова Д. Е., Прохорова М. Н. Особенности оленеводства и тенденции в изменении поголовья домашних оленей в республике Саха (Якутия) // АНО ИД «Научное обозрение». 2013. № 3. <https://cyberleninka.ru/article/n/osobennosti-olenevodstva-i-tendentsii-v-izmenenii-pogolovya-domashnih-olenev-v-respublike-saha-yakutiya> (in Russian).

Еганян Р. А. Особенности питания жителей Крайнего Севера России (обзор литературы) // Профилактическая медицина. 2013. Т.16, № 5. С. 41–47. <https://www.mediasphera.ru/issues/profilakticheskaya-meditsina/2013/5/downloads/ru/031726-6130201356> (in Russian).

Егоров Е. Г., Никифоров М. М. Развитие коневодства и скотоводства как традиционных секторов хозяйства Севера // Национальные интересы: приоритеты и безопасность. 2013. №47. <https://cyberleninka.ru/article/n/razvitie-konevodstva-iskotovodstva-kak-traditsionnyh-sektorov-hozyaystva-severa> (in Russian).

Попов, А. А. Качество жизни населения в условиях трансформации экономики: теория, проблемы, практика/ А. Н. Мыреев, А. А. Попов, С. В. Васильева – Я: Издательский дом СВФУ, 2015 – 581 с. (in Russian).

RIA. 2015. “Программа импортозамещения в российской экономике в 2014-2015 годах” November 25. <https://ria.ru/spravka/20151125/1327022750.html> (in Russian).

Протопопова Л. Д., Даянова Г. И. Проблемы развития личных подсобных хозяйств сельского населения Республики Саха (Якутия) // Никоновские чтения. 2016. №21. <https://cyberleninka.ru/article/n/problemy-razvitiya-lichnyh-podsobnyh-hozyaystv>

selskogo-naseleniya-respubliki-saha-yakutiya (in Russian).

Рожин В. С., Чичигинаров В. В. Возделывание зерновых культур в условиях Якутии // Достижения науки и техники АПК. 2006. №5. <https://cyberleninka.ru/article/n/vozdelывanie-zer-novyh-kultur-v-usloviyah-yakutii> (in Russian).

## Additional Readings

School of Health Sciences (University of Iceland) and National Food Institute (Technical University of Denmark). 2014. “How Can the Nordic Experience Be Used for Nutrition in the Future? Emphasis on Nordic Regional Nutrition Cooperation.” Copenhagen: Nordic Working Papers, Nordic Council of Ministers. <http://norden.diva-portal.org/smash/get/diva2:763080/FULLTEXT01.pdf>

Vincent, W. F., M. Lemay, and M. Allard. 2017. “Arctic Permafrost Landscapes in Transition: Towards an Integrated Earth System Approach.” Arctic Science 3 (2): 39–64. <http://www.nrcresearchpress.com/doi/pdf/10.1139/as-2016-0027>

Иванов В. А. Специфика модернизации аграрного сектора периферийных северных районов / В. А. Иванов, А. С. Пономарева // Корпоративное управление и инновационное развитие экономики Севера: Вестник Научно-исследовательского центра корпоративного права, управления и венчурного инвестирования Сыктывкарского государственного университета, 2013. № 2.-С.106-123. <http://vestnik-ku.ru/articles/2013/2/10.pdf>

Потравный И. М., Гассий В. В., Афанасьев С. М. Территории традиционного природопользования: ограничения развития или факторы экономического роста? // Арктика: экология и экономика. — 2017. — № 2 (26). — С. 4—16. [http://www.ibrae.ac.ru/docs/2\(26\)\\_2017\\_Arctic/004\\_016.pdf](http://www.ibrae.ac.ru/docs/2(26)_2017_Arctic/004_016.pdf)

Егоров Е. Г., Никифоров М. М. Развитие коневодства и скотоводства как традиционных секторов хозяйства Севера // Национальные интересы: приоритеты и безопасность. 2013. <https://cyberleninka.ru/article/n/razvitie>

konevodstva-i-skotovodstva-kak-traditsionnyh-sektorov-hozyaystva-severa

Боякова С. И., Винокурова Л. И., Игнатъева В. Б., Филиппова В. В. Якутия в условиях глобальных

климатических изменений: уязвимость, риски, социальная адаптация // Северо-Восточный гуманитарный вестник. 2010. № 1. С. 22-25. [http://igi.ysn.ru/files/publicasii/vestnik/vestnik\\_2010\\_1\(1\).pdf#page=22](http://igi.ysn.ru/files/publicasii/vestnik/vestnik_2010_1(1).pdf#page=22)

## Annex 1

## Northern Agriculture in Russia

Indicator		Murmansk Oblast	Arkhangelsk Oblast	Nenets AO	Republic of Komi	Yamal-Nenets AO	Khanty Mansi AO	Krasnoyarsk Kray	Republic of Sakha (Yakutia)	Chukotka AO	Magadan Oblast	Kamchatka Kray
Area of the region, square kilometers		144,900	413,103	176,810	416,774	769,250	534,801	2,366,797	3,083,523	721,481	462,464	464,275
Population, thousand people		753.6	1,111	44	840.9	538.5	1,655	2,876.5	964.3	49.3	144.1	315.6
Workers of agricultural organizations,		953	3,891	1,400	4,650	2,836	694	28,873	6,404	1,231	530	1,338
including those engaged in agricultural operations		892	3,646	1,312	4,397	2,634	621	26,872	5,634	1,201	239	1,288
Agricultural land area, thousand hectares		7.1	143.8	36.7	56	33.6	13.7	1979	201.9	0.8	1.8	23.5
including:	Arable land	5.8	49.4	0	30	0	1	1625.3	56.5	0	0.3	14.8
	Hay-making grounds	0.2	65.7	34.5	16.6	0	5.7	58	90.5	0.7	0.2	3.4
	Pastures	0.5	14.4	2.2	8.9	33.5	6.6	173.6	49.6	0.1	—	2.1
Cultivation area, thousand hectares	Wheat	—	0.9	—	0	—	0	741.3	2.1	—	—	0
	Rye	—	0.1	—	0	—	0	12.7	0.1	—	—	—
	Barley	—	1.7	—	0	—	0	142	3.3	—	—	0.1
	Oat	—	0.1	—	0	—	0.1	154.9	7	—	—	0.1
	Potato	0.6	7.4	0.1	4.4	0.1	4.4	38.1	7.5	0	0.8	2.1
	Vegetable crops	0.1	1.2	0	0.6	0	1	6.3	1.6	0	0.2	0.6
	Forage, crops	6.1	59.3	—	32.1	—	1.2	375.8	21.7	—	5.2	14.9
	Forage, crops for silage (maize excluded)	—	1.2	—	1.2	—	—	0.8	2.6	—	4.7	0.4
	Annual grasses	2.6	8.4	—	4.3	—	0.6	141	11.1	—	0.5	2.9
	Perennial grasses	1.4	49.7	—	26.6	—	0.6	212.4	7.5	—	—	11.5
Fertilizer application per hectare of cultivated area, kilograms	Mineral (on primary nutrient basis, 100%)	41.5	26.8	—	12.4	—	7.5	32.4	27.5	—	—	28.1
	Organic, tons	13.1	4.4	—	4.3	—	3.9,(2015)	0.8	0.4	—	—	—
Herd population, thousand head	Cattle	7.3	46.2	1.8	37.4	1.2	17.9	379	244.6	0	3.4	8.9
	Dairy cattle	6.8	46.1	1.8	36.3	1.1	16.6	359.9	240.8	0	3.2	8.7
	Beef cattle	0.5	0.1	0	1.1	0.1	1.3	19.1	3.5	0	0.1	0.2
	Sheep	0.3	5.2	0.1	9.8	0.1	4	66.7	0.4	—	0.1	2.5
	Goats	0.6	4.5	0	5.7	0.2	5.2	18.6	1.6	0	0.4	0.5
	Horses	0.1	1.6	0	3.2	0.1	2.6	26.3	242.6	0	0.2	1.2
	Pigs	8	13.6	0.1	32.4	1.2	53.3	576.5	23.4	0.3	2.6	12.9

Indicator		Murmansk Oblast	Arkhangelsk Oblast	Nenets AO	Republic of Komi	Yamal-Nenets AO	Khanty Mansi AO	Krasnoyarsk Krai	Republic of Sakha (Yakutia)	Chukotka AO	Magadan Oblast	Kamchatka Krai
	Poultry	46.4	275.9	2.3	1820.4	23.5	455.9	4991.3	746.9	10.8	157.2	250.2
	Reindeer	61.1	1.6	207.6	105.3	886.6	53.7	146.7	172.8	182	17	52.3
Gross harvest, thousand tons	Grain	—	4.6	—	0	—	—	2353.5	12.1	—	—	0.3
	Potatoes	9.5	141.7	1.4	96.6	1.3	74.3	1253.3	78.9	0	12.1	51.9
	Vegetables	0.4	32.6	0.1	22	0.1	21	238.8	37.8	0.1	5.6	18.2
Yield, hundred kilograms/ hectare	Potatoes	104	144	139	144	131	171	172	99	143	95	177
	Vegetables	69	257	179	316	120	237	253	161	118	241	244
Outputs	Cattle and poultry for slaughter, thousand tons	1.2	5.5	1.4	22.9	4.4	12.6	144.8	22	0.7	0.6	3.6
	Milk, thousand tons	15.4	121.3	3.5	54.3	1.9	26.3	733.5	164.6	0	5.7	18.5
	Eggs, million eggs	10.7	29.5	0.2	139.5	0.4	48.8	790.5	118	3.5	26.4	54
Milk yield per cow, thousand kilograms		4.4	6.5	4.7	4.3	3.6	4.5	5.1	2.2	3 (2014)	—	3.5

Source: Rosstat data.

Note: — = not available.

## Annex 2

### Financing Key Farm Support Measures per the Yakutia Government Program *Developing Agriculture and Regulating Markets for Farm Produce, Inputs and Food in Yakutia in 2012–2020*, Rubles, millions

Subprogram	2012	2013	2014	2015	2016	2017	2018	2019	2020
Development of livestock farming	3,046.7	3,087.7	3,105.9	3,853.8	4,218.5	3,660.6	3,775.1	2,664.1	2,664.4
Development of horse herding	106.4	112.7	91	133.6	149.3	154.2	162.7	130.5	130.5
Development of crop farming	768	558.3	499.4	623.3	621	246.2	296.7	338.9	336.9
Development of traditional northern industries	582.6	639.9	597.6	798.3	843.3	73.1	98.6	77.9	77.9
Development of northern reindeer breeding	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	828.4	816	563.4	563.4
Development of fisheries	106.2	106.9	107.1	196.6	161.7	140.9	155.9	155.9	155.9
Development of fodder production	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	127.7	305.1	162.9	162.9
Farmland reclamation	335.8	431	395.4	388.8	407	361.6	463.3	424.9	442.9
Development of food and food processing industries	117	109.9	92.9	221.4	112.3	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>
Technical and technological upgrading, innovative development	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>		297.7	230.5	278.6	278.6
R&D support of agriculture	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	13.3	13.5	13.5	13.5
Fostering investments in agribusiness	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	812.4	805.9	808.4	802
Promoting financial and lending services in agribusiness	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	2017 <sup>†</sup>	163.3	356.1	352	352
Promoting cooperation and small farming	164	174	598.7	1,315.2	1,520.4	574.8	448.3	432.3	432.3
Other forms*	5,076.8	5,074	5,485.3	5,383.2	5,596.8	3,847.6	3,665.9	3,494.1	3,657.4
Total	10,303.5	10,294.4	10,973.3	12,914.2	13,630.3	11,301.8	11,593.6	9,897.4	10,070.6

Note: \* Sustainable development of rural territories in 2014–2017 and the period to 2020; Construction of industrial facilities, technical and technological modernization of agribusiness; Putting in place an enabling environment for agribusiness; Social development in rural areas in 2012–2013; Veterinary services; Putting in place an enabling environment for all agribusiness sectors; 2017<sup>†</sup> means that means that financial support of these programs was expected to begin in 2017.

## Annex 3

### Laws, Regulations, and Programs Governing Agricultural Activities in the Republic Sakha (Yakutia)

1. Law of the Republic of Sakha (Yakutia) # 1660-3 N 963-V of June 5, 2016 *On Nomad Families* <http://docs.cntd.ru/document/439090024>
2. Law of the Republic of Sakha (Yakutia) # 1619-3 N 791-V of April 26, 2016 *On Agriculture Development in the Republic of Sakha (Yakutia)* <http://docs.cntd.ru/document/439048908>
3. Government Program of the Republic of Sakha (Yakutia) for *Developing Agriculture and Regulating Markets of Agricultural Products, Inputs, and Foods for 2012–2020* <http://docs.cntd.ru/document/473509401> Law of the Republic of Sakha (Yakutia) # 370-3 N 755-III of July 13, 2006 *On Territories of Traditional Natural Resource Use and Traditional Economies of Small-Numbered Indigenous Peoples of the North in the Republic of Sakha (Yakutia)* <http://docs.cntd.ru/document/802070067>
4. Law of the Republic of Sakha (Yakutia) # 3 N 179-I of June 25, 1997 *On Household Reindeer Herding* <http://docs.cntd.ru/document/804912120>

#### Key subsidies:

5. Order #14 of January 17, 2018 Re.: *Procedures for providing subsidies from the public budget of the Republic of Sakha (Yakutia) under the Crop Farming Subprogram* <http://docs.cntd.ru/document/446628515>
6. Order # 18 of January 18, 2018 Re.: *Procedures for providing subsidies from the public budget of the Republic of Sakha (Yakutia) under the Fodder Cropping Subprogram* <http://docs.cntd.ru/document/446628484>
7. Order # 68 of February 7, 2017 *To approve the procedures for providing subsidies for improving the management of high-yield animals and increasing yields in dairy livestock farming under the Cattle Farming Subprogram* <http://docs.cntd.ru/document/446245570>
8. Order # 69 of February 7, 2017 *To approve the procedures for providing subsidies to finance part of costs to support novice farmers and family cattle farms* <http://base.garant.ru/26765869/>
9. Order # 71 of February 7, 2017 *To approve the procedures for providing subsidies to reimburse part of expenses on interest payment under credits from Russian credit institutions and loans from agricultural credit consumer cooperatives* <http://docs.cntd.ru/document/446672083>
10. Order # 79 of February 9, 2018 Re.: *Procedures for providing subsidies from the public budget of the Republic of Sakha (Yakutia) under the Agricultural Land Reclamation Subprogram* <http://docs.cntd.ru/document/446649078>
11. Order # 87 of February 13, 2018 Re.: *Procedures for providing subsidies from the public budget of the Republic of Sakha (Yakutia) in support of agricultural operations under the Subprogram aimed at providing incentives to invest in agribusiness* <https://minsel.sakha.gov.ru/porjadki-predostavleniya-subsidij-na-podderzhku-ch-proizvodstva>
12. Order # 93 of February 20, 2017 *To approve the procedures for providing subsidies from the public budget of the Republic of Sakha (Yakutia) to support agricultural operations under the Cattle Farming Subprogram* <http://docs.cntd.ru/document/446196275>



13. Order # 94 of February 15, 2018 *To approve the procedures for providing subsidies from the public budget of the Republic of Sakha (Yakutia) under the Subprogram designated to create general enabling environments for all agribusiness sectors* <https://www.sakha.gov.ru/files/front/download/id/1797077>
14. Order # 312 of April 19, 2017 *To approve the procedures for providing subsidies from the public budget of the Republic of Sakha (Yakutia) to support agricultural operations under the Horse Herding Subprogram* <http://docs.cntd.ru/document/450237615>
15. Resolution of the Government of the Republic of Sakha (Yakutia) # 385-p of March 27, 2017 *On supplying public-sector institutions and population in poorly-accessible and remote communities of northern and arctic uluses of the Republic of Sakha (Yakutia) with potatoes and outdoor vegetables in 2017/2018 and delivering agricultural products from poorly-accessible and remote communities of the Olekminsky and Khagalassky Uluses to markets of such products in 2017* <http://docs.cntd.ru/document/450355820>
16. Order # 465 of June 8, 2017 *To approve the procedures for providing subsidies from the public budget of the Republic of Sakha (Yakutia) to support agricultural operations under the Subprogram aimed at promoting cooperation and small rural businesses* <http://docs.cntd.ru/document/45035579>

## Annex 4

### International Best Practices of Applying Innovative Agricultural Technology in the Far North

Best practice	Region	Technology	Description
Vertical greenhouses	Alaska	Indoor hydroponic systems to operate as vertical greenhouses of different sizes	The Vertical Harvest Hydroponics Company manufactures hydroponic systems functioning as vertical greenhouses of different sizes. Some of them are meant for one household while others can serve a group of households or a small community. The system placed within a 40-ft container has capacity to produce over 20,000 lettuce plants per year. There are also such systems specifically designed for schools (114 plants per cycle). The electric cost is estimated at about US\$0.78 per day (at \$0.10/ kWh)—i.e., around 50 rubles per day. The water usage is estimated at 7.6 liters per day. The time from seed to mature produce is 5-6 weeks, depending on produce grown. <sup>34</sup>
Community gardens and greenhouses	Inuvik, Northern Canada	The Community Garden Society of Inuvik (CGSI)	CGSI is a non-profit organization formed in November 1998. With the help and support of the local college (Aurora college), they converted a decommissioned arena, Grollier Hall, by removing the tin roof and replacing it with polycarbonate glazing. The building contains two main areas: 74 land plots on the ground floor and a commercial greenhouse on the second floor. Garden plots are available to residents of Inuvik, and are also sponsored by local charities. Greenhouse members are required to do 15 hours of volunteer service for each plot they rent. This includes giving tours, watering, and taking care of the charities' plots. The commercial greenhouse produces bedding plants and vegetables to cover operation and management costs. Financial resources come from grants and donations from the Government of Canada, the Government of the Northwest Territories, aboriginal groups, community sponsors, and local businesses. In 2008, community sponsors included Conoco Phillips, CIBC, and Shell Canada. In addition, some local oil companies and businesses donated in-kind services (e.g., plumbers and electricians). <sup>35</sup>
Heated greenhouses	McMurdo Station Antarctica	Sealed and insulated hydroponic greenhouses	The greenhouse is completely sealed and insulated. It is heated with a heater, HPS, and MH lamps. Each type of plant grows in its own system containing of its own reservoir, pump, aerator, water heater, and PVC troughs and tubing. Technicians use a three-part liquid nutrient and pH adjustors, which are administered by hand after a daily meter reading. The 60-m <sup>2</sup> greenhouse can generate a monthly average 113 kg of vegetables (lettuce greens, spinach, arugula, chard, tomatoes, peppers, cucumbers, and herbs) during peak cycles. The harvest is ample enough to provide a winter community of up to 230 people with a salad once every 4 days plus fresh vegetables incorporated into the menu. During summer, the community population can reach 1,000 people. During this time, the greenhouse acts as a supplement to the fresh food flown into the base from New Zealand. The greenhouse is the only source of live plants, colorful flowers, and warm, humid air. Many community members frequent the greenhouse for this reason alone. <sup>36</sup>
	Longyearbyen, Spitzbergen	A heated igloo greenhouse enables the utilization of local soils with the help of compost and earthworms	The greenhouse operates in Longyearbyen, which is the northernmost city in the world. Its owner, Benjamin L. Vidmar, grows greens in the greenhouse and maintains a batch of quails. He supplies his produce to local restaurants and takes back unused residue to use for composting. Using the compost as well as purposefully imported worms, he cultivates the local soil. In future, he plans to install a biogas system to use waste water from Longyearbyen to heat the greenhouse. In addition to farming, he gives tours to show this greenhouse. The tour cost varies from NOK 95 Norwegian kroner to 1,995 kroner (732–15,383 rubles), depending on the chosen program. The most expensive tour is called A Day in the Life of an Arctic Farmer; it lasts 7 hours and includes a presentation, help at the farm (real-life experience), lunch, and a learning completion certificate. <sup>37</sup>

<sup>34</sup> See Indoor gardening for big appetites: High volumes and monstrously delicious greens, available at <https://vhhydroponics.com/sunny-pro/>

<sup>35</sup> Northwest Territories: A Profile of Promising Practices from Canada and Abroad – Inuvik community greenhouse; see <https://www.canada.ca/en/public-health/services/reports-publications/bringing-health-planning-table-a-profile-promising-practices-canada-abroad/northwest-territories-inuvik-community-greenhouse-building-a-strong-sense-community-through-recreational-gardening-food-production-knowledge-sharing.html>

<sup>36</sup> Hydroponics at McMurdo Station, Antarctica; see <http://www.schundler.com/mcmurdo>.

<sup>37</sup> Arctic farming tours; see <https://www.polarpermaculture.com/tours/>

Best practice	Region	Technology	Description
	Repulse Bay (Nunavut)	Hydroponic igloo greenhouse with passive solar design	This greenhouse combines passive solar design and hydroponics to serve a hamlet of about 1,000 people. Inside the greenhouse is a reflector that captures warmth from the sun; this is stored in a large black tub of water, heating the greenhouse. Just three or four hours of sunlight a day are needed to maintain the correct temperature. The system can maintain the necessary conditions for plant growth 7 months a year, even when the temperature outside is below zero. A new efficient heating and lighting system will be installed in the near future, so it will be possible to grow peas, carrots, turnips, lettuce, and tomatoes year round, even during periods when there is no sun. When it is fully operational, its capacity will reach 2,000 plants with most of them growing in special hydroponic towers. They will enable to attain a fourfold increase in crop yields. <sup>38</sup>
Barents Farm	Northern Norway	Highly automated family dairy	This highly automated cattle farm can be run only by two operators. Its peculiarity is that the residential house of the farmers is built inside the domelike cow house to save on the costs of heating. This is a highly energy-saving technique: the energy and heat generated in the cow house are not wasted, but are utilized to heat the residential house. Below is a general description of a standard Barents farm: 1. It is designed for 160 beef cows and 40 milk cows. 2. Its total area is 660 m <sup>2</sup> . 3. The total area includes 220 m <sup>2</sup> under a residential house on the second floor. 4. Production processes are automated, and can be run by two operators (a couple), 5. Construction materials: glued wooden elements (based on pine wood). The utilization of glued wooden elements not only enables to construct faster, but also significantly reduces the cost of farm construction. <sup>39</sup>
Downstream processing of reindeer products	Finland (Lapland)	Production of cheese from reindeer milk <sup>40</sup>	
	Finland, Valio	Production of cheese with reindeer meat inclusions <sup>41</sup>	
	Russia, Yamal-Nenets Autonomous Okrug, Yamal Reindeer (Yamalskie Oleni) Municipal Company	Production and exports of reindeer meat and reindeer blood	Production and exports of reindeer meat, production of semi-finished reindeer meat products; since the beginning of 2012 this has included the production of blood dried through cool dehumidification, and dry blood for antler baths
	Russia, Yakutia, Taba Company	Harvesting, processing and exports of reindeer antlers and other glandular products	Reindeer breeding, harvesting and export of antlers, sale of reindeer products, harvesting and processing of reindeer antlers and other glandular products, manufacture of dietary supplements, health and beauty aids based on reindeer antlers, production of teas with northern berries and antler essences. <sup>42</sup>
Gathering and processing of wild berries	Russia, Yamal-Nenets Autonomous Okrug	Mobile buy and primary processing centers for wild berries	A facility to process wild plants using a sea container. It is equipped with a fan to clean the berries, floor scales, and a blast chiller with capacity of 30 kg/cycle, a packing machine complete with plastic film rolls, and a cool storage for 25 m <sup>3</sup> , storing temperature of -18°C. <sup>43</sup>
	Tomsk Oblast	Processing of wild plants, emergence of the Wildly Delicious brand	Entrepreneurs bought needed equipment and rent premises in Tomsk. Wild berries are procured from local people who gather and process wild berries seasonally and then freeze them. They have succeeded in promoting their products owing to the development and use of advertisement products for POS [points of sales]: original wooden shop counters, light panels, price labels, wobblers, and stickers and provide retail trade networks with them free of charge. <sup>44</sup>

<sup>38</sup> Kale in the Arctic: Inside an igloo greenhouse that could inspire fresh food production in the North; see <https://www.cbc.ca/news/canada/north/kale-in-the-arctic-inside-an-igloo-greenhouse-that-could-inspire-fresh-food-production-in-the-north-1.3698004>

<sup>39</sup> Russian Arctic Food Security: Emergence of Innovative Farms; see <http://www.mvnauka.ru/2016/10/Gerasimov.pdf>

<sup>40</sup> Cheese from Reindeer; see <https://journeysofcheesegirl.wordpress.com/2015/09/04/cheese-from-reindeer/>

<sup>41</sup> Lapland cheese with reindeer meat; see <https://www.valio.ee/en/products/cheese/cooked-fresh-cheese/lapland-cheese-with-reindeer-meat-120-g>

<sup>42</sup> Parliament Members get acquainted with the Taba Company's work and products; see <http://itumen.ru/content/parlamentarii-oznakomilis-s-deyatelnostyu-ao-%C2%ABtaba%C2%BB>

<sup>43</sup> Delivery and installation of three modular integrated facilities for primary processing of fish and wild berries; see <http://tholod.ru/modulnyy-proizvodstvenno-bytovoy-kompleks.html>

<sup>44</sup> Making money out of wild berries: experience gained by Tomsk entrepreneurs; see [https://www.rbc.ru/own\\_business/03/04/2018/5abcde379a7947f405a5d2ed](https://www.rbc.ru/own_business/03/04/2018/5abcde379a7947f405a5d2ed)



# Strengthening the Wild Harvest Value Chain in Armenia to Reduce Poverty in Rural Areas

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## Executive Summary

The **goal** of this case study is to suggest policy options aimed at strengthening the wild harvest value chain in Armenia to reduce poverty in rural areas.<sup>1</sup>

According to estimates, the volume of wild berries and fruit collection in Armenia amounts to tens of thousands of metric tons,<sup>2</sup> and provides up to 20 percent of the family income for people living in rural areas.<sup>3</sup> While poverty remains one of the most pressing socioeconomic issues in rural Armenia—the official rural poverty rate is 30.4 percent (Statistical Committee 2018a)—additional income-generating activities such as wild harvesting can improve the livelihoods of the rural population. Wild harvested berries—such as rosehips, raspberries, blackberries, cornelian cherries, and sea buckthorn, among others—are in demand both by consumers and the processing industry in Armenia. Policy interventions aimed at strengthening the wild berry value chain will contribute to reducing poverty in rural areas.

The functioning of the wild harvest berry value chain in Armenia is constrained by a number of **policy issues** related to (1) *the value chain supply side*, such as unstable supply, small-scale collection, market access challenge, and failure to comply with wild harvest regulations; (2) *the value chain demand side*, such as unstable demand and lack of innovation and diversification in the processing segment of the value chain; and (3) *the overall value chain context*, such as the absence of a national data collection system, the challenge of coordinating among value chain participants, and the absence of contractual agreements between value chain participants.

The **key stakeholders** in the wild harvest berry value chain in Armenia include wild harvest collectors, buyers of wild harvest produce (middlemen), processors, consumers, government agencies, and nongovernmental organizations (NGOs).

**Policy measures** aimed at strengthening the wild harvest value chain discussed in this case study address the three groups of policy issues identified. The suggested policy options are based on international

best practices and experience and take into account the specific wild harvest sector development characteristics in Armenia. *Policy options strengthening the supply side* suggest a model that would solve the issue of unstable supply in the value chain and focus on capacity building and cooperative development for wild harvest collectors. *Policy options strengthening the demand side* focus on developing Armenia's agri-food exports, including establishing agro-based clusters, ensuring compliance with international food safety standards, and investing in market research and export promotion activities. *Policy options strengthening the value chain infrastructure* suggest developing a data collection mechanism for the wild harvest sector, establishing an online platform/mobile application connecting wild harvesters and processors, and including wild harvesting as part of the organic sector development in Armenia. However, developing policy options aimed at strengthening the wild harvest berry value chain in Armenia requires a strategic approach to policy making based on (1) accurate wild harvest sector data and (2) stakeholder consultations.

## Background

### Rural Development and Poverty in Armenia

Agriculture plays an important role in Armenia's rural development. In 2011–15 this sector's contribution to the country's GDP amounted to 20 percent (Ministry of Agriculture 2018a). As of 2016, agriculture employed 338,100 people, which accounted for 33.6 percent of the country's total employment (Statistical Committee 2018b). With the rural population amounting to 38 percent of the total population in Armenia,<sup>4</sup> this sector is one of the largest employers in the country.

Poverty remains one of the most pressing socioeconomic challenges in Armenia. In 2016 the rural poverty rate was 30.4 percent (Statistical Committee 2018a). The main source of income for people living in rural areas is agriculture, which on the one hand

<sup>1</sup> For the purposes of the current case study, wild harvesting is limited to the collection of wild berries.

<sup>2</sup> The volume of wild berry collection separate from wild fruit collection is not available. Estimates are from SHEN NGO and AM Partners Consulting Company (2017).

<sup>3</sup> This increase in income occurs during collection season, which lasts from July till October.

<sup>4</sup> Population data are from the World Bank (accessed July 25, 2018), <https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS>

provides food (subsistence farming) but on the other generates only limited cash. Thus many families living in rural Armenia are in need of additional sources of income.

**Harvesting and selling wild berries can generate additional income for families in rural areas, and this sector has the potential to play a very important socioeconomic role.** In addition, reducing poverty is an important element of increasing food security, because poor people spend a large share of their incomes on food. Poverty is directly linked to high vulnerability to growth in food prices and declines in agricultural output. This is especially critical for poor people living in rural areas who obtain much of their income from farming (Martin 2010). Access to additional sources of income can help improve food security in rural Armenia by improving food accessibility (economic access to food) and reducing vulnerability.

## Wild Harvest Sector Overview

*Wild harvesting or wild crafting* is the practice of harvesting plants from their natural or “wild” habitat, primarily for food or medicinal purposes. It applies to uncultivated plants wherever they may be found. **For the purposes of the current case study, wild harvesting is limited to the collection of wild berries.**

Harvesting wild berries for personal consumption is a common practice in rural areas. People eat fresh berries during the harvesting season, make preserves (jams, juices, kompots,<sup>5</sup> etc.), and dry wild berries for culinary and medicinal purposes. From the nutrition perspective, berries are important sources of essential micronutrients, particularly vitamin C and folic acid, and locally grown berries are considered an important dietary resource (Beattie, Crozier, and Duthie 2005). Berry preserves are traditionally considered an alternative to fresh berries off-season, when buying fresh fruit and berries is not always economically feasible for the low-income population in both rural and urban areas in Armenia.

Besides the wild berries harvested for personal consumption, they are sold in markets or along the

main roads in the areas where they are collected. Usually people buy wild berries to make preserves. Wild berries are also used by processing companies producing juices and fruit/berry preserves, and are often combined with cultivated berries during processing.

According to estimates, the volume of wild berries and fruit collection in Armenia amounts to tens of thousands of metric tons (SHEN NGO and AM Partners Consulting Company 2017);<sup>6</sup> however, there is no accurate assessment of these quantities. Usually people engaged in this activity do not record how much they collect and sell, and in most cases their activities are not supervised. Some of the berries and fruit collected is used for the collectors’ own consumption. In addition, there is no state system in place for registering the amount of berries and fruit collected in forests.

The following wild berries are most often collected in Armenia: rosehips, raspberries, blackberries, cornelian cherries, and sea buckthorn, among others. Certain types of berries are more common in certain parts of the country. For example, sea buckthorn grows in large quantities in Gegharqunik Marz,<sup>7</sup> while raspberries, blackberries, and rosehips grow in the mountains in Tavush and Lori Marzes. **The focus regions for this case study are Tavush and Lori Marzes**, although most of the issues discussed here are common for the wild harvest sector in Armenia in general.

## Wild Harvest Sector Regulations in Armenia

As per the decree of the Minister of Agriculture No. 159 on “Secondary Forest Use,” individual entrepreneurs, legal entities, and natural persons may obtain the right to secondary forest use by submitting an application to the forest use right holder. A *secondary forest use contract* is then signed and a forest permit is issued, which allows the permit holder to harvest non-wood timber, fruits, berries, nuts, mushrooms, edible plants and medicinal plants, and technical raw materials, as well as to install bee hatcheries in the forest lands.

<sup>5</sup> Kompot is a nonalcoholic sweet beverage of Slavic origin that may be served hot or cold depending on the tradition or season. It should not be confused with the dessert called compote.

<sup>6</sup> Wild berry collection volume (excluding wild fruit) is not available.

<sup>7</sup> A marz is an administrative entity in Armenia, equivalent to region.

So-called *forest management plans* determine the resources of secondary forest use, their territorial distribution, and annual volumes of use/harvesting.

**Collection of wild berries and fruits:** Berry collection can be carried out in all public and community forest areas, with the exception of cases prescribed by the legislation of the Republic of Armenia. Berries should be harvested by methods that do not impede their natural recovery and reproduction (Box 1).

## Wild Harvest Value Chain Overview

### Harvesting Segment

- ✓ Harvesting is conducted by people living in rural areas (mostly women) involved primarily in cattle breeding, along with cultivating crops mostly for their own consumption.

- ✓ There is no specialization in gathering one single type of berry.
- ✓ Harvesting is conducted manually and in most cases without the use of any tools or equipment.
- ✓ The distance between the wild harvesting areas and villages where berry pickers live may be up to 10–15 kilometers (see Figure 1 for the relationship of segments of the wild harvest value chain).

### Post-Harvest Handling Segment

- ✓ Wild berries are sold shortly after they are collected (usually the same day) because of a lack of storage and cooling facilities and the berries' high perishability (raspberries and blackberries especially).

#### Box 1: Why Focus on the Wild Harvest Sector for Rural Poverty Reduction?

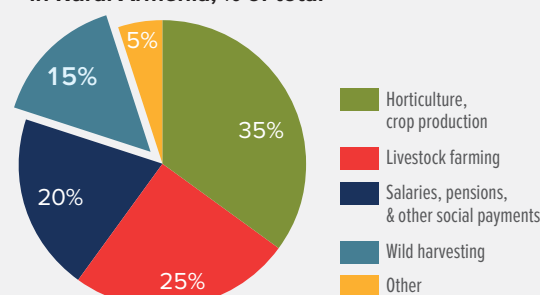
**Wild harvesting plays an important economic role in rural areas** by providing an additional source of income for the poorest people in these regions of Armenia. According to stakeholder interviews, this sector on average provides 15 percent of the family income during the collection season: see Figure B1.1 (wild harvesting season for berries starts around July and ends in October). For some wild collectors this activity provides up to 50 percent of the family income (this can occur when wild harvesters are employed directly by a processing company, as noted in an interview by the authors with private entrepreneur Alexandr Ghukasyan).

**The growth potential of the sector is huge.** According to estimates, only 4 to 5 percent of the potential wild harvest is being collected. Difficulty in accessing some collection sites located in the mountains, poor security in border areas, and a lack of demand from processors and middlemen, among other reasons, may explain why such a small amount is being harvested.

**The growth potential of collection volumes is significant and ranges between 20 and 80 percent** (SHEN NGO and AM Partners Consulting Company 2017). Primarily because of challenges linked to market access and difficulty connecting with buyers, the collection volume of wild berries is below its potential. During stakeholder interviews for this study, most of the wild collectors said that they could collect more if they could sell more.

**The potential to increase the production of high-value organic products for export is estimated as high.** Wild berries grow in ecologically clean conditions in forest areas located in the mountains, far from roads and industrial production facilities. Very little time is required to obtain organic certification for wild crops (between two weeks and several months). At the same time, certifying organic farmed crops requires a three-year conversion period. The global market for organic food continues to grow; it reached US\$89.7 billion in 2016 (FiBL 2018), which provides increasing opportunities for exporting Armenian organic products.

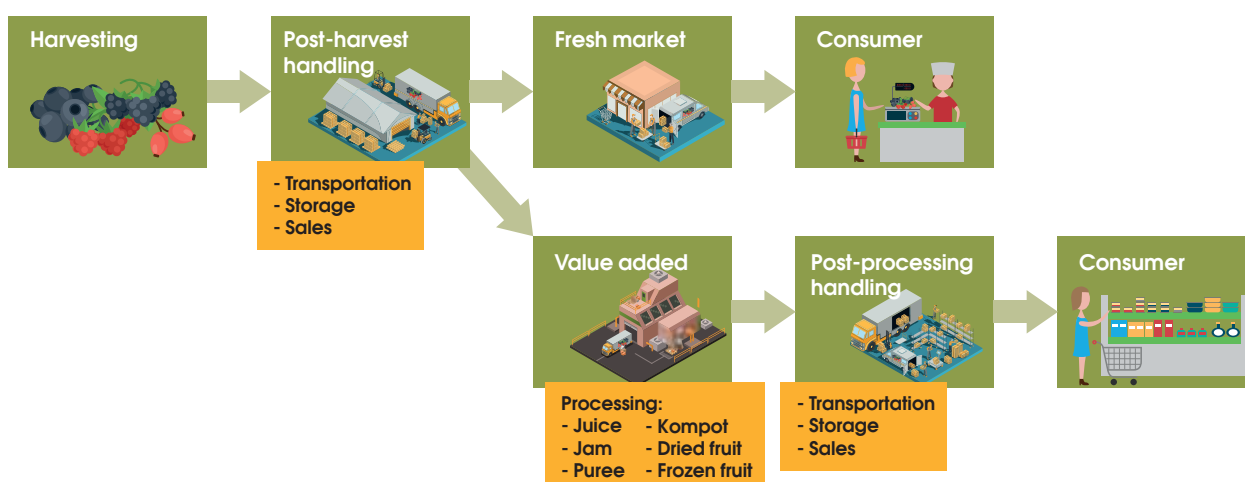
**Figure B1.1: Sources of Family Income in Rural Armenia, % of total**



Source: Stakeholder interviews (Sergey Meloyan, August 2018).

Entry barriers for the sector are low (e.g., access to technology and assets, skill requirements, etc.), which makes it accessible to most of the rural population. Traditionally women perform most of the work at the collection stage of the value chain and their engagement in higher-value-added activities that generate more income can be further increased (for example, if they gain new skills related to product storage, packaging, marketing and sales, etc.).

Figure 1: Wild Harvest Berry Value Chain



- ✓ Key sales channels for wild berries include direct sales to consumers at local markets, sales to middlemen, and sales to processors.
- ✓ From collection sites, wild berries are transported by harvesters either by foot or by taxi (a group of collectors may hire a taxi) or by middlemen/processors if they submit an order for a certain type of berry. The means of transportation is determined both by the distance from the village to the harvesting site and the amount of berries collected.

#### Fresh Market – Consumer Link

- ✓ When wild berries are sold at local markets or along main roads, they go directly to the end consumer.
- ✓ Berries from the market are either consumed fresh or are processed for personal consumption (as jams, juices, kompots, etc.).
- ✓ Quality (appearance), price, and place of origin are key factors impacting sales.

#### Value Added – Post-Processing Handling – Consumer Link

- ✓ Value is added to wild berries during processing activities such as producing jam, juice, puree, or kompot, or freezing/drying berries.
- ✓ According to Ministry of Agriculture data, over 350 companies process berries, fruits, and vegetables (including wild harvested berries) in Armenia (Table 1).
- ✓ Most processors of wild harvested berries are *small companies* operating on an order basis. Their production capacity is limited: in most cases they produce one or two kinds of products (jams and kompots) and have a limited number of clients. *Large and medium-sized companies* usually have a stable market for their products, have a large product line (besides jams and kompots, they produce juices, fruit purees, etc.), and have contracts with retailers in Armenia and abroad (primarily the Russian Federation).

**Table 1: Companies in Armenia that Process Berries, Fruit, and Vegetables**

Company type	Number of companies	Company names	Annual production capacity (metric tons)	Number of employees <sup>a</sup>
Fruit and vegetable processing companies	35 (7 are large companies)	Artashat Cannery OJSC, Echmiatsin Cannery OJSC, Ararat Food Plant LLC, Euroterm CJSC, MAP CJSC, Tamara Fruit CJSC	250,000	1,774
Physical persons and legal entities producing dried fruits and spices	350 (6 are medium-sized companies)	Chir LLC, Gyughi Tatik LLC, Armen Manoukian, Hasmik Mirzoyan Private Entrepreneurs, Vayk Group CJSC	15,000	880

Source: Ministry of Agriculture website <http://minagro.am/> (in Armenian)

Note: *Small, medium sized companies* are defined in the Republic of Armenia Law “About Small and Medium Entrepreneurship State Support” (<https://www.arlis.am/documentview.aspx?docID=64617>). *Small companies*: the number of employees is up to 50 people, and annual earnings from sales do not exceed 500 million Armenian Drams; *medium companies*: the number of employees is up to 250 people, and annual earnings from sales does not exceed 1,500 million Armenian Drams. A definition for large companies is not provided, but we may assume that large companies have more than 250 employees and their annual earnings exceed 1,500 million Armenian Drams.

CJSC = closed joint-stock company, a legal entity whose shares are distributed among a limited number of shareholders; OJSC = open joint-stock company, a legal entity where shares may be publicly traded without the permission of other shareholders; LLC = limited liability company.

<sup>a</sup> Total number of employees in companies of a certain type.

- ✓ Some processors produce organic certified products. For example, Sam-Har LLC (Sipan brand) and Euroterm CJSC (Noyan brand) have organic product lines.
- ✓ Transportation from production facilities is usually conducted by the producer directly to retailers’ storage facilities or directly to stores.
- ✓ Products made from wild harvested berries and fruit are available for consumers at domestic and foreign supermarkets (Figure 2).

## Policy Issues

Understanding the existing policy issues is critical for strengthening the wild harvest berry value chain in Armenia. The policy issues are related to (1) *the supply* and (2) *the demand* sides of the value chain and (3) *the overall value chain context* (Figure 3).

### Supply-Related Policy Issues

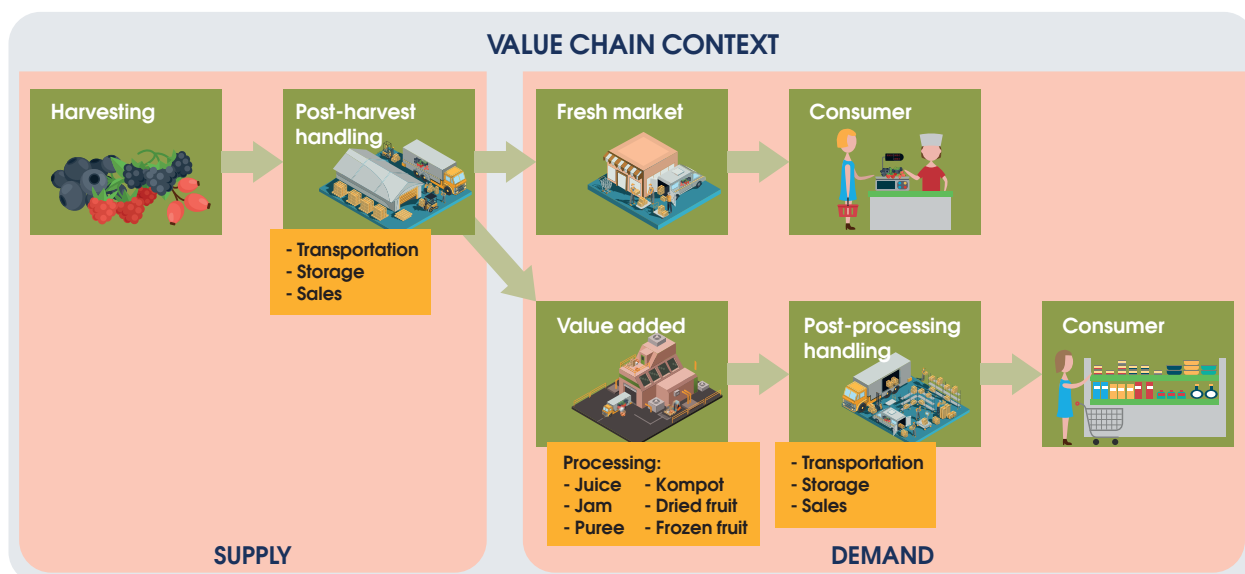
**Unstable supply:** Wild harvesting is not the main occupation of the people involved in this activity. People engaged in wild harvesting are mostly farmers who own certain agricultural assets. Besides collecting wild berries for their personal consumption, they take up this activity when they know that they

**Figure 2: Berry and Fruit Kompots on Sale at a Supermarket in Yerevan**

Source: Yulia Mitusova 2018.

are going to be able to sell what they collect (they have an order or know that a buyer is going to come to their village at a certain time).



**Figure 3: Policy Issues in the Wild Harvest Berry Value Chain**

**Small-scale collection:** The average daily collection volumes of wild berries per harvester are low. Based on stakeholder interviews, one person can collect up to 15 kilograms of raspberries or up to 25 kilograms of blackberries per day; however, the average daily collection volumes are lower and range between 5 and 10 kilograms per person. Unless wild collectors work in a group or form a cooperative, the individual small-scale collection volumes do not generate serious commercial interest. Processing companies need hundreds and thousands of metric tons of berries for processing, and often have to combine cultivated and wild harvested berries to make up the necessary volume.

**Access to market challenge:** Based on stakeholder interviews, access to market (i.e., finding buyers) is the biggest challenge that wild collectors face. Wild berries are usually gathered in remote areas far from large cities where major agricultural and food markets and larger processing companies are located. In most cases wild collectors do not have the resources to travel to a city market (often 10 to 15 kilometers away) and are dependent on buyers to come to their village and pick up the berries they collect.

**Failure to comply with wild collection regulations:** The Hayantar State Non-Commercial Organization (SNCO) of the RA [Republic of Armenia] Ministry of Nature Protection is responsible for regulating the wild harvest sector. Those engaged in wild collection for commercial purposes should obtain a relevant permit (forest permit) from the regional representations of these entities; in certain cases, they also pay

fees and only then can engage in wild collection. In practice, nobody complies with these legal requirements. While collection volumes are low this might not be a significant issue, but if collection volumes increase the environmental sustainability of forests could become an issue. In this case the following questions arise: How can the sustainable collection of wild berries be ensured? What kind of regulations would help protect forests in Armenia and at the same time encourage wild harvesting in a sustainable way?

### Demand-Related Policy Issues

**Unstable demand:** Most of the wild berry processors are small companies operating on an order basis. They start production when they have an order for a certain type of product from a client. Based on stakeholder interviews, finding clients is the key challenge small processors in Armenia are facing. For a one-person company it is very difficult to manage the production process and at the same time find clients. Thus, even during the harvesting season, small producers cannot ensure a stable demand for wild harvested berries.

**Lack of innovation and diversification in the processing segment of the value chain:** Most of the small processing companies produce a limited number of products traditional for Armenia, Russia (a key export market for Armenian products), and other countries in the region, such as jams, kompots, dried berries/fruit, and so on. They use very basic

equipment and employ traditional production methods. While these products are in demand in Armenia and Russia, this might not be the case for other foreign markets. Continuing to expand exports is very important for Armenian producers due to the following: First, the capacity of the domestic market is limited—Armenia’s total population is approximately 3 million (Statistical Committee 2018c). Second, depending on Russia as the only export market is very risky: Armenian exporters experienced significant financial losses when the Russian ruble depreciated in 2014. Expanding into Europe and other foreign markets requires both (1) understanding the preferences and tastes of foreign consumers, and (2) investing in advanced quality-control systems and producing high-value products that have high export potential.

## Policy Issues Related to the Value Chain Context

### **Absence of a national data collection system:**

Currently there is no official country-level record of the quantity of wild berries that are collected, which leads to an inability to get an accurate estimate of this sector’s size. An absence of statistical data proving the socioeconomic importance of the wild harvest sector or providing insight regarding its potential prevents policy makers from adopting relevant policies necessary to further develop this sector.

### **Value chain participants’ coordination challenge:**

Having an efficient information flow and proper *coordination between wild collectors and processors* is critical for the efficiency of the wild harvest value chain. Most wild collectors interviewed said that they could collect more if they knew where to sell the wild harvested berries. At the same time, processors (especially the larger ones) admitted that they would buy more wild berries if they could find suppliers. Coordination between wild collectors is also very important because for processors it is easier and more convenient to work with one supplier than to make separate arrangements with 50 suppliers.

### **Absence of contractual agreements between value chain participants:**

There are no contracts or signed agreements between wild collectors and buyers. Because of the high level of informality of the wild harvest berry value chain, wild collectors do not always keep the promises they make about the volumes of berries they plan to collect. For example, if a different buyer offers a higher price, an

agreement made with the initial buyer may not be kept. In addition, because there are no contracts, the sales volumes of wild berries are not recorded.

## Stakeholder Groups

### Wild Harvest Collectors

Wild berries are usually collected by women living in rural areas in the proximity of forests and/or pastures. The age of the women involved in wild harvesting is usually 30+ (in most cases 50+). In most cases these women are also involved in cattle breeding and/or crop cultivation. For them wild harvesting is not only a source of additional income but an activity that they enjoy.

Wild harvesters may be divided into two groups: (1) women organized in an informal group or cooperative who have participated in trainings on sustainable collection methods through an international or local NGO; and (2) individual collectors with no training in wild harvesting requirements or methods. Women in both groups have experience selling the berries they collect (1) directly to consumers at local markets or along the main roads; (2) to middlemen; and (3) directly to processors. Usually wild collectors are aware of the quality required and prices for the berries they collect. Their main goal is to be able to sell the berries as soon as they collect them at a favorable price. In some cases wild harvesters are willing to participate in post-harvest handling and processing activities. However, because of a lack of access to finance in most cases, they are limited to participating only in the harvesting segment of the value chain.

### Buyers (Middlemen)

In many cases the direct buyers of wild harvested berries are middlemen who serve as a link between wild harvesters and processors and/or vendors at agricultural markets up to 200 kilometers away in Yerevan and other cities. Their main role is to deliver wild harvested berries from collection sites to processing sites. Their margin ranges from 50 to 100 Armenian drams (US\$0.1–0.2) per kilogram.

Sometimes middlemen inform wild harvesters in advance of the quantity of berries they require, their price and pick-up date and time. In other cases they

drive around villages during harvesting season and buy berries that are available with no prior agreement on quantity and price. Payment is usually made at the moment of procurement.

Middlemen usually do not store the berries, but take them directly to processing facilities or markets and try to sell them as quickly as possible.

Middlemen are interested in having a high margin for the berries they sell. This requires having access to the best-quality products, picking up the necessary amount from one single location and reselling the products for the highest possible price.

## Processors

Processing enterprises located in rural areas usually have a network of wild berry collectors and middlemen to get their supplies. Large processors based in Yerevan require larger quantities of wild berries, and even though they also have suppliers they work with frequently, very often they are unable to procure the required amount of wild berries. In this case they either produce a smaller quantity of a certain type of product or use cultivated berries as a substitute. However, during stakeholder interviews, all processors mentioned that wild harvested berries were important ingredients because of their unique flavor (which cultivated berries do not have).

All processors are interested in having access to good-quality raw materials when they need them and having a stable market for their products. At the same time, when inquired about the key challenges that processors were facing, the answer differed, depending on the size of the company. Large companies with a well-developed client base mentioned that their main challenge was getting the necessary amount of raw materials at the right price. They need to be able to buy more and pay less for each kilogram they procure. For small companies, the key challenge is finding clients for their products.

## Consumers

Consumers of wild harvested berries include the wild harvesters themselves, rural and urban populations

in Armenia, and consumers in foreign countries. In most cases, consumers purchase processed wild harvested produce in the form of jams, kompots, juices, and so on. The share of wild harvested berries in these products' content may vary from 5 percent (raspberry jam) to 100 percent (cornelian cherry juice). Frozen (berry mixes) and dried (rosehip) wild harvested products are also available for consumers.

In some cases consumers purchase wild harvested berries for canning purposes—this is a common practice in Armenia, especially in rural areas. Wild harvested berries are also consumed raw. Because of the high perishability of fresh wild harvested berries, raw berries are consumed mostly in rural areas close to wild harvesting sites.

Both domestic and foreign consumers are interested in having access to high-quality, safe products at a reasonable price. Consumers of organic products are ready to pay more for organic certified products.

## Government Agencies

The government plays an important role in developing the wild harvest sector because it can design policy measures that directly or indirectly impact this sector. At the same time, different government agencies have different interests and varying levels of influence on the development of wild harvesting in Armenia.

**The Ministry of Agriculture** develops and implements policies in the area of agriculture and food. In addition, the ministry leads intergovernmental cooperation in the fields of agriculture, forestry, plant-growing, cattle-breeding, irrigation, and soil usage (Ministry of Agriculture 2018c).

In the “Sustainable Development Strategy for Rural Communities and Agriculture of RA in 2010–2020,” wild harvesting is mentioned as one of the priority areas in the field of crop cultivation and food processing (Ministry of Agriculture 2010, pp. 48 and 60, in Armenian). In addition, “production of canned foodstuff, . . . mineral waters and juices” is one of the focus areas for industry and export promotion mentioned in the “Armenia Development Strategy for 2014–2025” (Ministry of Agriculture 2014).<sup>8</sup>

<sup>8</sup> No differentiation is offered on cultivated vs. wild harvested raw materials. However, based on interviews with processors (both large and small), wild harvested berries and fruit are an important ingredient in canned fruit products and juices.

However, so far no policies specifically dedicated to the wild harvest sector have been adopted at the Ministry of Agriculture level.

Wild harvesting is not the main focus of the Ministry of Agriculture because its primary focus is on cultivated crops. However, this sector can play an important role in Armenia's agri-food sector and help solve socioeconomic issues in rural areas (1) if it is developed in parallel with the cultivated berries and fruit sector, and (2) if it provides raw materials for organic production. In this case the ministry could develop policy measures in partnership with other government agencies to facilitate the growth of the wild harvest sector.

**The Ministry of Nature Protection** develops and implements state policy in the field of environmental protection and rational use of natural resources. Non-timber forest use (including wild harvesting) is one of the focus areas of the ministry. The Bioresources Management Agency and Hayantar SNCO are directly responsible for overseeing the use of natural resources, ensuring their sustainability and cadaster management of forests, among other activities.<sup>9</sup>

The Ministry of Nature Protection is directly involved in policy development related to wild harvesting activities in Armenia. Although basic regulations covering wild harvesting activities do exist, data necessary for sustainable management of non-timber forest products are absent and a unified state inventory of the flora stock in Armenia has never been conducted.

## Nongovernmental Organizations

Local and international nongovernmental organizations (NGOs) play an important role in the wild harvest sector in Armenia. Through various programs they conduct wild harvest sector market research and trainings on sustainable collection practices for collectors, among other activities.

A significant amount of work has been conducted in the wild harvest sector in Armenia by the following organizations: The International Finance Corporation, the International Center for Agribusiness Research and Education (ICARE), the

Armenian Young Women's Association (in the framework of the Armenia Gender Project); Shen NGO and AM Partners Consulting Company (in the framework of the EU project Integrated Support for Sustainable Economic Development in Rural Mountainous Areas of Armenia), and the German Technical Cooperation Agency (GTZ). However, most of this work has been either focused on specific marzes (regions) in Armenia (not the country as a whole) or dedicated to certain aspects of the wild harvest sector development, such as gender, entrepreneurship, and so on. The more general projects focused on value chain analysis and sustainable economic development offer a very high level overview of the wild harvest sector in Armenia and do not provide data on the number of people engaged in wild harvesting or the volume of wild harvest collection on the country level. Moreover, most of the information available in the various NGO reports is based on estimates and interviews with people engaged in wild harvesting, and there are no hard data to support the available soft data.

## Policy Options

While some evidence of the wild harvest sector's socioeconomic importance in rural Armenia exists, the data available on the sector's size and its contribution to the agri-food industry and growth potential are limited. Thus, in order to justify developing a comprehensive strategy for the wild harvest sector development, additional data collection and sector assessment work are needed. In the short term, ***policy options aimed at strengthening the supply and demand sides of the value chain***, as well as ***the overall value chain infrastructure***, will help strengthen the wild harvest berry value chain and contribute to improving the livelihoods of the rural population in Armenia.

The suggested policy options are based on international best practices and experience and take into account the wild harvest sector development characteristics specific to Armenia. The objective of these policy options is to support the development of the wild harvest berry value chain, while also (1) having a spillover effect on broader agri-food sector value chains and (2) building on already existing initiatives and programs in the agri-food sector.

<sup>9</sup> The Bioresources Management Agency moved to the jurisdiction of the Ministry of Nature Protection from the Ministry of Agriculture in 2018.

## 1. Policy options strengthening the supply side

### *a. Contract workers to ensure stable supply*

The ability to sell wild harvested berries—that is, to make sure that their work is rewarded—is the main concern for people engaged in this activity. To address this issue, the wild berry sector development model of Finland and Sweden (Laird, McLain, and Wynberg 2010) can be adopted in Armenia. Wild berry enterprises in Finland and Sweden employ seasonal pickers (both domestic and foreign migrant workers).<sup>10</sup> By employing contract workers, companies can secure more berries than they could buy from local pickers. This model also solves the issue of earning a stable seasonal income for wild harvesters. Thus both enterprises and contract workers benefit.

This approach requires processing companies to have a stable demand for wild berries, which is not

always the case in Armenia. In addition, because most people combine wild harvesting with other agricultural activities, they might not be able to commit to a full-time seasonal job. The role of middlemen in the wild harvest berry value chain will become less important if processing companies have direct contact with wild harvesters.

While this model might apply to large companies that have a stable demand for wild harvested berries and to people looking for a full-time seasonal job, the impact of this policy option on strengthening the wild berry value chain in Armenia and reducing poverty in rural areas will probably be very limited.

### *b. Provide education and extension services for wild harvesters*

Educating wild harvesters on sustainable collection practices, safety, and other relevant skills will help increase their productivity and provide additional opportunities to participate in higher value added activities in the wild harvest berry value chain (Box 2). During stakeholder interviews, wild collectors mentioned that the trainings they had received on wild collection were very beneficial: the quality of the collected berries improved and their quantity increased.

Trainings and consultations could be organized through the Agricultural Development Fund,<sup>11</sup> which is administered by the Ministry of Agriculture. Trainings on wild harvesting could be included in the Fund's annual work plan, and the Fund's staff based in the marzes would provide trainings and consultations to target groups. No significant expenses would be involved because existing infrastructure and staff would be used to conduct these trainings. In addition, NGOs that have already conducted similar trainings could be involved. Wild collectors would be the main beneficiaries of the trainings. Processors and middlemen would also benefit: they would have access to better-quality products and would work with organized groups of wild harvesters. Because wild berries would be harvested in a sustainable way, the environment would be positively impacted.

#### *Box 2: Areas of Focus for Education Programs for Wild Harvesters*

- ✓ Sustainable and safe wild harvest collection
- ✓ Transportation and storage of wild collected products
- ✓ Basic cost-benefit calculations (many collectors never considered any value-adding activities that could result in higher profitability)
- ✓ Basic Internet marketing (processors' contacts are available on the Internet, hence the ability to search the web will help collectors connect with potential customers)
- ✓ Teamwork (because individual collection volumes are insufficient to generate serious commercial interest, collaboration of several collectors is critical to enable access to market)
- ✓ Management and leadership skills (processors or middlemen prefer to work with a group leader who organizes collectors and serves as a contact point in negotiations on product quality, quantity, and payment terms)

<sup>10</sup> In case of Armenia only local collectors can be engaged as contract workers.

<sup>11</sup> The Agricultural Development Fund's main function is to provide trainings and consultations in communities, and it possesses the necessary infrastructure in all of the marzes to conduct trainings.



### *c. Establish cooperatives in the wild harvest sector*

Cooperative development is an important strategic area for the agriculture sector development in Armenia.<sup>12</sup> Currently only 12 percent of 3,278 cooperatives registered in Armenia are agricultural in nature (State Register of Legal Entities of the Republic of Armenia 2018). Official data on registered wild harvest collection cooperatives are not available; however, out of six wild harvest collector groups interviewed, one was operating as a registered cooperative.

Establishing cooperatives in the wild harvest sector would formalize the value chain transactions and create additional business opportunities for wild harvesters. Because processors and retailers prefer to sign contracts with legal entities and not deal with private persons, operating as a registered cooperative would increase the likelihood of having long-term supply contracts. As an organized group, wild harvesters would also be able to offer a larger quantity of berries to buyers. In addition, cooperatives are more likely to be included in government and donor programs targeting the development of the agri-food sector.

The Agricultural Development Fund, NGOs, or informal wild collector group leaders would have to facilitate the development of cooperatives in the wild harvest sector. Wild harvesters would be the main beneficiaries of cooperative development because, as a formal organized group, they would become a more attractive business partner for the processing industry. Processors and middlemen would also benefit because they would be working with only one partner and getting access to a larger quantity of berries.

## 2. Policy options strengthening the demand side

Because of the limited size and high competition in Armenia's domestic food market, **developing**

**exports** is one of the focus areas for most of the companies processing wild harvested berries. Both small and large companies are always in search of new clients and export markets. The critical success factor in building a strong export industry is to emphasize quality, high value, and product differentiation, so that competition is not based on cost only. In addition, building a strong export industry requires public-private dialogue and stakeholder cooperation. In the case of Armenia, Business Armenia could serve as a platform for dialogue between the processing industry, the government, and other stakeholders involved in export related activities.<sup>13</sup> The following measures could help support export growth for Armenian processing industry:

### *a. Establish agro-based clusters*

An agro-based cluster for berry/fruit and vegetable producers and processors (including wild harvest processors) needs to be built.<sup>14</sup> This could be initiated either by NGOs working on projects related to the wild harvest sector or the fruit and vegetable processing industry in Armenia, by the Ministry of Agriculture, or by active industry representatives. Research indicates that clustering in the agricultural sector presents many benefits, such as creating an enabling environment for interfirm cooperation, facilitating the diffusion of innovations, and acting as a means to efficiently channel public support to increase competitiveness in the agricultural sector (Gálvez-Nogales 2010). The following is especially relevant for Armenia: small-scale firms can benefit from participating in agro-based clusters, as they enjoy evident joint-action advantages and agglomeration economies. In addition, clusters help create regional/country identity that would help brand Armenian agri-food products in foreign markets.

### *b. Ensure compliance with international food safety standards*

Capacity to comply with food safety standards is a pre-condition for growing exports (especially

<sup>12</sup> See "Sustainable Development Strategy for Rural Communities and Agriculture of RA in 2010–2020" (in Armenian), available at [http://minagro.am/public/uploads/2014/02/agstrategy\\_arm3.pdf](http://minagro.am/public/uploads/2014/02/agstrategy_arm3.pdf)

<sup>13</sup> *Business Armenia* (the rebranded Development Foundation of Armenia; see <https://www.businessarmenia.am/en/>) was established by the Government of the Republic of Armenia in 2015 with the mission of promoting the country's economic growth. Its aim is to enhance Armenia's rating and competitiveness, attract investments, and promote exports.

<sup>14</sup> An agro-based cluster is a concentration of producers, agribusinesses and institutions that are engaged in the same agricultural or agro-industrial subsector, and interconnect and build value networks when addressing common challenges and pursuing common opportunities.

for small processors). Certification of compliance with standards at the cannery level is a necessary condition for market diversification. The Ministry of Agriculture could play an important role in this process by (1) providing consultations on international food safety requirements to local processing companies, and (2) offering small and medium enterprises financial assistance (subsidies) for upgrading equipment/processes to comply with international food safety standards. This would require both financial and human resource allocation from the Ministry of Agriculture, as well as possible involvement of regional extension service offices. Processors (especially small and medium enterprises) would benefit from these measures because they would become more competitive internationally. At the same time, both domestic and international consumers would benefit because they would have access to safer food products.

### *c. Invest in market research and export promotion activities*

Assistance in finding new markets, helping assess market opportunities, and implementing market development strategies are key measures aimed at growing Armenian exports. Priority should be given to high-value products (including organic products). Export promotion activities can include: (1) branding and promoting the origin through participation in international fairs and exhibitions, (2) organizing study tours to potential export countries, and (3) conducting market research and market studies to help companies target markets and products more effectively. These measures are especially relevant for small companies that have limited resources for market research and partner search activities. *Business Armenia* could play an important role in organizing export promotion activities. NGOs could take part in conducting research on the most promising markets for Armenian processed products in the framework of existing programs.

## 3. Policy options strengthening the value chain infrastructure

### *a. Data collection*

Availability of data on consumption and trade of wild harvested berries, among non-timber forest products, is a challenge not only in Armenia but also

in many other countries in the world. This sector's activities are rarely reflected in national statistics, such as gross national product, because they mostly occur at the local level. However, it is challenging to create wild harvest sector regulations and policies facilitating trade and the overall development of this sector without solid statistics.

**Government level:** A possible solution could be for the government to choose non-timber forest products of national relevance (for example, high-value export products or widely used berries) and develop monitoring and product classification systems to track them (Vantomme 2003). In Armenia, such systems could be developed at the level of the Bioresources Management Agency under the Ministry of Nature protection, or Hayantar SNCO, which operates in the area of non-timber forest use, including inventory management and cadaster management of forests. This measure would improve national accounting of the most important wild harvested berries and would provide the data necessary for designing and implementing policies facilitating the development of this sector.

**Industry level:** Industries could also be tasked with collecting statistical data on wild harvested berries. For example, the American Herbal Products Association, a US trade group for herbal products companies, conducts a survey of raw material suppliers to determine the amounts of traded wild harvested North American plants (AHPA 2018). Collecting data at the industry level requires the presence of an industry association responsible for this task. It also requires ensuring a consistent survey response rate and relying on company self-reporting data. Given the current level of development of the wild harvest sector in Armenia and the absence of a wild harvest sector association, data collection on the industry level is perhaps not feasible in the near future.

**NGO level:** NGOs are already collecting some data on the wild harvest sector, although these data are very local and inconsistent from one project to another. Given different NGOs' existing interest in the wild harvest sector, these NGOs could play a more important role in data collection and help build up the knowledge base about this sector. For this to happen, one of the NGOs with an active project in the wild harvest sector would have to coordinate the data collection effort with other NGOs also working in this sector.

### *b. Online platform/mobile application connecting wild harvesters and processors*

An online platform or mobile app linking market participants could help solve the coordination issue the wild harvest berry value chain is facing. Along with agriculture, information and communication technology (ICT) development is one of the priority sectors in Armenia's National Development Strategy for 2014–2025 (Ministry of Agriculture 2014). A reasonable infrastructural base for a digital economy exists in Armenia. All communities have 2G and 3G access from at least one provider, most people have a mobile phone, and more than 80 percent have Internet access (Christensen 2018).

The wild harvest sector has the capacity to use ICT to establish connection between value chain participants. All wild harvesters who participated in stakeholder interviews had mobile phones, and most of the collector group leaders and heads of cooperatives had smart phones.

Mobile apps—such as AgriTrade, Mykrops, and so on—connecting farmers and buyers are used in different countries in the world. These apps (1) enable agriculture suppliers to list their available products, and buyers to list their demand for certain products; and (2) serve as a platform for communication between farmers and buyers. Similar apps could be used in the agri-food sector in Armenia (including the wild harvest sector) to facilitate contact between suppliers and buyers of agricultural products.

Both wild harvesters and processors would benefit from using an app connecting market participants. Developing such an app would require financial resources and additional research on the preferences and capabilities of the target users. This could be done in the framework of existing government programs on Armenia's agriculture sector and digital economy development.

### *c. Wild harvesting as part of the organic sector in Armenia*

Organic agriculture is one of the priority areas identified in the “Sustainable Development Strategy for Rural Communities and Agriculture of RA in 2010–2020.” Basic organic sector regulations were adopted in 2008, and the organic production of

vegetables, fruits, cereals, and berries, along with the collection of wild species and beekeeping are well established in Armenia. Over the last decade the number of organic farms and processors as well as organic certified land (including wild collection areas) have been increasing (from 1,500 hectares in 2009 to 19,000 hectares in 2012) (IFOAM and ICARE 2017). The main exported organic products are fruit and berry products from organic agriculture and wild collection, such as individually quick frozen products, juices, beverages, kompots, and honey (IFOAM and ICARE 2017).

Wild harvesting is an important contributor of raw materials to the organic industry and could be developed as part of the organic sector in Armenia. A recent study initiated by the Organic Agriculture Support Initiative (OASI) concludes that while the organic sector in Armenia has been developing over the last two decades through international projects and local NGOs, “a common sector vision development or a common strategy to direct the activities of stakeholders” is absent (IFOAM and ICARE 2017, p. 5). If such a strategy “directing the activities of stakeholders” in Armenia's organic sector is adopted by the Ministry of Agriculture, wild harvesting could be included as a separate sector focus area.

Both wild collectors and processors would benefit from working with higher-value products. Wild collectors would be able to earn more money by collecting higher-value organic berries from organic certified collection areas. Processors would be earning more because they would be producing and selling higher-value products. The government would have to allocate a budget to introduce measures and policies focusing on wild harvesting as a strategic contributor to organic sector development in Armenia (IFOAM 2017). Organic sector actors would be the main beneficiaries if the government introduced measures to support organic agriculture in Armenia. Conventional agriculture value chains would not benefit in this case.

## Assignment

1. Analyze the proposed policy options and discuss their impact (1) on strengthening the wild harvest berry value chain in Armenia and (2) on separate groups of stakeholders.

2. Which of these policy options are most likely to be implemented in Armenia? Why? Discuss the power of each stakeholder group on the policy making process.

## Policy Recommendations

Strengthening the wild harvest berry value chain leading to reducing poverty in rural areas in Armenia requires a strategic approach to policy making based on (1) accurate wild harvest sector data, including an evaluation of the sector's potential and an estimate of current collection volumes; and (2) stakeholder consultations.

**Data collection:** Policies developed as a result of a careful assessment of the opportunities associated with specific wild harvested products, along with an analysis of ecosystems and livelihoods of rural communities relying on wild harvesting as a source of income, are the most efficient in their ability to strengthen the value chains in this sector. Pilot data collection for a number of selected wild harvested berries or fruits of national relevance should be organized by the Ministry of Nature Protection. In addition, data from processing enterprises and retailers, as well as export statistics, could be used to supplement data collection on the ministry level.

**Stakeholder consultations:** Consultations with stakeholders are an important way to gather information and determine policy priorities. While large processors, technical experts, and in some cases NGOs may be consulted in the policy making process, wild harvesters and small processors are rarely involved in policy design and have limited influence on the process. To design efficient policy measures strengthening the wild harvest value chain in Armenia and reducing poverty in rural areas, all relevant stakeholders need to be invited to participate in the dialogue. These consultations could be organized by the Ministry of Agriculture. Local and international NGOs that have conducted work in this sector could facilitate the process.

Only once primary data collection is completed and consultations with relevant stakeholders take place can a strategy aimed at strengthening the wild harvest berry value chain in Armenia be developed.

## References

- AHPA (American Herbal Products Association). 2018. "Submit Data for New Tonnage Survey." <http://www.ahpa.org/News/LatestNews/TabId/96/ArtMID/1179/ArticleID/1003/Submit-data-for-new-tonnage-survey.aspx>
- Beattie J., A. Crozier, and G. G. Duthie. 2005. "Potential Health Benefits of Berries." *Current Nutrition & Food Science* 1 (1): 71–86. [https://www.researchgate.net/publication/276957450\\_Potential\\_Health\\_Benefits\\_of\\_Berries](https://www.researchgate.net/publication/276957450_Potential_Health_Benefits_of_Berries)
- Christensen, G. 2018. Digital Agriculture in Armenia: Current and Prospective Applications. Unpublished report.
- Gálvez-Nogales, E. 2010. *Agro-Based Clusters in Developing Countries: Staying Competitive in a Globalized Economy*. Rome: FAO.
- FiBL. 2018. The World of Organic Agriculture 2018: Key Data. <https://www.organic-world.net/yearbook/yearbook-2018/key-data.html>
- IFOAM (International Federation of Organic Agriculture Movements). 2017. Guidelines for Public Support on Organic Agriculture. Report, IFOAM Organics International. <https://www.ifoam.bio/en/global-policy-toolkit-public-support-organic-agriculture>
- IFOAM and ICARE (International Federation of Organic Agriculture Movements and International Center for Agribusiness Research and Education). 2017. Capacity Development Strategy and Plan for the Organic Agriculture Sector in Armenia. Yerevan and Bonn: IFOAM-Organics International and ICARE.
- Laird S. A., R. J. McLain, and R. P. Wynberg. 2010. *Wild Product Governance: Finding Policies that Work for Non-Timber Forest Products*. London and Washington, DC: Earthscan. (Recommended)
- Martin W. 2010. "Food Security and Poverty—A Precarious Balance." Let's Talk Development blog, November 5, 2010. <http://blogs.worldbank.org/developmenttalk/food-security-and-poverty-a-precarious-balance>
- Ministry of Agriculture of the Republic of Armenia. 2010. "Sustainable Development Strategy for Rural

- Communities and Agriculture of RA in 2010–2020.” [http://minagro.am/public/uploads/2014/02/agstrategy\\_arm3.pdf](http://minagro.am/public/uploads/2014/02/agstrategy_arm3.pdf) (in Armenian).
- . 2014. Armenia Development Strategy for 2014–2025. [http://minagro.am/public/uploads/2014/08/PT23.1\\_14page1-216.pdf](http://minagro.am/public/uploads/2014/08/PT23.1_14page1-216.pdf) (in Armenian).
- . 2018a. Agrarian Policy Overview. <http://minagro.am/en/agriculture-in-armenia/agrarian-policy/>
- . 2018b. Agro-Processing. <http://minagro.am/en/agriculture-in-armenia/agro-processing/>
- . 2018c. Historical Review. <http://minagro.am/en/ministry/historical-review/>
- SHEN NGO and AM Partners Consulting Company. 2017. Market Research for the EU Project Integrated Support for Sustainable Economic Development in Rural Mountainous Areas of Armenia. Unpublished report.
- State Register of Legal Entities of the Republic of Armenia. 2018. [http://www.justice.am/storage/files/legal\\_acts/legal\\_acts\\_3052294284671\\_stat\\_2018-06.pdf](http://www.justice.am/storage/files/legal_acts/legal_acts_3052294284671_stat_2018-06.pdf) (in Armenian).
- Statistical Committee of the Republic of Armenia. 2018a. Food Security and Poverty: Accessibility of Food. [https://www.armstat.am/file/article/f\\_sec\\_2\\_2018\\_5.pdf](https://www.armstat.am/file/article/f_sec_2_2018_5.pdf) (in Armenian).
- . 2018b. Food Security and Poverty: Social-Economic Indicators. [https://www.armstat.am/file/article/f\\_sec\\_1\\_2018\\_1.pdf](https://www.armstat.am/file/article/f_sec_1_2018_1.pdf) (in Armenian).
- . 2018c. Population Data of the Republic of Armenia as of July 1, 2018, [http://www.armstat.am/file/article/nasel\\_01.07.2018.pdf](http://www.armstat.am/file/article/nasel_01.07.2018.pdf) (in Armenian).
- Vantomme, P. 2003. “Compiling Statistics on Non-Wood Forest Products as Policy and Decision-Making Tools at the National Level.” *The International Forestry Review* 5 (2): 156–60. [https://www.jstor.org/stable/43739889?seq=1#page\\_scan\\_tab\\_contents](https://www.jstor.org/stable/43739889?seq=1#page_scan_tab_contents)



## Abbreviations

<b>CJSC</b>	closed joint-stock company
<b>FiBL</b>	Research Institute of Organic Agriculture
<b>GTZ</b>	German Technical Cooperation Agency
<b>ICARE</b>	International Center for Agribusiness Research and Education
<b>ICT</b>	information and communication technologies
<b>IFOAM</b>	International Federation of Organic Agriculture Movements
<b>LLC</b>	limited liability company
<b>NGO</b>	nongovernmental organization
<b>OASI</b>	Organic Agriculture Support Initiative
<b>OJSC</b>	open joint-stock company
<b>SNCO</b>	State Non-Commercial Organization



# Promoting Relationships between Local Agricultural Producers and the National School Meals Programme in the Kyrgyz Republic

*Anatoly Maksimov, Yulia Kalinichenko*



## Executive Summary

The National School Meals Programme was launched in the Kyrgyz Republic in 2002; it covers at least 400,000 children throughout the country (Ministry of Education and Science 2018). In 2012, at the initiative of the Government of the Kyrgyz Republic, international development partners started implementing a school meals optimization program, mainly by switching the schools to a model of providing more nutritious, balanced, and varied hot meals.

At present, 1,146 schools (51.2 percent of the total number of schools in the country) provide schoolchildren with hot meals (UN System in the KR 2018); by 2022, about 2,076 schools throughout the country (92.8 percent of the total) will serve hot meals.<sup>1</sup>

About 622.4 million Kyrgyz som (approximately US\$9.15 million) on average is allocated annually from the republic's budget for program implementation (WFP 2018, p. 5). At the same time, the market potential for school meals in the Kyrgyz Republic is estimated to be less than 994.5 million som (about US\$14.4 million), while demand for local crop products is estimated at 13.4 thousand metric tons per year.<sup>2</sup>

Schools' increasing coverage of hot meal services facilitates a growing demand for food products at the local level. Furthermore, cooperation between the School Meals Programme and local producers is mutually beneficial. School meals provide a sustainable and appealing market for local farmers. Schools, in turn, are able to get food products at more attractive prices because of reduced nonmanufacturing costs. Schools can also get food products in smaller quantities (reducing the time needed for storage and simplifying storage management) and can diversify the school menu. However, several factors constrain the development of supply chains focused on school meals in the Kyrgyz Republic.

Further policy measures are needed to expand programs for school meals and engage local agricultural producers, as well as to establish efficient supply chains in this sector. Such chains can become

a practical tool for improving the sustainability and quality of the national social safety net for a vulnerable population through initiatives such as school meals programs by ensuring a reliable supply of high-quality and safe domestic agricultural products.

The objective of this study is to propose national policy measures to build mutually beneficial relationships between local agricultural producers and the School Meals Programme in the Kyrgyz Republic.

Based on a comprehensive analysis and assessment of the links between local agricultural producers and the National School Meals Programme, this case study proposes the following set of actions: develop a favorable institutional environment, strengthen public-private partnerships, promote demand and supply for local products, and develop logistics and infrastructure for supplying local products to the program.

The proposed measures arise from the assumption that school meals and local production should be closely interrelated. A well-established supply chain in this sector will play an important role in enhancing sustainability of national food security and improving nutrition in the Kyrgyz Republic.

## Background

### Socioeconomic Context

The Kyrgyz Republic has recently demonstrated considerable progress in socioeconomic development. In 2017, the country was ranked 46th out of 130 countries in the Human Capital Index, outpacing several Eurasian countries such as Armenia (49th place) and Tajikistan (57th place) (World Economic Forum 2017, p. 8).

For the last five years the Kyrgyz Republic has shown a trend of poverty reduction (Figure 1).

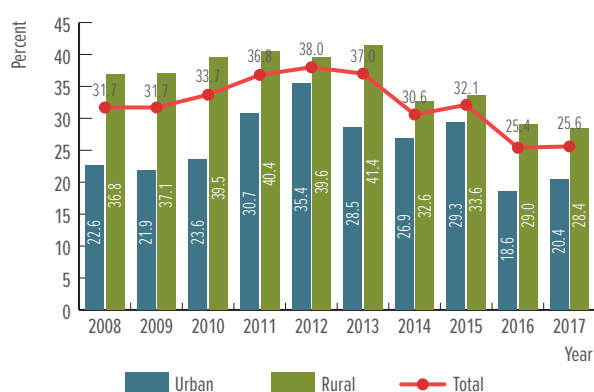
However, 1.6 million people are still living below the poverty line,<sup>3</sup> including 72 percent of rural residents,

<sup>1</sup> The total number was obtained by adding the current number of schools serving hot meals (1,146) and the number of pilot schools to be launched by the World Food Programme (WFP; 500) and Mercy Corps (430) before the end of 2022.

<sup>2</sup> This demand was calculated by authors based on 13 som per day (KABAR 2018) and one-third of the average physiological rate of consumption of potatoes, vegetables, and cucurbits by schoolchildren in grades 1 through 4 (450,000 children during the school year, 170 days a year).

<sup>3</sup> The population of the Kyrgyz Republic as of January 1, 2018, was 6,257,000 people.

**Figure 1: Poverty rate by place of residence  
(as percentage of the total population)**



Source: NSC KR 2018.

and 47,000 people of whom 85 percent are rural residents are under the extreme poverty line (NSC KR 2018, pp.1, 2).

In addition to the high level of poverty, unresolved issues include a low level of employment, poor food security, and limited access to high-quality and balanced nutrition, as well as limited opportunities for small farmers.

The Strategy of Sustainable Development for the Kyrgyz Republic until 2040 (Strategy 2040), which is currently under development, is largely aimed at addressing the above challenges. The key targets of this strategy include increased employment and improvement of professional competencies, especially in rural areas. Development of agriculture is specified as a priority sector; this is to be achieved by increasing the marketability of domestic agricultural products in external markets, as well as by helping small private farms come together to form cooperatives and agglomerations to improve the economic effectiveness of the sector. Strategy 2040 lays out plans to establish logistics and processing centers to improve the efficiency of the agricultural sector and integrate small and medium businesses into it. In the area of food security and nutrition, the focus is on providing the population with high-quality food products, first and foremost domestic ones (President of the Kyrgyz Republic 2018).

In addition, the Government of the Kyrgyz Republic is currently developing the Programme of Food Security and Nutrition for the Period 2018–2023. The draft Programme contains measures to improve the accessibility of food products by expanding the

coverage of schools that have a hot meal program and creating conditions for agricultural producers to be involved in supplying the schools with locally produced foodstuffs.

One of the ways to achieve national priorities is to implement and expand the School Meals Programme, which is designed to improve people's access to diverse and balanced nutrition as well as to provide direct and indirect opportunities for increasing employment and agricultural output at the local level (Bandi et al. 2010, p. 75).

## The School Meals Programme in the Kyrgyz Republic: Milestones, Partners, and Achievements

The School Meals Programme was launched in 2002 after the adoption of the June 27, 2002 Law No. 111 “On the Arrangements for Students’ Meals at General Education Schools in the Kyrgyz Republic.” Since the onset of the program, the government has guaranteed that all primary school children will receive school meals. In 2018, the program covered not fewer than 400,000 children throughout the country.

About 622.4 million som (approximately US\$9.15 million) on average is allocated annually from the republic's budget for the School Meals Programme (WFP 2018, p. 5). The program is co-financed by local administrations, which allocate the funds to rehabilitate the infrastructure and retrofit school canteens to provide sufficient sanitary and technical conditions for its implementation. The development of the School Meals Programme in the Kyrgyz Republic is also supported by an international community of development partners.

While recognizing the successes of the School Meals Programme, one should note that, from the very beginning, the offered rations (a beverage, typically tea, and a bun) failed to meet the average physiological nutrition standards established by the country's Ministry of Health. School rations did not contain sufficient amounts of macronutrients, especially protein, or micronutrients—vitamins and minerals. To address this challenge, the World Food Programme (WFP) at the request of the government initiated a development program aimed at optimizing school meals.



The main focus of the WFP program is to introduce a more balanced and nutritious hot menu (a beverage, a bakery item, a hot meal, sometimes a salad) to replace the cold lunch consisting of only a beverage and a bakery item.

Transition to hot meals is implemented within the financing allowance established by the government: 7–10 som per child per day. The pilot schools under the WFP program practice voluntary co-financing of school meals by parents. The parents' contribution is 3 som per day on average (WFP 2018, p. 9). This money is used to diversify the rations and increase their nutritional value (by including vegetable salads, fruit, and meat).

An analysis of nutritional and calorie value of the school menu shows that, after including hot meals, the content of major macro- and micronutrients increases by several times and approaches the average physiological nutrition standards approved by the Ministry of Health of the Kyrgyz Republic (WFP 2018, p. 15) (Table 1 and Figure 2).

During the first five-year stage of the WFP pilot program (2013–2017) hot meals were introduced in 335 schools, and currently cover about 113,000 children (15 percent of the total number of eligible children; WFP 2018, p. 6). In addition, 102 schools (5.6 percent) in the Issyk-Kul and Talas regions changed to hot meals with technical assistance from the WFP through financial contributions of local authorities, communities, and some international donors (WFP 2018, p. 17).

Drawing on the experience, methodologies, and documents gained under the WFP pilot project, the Mercy Corps nongovernmental organization (NGO) in the Kyrgyz Republic supported the transition to hot meals in 154 schools (6.9 percent) (US Embassy in the KR 2018).

At present, about 1,146 schools (51.2 percent) regularly serve hot breakfasts or midday meals to primary school students (UN System in the KR 2018).

As part of the second stage of the program (2018–2022) the WFP plans to introduce hot meals in another 500 schools (350 schools through direct financial support and 150 schools through technical assistance) (UN System in the KR 2018); Mercy Corps, in turn, intends to support at least 430 new schools (Ministry of Health 2018). Therefore about 2,076

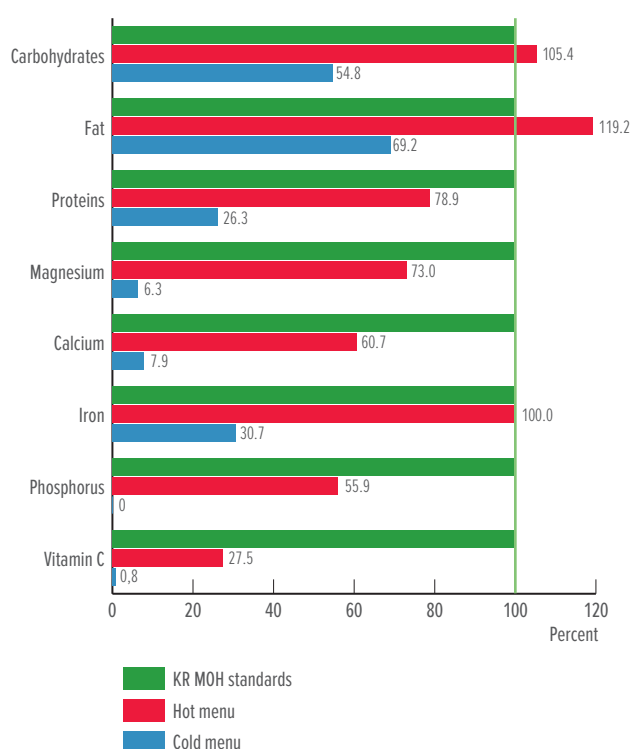
**Table 1: Average Weekly Content of Macro- and Micronutrients in School Rations Before and After the Transition to Hot Meals**

Nutrient	Cold menu	Hot menu	Kyrgyz Ministry of Health standards
Vitamin C (mg)	0.12	4.13	15
Phosphorus (mg)	0.08	231	413
Iron (mg)	0.92	3	3
Calcium (mg)	21.78	167	275
Magnesium (mg)	4	46	63
Proteins (g)	5	15	19
Fat (g)	54	93	78
Carbohydrates (kcal)	293	564	535

Source: WFP 2016a.

Note: Data are provided using the example of the Rakymov secondary school, Issyk-Kul Oblast (May 2015).

**Figure 2: The Content of Macro- and Micronutrients in School Rations Before and After the Transition to Hot Meals, as a Percentage of the Daily Average Norm**



Source: WFP 2016a.

Note: KR MOH = Kyrgyz Republic Ministry of Health.

schools throughout the country (92.8 percent of the total number) will be covered with hot meals by 2022.

## Supply of Locally Produced Agricultural Products for the School Meals Programme

The steadily increasing coverage of schools in the Kyrgyz Republic with hot meals is driving up the demand for foodstuffs. The diversified school menu opens more marketing opportunities, especially for farmers producing milk, eggs, potatoes, vegetables, and fruit.

According to world best practice, school meals programs ensure direct or indirect transfer of the value of provided meals to households (Bandi et al. 2010). When arranging such programs it is important to encourage the procurement of foodstuffs produced by local farmers and to facilitate their integration into the relevant food supply chains. This enables farmers to grow their revenues, fosters economic and social activity, and contributes to poverty reduction (Uccello et al. 2017).

The assessment of the organization of school meals for primary school students in the Kyrgyz Republic performed in 2015, using the World Bank tools developed under the Systems Approach for Better Education Results (SABER),<sup>4</sup> highlighted the fact that the use of locally produced agricultural products in school rations under the School Meals Programme creates a sustainable sales market for local farmers. A special emphasis was put on the need to develop a state program of school meals including strategic measures aimed at agricultural sector development by supplying the schools with domestic products (World Bank 2015, p. 19).

Cooperation with local producers provides an opportunity to use public funds allocated for food procurement more efficiently and enables the organization of adequate hot meals with the same amount of money that was previously used to serve tea and a bun (WFP 2015, p. 22).

In the midst of this seemingly favorable situation for local agricultural producers, several factors impede or complicate their participation in the supply of foodstuffs to schools. A survey of agricultural producers,<sup>5</sup> conducted by the Social and Industrial Foodservice Institute (SIFI) as part of the comprehensive assessment of the school meals system in the Kyrgyz Republic, demonstrated that:

- ✓ The top five issues facing agricultural producers include high interest on loans (63.5 percent of respondents), lack of clear marketing prospects (32.8 percent), influence of the world financial crisis (25.3 percent), water supply concerns (23.3 percent), strong competition (22.5 percent), decrease in demand (21.7 percent) (Figure 3).
- ✓ Out of 73 producers who were making direct food deliveries to schools at the time of the survey, 60 responded that they were in one way or another interested in further deliveries.
- ✓ The 163 producers who made no food deliveries to schools noted that the main reasons they did not participate included lack of proposals from schools (32.5 percent), the size of the delivery was too small (14.7 percent), did not know why they were not involved in delivery (12.3 percent), the quality and range of their manufactured products did not suit the schools (11.7 percent), unsatisfactory prices (8.6 percent), lack of surplus supplies (8.6 percent), inability to “reach out” to school deliveries (8.0 percent) (Figure 4). A high percentage of producers waiting for proposals from schools means that they are unaware about the procedures for supplying food to schools and tenders being held.

Further development of mutually beneficial relationships between local agricultural producers and school meals programs requires establishing a sustainable supply chain that “is a cornerstone of any long-term strategy aimed at poverty and hunger reduction” (Uccello et al. 2017).

<sup>4</sup> The approach is used to assess education systems for compliance with the world standards and best practice with a view to assist the national governments in implementing education reforms and ensuring education for all. The assessment involved representatives of ministries and agencies of the Kyrgyz Republic and international and nongovernmental organizations engaged in education, agricultural development, and nutrition.

<sup>5</sup> The survey was carried out in 2016 and covered 258 agricultural producers from 39 districts of the Kyrgyz Republic. See UN WFP (2016) for further information.

## Policy Issues

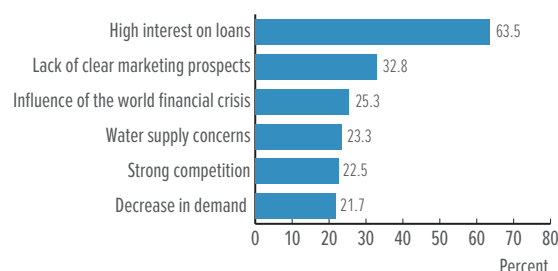
The School Meals Programme has been actively implemented in the Kyrgyz Republic since 2012. The last five years have seen a considerable increase in the number of schools offering hot meals, improvements in the diversity and nutrition value of school rations, and the development of the program's legal and organizational framework. However, despite the obvious capacity, there are still some unresolved policy issues that could directly impact the relationships between local farmers and the School Meals Programme, addressed below.

### Deficient Institutional Framework

The institutional environment for the sustainable development of school meals as an element of the country's national food security strategy is still not in place. In the absence of a single policy paper on school meals optimization in the Kyrgyz Republic, the following issues remain unresolved:

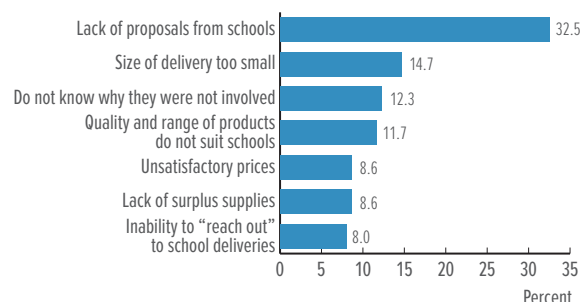
- ✓ Lack of a single roadmap to transition schools to hot meals that would integrate the pilot projects implemented by international organizations with the efforts of the government, local authorities, and other partners. Without such a roadmap in place, the government, local authorities, and development partners working to facilitate agricultural development are unable to assess the schools' demand for agricultural products at the regional and district levels.
- ✓ Lack of a legal and regulatory relationship between programs for agricultural development and programs for improving food security, nutrition, and the organization of school meals as links in the same chain. There is no understanding at the institutional level that the expansion and optimization of the School Meals Programme affects both the educational process and the demand on the food market.
- ✓ The requirements of the rations for primary school students are still to be defined. Local education authorities responsible for coordinating school menus do not check the menus offered at schools for compliance with the basic principles of sensible nutrition. Decisions about the menu are often guided by the desire to reduce the list of products in

**Figure 3. Top Five Issues Faced by Agricultural Producers in the Kyrgyz Republic (% of Survey Respondents)**



Source: WFP 2016b.

**Figure 4: Major Reasons for the Disinterest of Local Agricultural Producers in Supplying Food to Schools (% of Survey Respondents Who Do Not Supply Food to Schools)**



Source: WFP 2016b.

procurement packages or the number of such packages rather than the desire to ensure balanced and diverse rations. By including all types of products into a single list included in a single procurement package that covers all products, the local authorities are able to reduce labor costs of holding tenders. This cuts out the local producers, however, because they are unable to supply all the products in the package—thus reducing cooperation with suppliers.

- ✓ The procedures and conditions of public procurement are insensitive to the specifics of small agricultural producers and restrict their participation in tenders for supplying food to schools and other social institutions.

### Demand Constraints

The factors constraining the introduction of hot meals in schools include:

- ✓ Insufficient infrastructure—that is, limited access to (or unserviceable condition of) infrastructure (water, power and gas supply, sanitation)
- ✓ Lack of production and storage facilities meeting sanitation and hygiene standards
- ✓ Inadequate material and technical equipment in school catering facilities
- ✓ Fluctuating prices of products procured for school meals
- ✓ Lack of annual indexation of funds allocated from the republic's budget for food procurement for school meals

It is expected that, with the assistance of international development projects and through domestic efforts, the number of schools serving hot meals (and hence generating a steady demand for local agricultural products) by 2022 will amount to more than 90 percent of the total number of schools. The remaining 10 percent will consist of schools facing the most complicated infrastructure challenges—in particular, those that have no standard canteens and those located in villages without drinking water sources.

## Lack of Logistics

A continuous logistics chain (production location and management, storage, participation in tenders, delivery system, and quality assurance) of local agricultural product delivery to schools and other social institutions is nonexistent in the Kyrgyz Republic. Small land plots, poor cooperation between agricultural producers, and the lack of vegetable storehouses do not allow local producers to achieve output sufficient to deliver foodstuffs to schools (Economic Review 2015).

## High Barriers for the Participation of Local Producers in Tenders

Pursuant to the Law of the Kyrgyz Republic of April 3, 2015, No. 72 “On Public Procurement,” the country has transitioned to e-government procurement. Although it has obvious advantages, the electronic system is not free from shortcomings, especially in terms of its practical implementation.

According to this law, each tender must be attended by a qualified specialist from a government agency. This provision is often ignored because of the lack of trained public procurement specialists. In addition, staff turnover is high among procurement specialists at government agencies (Mukanova 2016b).

Low competence of the staff engaged in the organization and holding of tenders leads to numerous violations, particularly with respect to public procurement procedures. Lack of complete information often presents a barrier to participation in procurement: up to 60 percent of documents need to be directly requested from the procuring entity, which creates unequal conditions for the bidders (Mukanova 2016b).

Difficulties in the use and the limited functions of the public procurement portal also present a major barrier for participation. User-unfriendly interface, the placement of information relevant to a single tender on different webpages, and the inability to review the complete tender history—as well as the lack of access to proposals from other bidders after the tender is closed—create additional difficulties for potential bidders (Mukanova 2016b).

The public procurement portal fails to provide sufficient information to analyze the purchasing prices of products for school meals. However, some of the school principals interviewed during the survey highlighted overpricing of agricultural products as compared to market prices. The WFP also noted that in 2013–2014 the efficiency of food procurement for schools (the ratio between actual purchasing and market prices) made up only 70 percent (WFP 2015, p. 22).

Local farmers cannot provide large deliveries on their own, and the tenders are usually won by mediators, which brings no budget savings (Kaktus Media 2018). Moreover, according to school administrators, foodstuffs are often delivered to schools from other districts, or even from the capital city, while the same products are available locally.

A monographic survey among 29 schools in the Kemin District conducted by SIFI with direct involvement of the authors has confirmed the existing deficiencies in the organization of food procurement for school meals. At present, only two schools in the district that keep autonomous accounts independently procure food products, while the local education

department conducts procurement for the remaining 27 schools. Decisions are made solely on the basis of proposals from suppliers. Furthermore, the supplier cannot guarantee the availability and quality of the supplied products nor even their price during the school year. In addition, the supplier is interested in making one-time deliveries, and the task of food storage falls on the shoulders of school principals. Given that schools cannot provide appropriate long-term storage conditions, the products, even if delivered with adequate quality, lose their viability as consumer goods.

Besides, local agricultural producers, especially farmers and households, cannot participate in tenders because of limited opportunities for the certification, storage, and transportation of their products.

### Limited Access to Certification of Locally Produced Agricultural Products

Another outstanding problem is related to the certification and quality assurance of products supplied for school meals and other social institutions at the various stages of production, storage, delivery, and use for cooking.

## Stakeholder Groups

### The Government of the Kyrgyz Republic

The Government of the Kyrgyz Republic plays an important role in improving the food security of the country, since it is in a position to elaborate policy measures aimed at supporting local communities. Policy measures to support small agricultural producers in a country where the majority of population lives in rural areas are viewed as a top priority.

Measures to consolidate small-scale production and improve the competitiveness of local producers are being considered at all governance levels. The government is currently developing strategic documents to support various forms of agricultural cooperation, and is also focusing efforts on improving the efficiency of budget expenditures and the system of public procurement.

### Local Administrations (Aiyl Aimaks)

Local administrations (aiyl aimaks) are also involved in creating conditions for cooperation and reducing the number of small agricultural producers. They are keen to have a market integrator (logistics center) that would provide links between local producers and consumers of agricultural products; this would facilitate new job creation and tax revenues for the local budget, which would generally have a positive impact on local development. Aiyl aimaks can participate in making strategic decisions by the market integrator through their representatives in its management body.

### Local Agricultural Producers

Local agricultural producers are concerned about getting access to the supply chain of food to schools. School meals present a protected expenditure item of the state budget of the Kyrgyz Republic, and therefore seem a relatively reliable and stable market.

Local farmers have no facilities for long-term storage of their products, so are forced to sell them during the low-price season. Building vegetable storage facilities at the local level could be one way to address the problem of storage and marketing.

Farmers are also interested in the certification of their products for compliance with quality and safety standards. Certificate availability opens access to food supply to schools and other state-funded institutions (kindergartens, hospitals, etc.).

Farmers can advance their interests through local administrations and the country's Ministry of Agriculture, as well as through their associations.

### Schools

Schools are keen on the provision of high-quality and balanced meals to children, first and foremost grade 1–4 students whose nutrition is supported from the republic's budget at the rate of 7 som per day per beneficiary (10 som in mountainous, remote, and difficult-to-reach areas). Properly arranged meals increase resistance to disease and foster the cognitive abilities and academic achievements of the students. Sensible nutrition acquires



even more importance in view of students' increasing learning load.

A well-designed supply chain would release school principals from extrinsic functions of food delivery, storage, and quality control.

Schools have no associations that coordinate school meals issues, but their interests could be represented by the Ministry of Education and Science of the Kyrgyz Republic, which, among other things, is responsible for organizing school meals.

## International Partners

International development partners, as well as non-profit organizations, assist in addressing the issues of food security and nutrition through agricultural development projects, active social support of local communities, and school meals optimization. Thus the WFP supports the Farm to School initiative aimed at promoting closer relationships between the school meals system and local agricultural producers by changing procurement practices at and for schools. The Food and Agriculture Organization (FAO) is working to establish a pilot centralized model of agricultural product delivery (a logistics center) to meet the demand of schools and other social institutions at the district level. International partners are interested in promoting sustainability and further institutionalizing their successful pilot interventions.

The achievement of Sustainable Development Goals (SDGs) is on the agenda of both the **Government of the Kyrgyz Republic** and all key international partners supporting agricultural development in the country, including the **UN system**. The UN Development Assistance Framework for 2018–2022 (UNDAF), jointly elaborated by the UN and the government, provides a firm basis for supporting the Kyrgyz Republic in moving forward to achieve the Agenda 2030 goals. The UNDAF priorities cover sustainable and inclusive economic growth, rural and agricultural development, and social protection and education. Promoting relationships between local agricultural producers and the school meals system would contribute to the achievement of Goal 2: *End Hunger, Achieve Food Security and Improved Nutrition, and Promote Sustainable Agriculture*.

## Policy Options

### 1. Establish an institutional environment for the expansion of the optimized School Meals Programme

The major policy measure for creating a favorable institutional environment would be **to adopt a national implementation strategy for sustainable development of the School Meals Programme in the Kyrgyz Republic**, and correlate it to the Strategy 2040 and Programme of Food Security and Nutrition for the Period 2018–2023. The program should contain an action plan on building relationships between local farmers, the system of food procurement for schools, and the School Meals Programme.

The school hot meal optimization during 2018–2022 will require continuous coordination by the Interministerial Working Commission (IWC) chaired by the Vice Prime Minister of the Kyrgyz Republic and the Ministry of Education and Science in the following major areas of activity:

- ✓ **Approve the roadmap of gradual inclusion of new schools in meal optimization projects** with the support of international organizations and local administrations.
- ✓ **Establish a working body (division) within the Ministry of Education and Science** to be responsible for coordination between all stakeholders of the expansion of the optimized School Meals Programme.

**The existing practice of competitive food procurement for school meals** should be also revised. It is important that the tender announcement and implementation procedures be brought into compliance with the Law “On Public Procurement” as much as possible to enable participation of local producers in tenders for food supply to schools. The Ministry of Agriculture and the Ministry of Education and Science must establish sound mechanisms for communicating with local agricultural producers regarding coordination of supply of food products to schools.

There is a world practice of **establishing quotas for procurement of locally manufactured products** to provide additional support to local farmers. For example, the Brazilian Law “On School Meals” stipulates that beginning in 2009 at least 30 percent of

food supplied for school meals should be directly purchased from local family farms. In the Kyrgyz context, introducing quotas would facilitate local procurement of such products as milk, eggs, meat, potatoes, vegetables, fruit, and dried fruits (kompot mixtures).<sup>6</sup> In some regions it is also possible to purchase locally produced cereals, beans, and flour.

## 2. Strengthen public-private partnership in the school meals system

When selecting an organizational form of integrating various participants (links) in the supply chains focused on school meals, it is important to ensure close cooperation between the public and private (farms and other entrepreneurs) sectors.

The public-private partnership (PPP) can be a potential form of such cooperation. Essentially, a PPP means long-term (up to 50 years) coordination between the public and private sectors on all aspects of joint project development and implementation, including the design, financing, construction, rehabilitation, and reconstruction of facilities, as well as the management of existing or newly established facilities, including infrastructure.<sup>7</sup>

The PPP mechanism stipulates that the government enters into a long-term agreement with private partners for the reconstruction/construction and operation of public infrastructure facilities on condition of private investments and risk sharing between the public and private partners. In the long run, the government receives a reconstructed/constructed public facility, and private partners obtain profit.

Expanding relationships between local agricultural producers and the School Meals Programme under the PPP arrangements offers obvious financial and economic advantages. Thus, according to the Law “On the Public Private Partnership in the Kyrgyz Republic,” the public partner can render financial or economic support to the private partner and/or design company. However, active financial and economic participation of the government in PPP arrangements assumes continuous monitoring and evaluation of joint projects.

The above circumstances should be taken into account when initiating PPP projects, because—to some extent—they restrict the private partner’s freedom to make implementation-related decisions.

## 3. Stimulate the demand for locally produced foodstuffs for school meals

To expand the market for locally produced products, it is important to **encourage a larger number of schools to transfer to hot meals** instead of “dry” breakfasts consisting of buns and beverages. It would be possible to extend the geography and increase the number of schools serving hot meals, first because of school meals optimization projects implemented by international and nongovernmental organizations. However, local administrations must also contribute to the rehabilitation of infrastructure (particularly water supply and sanitation facilities) and the renovation of school food units and canteens.

The WFP experience gained under the technical assistance project has shown that it is also possible to facilitate the transition of schools to provide hot meals from local administrations’ own funds and donations from private persons or organizations. The WFP managed to facilitate the transition to hot meals at about 150 schools in the northern part of the republic; about 150 additional schools will have such an opportunity by 2022’s year end.

Additional funding is required to create basic infrastructure and technical facilities to be able to increase the number of schools covered with hot meals. To this end, it is proposed that **a charity fundraising campaign to facilitate the organization of hot meals at schools** be initiated. The target audience would include civil society organizations, private companies, local communities, and parents. The main message of the campaign would be that the Government of the Kyrgyz Republic is committed to promoting the education and health of the younger generation, being fully aware that this is a major factor affecting the future welfare of the country. At the same time, it is hardly realistic to believe that the government alone would be able to address the whole range of issues related to improving school meals. The campaign would enable all non-indifferent Kyrgyz citizens to

<sup>6</sup> Kompot is a nonalcoholic sweet beverage of Slavic origin.

<sup>7</sup> Article 1, Law of February 22, 2012 No. 7 “On the Public Private Partnership in the Kyrgyz Republic.”

make their contributions and help create safe, clean, and comfortable canteens for their children.

One of the main principles of healthy nutrition at schools is to ensure balanced rations. **The formulation and introduction of diverse and balanced rations** while complying as much as possible with established standards would be an important step in promoting demand for local products. This would be facilitated by the approval of a single list of requirements for school menus, including information about the minimum mandatory set of food products.

In the future, by increasing the capacity of school canteens, it would be also possible to provide hot meals to middle and secondary school students.

To diversify the school menu, it is also important to **arrange for the regular professional training of cooks** to ensure diverse rations consisting of hot first and second courses, salads, beverages, and baked goods. Prior to the introduction of hot meals, the cooks at school canteens were required only to distribute ready-to-eat baked goods and prepare tea or, occasionally, kompot. Therefore the cooks' qualification was not a decisive factor for their employment.

To address the task of knowledge management in the area of school meals, it is recommended that the government establish centers of excellence in several regions to provide professional training of staff engaged in school meals. In addition to cooks and kitchen workers, professional training can be offered to school principals and other executive staff in such areas as food procurement management, monitoring and quality assessment of school meals arrangements, reporting, and so on. This will require the modernization of the facilities and equipment of technical schools and an elaboration of professional training programs for the specialists engaged in school meals organization at different levels.

#### 4. Stimulate the supply of locally produced foodstuffs for school meals

Important measures aimed at encouraging farmers to diversify and increase the output of their products include:

- ✓ Raise awareness about the volumes and conditions of food supply to schools and other social institutions.

- ✓ Introduce preliminary (futures) contracts for the supply of agricultural products.
- ✓ Diversify production with due regard to the demand for food products for schools and other social institutions.
- ✓ Purchase new high-yield seed varieties, cattle breeds, efficient technologies, and agricultural machinery and equipment.
- ✓ Improve phytosanitary control over the use of mineral fertilizers and crop protection agents.
- ✓ Promote various types of agricultural cooperation (production, processing, supply, marketing, maintenance).
- ✓ Create logistics infrastructure for the production flow from producers to end-users.

Promoting production at schoolyards (school farms, greenhouses, vegetable gardens, orchards, and educational-experimental plots) can help in improving school meals.

#### 5. Develop logistics and infrastructure to provide local products for school meals

Establishing a sustainable model to provide the School Meals Programme with local agricultural products (a supply chain) is an important factor contributing to the national system of food security and nutrition in the Kyrgyz Republic. **Logistics centers** (local and regional ones) are viewed as an integrating element of this chain.

The logistics center is designed to fill the gaps in the existing supply chain and to perform such functions as storage, quality assurance, transportation, and delivery of products through the system of public procurement. The center should serve as a liaison between the producers (farmers) and end-users (schools, preschool institutions, hospitals, and other entities).

The logistics center would ensure that the farmers have a stable demand for their products by distributing purchasing requests and signing (futures) contracts for the supply of food products that are

specifically needed for school meals, and then purchasing the products from farmers on a centralized basis. It would also take up the procurement, transportation, and storage functions, which means that small producers would be able to deliver their products directly from the field (private subsidiary plot) to the center's storage facilities. This would help increase the number of suppliers and therefore enhance competition among the agricultural producers.

The logistics center could participate in tenders for the supply of products for school meals and, being able to offer a lower price for the products that were purchased during the low-price season, would have more chances to win tenders than individual farmers.

The UN FAO experience in establishing a pilot logistics center in the Kemin District has shown that such centers can also perform quality assurance functions. Regular laboratory analysis and organoleptic inspection of products during their storage can be provided under the cooperation agreement with the Center for Disease Prevention and State Sanitary and Epidemiological Supervision. Therefore every lot purchased from local agricultural producers would be subject to the required quality control procedures.

In the context of the Kyrgyz Republic, logistics centers could be established at two levels: local (district) and regional. District centers could focus on the promotion of local products, among other things, for school meals. These could be supplemented with higher-level (regional) logistics centers that, on the one hand, could import the products not manufactured domestically and deliver them to district centers. On the other hand, they could purchase products from district centers and organize wholesale shipments of products to be delivered to other districts or exported.

## Assignment

1. Review the proposed policy measures and discuss their potential consequences for the establishment of a sustainable supply chain focused on school meals, as well as their impact on various stakeholders. How would the adoption of the above policy measures affect the functioning of such a chain?
2. What further policy measures are needed if the government decides to establish logistics centers in each district to provide a centralized supply of local agricultural products to schools and other social institutions?
3. What other measures can be taken to achieve a more sustainable operation of logistics centers focused on school meals and the needs of other social institutions?

## Policy Recommendations

It is recommended that the Government of the Kyrgyz Republic (with involvement of core ministries as well as international and national partners) implement national policy measures aimed at establishing sustainable mutually beneficial links between local agricultural producers and the School Meals Programme (the value chain). In this case it is important to implement such measures using a phased approach.

In the current period (up to two years), the government should:

- ✓ Set up a working school meals coordination body under the Ministry of Education and Science.
- ✓ Adopt a government program for sustainable school meals development in line with the priorities specified in Strategy 2040 and the Programme of Food Security and Nutrition for the Period 2018–2023 that contains a set of measures to promote relationships between local farmers, the system of food procurement for schools, and the School Meals Programme.
- ✓ Develop a roadmap for a phased inclusion of schools in projects on meals optimization for 2018–2022 that provides for the participation of local bodies of power (regarding renovation of the infrastructure and repairs of catering units and canteens) and the local community as well as international development partners.
- ✓ Implement a system of communication that would focus farmers on diversifying and planning their output, taking into account the food product needs of schools and other social institutions.

- ✓ Launch a pilot project on the procurement of local agricultural products through a logistics center for organizing meals in schools and other social institutions.
- ✓ Ensure quality assurance of the products supplied for school meals.
- ✓ Develop and approve school menu instructions, including information on the minimum mandatory set of food products.
- ✓ Prepare and conduct a charity fundraising campaign to facilitate the rehabilitation and renovation of school canteens and create the required conditions for the organization of hot meals at schools.

In the mid-term period (three to five years):

- ✓ Develop and approve the methodology for annual indexation of funds allocated for school meals at a level not lower than the actual inflation rate.
- ✓ Study the cost efficiency of the pilot model of supplies of local agricultural products under the school meals program through the logistics center and, if it is efficient, disseminate it nationally.
- ✓ Improve the current practice of tender-based procurement of food products for organizing school meals and introduce quotas for the procurement of local food products.
- ✓ Develop training modules and institutionalize regular professional training of cooks using the experience of the international development partners.

In the longer term (exceeding a five-year horizon):

- ✓ Improve the relationship between the public and private sectors regarding the organization of school meals on the basis of PPPs.
- ✓ Develop various areas of agricultural cooperation (production, processing, supply, sales, service provision).
- ✓ Set up sustainable food value chains with the participation of logistics centers.

## References

Bandi D., K. Burbino, M. Grosh, et al. 2010. *New Approaches to School Meals: Social Protection, Child Development and Education Sector*. M.: FGNU Rosinformagrotech (in Russian).

Economic Review. 2015. "The Export of Agricultural Products from Kyrgyzstan Is Impeded by Small-Scale Production." *Economic Review* November 1, 2015. <http://review.uz/ru/news/sentral-asia/newss5282> (in Russian).

KABAR (Kyrgyz National Information Agency). 2018. "261 Schools out of 2.2 Thousand Participate in the School Meals Optimization Programme in Kyrgyzstan." *Kyrgyz National Information Agency (KABAR)*. February 19, 2018. <http://old.kabar.kg/rus/society/full/102487> (in Russian).

Kaktus Media. 2018. "What May Lie Ahead in Kyrgyzstan in the Implementation of Public Procurement System?" *Kaktus Media*, May 18, 2018. [https://kaktus.media/doc/374617\\_chto\\_novogo\\_jdet\\_kyrgyzstan\\_v\\_realizacii\\_sistemy\\_gosydarstvennyh\\_zakypok.html](https://kaktus.media/doc/374617_chto_novogo_jdet_kyrgyzstan_v_realizacii_sistemy_gosydarstvennyh_zakypok.html) (in Russian).

Mukanova N. A. 2016a. "e-Procurement: Assessing Sources of Corruption." Slides. *CABAR.asia*, May 10, 2016. <http://cabar.asia/wp-content/uploads/2016/05/Prezentatsiya-ADS-KR-Sistema-elektronnyh-goszakupok-otsenka-prichin-korrupsii.pdf> (in Russian).

———. 2016b. *IWPR Representative in Kyrgyzstan: Roundtable transcript of April 21, 2016 "e-Procurement: Assessing Sources of Corruption."* *CABAR.asia*, May 10, 2016. <https://analytics.cabar.asia/ru/iwpr-kyrgyzstan-stenogramma-kruglogo-stola-sistema-elektronnyh-goszakupok-otsenka-prichin-korrupsii/> (in Russian).

Ministry of Education and Science. 2018. "The School Meals Programme in Kyrgyzstan Will Be Extended – During the Next 5 Years over One Half of Schools in the Country Will Be Covered with Hot Meals." March 16, 2018. <http://edu.gov.kg/ru/news/programmema-shkolnogo-pitaniya-v-kyrgyzstane-budet-rasshirena-v-techenie-sleduyushih-5-let-goryachim-pitaniem-budut-ohvacheny-bolee-poloviny-shkol-stran/> (in Russian).

Ministry of Health. 2018. "Mercy Corps Launching the New McGovern-Dowd Programme Food for Education



2018–2021.” KR Ministry of Health, February 6, 2018. <http://www.med.kg/ru/500-mersiko-zapuskaet-novuyu-programmemu-makgoverna-doula-prodovolstvie-dlya-obrazovaniya-2018-2021.html> (in Russian).

NSC KR (National Statistics Committee of the Kyrgyz Republic). 2018. “Poverty Level in the Kyrgyz Republic in 2017.”

<http://www.stat.kg/media/publicationarchive/e6b6504b-fbdc-4699-9cf5-1f13d0eafaa1.pdf> (in Russian).

President of the Kyrgyz Republic. 2018. “Strategy of Sustainable Development for the Kyrgyz Republic for the Period 2018–2040 (draft).” Official website. [www.president.kg/sys/media/download/35924](http://www.president.kg/sys/media/download/35924) (in Russian).

Uccello, E., D. Kauffmann, M. Calo, and M. Streissel. 2017. Nutrition-Sensitive Agriculture and Food Systems in Practice: Options for Intervention. Rome: FAO. <http://www.fao.org/3/a-l7848E.pdf>

UN System in the Kyrgyz Republic. 2018. “School Meals Have Become an Item on the Agenda of the Annual MOES Collegium.” [http://kg.one.un.org/content/unct/kyrgyzstan/ru/home/news/kg-news/2018/wfp\\_school\\_meals\\_moes.html](http://kg.one.un.org/content/unct/kyrgyzstan/ru/home/news/kg-news/2018/wfp_school_meals_moes.html) (in Russian).

US Embassy in the Kyrgyz Republic. 2018. “Launching the McGovern-Dole Programme Food for Education 2018–2021.” February 6, 2018. <https://kg.usembassy.gov/ru/mcgovern-dole-food-for-education-programme-for-2018-2021-launches/> (in Russian).

World Economic Forum. 2017. The Global Human Capital Report 2017: Preparing People for the Future of Work. [http://www3.weforum.org/docs/WEF\\_Global\\_Human\\_Capital\\_Report\\_2017.pdf](http://www3.weforum.org/docs/WEF_Global_Human_Capital_Report_2017.pdf)

WFP (World Food Programme). 2015. School Meals Optimization Programme in the Kyrgyz Republic (2013–2014). World Food Programme in the Kyrgyz Republic (in Russian).

———. 2016a. Rakimova: School Nutrient Chart. School Meals Optimisation Programme. World Food Programme.

———. 2016b. Results of Survey among Agricultural Producers: Comprehensive Assessment of

School Meals in the Kyrgyz Republic. World Food Programme. (in Russian).

———. 2018. School Meals Optimization: Major Facts and Figures. Bishkek: World Food Programme (in Russian).

World Bank. 2015. Kyrgyz Republic: School Meals. SABER Country Report. World Bank.

## Recommended Literature

Bandi, D. 2010. New Approaches to School Meals: Social Protection, Child Development and Education Sector. M.: FGNU Rosinformagrotech, 2010 (in Russian).

Niveli, D. 2015. Assisting the Establishment of Sustainable Supply Chains in the Food Sector. Rome: FAO

Uccello, E., D. Kauffmann, M. Calo, and M. Streissel. 2017. Nutrition-Sensitive Agriculture and Food Systems in Practice: Options for Intervention. Rome: FAO. <http://www.fao.org/3/a-l7848E.pdf>

## Laws and Resolutions of the Government of the Kyrgyz Republic

Law of June 27, 2002, No. 111 “On the Arrangements for Students’ Meals at General Education Schools in the Kyrgyz Republic”

Law of June 11, 2004, No. 70 “On Cooperatives”

Law of February 22, 2012, No. 7 “On the Public Private Partnership in the Kyrgyz Republic”

Law of April 3, 2015, No 72 “On Public Procurement”

Resolution of March 9, 2009, No. 138 “On Approving the Regulations for the Monitoring and Indicators of Food Security in the Kyrgyz Republic”

Resolution of February 19, 2010, No. 111 “On Approving the Average Physiological Standards of Major Food Product Consumption for the Population of the Kyrgyz Republic”

Resolution of December 26, 2014, No. 734 “On the Main Directions for the Development of School Meals in the Kyrgyz Republic”

Resolution of September 4, 2015, No. 618 “On Approving the Programme of Food Security and Nutrition in the Kyrgyz Republic for the Period 2015-2017”

## Abbreviations

<b>FAO</b>	Food and Agriculture Organization (of the UN)
<b>IWC</b>	Interministerial Working Commission on School Meals Optimization
<b>KR</b>	Kyrgyz Republic
<b>NGO</b>	nongovernmental organization
<b>NSC KR</b>	National Statistics Committee of the Kyrgyz Republic
<b>PPP</b>	public-private partnership
<b>SABER</b>	Systems Approach for Better Education Results
<b>SDGs</b>	Sustainable Development Goals
<b>SIFI</b>	Social and Industrial Foodservice Institute (in Russia)
<b>Strategy 2040</b>	Strategy of Sustainable Development for the Kyrgyz Republic until 2040 (draft)
<b>UNDAF</b>	UN Development Assistance Framework
<b>WFP</b>	World Food Programme



# Improving Fruit and Vegetable Value Chains in Uzbekistan

*Darya Ilina, Muzafar Karimov*



## Executive Summary

Uzbekistan holds a competitive advantage in fruit, vine, and vegetable growing (Гулямов 2014) and has considerable reserves and a solid potential for further boosting output. However, problems with organizing the value chain in fruit and vegetable products are evident. Shortcomings in the value chain's development result in produce losses, which experts estimate at 30 to 35 percent of the total output.

The purpose of this study is to identify key issues in the functioning of the fruit and vegetable value chain and formulate recommendations for its improvement.

The study looks at the following issues:

- ✓ Key development trends in fruit and vegetable growing in Uzbekistan and policy measures taken by the government;
- ✓ Alternative policy changes from the stakeholders' points of view, including those of the government, of private and *dehkan farms*,<sup>1</sup> and of consumers;
- ✓ Specific recommendations for upgrading the fruit and vegetable value chain.

There are specific problems at every stage of the value chain (production, processing, transportation, and sales) that cause losses. What is common at all stages is financing shortages, a poor understanding of consumer needs, and an inadequate logistics system. In addition, there are acute shortages of skilled personnel in each of these spheres.

The following stakeholders are in a position to influence the fruit and vegetable growing sector in Uzbekistan: farm producers, including private and *dehkan farms* and farming organizations; the government, as represented by the Agriculture Ministry, the holding company *Uzbekozikovkatholding*, the joint-stock company *Uzagroexport*, the joint-stock company *Uzsharobsanoat*, and the *Uzbekozikovkatzakhira* association; private processing companies; and the public.

A review of Uzbekistan's fruit and vegetable sector has shown that overall it is developing rather

dynamically. Government control is very strong. However, regrettably, the system of government contracts does not always function efficiently at the grassroots level; this inefficiency causes produce loss. Apart from that, there is a strong potential for the better use of resources and for expanding the export of fresh and processed fruits and vegetables.

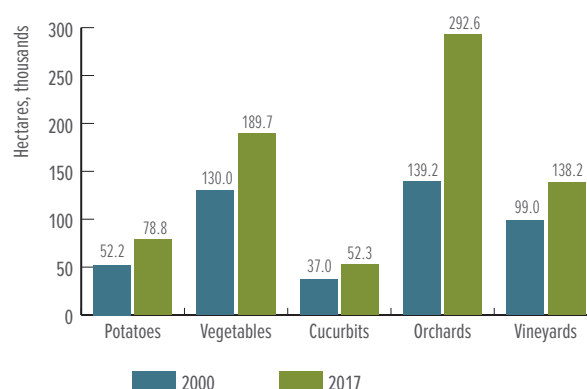
## Background

### Production

According to the State Statistics Committee of the Republic of Uzbekistan, thanks to measures that had been taken to optimize the structure of planted areas, in 2017 the area under potatoes increased by 50 percent compared with 2000, that under vegetables by 45 percent, and that under cucurbits by 41 percent (Figure 1). Orchard areas have been growing since 2009, primarily as a result of the intensive planting of highly efficient dwarf varieties of fruit trees on the basis of advanced foreign experience. Vineyards have been modernized and reconstructed and new areas planted with vines as well. As a result of all these efforts, the area under fruit orchards has more than doubled and that under vineyards grown by 40 percent.

The current policy of optimizing the planted area, zone farming crops, and introducing new technologies

**Figure 1: Plantings and perennial plantations of Fruits and Vegetables in Uzbekistan, 2000–17**



Source: State Statistics Committee of the Republic of Uzbekistan.  
<https://stat.uz/uz/>

<sup>1</sup> *Dehkan farms* are family small-scale farms engaged in the production and sale of agricultural products on the basis of the personal labor of family members on the backyard plot granted to the head of the family as a lifelong inheritable possession.



has made it possible to considerably increase the production of crops other than cotton and ensure food security, while maintaining a relatively stable output of cotton (around 3 million metric tons per year), which is a major commodity and export crop for Uzbekistan. It should be noted that (unlike cotton and grain) high margin crops such as fruits and vegetables did not receive any special government support, with the exception of tax credits and concessional loans intended for all the players in the farming sector (Pugach, Yusupov, and Berdinazarov 2016).

In 2017, fruits and vegetables accounted for over 50 percent of total agricultural output.

More than 21 million metric tons of horticulture products are grown in Uzbekistan every year, including vegetables (which make up 53.5 percent of total horticulture output), fruits (14.4 percent), potatoes (14.2 percent), cucurbits (9.8 percent), and grapes (8.2 percent). Compared with 2010, the production of vegetables, potatoes, grapes, fruits and berries, and cucurbits has gone up on average by 4.1 times (Table 1).

This increase in production was made possible, primarily, by the increase in the average yield of horticulture crops (Table 2).

Although in 2000–17 the population of Uzbekistan grew by more than 30 percent, a considerable increase in per capita fruit and vegetable production was achieved (Figure 2).

Uzbekistan has a total of 8,500 hectares of greenhouses; 40 hectares of these have greenhouses that use hydroponic technology. These greenhouses grow more than 500,000 metric tons of vegetables and citrus fruits, which are delivered to consumers in the winter period.

A change in priorities from cotton cultivation to fruit and vegetable growing was announced through the adoption of Decree No. UP-4041, dated October 20, 2008, issued by the President of the Republic of Uzbekistan “On Measures to Optimize Planted Areas and Increase Food Crops Production.” The decree’s plan was to ensure that vegetables and other food crops would be sown and planted on 27,000 hectares in those areas and farms that had appropriate conditions for growing such crops.

At the later stage of the reforms, the government redoubled its attention to the development of vegetable farming, fruit farming, and grape growing and also adopted additional measures to incentivize their

**Table 1: Fruit and Vegetable Output by Farms of All Types, 2000–17**  
*1,000 metric tons*

Produce	2000	2005	2010	2015	2017	2017 vs 2000
Potatoes	731.1	924.2	1,694.8	2,696.7	3,014.6	Increase by 4.1 times
Vegetables	2,644.7	3,517.5	6,346.5	10,128.1	11,433.6	Increase by 4.3 times
Fruit and berries	790.9	949.3	1,710.3	2,746.2	3,076.3	Increase by 3.9 times
Grapes	624.2	641.6	987.3	1,579	1,748.9	Increase by 2.8 times
Cucurbits	451.4	615.3	1,182.4	1,853.1	2,094.8	Increase by 4.6 times

Source: State Statistics Committee of the Republic of Uzbekistan. <https://stat.uz/uz/>

**Table 2: Fruit and Vegetable Productivity, 2000–17**  
*Centner/hectare*

Produce	2000	2005	2010	2015	2017	2017 vs. 2000
Potatoes	129.3	170.3	194.9	225.0	217.9	Increase by 1.7 times
Vegetables	183.8	215.8	252.5	289.7	253.6	Increase by 1.4 times
Fruit and berries	56.9	62.3	92.6	125.8	118.3	Increase by 2.1 times
Grapes	63.1	64.7	90.8	132.3	157.0	Increase by 2.5 times
Cucurbits	132.4	169.1	198.7	206.1	197.9	Increase by 1.5 times

Source: State Statistics Committee of the Republic of Uzbekistan. <https://stat.uz/uz/>

Note: A centner is unit that is usually defined as 100 base units of kilograms.

speedy growth. In 2014 cotton growing was totally discontinued in three districts of the republic: Asaka (the Andijan region), Jomboy (the Samarqand region), and Yangiyol (the Tashkent region), and areas under cotton were reduced in five more districts. As a result, more than 30,000 hectares of irrigated land was released for grain, vegetable, potato, fruit, and vine growing.

The process of reducing the area under cotton still continues with the work launched to reduce the areas under cereal production.

At present Uzbekistan's agriculture is in transition from large-scale cotton and grain growing to finely controlled production of various fruit and vegetables.

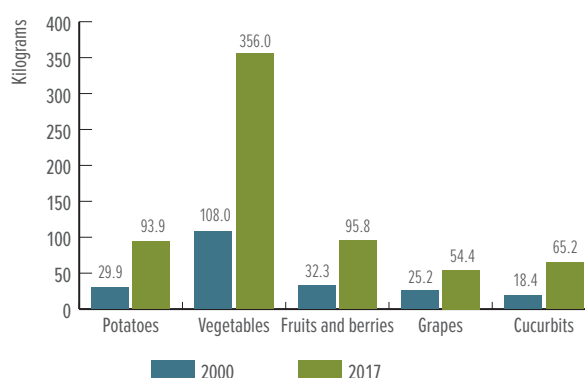
## Sales of Products

Since the 2016 harvest, Uzbekistan has been using government contracts for fresh fruits and vegetables, potatoes, cucurbits, and grapes (Decree of the President of the Republic of Uzbekistan April 12, 2016). The government contracts are based on the need for sufficient produce to ensure a stable supply of raw materials to private processing companies that form part of the Uzbekozikovkatholding company, to put enough produce into storage facilities for the winter-spring season to sustain the domestic market, and to export fresh fruits and vegetables. It means that the amount of government contracts will be determined by public need rather than producers' capacity.

In accordance with the established procedure, under government contracts, produce for subsequent industrial processing is bought based on contractual agreements between producers and processing companies, with at least 40 percent of the contract price paid in advance. Theoretically the government contract performance pattern is no different from the procurement of strategic commodities, such as cotton and grain. However, the Decree of April 12, 2016, emphasizes that fresh fruits and vegetables from small-scale farms and dehqan farms will be procured at contractual (market) prices, whereas cotton and grain prices are fixed by law with due regard for world market prices.

In addition, private and dehqan farms are free to sell their produce on both domestic and international markets.

**Figure 2: Per Capita Fruit and Vegetable Production**



Source: Authors' calculations, based on data from the State Statistics Committee of the Republic of Uzbekistan.

## Storage and Processing

The aggregate storage capacity of fruits and vegetables in the republic has been brought up to 1 million metric tons (UzDaily.uz 2018), which makes it possible to ensure the supply of the main types of agricultural products without interruptions or dramatic seasonal price fluctuations—not only for the country's population but also to increase export supplies.

Tax credits and preferences in the horticulture sector are provided, mostly, to processing companies. Until January 2019, private companies specializing in fruit and vegetable processing are exempt from customs levies (except customs fees) when they import advanced equipment and technologies. For the same period, the processing companies under Uzbekozikovkatholding are exempt from the following payments: profit taxes, corporate property taxes, single tax payments for micro-companies and small businesses, and mandatory payments to government specialized funds (except for the single social tax) (Decree of the President of the Republic of Uzbekistan April 12, 2016).

Despite the support offered by the government for the development of the processing sector, the amount of total produce that is processed is relatively low (Table 3).

The low proportion of fruits and vegetables that are processed can be explained by the imperfect methodology of data collection, since amounts processed by households are not taken into account. The bottom-line figures could look very different.

According to a survey conducted in Uzbekistan by the Japan International Cooperation Agency (JICA) in June 2017 (JICA 2017), the processing level of individual products is over 40 percent (Table 4).

## Public Consumption

A dynamic increase in income helps strengthen financial possibilities and increase the population's consumption of the main types of food. Between 2000 and 2016, per capita consumption of vegetables and cucurbits grew by 2.2 times, that of potatoes by 1.6 times, while consumption of fruit and berries increased by 3.5 times (Figure 3).

## Export

Over the past few years, fruit and vegetable export proceeds dropped from US\$1,121.6 million in 2010 to US\$664.1 million in 2017 (Table 5). However, the 2017 physical volume of fresh and processed fruit

and vegetable exports rose by 41.3 percent (or 264,200 metric tons) from 2010 to 904,100 metric tons. The diminishing fruit and vegetable export earnings are due to dropping prices for produce in the countries traditionally exporting fruit and vegetables from Uzbekistan—the Russian Federation and Kazakhstan—and foreign exchange market fluctuations.

The figures provided earlier demonstrate that today the potential of horticulture export is underutilized. Although overall horticulture output exceeds 21 million metric tons, only 4 percent of the output is exported (mainly to Russia and Kazakhstan). According to experts, this potential may amount to US\$5–10 billion. Russian sanctions against EU food exports also add to Uzbekistan's opportunities to exploit its fruit and vegetable export potential to its advantage.

One impediment to the realization of the fruit and vegetable export potential is that one company—Uzagroexport—has privileges over other exporters. Uzagroexport has the right to export fresh fruit and

**Table 3: Fruit and Vegetable Processing, 2015–17**

Produce	Processed, thousand metric tons			Processing level, %		
	2015	2016	2017	2015	2016	2017
Vegetables (including potatoes)	222.2	701.3	723.6	2.2	6.2	6.3
Cucurbits	0.0	1.1	0.7	0.0	0.05	0.03
Grapes	137.2	113.3	135.4	8.7	6.5	7.7
Fruit and berries	99.3	554.7	533.9	3.6	18.2	17.4

Source: Ministry of the Economy of the Republic of Uzbekistan.

**Table 4: Ratio of Fresh to Processed Produce**  
Percent

Produce	Sold fresh	Processed
Sweet cherries	31	69
Apples	70	30
Apricots	70	30
Peaches	74	26
Grapes	59	41
Pomegranates	88	12
Plums	75	25
Tomatoes	60	40
Peppers	63	37

Source: JICA 2017.

vegetables with prepayment of at least 30 percent or without prepayment if the produce is sold to one of the Uzagroexport trade houses set up abroad with major foreign importers that are reliable and long-term partners. Other exporters can export fresh fruit and vegetables only upon signing a contract and once 100 percent prepayment has been received.

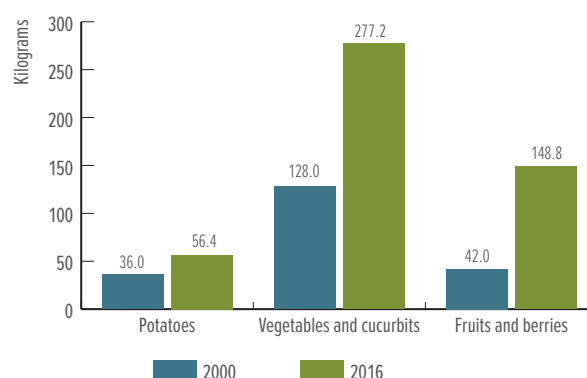
## Policy Issues

Specific problems occur at every stage of the value chain (production, processing, transportation, and sales) that cause losses. What is common at all the stages is financing shortages, a poor understanding of consumer needs, and an inadequate logistics system. For example, timely information on product prices in the trade sector is not always accessible to participants at other stages such as production, processing, and transportation. In addition to these, there are acute shortages of skilled personnel in each of the above spheres (JICA 2017).

## Production Issues

Production issues include high risks of disease and pests that are generated by the wide expansion of intensive gardening; farmers' lack of experience in orchard growing, in particular in pruning and thinning;

**Figure 3: Per Capita Fruit and Vegetable Consumption, 2000–16**



Source: State Statistics Committee of the Republic of Uzbekistan. <https://stat.uz/uz/>

insufficient application of crop-growing technologies that would enable farmers to avoid damage to harvested crops (and thus avoid the reduction in the price of marketable products); insufficient use of pre-cooling of the produce and other methods of quality management after harvesting; and so on.

Eighty percent of water resources that form the basis of production come from neighboring countries, and the water supply is not secure. Efficient use of scarce water resources could lead to higher productivity, but water fees depend on the area in which the farmland is located and therefore farmers lack

**Table 5: Fruit and Vegetable Export in 2010 and 2017**

Indicator	2010	2017
Export total, US\$, millions	13,044.5	13,927.8
Including food products (HS Code 2-24), US\$, millions	1,260.6	875.9
Share of food products in exports, %	9.7	6.3
Including fruit and vegetables (HS Code 07, 08,20), million US dollars	1,121.6	664.1
HS Code 07 – vegetables, US\$, millions	313.0	217.7
HS Code 08 – fruit and nuts, US\$, millions	779.1	417.2
HS Code 20 – products of processing of vegetables, fruit, nuts and other plant components, US\$, millions	29.5	29.2
Share of fruit and vegetables in total exports, %	8.6	4.8
Share of fruit and vegetables in food exports, %	89.0	75.8
Physical volume of fruit and vegetable exports, thousand tons	639.9	904.1
Share of horticulture product exports in total fruit and vegetable output, %	5.4	4.2

Source: State Statistics Committee of the Republic of Uzbekistan. <https://stat.uz/uz/>

Note: The HS Codes refer to the Harmonized Commodity Description and Coding Systems (HS)—an international nomenclature for the classification of products. It allows participating countries to classify traded goods on a common basis for customs purposes.

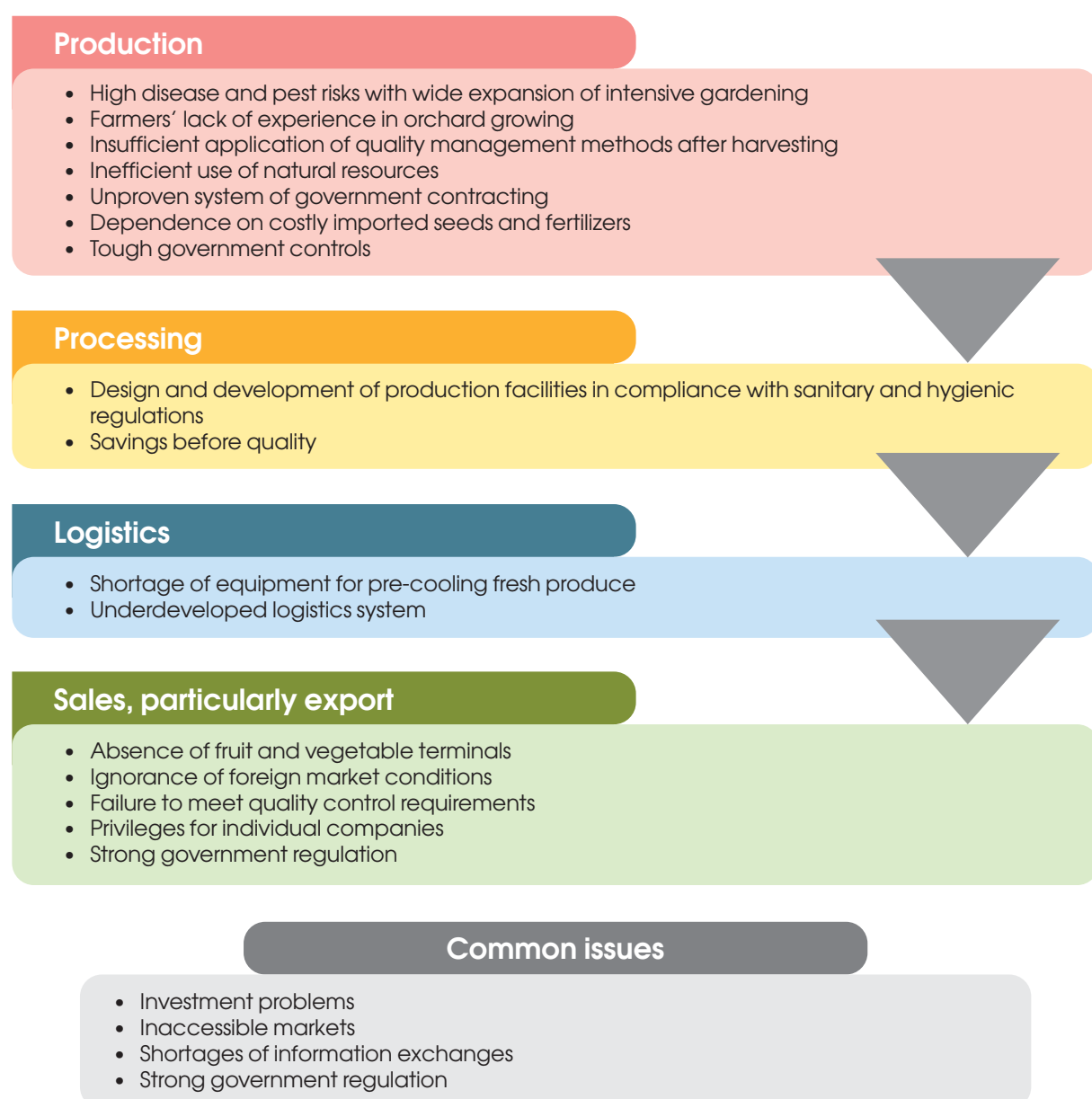
the incentive to save water and the introduction of water-saving technologies is too slow. The activities of water users' associations are stagnating because of the under-collection of water fees, sluggish repairs to end-of-line water channels, and the inefficient use of water resources. Furthermore, Uzbekistan has many saline areas where it is difficult to grow fruits and vegetables.

In 2018 the government planned that vegetables would be planted on 680,000 hectares of land reallocated from grain growing. The conclusion of public contracts to purchase produce from resowing with processing companies, exporters, and procurement

companies has not been active enough. No government contracts have been concluded under the government contract system to purchase 23 percent of the harvest from the resown areas in Karakalpakstan, 27 percent of the harvest in Tashkent province, and 53 percent in Bukhara province (Выступление Президента Республики Узбекистан 2018).

Cases of failure to sign contractual agreements are quite common. In the Qibray district, farmers were required by the hokimiyat (local authorities) to comply with Resolution No. PP-3230 of the President of the Republic of Uzbekistan dated August 21, 2017, "On Measures for Timely Supply of Material and Technical

**Figure 4: Key Issues of Value Chain Development in Uzbekistan's Fruit and Vegetable Sector**





Resources Required for Planting and Placement of August Onions and Garlic for 2018 Harvest, and Also Vegetable Crops under Tuksonbosti Method” planted garlic and then found it difficult to sell their produce.<sup>2</sup> The garlic glut on the domestic market depressed prices to levels that did not even cover cultivation costs (Podrobno.uz 09.09.2018).

There are also issues with making advance payments to farmers (Uzbekistan Today 2018). By early August 2018 processing companies had paid producers only 10 percent of the required advance, exporters had paid 11 percent, and procurement organizations had paid 38 percent.

A large number of agricultural products are not considered suitable for long-distance transportation because of damage and loss, which is why it is quite difficult to sell them in markets located far from the farm. Despite low prices, however, farmers are forced to sell perishable products at local markets. Hence, without addressing the issues of the post-harvest treatment of agricultural produce and its storage, processing, and efficient sale, farms are not able to meet profit targets. To meet these targets, it is recommended to develop diversified farms.

The government provides fertilizers and pesticides mostly for cotton and wheat growing, whereas it is relatively difficult for vegetable and fruit growers to purchase fertilizers and pesticides. Fruit and vegetable producers looking for good harvests and high-quality produce try to get costly imported fertilizers and pesticides.

Most vegetable seeds and fruit tree seedlings are imported. Uzbekistan does not produce or sell quality seeds or planting stock. Prices for seeds of the best varieties of vegetables are high. According to expert estimates, the aggregate cost of imported seeds is US\$30 million a year.

The level of government regulation of the fruit and vegetables sector is becoming higher. In late March 2018 the authorities requested that households plant vegetables and fruit on their fertile subsidiary plots within one month (Y3A 2018). Subsequently the government devised a mechanism for monitoring the efficient utilization of subsidiary plots (Decree of the Cabinet of Ministers of the Republic of Uzbekistan March 2018); based on this decree

the authorities will either extend benefits to their owners or fine and punish them to the point of taking their plots away.

## Processing Issues

All stages, from the development and design of a processing facility and selection of equipment and materials to its commissioning and management, have an important role to play in the processing industry. A survey (JICA 2017) conducted in the republic identified problems with development and design, including compliance with sanitary requirements. In some cases sanitary facilities were located next to production workshops. It is necessary to take into account sanitary requirements at the stage of preparing technical design of the enterprise.

Some food processing companies try to minimize their initial costs by buying cheap equipment manufactured in China, ignoring its effect on the quality of their future output.

**In storage:** As one of the elements of logistics, the task is to ensure that unprocessed produce remains fresh through pre-cooling as well as to build storage facilities with due regard for regional needs (JICA 2017). However, pre-cooling equipment is not sufficient; this means that there is room for improving the quality of fresh produce.

**In transportation:** In addition to developing the main type of transportation—that is, refrigerated trucks—the government has been also implementing measures to improve rail transportation. Large processing companies often use their own refrigerated trucks for transporting produce, which is a routine method of transportation for door-to-door delivery. At the same time, dried vegetables and fruit go by rail. Air transport is profitable only when shipping consignments of 50 tons or more. In practice, air transport ships high-value produce, such as sweet cherries (JICA 2017).

**In sales, particularly export,** there are also a number of issues:

- ✓ *Absence of fruit and vegetable terminals to build up produce for wholesale shipments. To make up a consignment for shipping (truck, rail car), it is necessary to have logistics centers with*

<sup>2</sup> The word tukson means “ninety” in Uzbek: in three winter months plants mature under the snow by spring.

refrigerators and farm produce preprocessing technology.

- ✓ *Vague pricing policies and ignorance of foreign market conditions.* A lack of clarity about policies and foreign conditions dramatically decreases the competitiveness of Uzbek farm produce when compared with that of competing suppliers from other countries.
- ✓ *Quality control.* Uzbekistan has yet to undertake many efforts to improve quality control or to enhance the inspection system, taking into account its plans to increase agricultural produce and food products export. Quite often export products are not allowed to enter the destination country, for example, Russia (Uz24.uz 2018, *kommersant.uz* 2018).

In June 2017 the Uzagroexport monopoly on the sale of fruits and vegetables abroad was abolished (Decree of the President of the Republic of Uzbekistan 2017). This company was set up in April 2016 and given a monopoly to export fresh and processed vegetables and fruits (Decree of the President of the Republic of Uzbekistan 2016). Other small-scale farms and dehkan farms were obliged to execute commission agent agreements with Uzagroexport and pay it a commission of up to 1 percent of the de facto export volume. At that time this decision was justified by the need to create a single quality and efficient supply chain to export products to other countries under the control of the government (FAO 2018). However, now that a new government is in place, the decision has been made to give a chance for competition to develop in this area. As a result, beginning in July 2017, business entities and entrepreneurs have been allowed to export fresh horticulture products, grapes, and cucurbits under direct contracts with 100 percent advance payment. However, Uzagroexport has retained the privilege of selling against a smaller prepayment or altogether without it under certain conditions (see Background).

Prices recommended by Uzagroexport for executing export contracts are rather notional. Since Uzagroexport is the company that regulates pricing for export products—meaning that it does not allow farmers to export their harvest below fixed prices<sup>3</sup>—produce simply perishes. For example, in May

hundreds of metric tons of vegetables were dumped in the Fergana province because farmers could not sell them at the prices they wanted (KUN.UZ 2018).

There are no official statistics on total losses of fruits and vegetables. Uzagroexport estimates that losses incurred in the transportation and pre-processing of produce within the country alone stand at 30–35 percent of total output (Podrobno.uz 22.06.2018). According to the JICA survey, amounts of losses vary substantially depending on the type of product and the stage of the value chain (JICA 2017) (Table 6).

## Stakeholder Groups

The following groups of stakeholders with an influence on the development of the fruit and vegetables sector in Uzbekistan can be identified:

### Farm Producers

**Farms** are business entities engaged in production of agricultural produce and other types of activities not prohibited by legislation with the use of leased lands (Law of the Republic of Uzbekistan 1998 N° 602-I). As of January 1, 2018, the number of active farms exceeded 152,000, 50 percent of which grew vegetables and fruits. When land is provided under a lease contract, the contract formalizes the farm's obligation to ensure crop productivity (averaged over three years) not below the legislated standard productivity.

Currently activities to transform farms into diversified enterprises are under way. Starting January 1, 2022, the government will terminate the land leases of those farms that have not diversified (by supplementing crop farming with processing, storage and sales of farm produce, industrial production, delivery of works and services, or other activities).

**Dehkan farms** are small-scale family farms that grow and sell agricultural produce where the family provides all of the labor. They are located on subsidiary land plots provided to the head of the family under lifetime ownership with hereditary succession (Law of the Republic of Uzbekistan 1998N° 604-I). As of January 1, 2018, there were 4,831,500 dehkan farms,

<sup>3</sup> The legislated practice of fixing minimum export prices by Uzagroexport was abolished by Decree No. UP-5495 of the President of the Republic of Uzbekistan dated August 1, 2018, "On Measures Drastically to Improve Investment Climate in the Republic of Uzbekistan."

**Table 6: Harvest Volume Breakdown**  
Percent

Crop	Volume	Losses (in harvesting)	Processing	Losses (in sales)	Domestic consumption	Export
Sweet cherries	100	7	58	3	24	8
Grapes	100	9	35	5	35	16
Tomatoes	100	12	32	4	33	19
Cucumbers	100	4	5	2	79	10

Source: JICA 2017.

Note: Volume = 100 percent of the harvested crop.

which together generate more than half of all fruits and vegetables grown in the republic.

The main objective of dehkan farms is to achieve self-sufficiency; surplus is sold in the market. Such farms have no obligations regarding crop production; they select the crops they want to grow at their own discretion and based on market demand.

**Entities engaged in agriculture** are legal companies that have land under their economic management as well as other separate property. They are involved in the production of animal and crop farming products and provide services to support agricultural production. For this group of companies, the production of horticulture products is secondary business.

**Private food producers not participating in Uzbekozikovkatholding.** Prior to January 1, 2019, these were privately owned enterprises that process horticulture products, potatoes, cucurbits, and grapes; regardless of their affiliation, they are exempt from customs duties (except for customs charges) when they import modern equipment and technologies. However, a number of tax credits and reduced rates of mandatory payments provided to companies forming part of Uzbekozikovkatholding do not apply to these companies.

## Government Authorities

**The Ministry of Agriculture** was set up in February of 2018 (Resolution of the President of the Republic of Uzbekistan February 2018) on the basis of the Ministry of Agriculture and Water Resources. This ministry is the primary administrative body responsible for agricultural policy. Its main task is to coordinate the activities of government agencies, economic management authorities, and other organizations related to ensuring food security in Uzbekistan.

Its functions include improving the export potential of agriculture and supporting higher value added of agricultural products; improving public-private partnership mechanisms; developing comprehensive targeted, sectorwide, and regional programs aimed at supporting development of agriculture; achieving food security for the country; and maintaining stable price levels for food products in the domestic market.

**The holding company Uzbekozikovkatholding** (Annex 1), set up in 2016 on the basis of the abolished Association of Food Processing Enterprises (Decree of the President of the Republic of Uzbekistan February 2016), is an **administrative supra-structure** traditional for the country: an association of food-producing companies with the mission of representing the industry vis-à-vis the government. Some of its functions include implementing organizational measures to develop the sector; assisting the implementation of state policy; and taking into account state's interests in agricultural produce processing, production, and sale of food products. Two-thirds of the holding's businesses are fruit and vegetable processing companies.

**The joint-stock company Uzagroexport** (Annex 2) was set up under Uzbekozikovkatholding (Decree of the President of the Republic of Uzbekistan 2016). It exports fresh and processed horticulture products under direct export contracts signed with foreign partners as well as under commission contracts concluded with small-scale farms and dehkan farms, agri-business companies, and processing companies. Uzagroexport's main activity is to increase the volume and expand the product line and geography of fruit and vegetable exports. The company is the largest fruit and vegetable exporter and has certain monopoly rights, which holds back the development of the sector.

**The joint-stock company Uzsharobsanoat** (Annex 3) was set up in 2018 (Decree of the President of the

Republic of Uzbekistan February 2018) through the reorganization of the holding company Uzvinosanoatholding. Like Uzbekozikovkatholding, Uzsharobsanoat is an administrative supra-structure—an association of businesses engaged in growing and processing grapes and producing alcoholic beverages and potable ethanol. Its tasks are to carry out technical and technological policy in the winegrowing sector, assist in that sector's development, and manage and coordinate the activities of enterprises that produce food-grade alcohol—liqueurs, spirits, and wines.

**Uzbekozikovkatzakhira, the association of fruit and vegetable procurement and storage companies** (Annex 4), was created in 2016 by restructuring the Uzulgurzhisavdoinvest association (Decree of the President of the Republic of Uzbekistan 2016). It is also an administrative supra-structure engaged in addressing the issues of setting up the reserve stock of horticulture products, strengthening the logistics infrastructure for storing horticulture products, preparing proposals regarding needs in import of socially important food products and horticulture products that are not produced in the republic or are in short supply, organizing retail trade in fruit and vegetables locally, and providing advice in certifying produce for export.

## Consumers

**Uzbekistan population:** As of January 1, 2018, the republic's resident population was 32.6 million. This suggests that the country's domestic market is the largest in Central Asia. The percentage share of rural population in the total population is 49.4 percent.

## Policy Options

The main shocks that will impact development of Uzbekistan's agriculture in the near term may include increased natural and artificial shortage of water resources, climatic changes, and continued growth in the prices of manufactured goods (such as agricultural machinery, fertilizers, fuel and lubricants).

The major task in the mid-term is to create competitive agriculture with a high level of mechanization and resilience to climatic changes that would help address the task of achieving food security, increasing income of agricultural producers and generating financial resources in economy from export of

agricultural products with efficient and effective use of natural resources.

Two possible fruit and vegetables development scenarios are considered in this case. The *first scenario* proceeds from the continuation of the current policy and the chosen path of reforms. The *second scenario* takes a look at the liberalization of the fruit and vegetables sector on the basis of a gradual land reform, introduction of pay for water use, abolition of the government contract practice, and so on.

### 1. Policy options for developing the fruit and vegetables sector under the *first scenario* (continuing current policy)

The development of the fruit and vegetables sector under the *first scenario* is predicated primarily on the sector development programs and strategies currently approved.

The Government's Agriculture Development Program for 2016–2020 (Resolution of the President of the Republic of Uzbekistan 2017) has set forth main guidelines for continued restructuring of agricultural production, implementing advanced agricultural technologies, instituting complex mechanization of agriculture, and increasing the value added of agricultural produce. This program envisages the stage-by-stage optimization of areas under cotton with the subsequent planting of fruits and vegetables, potatoes, and other crops on the released lands; organizing intensive orchards; and further developing selection and seed-growing.

Lands on which cotton productivity does not exceed 1.2–1.5 metric tons per hectare (the country's average being 2.4 metric tons per hectare) and on which wheat productivity is under 2.0 metric tons per hectare (the average being 4.22 metric tons per hectare) will be released, as will salinized areas and lands in the foothills of mountains.

Lands reallocated from cotton growing will be leased for crop farming under long-term agreements (Resolution of the President of the Republic of Uzbekistan 2018), predominantly to those business entities that:

- ✓ have logistics centers (facilities for storage and primary or advanced processing of fruit and vegetables, and also farming technology) and

experience in selling fruit and vegetables on the domestic and foreign markets;

- ✓ have experience in establishing and operating advanced hothouses and intensive orchards;
- ✓ have own or raised funding to organize an agricultural value chain in the cluster format; and
- ✓ take on obligations to arrange for growing, processing, and selling fruits and vegetables, including for export, and introduce most advanced resource- and water-saving technologies and create jobs.

The plans for developing Uzbekistan's agriculture for 2016–2020 therefore provide for reducing the areas under cotton and wheat by 220,500 hectares over five years (Table 7). The largest areas will be set aside for vegetables (to grow by 91,000 hectares upon the program's completion) and fodder crops (to grow by 50,300 hectares).

Expert estimates (UNDP-CER 2016) show that the stage-by-stage reduction of areas under cotton and spiked cereals on a total area of 220,500 hectares to be replaced by other food crops will make it possible to receive additional revenue of over 490 billion soms a year (instead of a loss of more than 270 billion soms) and to increase employment by 175,000 workers.

In addition, the gradual replacement of old orchards and vineyards with intensive systems and the

establishment of new intensive orchards and fruit and vegetable plantations with the application of high-tech agricultural techniques makes it possible to raise orchard productivity at least three to four times by 2020 by increasing the number of plantations and the share of highly productive intensive orchards from 12 percent, or 28,000 hectares, in 2015 to 28.3 percent, or 78,000 hectares, in 2020.

As part of the implementation of the nationwide Strategy of Actions for the Further Development of the Republic of Uzbekistan in 2017–2021 (Resolution of the President of the Republic of Uzbekistan 2017), the following priority guidelines for the development of agriculture were laid down:

- ✓ Extend structural reforms and dynamic development of agricultural production, further consolidate the country's food security, expand ecologically safe production, and boost the export potential of the agrarian sector.
- ✓ Further optimize areas under crops to cut the areas under cotton and spiked cereals to use the land thus released for growing potatoes, vegetables, fodder, and oil crops and new intensive orchards and vineyards.
- ✓ Provide incentives to create favorable conditions for the development of farms, primarily diversified ones that, in addition to growing produce, practice processing, procurement, storage, sales, construction work and deliver services.

**Table 7: Planned Areas under Agricultural Crops in Uzbekistan by 2020**  
*Hectares, thousands*

Agricultural Crops	2015	2020	Variation from 2015
Cotton	1,285.5	1,115.0	-170.5
Wheat	1,329.5	1,279.5	-50.0
Total cotton and wheat	2,615.0	2,394.5	-220.5
Potatoes	80.3	116.3	36.0
Vegetables	192.0	283.0	91.0
Fruits	261.9	279.9	18.0
Fodder	309.1	359.4	50.3
Oil crops	14.3	28.3	14.0
Grapes	144.0	155.2	11.2
Total fruits and vegetables	1,001.6	1,222.1	220.5

Source: Compiled by the authors based on Resolution No. PP-817 of the President of the Republic of Uzbekistan dated December 29, 2015, "On Measures Further to Reform and Develop Agriculture over the 2016-2020 Period."



- ✓ Implement investment projects to build new and reconstruct and modernize existing processing facilities with advanced high-tech equipment for more advanced processing of farm produce, and produce ready-to-cook and ready-to-use food and packaging goods.
- ✓ Further expand the infrastructure for storage, transportation, and sales of farm produce and provide agrochemical, financial, and other modern market services.
- ✓ Further improve irrigated lands; develop a system of land improvement and irrigation facilities; introduce broad intensive technology in farm production, primarily modern water- and resource-saving techniques; and apply highly efficient farm technology.
- ✓ Expand research to create and introduce a new selection of varieties of disease- and pest-resistant farm crops and highly productive animal breeds adapted to local soils and climatic and environmental conditions.
- ✓ Adopt systemic measures to mitigate the negative impact of global climate change and the drying up of the Aral Sea as a result of the development of agriculture and people's life and activities.

From 2018 on it is planned to establish one or two fruit and vegetable clusters in each of Uzbekistan's regions to build a chain on the principle "seeds – seedlings (young plants) – cultivation – procurement – storage – processing – transportation – delivery to market" and in 2019 to involve all the districts specialized in fruit and vegetable growing in the cluster organization of farm production (Resolution of the President of the Republic of Uzbekistan 2017).

The export expansion strategy is aimed at increasing production and developing a system of procurement, storage, transportation, and marketing fresh fruits and vegetables abroad. The focus also is on the fruit and vegetable processing industry producing goods that will comply with foreign market requirements. The strategic target is to bring fruit and vegetable exports up to US\$10 billion per year (Podrobno.uz 22.06.2018).

By 2020 the Government of Uzbekistan plans to establish 17 commercial and logistic centers that will

have refrigerator and deep-freeze equipment and dovetail with motor and railway transport.

On the whole, an increase in the production of food instead of cotton, which is now a dominant crop, will ultimately contribute to strengthening Uzbek food security and improving food patterns of the population. However, this scenario does not take into account a number of issues that should be addressed to support the successful operation of agriculture as a whole and the horticulture sector, in particular, in the long run.

## 2. Policy options for developing the fruit and vegetables sector under the second *scenario* (liberalizing the sector on the basis of a gradual land reform, introducing for-pay water use, abolishing government contract practice)

The *second scenario* of developing the fruit and vegetable sector envisages the following measures:

**Implement step-by-step land reform.** The key to sector development and efficient land use in the longer term is to ensure the protection of the rights of ownership in agriculture. At the first stage it is necessary to formulate clear-cut regulations and criteria for monitoring land use: what indicators are put on record, and how frequently, what is a critical variation from the norm and what variations constitute a cause for charges of misuse of a land plot.

Farm producers are not protected from land confiscation, which is a characteristic feature of the laws of Uzbekistan (Norma.uz 2018). A land plot can be taken from one farm producer and leased to another, who is expected to make efficient use of that land. However, the law does not protect the new leaseholder from eventual confiscation. The rights of use, or leases, on land plots should be terminated only by a court of law, otherwise there is a direct invitation to arbitrariness at the grassroots level. Such measures would provide the basis for implementing a gradual full-scale land reform with the introduction of the right of ownership.

**Actively introduce market mechanisms into agriculture.** Agro-business is a business like any other. It is necessary to establish free markets of resources

for farm production (fuel and lubricants, seeds, technology, etc.) and free markets for final farm produce. If farmers themselves decide what to grow and how, they will choose most profitable crops for themselves and maximize both their earnings and tax revenue for government (Haymov 2018). The government can support individual areas of agrobusiness by fixing minimum procurement prices or subsidizing individual resources, as many countries effectively do. At the same time it is recommended that the existing system of government contracts be dropped. Government should be one market player, on an equal footing with the others. This would also help build government's credibility among farm producers.

**Promote competition by opening export channels to more companies.** Uzbek farms and processing companies would only stand to gain if qualified companies were granted free access to export, thus creating a competitive environment for their goods. The government would, perhaps, consider a plan giving companies access to export operations and simultaneously relaxing export restrictions.

**Find innovative ways to propagate knowledge and expertise.** Uzbekistan does not have an in-place service for the propagation of knowledge and expertise, although regional branches of research institutions participate in training specialists and in exhibitions and shows of advanced farm technology and processes. Organizations such as USAID implement programs to teach the basics of agriculture and productive crop farming. There are many farm machinery exhibitions. It is very important to proceed from all these diverse practices to find efficient ways of bringing information about the production and marketing of farm produce to as many Uzbek farmers as possible.

**Introduce for-pay water use.** Economic incentives to conserve water are the most effective method of managing water demand in world practice. This method can be implemented by the introduction of for-pay water use and improvements in the tariffs policy. The establishment of a for-pay water use regime could help resolve many problems. Farm producers would know exactly how much they pay for every cubic meter of water they use and thus be encouraged to save it. Water management organizations could more precisely plan their revenue and, accordingly, their expenditures for maintenance, reconstruction, and building new irrigation and land

improvement facilities, depending on the amount of water they supply to consumers.

These steps, along with current policy measures to modernize agricultural production, would help accelerate the growth of the fruit and vegetable sector, cut produce losses in production and sales, and make more efficient use of scarce available natural resources.

## Assignment

1. Analyze the proposed policy measures and discuss their possible impact on the development of the fruit and vegetable sector in Uzbekistan and on different groups of stakeholders.
2. What additional measures would you suggest for the speedier development of the fruit and vegetable sector and produce loss cutting in Uzbekistan? Make sure you keep the interests of a select group/all of the stakeholders in mind.

## Policy Recommendations

A review of Uzbekistan's fruit and vegetable sector has shown that, overall, it is developing rather dynamically. Government control is very strong. However, regrettably, the system of government contracts does not always function efficiently at the grassroots level, which causes produce losses. Apart from that, there is a strong potential for the better use of resources and for expanding the export of fresh and processed fruit and vegetable produce. The following measures are recommended to invigorate the existing growth reserves and strengthen food security in the longer term:

- ✓ Further improve the structure of the areas under crops through a stage-by-stage reduction of cotton plantings on low-productivity lands (those with yields of less than 15 centners per hectare) because they are not cost-efficient; a reduction of areas under spiked cereals on non-irrigated lands and in the foothills with poor water supply; and allocation of the areas thus released for growing more profitable vegetables and new

orchards and vineyards with the introduction of drip irrigation. This would make it possible to raise farm producers' earnings and strengthen food security.

- ✓ Implement the stage-by-stage transition to the system of partial for-pay water use in agriculture to encourage rational water use in the sector and enable an accumulation of funds for maintaining and investing in irrigation and pumping systems. The water savings would make it possible to overcome water shortages in the longer term and increase fruit and vegetable production.
- ✓ Promote a market in land plots. Consideration should be given to pilot programs that would help farmers lease land or sell their land use rights. In parallel, investments should be made in the development of mechanisms and institutions needed to form transparent and efficient land markets. The strengthening of the institution of ownership would encourage greater responsibility in farm producers and promote production.
- ✓ Further abolish restrictions on export. Export bans and restrictions, such as the practice of fixing minimum prices, detract from Uzbekistan's reputation as a reliable supplier of quality fruits and vegetables. They also encourage resort to unofficial and illegal marketing channels, hampering the establishment of official markets of the kind necessary to gain access to markets of high-quality produce both domestically and abroad. This policy prevents producers from expanding production and they sell their produce through channels with low value added. Abolishing these bans and restrictions would enhance the country's reputation as a reliable supplier.
- ✓ Uzagroexport should establish its own laboratory to assess the quality of produce and to provide a corporate certification authority functionally specializing in supporting export operations. This measure would help improve the quality of exports and make more efficient use of the available export potential.
- ✓ Establish pilot clusters for production, processing, delivery of services, sales, and scientific and technical support. This would

make it possible to build an integral production cycle and cut losses.

- ✓ Develop uniform lending standards applicable to all fruit and vegetable growers and improve the current mechanisms of financing agriculture to provide for lending on beneficial terms. This would make it possible to do away with or at least mitigate funding shortages identified at every stage of the value chain of fruit and vegetable production.
- ✓ Develop a database of potential foreign markets accessible to all farm producers. This database would enable farm producers to search by type, sort, and determine tentative volume by key consumers as well as their requirements. Such a database would expand the farm producers' understanding of markets and enable them to plan fruit and vegetable production more efficiently.

The implementation of all the above measures would help saturate the domestic market with fruits and vegetables, increase the export potential of the sector, sustain the level of food security, cut produce losses, create new jobs, and raise the earnings of a large segment of the rural population.

## References

- FAO (Food and Agriculture Organization of the United Nations). 2018. Review of Agricultural Trade Policies in the Post-Soviet Countries 2016–17. <http://www.fao.org/3/I9313RU/i9313ru.pdf> (in Russian).
- JICA (Japan International Cooperation Agency). 2017. Data Collection Survey on Agriculture Sector in Uzbekistan. Final Report. June. [http://open\\_jicare-port.jica.go.jp/pdf/1000032510.pdf](http://open_jicare-port.jica.go.jp/pdf/1000032510.pdf) (in Russian).
- Pugach I., Y. Yusupov, and Z. Berdinazarov. 2016. "Agricultural Policy in Wheat Production and Crop Diversification in Uzbekistan." IAMO Discussion Paper No. 157, Halle (Saale): IAMO <https://www.iamo.de/fileadmin/documents/dp157.pdf> (in Russian).
- UNDP (United Nations Development Programme). 2016. Improving Productive and Export Potential of Fruit and Vegetable Sector of Uzbekistan: Challenges and Perspectives. Analytical Report 2016/09.

Center for Economic Research, Tashkent. <http://www.uz.undp.org/content/uzbekistan/ru/home/library/poverty/improving-productive-and-export-potential-of-fruit-and-vegetable.html> (in Russian); Summary available in English: file:///C:/Users/wb489581/AppData/Local/Packages/Microsoft.MicrosoftEdge\_8wekyb3d8bbwe/TempState/Downloads/un\_uzb\_summary%20(1).pdf

Uz24.uz «Россия не допустила ввоз почти 20 тонн узбекских фруктов» 03.08.2018 <http://uz24.uz/ru/society/rossiya-ne-dopustila-vvoz-pochti-20-tonn-uzbekskih-frukto>

UzDaily.uz Министр внешней торговли рассказал об экспортном потенциале плодоовощной продукции Узбекистана 02.04.2018 <https://www.uzdaily.uz/articles-id-36832.htm>

Podrobno.uz «Кто виноват в проблеме или что делать с чесноком кибрайским фермерам?» 09.09.2018 <https://podrobno.uz/cat/obchestvo/kto-vinovat-v-probleme-ili-ch/>

Podrobno.uz «Тохиржон Жалилов: все проблемы в экспорте плодоовощей мы создаем себе сами» 22.06.2018 <https://podrobno.uz/cat/economic/tokhirzhon-zhalil/>

Выступление Президента Республики Узбекистан Шавката Мирзиёева 31 июля 2018 года на видеоселекторном совещании, посвященном вопросам ускорения развития хлопчатника, посева повторных культур, эффективного использования приусадебных земель населения и экспорта сельскохозяйственной продукции. <https://stat.uz/ru/press-tsentr/novosti-uzbekistana/4551-agrar-islohotlar-natijasi-farovonlikoshishi-va-narx-navo-barqarorligida-aks-etishi-kerak-2>

Гулямов Р. А. и др. «Потенциал и перспективы развития плодоовощеводства и виноградарства Узбекистана» Ташкент – «Узбекистан» – 2014

Информационно – правовой портал Norma.uz. «Нужна ли частная собственность на землю?» [https://www.norma.uz/nashi\\_obzori/nujna\\_li\\_chastnaya\\_sobstvennost\\_na\\_zemlyu](https://www.norma.uz/nashi_obzori/nujna_li_chastnaya_sobstvennost_na_zemlyu)

Информационное агентство «Uzbekistan Today». «Как идут работы в рамках «Ударного двухмесячника накопления урожая». 01.08.2018

<http://www.ut.uz/ru/obshestvo/kak-idut-raboty-v-ramkakh-udarnogo-dvukhmesyachnika-nakopleniya-urozhaya/>

Национальное информационное агентство Узбекистана (УзА) «Обсуждена результативность проводимой в сельском хозяйстве работы» 24.03.2018 <http://uza.uz/ru/politics/obsuzhdena-rezultativnost-provodimoy-v-selskom-khozyaystve-r-24-03-2018>

Наумов Ю., эксперт Center for Economic Development О последних инициативах по развитию сельского хозяйства в Узбекистане <http://ced.uz/sobytiya/o-poslednih-initsiativah-po-razvitiyu-selskogo-hozyajstva-v-uzbekistane/>

Новостной портал KUN.UZ Неудачная ценовая политика «Узагроэкспорт»: 150 тонн овощей выброшено на свалку 03.05.2018 <https://kun.uz/ru/news/2018/05/03/neudacnaa-cenovaa-politika-uzagroesport-150-tonn-ovosej-bylo-vybroseno-v-musor?q=%2Fru%2Fnews%2F2018%2F05%2F03%2Fneudacnaa-cenovaa-politika-uzagroesport-150-tonn-ovosej-bylo-vybroseno-v-musor>

Портал «Kommersant.uz» «На границе Оренбурга задержаны 432 тонны овощей и фруктов» 14.06.2018 <http://kommersant.uz/bez-rubriki/orenburg-zaderzhal>

## Recommended Readings

FAO (Food and Agriculture Organization of the United Nations). 2018. Review of Agricultural Trade Policies in the Post-Soviet Countries 2016–17. <http://www.fao.org/3/I9313RU/i9313ru.pdf> (in Russian)

Pugach I., Y. Yusupov, and Z. Berdinazarov. 2016. “Agricultural Policy in Wheat Production and Crop Diversification in Uzbekistan.” IAMO Discussion Paper No. 157, Halle (Saale): IAMO <https://www.iamo.de/fileadmin/documents/dp157.pdf> (in Russian)

UNDP (United Nations Development Programme). 2016. Improving Productive and Export Potential of Fruit and Vegetable sector of Uzbekistan: Challenges and Perspectives. Analytical Report 2016/09. ), Center for Economic Research. Tashkent. <http://www.uz.undp.org/content/uzbekistan/ru/home/library/poverty/improving-productive-and-export-potential-of-fruit-and-vegetable.html>

potential-of-fruit-and-vegetable.html (in Russian); Summary available in English: file:///C:/Users/wb489581/AppData/Local/Packages/Microsoft.MicrosoftEdge\_8wekyb3d8bbwe/TempState/Downloads/un\_uzb\_summary%20(1).pdf

Гулямов Р. А. и др. «Потенциал и перспективы развития плодовоовощеводства и виноградарства Узбекистана» Ташкент – «Узбекистан» – 2014

## Decrees, Laws, and Resolutions

The Decree of the Cabinet of Ministers of the Republic of Uzbekistan of December 14, 2017, No. 984 “On Approval of the Regulations on the Order of Export of Fresh, Dried and Prepared Fruit and Vegetable Products”

The Decree of the Cabinet of Ministers of the Republic of Uzbekistan of March 18, 2018, No. 205 “On Measures on Organization of Efficient Use of Household Plots and Plots of Dehkan Farms”

The Decree of the President of the Republic of Uzbekistan No. PP-2520 of April 12, 2016, “On Measures to Improve the System of Procurement and Use of Fruits and Vegetables, Potatoes and Melons”

The Decree of the President of the Republic of Uzbekistan No. PP-817 of December 29, 2015, “On Measures for Further Reform and Development of Agriculture in 2016-2020”

The Decree of the President of the Republic of Uzbekistan No. PP-3077 of June 21, 2017, “On Measures for Further Support of Domestic Exporting Organizations and Improvement of Foreign Economic Activity”

The Decree of the President of the Republic of Uzbekistan No. PP-2515 of April 7, 2016, “On the Formation of a Specialized Foreign Trade Company for the Export of Fresh and Processed Fruit and Vegetable Products ‘Uzagroeksport’”

The Decree of the President of the Republic of Uzbekistan No. PP-2492 of February 18, 2016, “On Measures to Further Improve Organization of the Food Industry Management in the Republic”

The Decree of the President of the Republic of Uzbekistan No. PP-3573 of February 28, 2018, “On Measures on Radical Improvement of the Wine Industry and the Sale of Alcoholic Beverages”

The Decree of the President of the Republic of Uzbekistan No. PP-2517 of April 8, 2016, “On the Establishment of an Association of Enterprises for Harvesting and Storing Fruit and Vegetables ‘Uzbekzokovkaqtakhira’”

The Decree of the President of the Republic of Uzbekistan No. PP-3344 of October 20, 2017 “On Additional Measures to Ensure Food Security in the Republic and Further Improve the Activities of the Association ‘Uzbekozikovkatzakhira’

The Decree of the President of the Republic of Uzbekistan No. UP-5495 of August 1, 2018, “On Measures Drastically to Improve Investment Climate in the Republic of Uzbekistan”

The Law of the Republic of Uzbekistan No. 602-I of April 30, 1998, “On Farms” (in the version of the Law of the Republic of Uzbekistan No. 476 of April 18, 2018)

The Law of the Republic of Uzbekistan No. 604-I of April 30, 1998, “On Dehkan Farms”

The Resolution of the President of the Republic of Uzbekistan No. UP-5330 of February 12, 2018, “On Organizational Measures for the Radical Improvement of the System of Public Management of Agriculture and Water Resources”

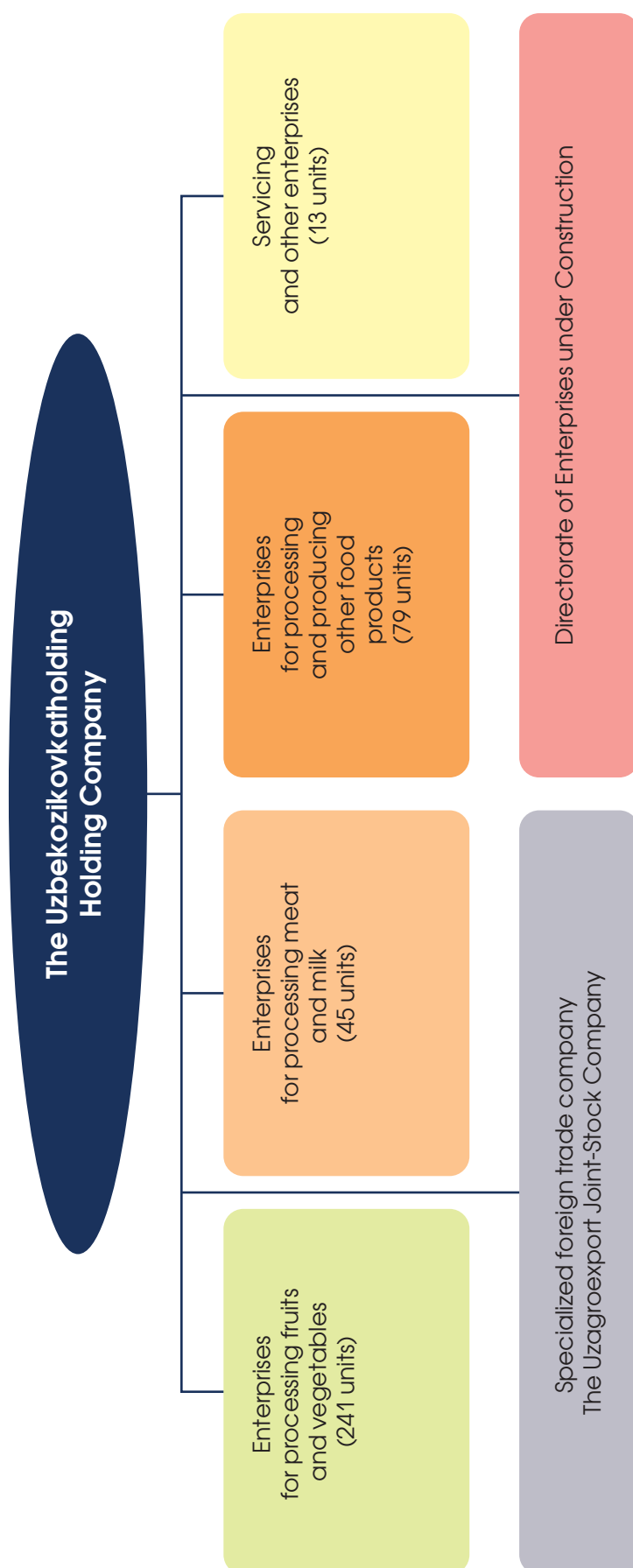
The Resolution of the President of the Republic of Uzbekistan No. UP-5388 of March 29, 2018, “On Additional Measures for the Accelerated Development of Fruit and Vegetable Growing in the Republic of Uzbekistan”

The Resolution of the President of the Republic of Uzbekistan No. UP-4947 of February 7, 2017, “On the Strategy of Actions for the Further Development of the Republic of Uzbekistan”

The Resolution of the President of the Republic of Uzbekistan No. PP-817 of December 29, 2015, “On Measures Further to Reform and Develop Agriculture over the 2016-2020 Period”



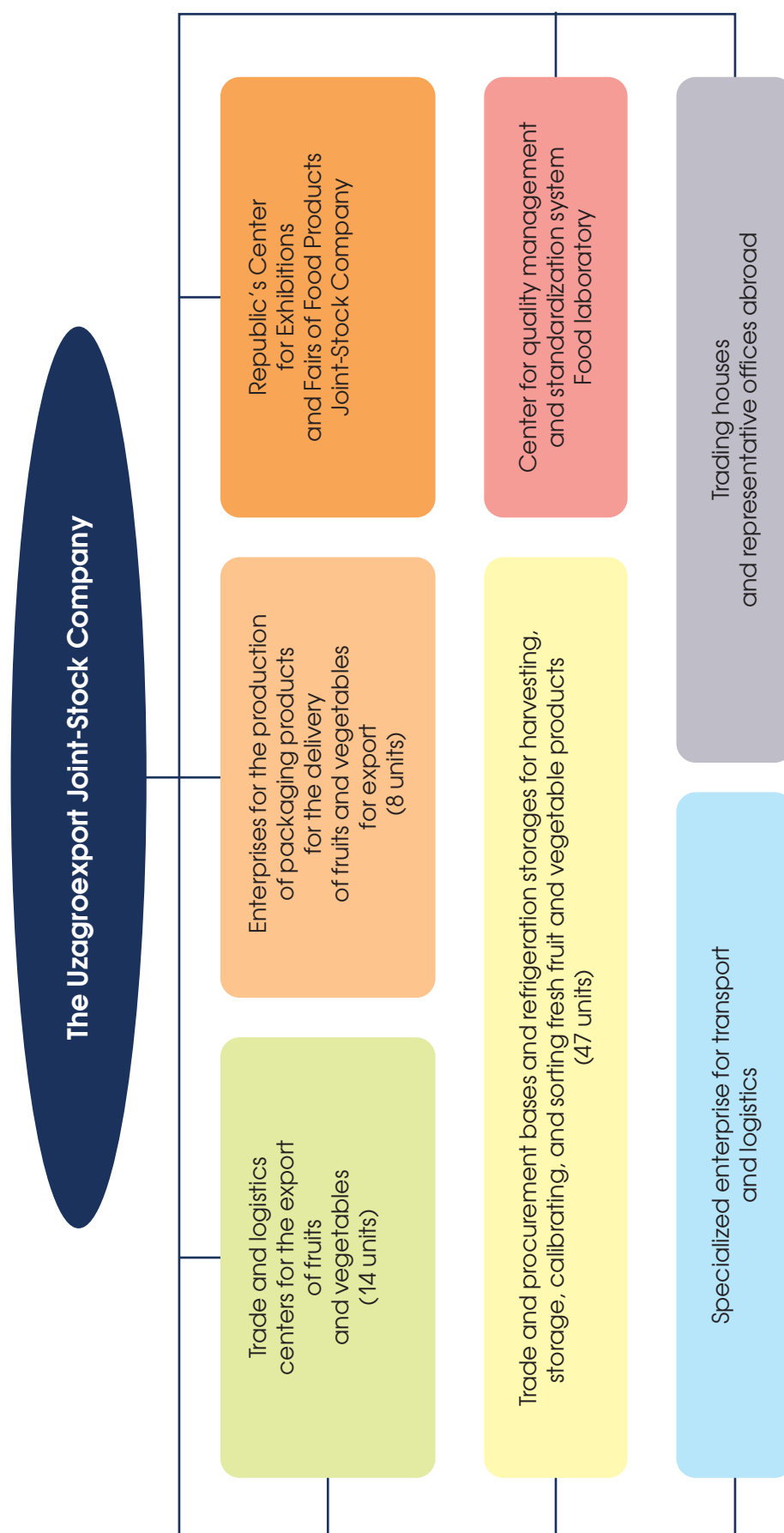
## The Structure of the Uzbekizikovkatholding Holding Company



Source: Appendix No. 6 to the Resolution of the President of the Republic of Uzbekistan No. PP-2515 of April 7, 2016 "On the Formation of a Specialized Foreign Trade Company for the Export of Fresh and Processed Fruits and Vegetables 'Uzagroeksport'."

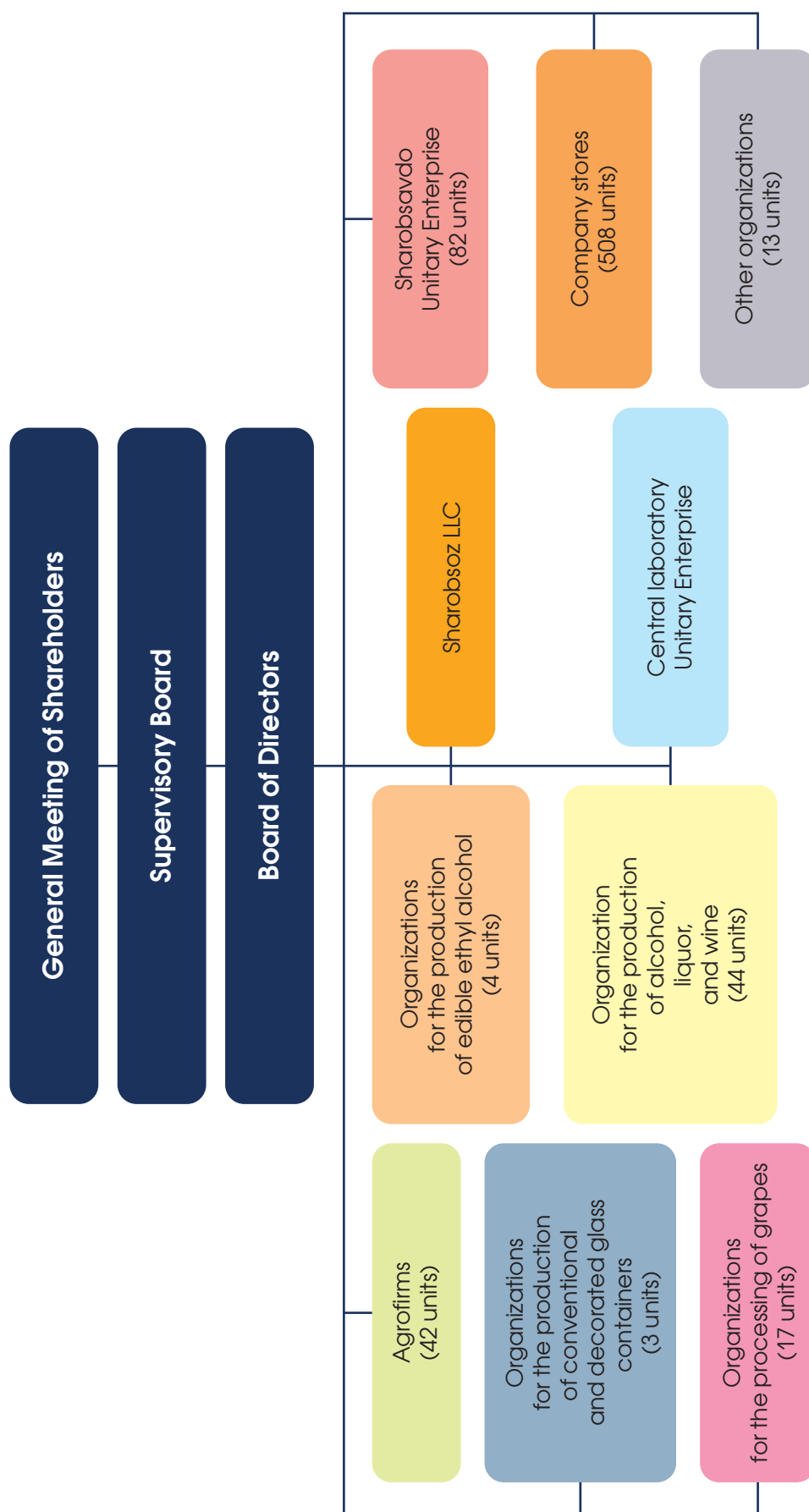
## Annex 2

### The Structure of the Specialized Foreign Trade Company Uzagroexport Joint-Stock Company



Source: Appendix No. 3 to the Resolution of the President of the Republic of Uzbekistan No. PP-2515 of April 7, 2016 "On the Formation of a Specialized Foreign Trade Company for the Export of Fresh and Processed Fruits and Vegetables 'Uzagroekspart'."

## The Structure of the Uzsharobsanoat Joint-Stock Company

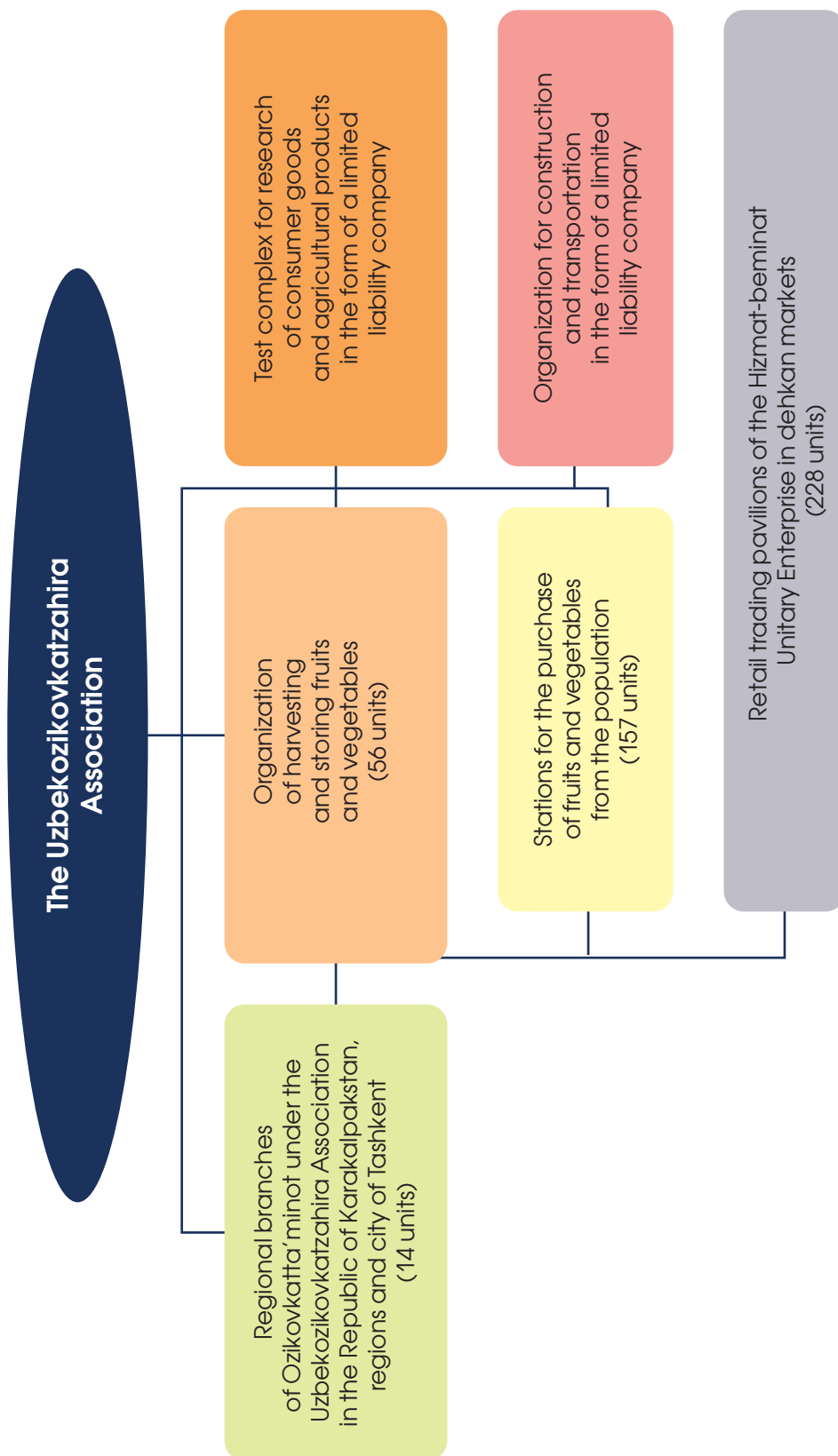


Source: Appendix No. 4 to the Decree of the President of the Republic of Uzbekistan No. PP-3573 of February 28, 2018 "On Measures on Radical Improvement of the Wine Industry and the Sale of Alcoholic Beverages."

Note: A unitary enterprise is a government-owned corporation.

## Annex 4

### The Structure of the Association of Enterprises for Harvesting and Storing Fruits and Vegetables Uzbekozikovkatzakhira



Source: Appendix No. 1 to the Decree of the President of the Republic of Uzbekistan No. PP-3344 of October 20, 2017 "On Additional Measures to Ensure Food Security in the Republic and Further Improve the Activities of the Association 'Uzbekozikovkatzakhira'."



# Improving Wheat Value Chain Performance in Armenia

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## Executive Summary

The objective of this case study is to provide options for improving the performance of the wheat value chain in Armenia to promote better food security.

Generally, policy issues related to wheat production and overall wheat market value chain development in Armenia concern the lack of access to quality seed; the abuse of the monopoly of power characterized by the unfair business practices of two companies that control wheat imports, milling, and flour sales and drive up prices; the significant loss and waste in the wheat food chain, which are extremely important in the context of a shortage of land, water, and other resources in Armenia; and the lack of agricultural information and marketing support.

The wheat value chain in Armenia represents flows of functions and stakeholders that are classified into primary and input suppliers and support service actors. Support service providers are important actors engaged in input support, marketing, policy, and infrastructural and transformational functions. Primary stakeholders perform functions of input supply, production, processing, and marketing, some of which can be implemented by more than one stakeholder.

For tackling the identified issues and improving performance of the wheat value chain in Armenia, the following policy options are proposed: enhancing access to quality seeds by developing the seed production industry in Armenia; reducing wheat loss; promoting inclusive institutional food procurement arrangements that provide better access for small companies; and developing the agricultural market information system for the wheat industry.

## Background

Wheat is the basis of bread—a key staple in the diet of most people worldwide that provides many of the nutrients required for normal development and good health—and is one of the essential food security commodities (Hecht 2017).

In Armenia, wheat provides about 42 percent of households' caloric consumption. It is consumed mostly as bread. Over 15 percent of the population in Armenia has food rations of 70 percent bread and

potato (NSSA 2017). After the food crisis of 1990s, when the most important food such as bread was rationed at 250 grams/person/day, food independence and availability and access to food became central to Armenian domestic economic and food security policies. Agricultural policies have been evolving toward recognizing the crucial role of government support for the wheat industry, although less attention is paid to the processing and marketing components of the wheat value chain. Thus the Wheat Seed Production Development Plan 2010–2014 of Armenia aims to improve wheat production and increase self-sufficiency, which is currently at the unsatisfactory level of 36 percent; the national agricultural development target is to reach 80 percent wheat self-sufficiency by 2020 (Alaverdyan et al. 2015; NSSA 2017).

The objective of this case study is to provide options for improving the performance of the wheat value chain in Armenia.

Since the land reforms of the 1990s, Armenian agriculture has been dominated by small farms (of 3 to 5 hectares) and subsistence farmers. Agricultural production, marketing, and trade are implemented by private entrepreneurs with minimum government intervention, which is mainly concentrated on the supply side. Support generally comes from externally funded projects. However, after the crisis of 2008, the government initiated a number of support reforms, including in the wheat sector. These reforms were mostly input support programs focusing on the provision of seeds, fertilizer, and diesel to increase wheat production (ICARE 2012). Government actions have not been successful in developing extension services: only 20 percent of farmers in Armenia obtain extension services, which are important parts of the value chain (Bobojono et al. 2016). Indeed, poor or no access to services or machinery is among the main reasons that Armenian farmers do not have a strong wish to stay in agriculture, the others being low financial profitability and instability of income. No crop insurance services are currently available to Armenian farmers. The availability of assets (such as buildings, machinery, and other equipment) is also very low. Indeed, 90 percent of farmers in Armenia made no capital investments in 2016, and about 40 percent of farmers still intend to make investments in the next couple of years (ACT 2017). Moreover, Armenian farmers commercialize (sell through different marketing channels), on average, about 40 percent of their produce, keeping about

60 percent of the products they produce for their own use (Bobojono et al. 2016).

Wheat is the primary agricultural crop in Armenia, amounting to one-third of sown land, with production concentrated in several priority regions of the country. Overall, with fluctuations within the last decade, the sown area and production of wheat registered annual negative growth (Table 1). Domestic wheat production is compromised by the mountainous landscape, dry and variable weather conditions, and fragmentation of land plots. Furthermore, agricultural land use is moving toward high value-added commodities: fruits, berries, grapes, and so on (Table 1). Agricultural production shifts to brandy and wine, dried fruit, organic fruits, vegetables, and honey which are increasingly being demanded both by local consumers and consumers abroad. Wheat production is less profitable than growing fruit and vegetables, especially at lower elevations (below 1,500 meters), where irrigation is necessary to cultivate the crops and adds to the production cost. Some regions have fewer opportunities for alternative crop production, and farmers grow wheat even though the yields are low.

Domestic consumption of wheat significantly exceeds production, making Armenia a net importer of wheat, dependent on international wheat suppliers. The country imports almost two-thirds of the wheat

consumed. Indeed, wheat is the main imported food product, and it comprised a 58 percent share in total imported food in 2017 (NSSA 2017). Currently the Russian Federation continues to be Armenia's main wheat and flour supplier, with a gradually reduced share of imports from Kazakhstan and Ukraine. Import dependency of wheat reflects an essential facet of food insecurity of Armenia—the important aspect of stability—and conveys information about the dependence of a country on this staple commodity. The dependence is related to a number of threats. Thus, in 2010–11 Russia banned wheat and other grain exports in response to a drought that destroyed one-third of its harvest. Armenian importers had been hurriedly searching grain markets in Bulgaria, Kazakhstan, Ukraine, and the Islamic Republic of Iran for alternative import opportunities. Overall, this situation resulted in an increase in bread and flour prices in Armenia (Dzorova 2017).

Another factor in the instability of the wheat and flour import supply relates to difficulties with transportation through neighboring countries. Armenia has closed borders with two (Turkey and Azerbaijan) out of four neighboring countries. The only overland route linking Armenia with Russia runs through Georgia and is repeatedly closed because of poor weather conditions, which hampers the production process, or because of other problems occurring in the Upper Lars border checkpoints (between Russia

**Table 1: Area Sown and Production of Main Agricultural Products in Armenia, 2008–17**

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	CAGR*
<i>Sown area. Hectares, thousands</i>											
Total	305	300	284	287	304	318	324	338	353	295	-0.004
Wheat	93	92	87	78	94	100	106	109	109	82	-0.013
Vegetables	24	24	24	25	25	25	26	28	30	28	0.018
Fruit & berries	37	37	38	37	39	40	40	40	41	42	0.016
Grape	17	17	17	16	17	18	17	17	17	16	-0.007
<i>Production. Metric tons, thousands</i>											
Wheat	226	198	184	224	243	312	338	363	350	176	-0.03
Vegetables	825	820	708	787	849	661	696	608	606	547	-0.04
Fruit & berries	318	332	129	239	332	338	291	377	243	362	0.01
Grape	186	209	223	230	241	241	261	309	179	210	0.01
Livestock	126	126	124	128	130	147	163	176	187	193	0.05
Milk	662	616	601	602	618	657	700	729	754	758	0.02

Source: Authors, based on data from NSSA 2012, 2017.

Note: CAGR = compound annual growth rate.

and Georgia). Moreover, in September 2018 Georgia announced the banning of the transit of wheat trucks through its roads because of the disruption that these heavy trucks cause. The proposed alternative is transportation by railway. However, this is a much more expensive solution, which will be reflected in a flour price increase (Arka 2018). Negotiations are currently underway between Armenia and Georgia for getting discounts for railway transportation to mitigate the imported wheat and flour price increase.

Furthermore, market power in the wheat and flour sector in Armenia is concentrated in a few related businesses that prevent small actors (such as farmers or millers) from obtaining open access to the market. Almost 90 percent of wheat in Armenia is concentrated in the hands of two companies: Alex Grig and Manana Grain (PFA 2016). These two companies generate 93 percent of the markup on the costs, and there is a high likelihood that they do not pay the full amount of taxes due. This kind of monopoly guarantees the monopolists excessive profits by any standard. According to expert estimations, this creates strong pressure for local production and extra costs for Armenian consumers of about 2,500 Armenian drams per person per month, threatening food security and constituting a huge burden for the poorest in the country, with the estimated extreme poverty line of 23,383 drams per month in 2016.

An important aspect for consideration in the context of functioning of food systems, in particular wheat value chains, is the issue of loss and waste at all stages. Food loss and waste is a reduction in the amount of food intended for human consumption at successive stages of the food value chain, as well as a deterioration of its quality characteristics such as nutritional value, food safety, attractiveness to the consumer, and so on. Food loss and waste are generated at all the stages of the food chain—from initial production to final consumption by households. The concept of food waste refers to the stage of final consumption of food; and the concept of food loss is used for the stage of production, storage, transportation, processing, and distribution. At the same time, the term food loss can be used in a broader sense, as a synonym for food loss and food waste (FAO 2014). Food loss is defined as loss in the stages preceding the final consumption. According to expert estimates, in Armenia wheat loss and waste account for about 28 percent of wheat intended for human consumption (Urutyan and Yeritsyan 2014).

## Policy Issues

Generally, policy issues related to wheat production and overall wheat market value chain development in Armenia are concerned with production, governance, and marketing. The key issues identified are discussed below.

### Lack of Access to Quality Seeds

Insufficient volumes and inefficiency of wheat production are associated with the quality of resources used in wheat production, including the poor quality of seeds. Many small producers use seeds of their own production, as part of their own crop (ICARE 2012). The main reason for not buying quality seeds is a lack of money and the invisible effects of additional financial and time expenditures. Furthermore, purchased seeds are either local or imported. Local seed production is limited because the seed selection and production system in the post-Soviet period were practically destroyed. In Soviet times there were 30 specialized institutions for seed production. Currently, only two state organizations are operating: the Gyumri Seed Selection Station and the Scientific Center of Agriculture. They experiment with wheat and barley samples and create new high-yield varieties (e.g., Armsim, Armik, Van, Utik, Sevan, etc.) (ICARE 2012). The Gyumri Seed Selection Station reproduces selected varieties of crops for the mountainous zones of Armenia. With over 90 years of operation, the station has become a prestigious scientific/production center for the selection and production of wheat, barley, legume, and vegetable/melon crop seeds with the creation of over 40 varieties of agricultural crops (Avetisyan 2010). Currently, however, these institutions face a number of challenges—such as the lack of land, an obsolete irrigation system, and the lack of modern machinery and equipment. This limits their capacity to meet local demand.

Currently, only 10 percent of seeds used are locally produced; the rest are imported. The government heavily subsidizes the importation of expensive seeds and aims to increase the current low level of seed sufficiency. The government announces a tender and identifies a company that imports and sells seeds on the domestic market at a reduced price and receives compensation from the government for the price difference. In spite of seed subsidies, seed prices are too high for the farmers so they incur debts, which are then written off by the state. Furthermore,

the quality of imported seeds is not well controlled and there are examples of deliveries of substandard seeds. Imported seeds are not always well adapted to local conditions and are therefore not always the most productive (ICARE 2012). Finally, there is the problem that most of local varieties are almost extinct and are not preserved in collections (MA 1995).

### Significant Amounts of Loss and Waste in the Wheat Value Chain

Reducing wheat loss will increase the supply of wheat for food purposes without involving additional land and other resources for the production, which is extremely important in the context of a shortage of land, water, and other resources in Armenia. Figure 1 presents loss across all stages of the wheat value chain in Armenia (Urutyan and Yeritsyan 2014). In Armenia the highest share of loss occurs during agricultural production (26 percent), followed by processing (20 percent) and distribution stages (22 percent). In total, losses comprise more than half of the wheat produced domestically.

Losses at the stage of production and storage of wheat account for more than 40 percent of all loss and waste (Figure 1). This is due to a lack of technology or its poor quality, inadequate farmers' skills, and a lack of ability to apply modern technology. Losses at the storage stage are associated with the lack of quality wheat storage facilities, primarily from product manufacturers. According to the agricultural census,<sup>1</sup>

only 27 percent of individual farms and 10 percent of farms that have the status of a legal entity have agricultural buildings and facilities (NSSA 2014). Losses are also due to the lack of specialized transportation available to producers and the lack of modern equipment for drying, sorting, and cleaning wheat. This leads to the deterioration of the quality of the wheat because it is exposed to increased humidity and temperature, the loss of dry matter because of increased respiration, and also a greater exposure to infection by microorganisms. At the same time, both a physical reduction in volume and a decrease in the quality of wheat adversely affect its nutritional value and safety and reduce the potential income of farmers.

Loss also occurs at the processing stage (the production of flour, bread, and other products from wheat flour) and at the stage of the sale of finished products. Loss occurs because of both technological and institutional reasons—for example, loss occurs if the wheat is not in compliance with the requirements of processors, if there are no available sales channels, or if prices fluctuate.

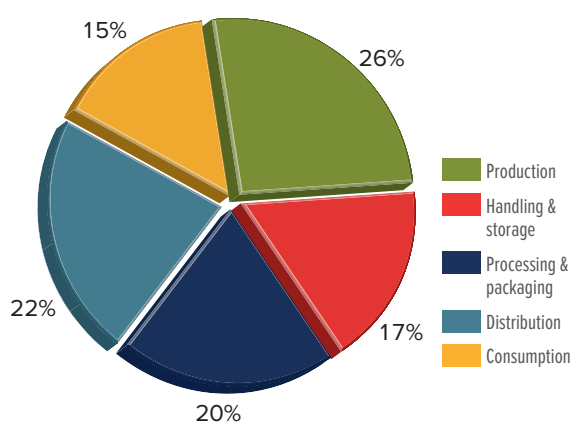
### Abuse of Monopoly of Power

The lack of a fair and competitive environment in various sectors of the economy, including the markets for essential commodities such as sugar, wheat, and fuel imports, is one of the most basic challenges for the Armenian economy. In particular, Armenian wheat and flour markets are characterized by two companies monopolizing wheat imports, milling, and flour sales and charging almost double the related costs (HMF 2013; PFA 2016). Flour-importing monopolists that also hold wheat processing and trading businesses dictate the prices; they may set it lower during the harvest period to force farmers to sell at a lower price. Flour price changes in Armenia are asymmetric and reflect international prices with a significant lag. For example, after the fall in international prices in 2012, in Armenia prices continued increasing until 2014 (PFA 2016).

### Lack of Agricultural Information and Marketing Support

In recent years, government support programs have focused mostly on financial tools. The government

Figure 1: Loss across the Wheat Value Chain, %



Source: Adapted from Urutyan and Yeritsyan 2014.

<sup>1</sup> See the Statistical Committee of the Republic of Armenia's agricultural census, available at <https://www.armstat.am/en/?nid=82&id=1860>



is criticized for limiting its activities to loans or subsidies and paying less attention to information and marketing support mechanisms, which is the major obstacle for farmers who experience continuous tension during the harvest and post-harvest periods; a lack of information and marketing support impacts their plans for the following production years (Arka 2018). Although agricultural marketing was featured in some donor projects, it still remains a widespread problem. Many farmers face the following issues: low commodity prices, marketing and sales challenges, distance to markets, lack of storage facilities, lack of adequate information related to production and marketing, and problems related to transportation (Ahouissoussi et al. 2014). Farmers' survey results shows that "information" is an important factor affecting agriculture sector in Armenia (ICARE 2012). In particular, farmers indicated a need for government to provide information on demand and supply trends and priorities, so that they can be better informed about what to grow each year.

## Stakeholders

Figure 2 represents the wheat value chain in Armenia with flows of functions and actors/stakeholders.

### Government

Agricultural production, processing, marketing, and trade in Armenia are performed by private entrepreneurs with minimum government support. However, after the economic and food crises of 2008 and Russia's ban on wheat exports in 2010–11, the government launched several support initiatives that provided seeds, fertilizers, and diesel fuel to increase production (ICARE 2012). Recent government support focuses on financial tools (such as agricultural loans and insurance) but less on information and marketing.

### Seed Providers

Since its destruction in 1990, the seed selection and production industry in Armenia has not recovered. Of the 30 previously operating specialized seeds selection and production stations, currently only two are operating: the Gyumri Seed Selection Station and the Scientific Center of Agriculture. These

stations experiment with wheat samples and create new high-yield varieties adapted to local conditions. However, these stations are in deplorable condition: they are working with a destroyed irrigation system and outdated equipment and storage facilities. They also face strong competition from imported seeds that are heavily subsidized by the government and in many cases do not meet harvest expectations. Relatively lenient control mechanisms for quality seeds and plant imports resulted in problems for farmers, who got infected seeds or plants (Urutyanyan, Yeritsyan, and Mnatsakanyan 2015).

### Financial Organizations

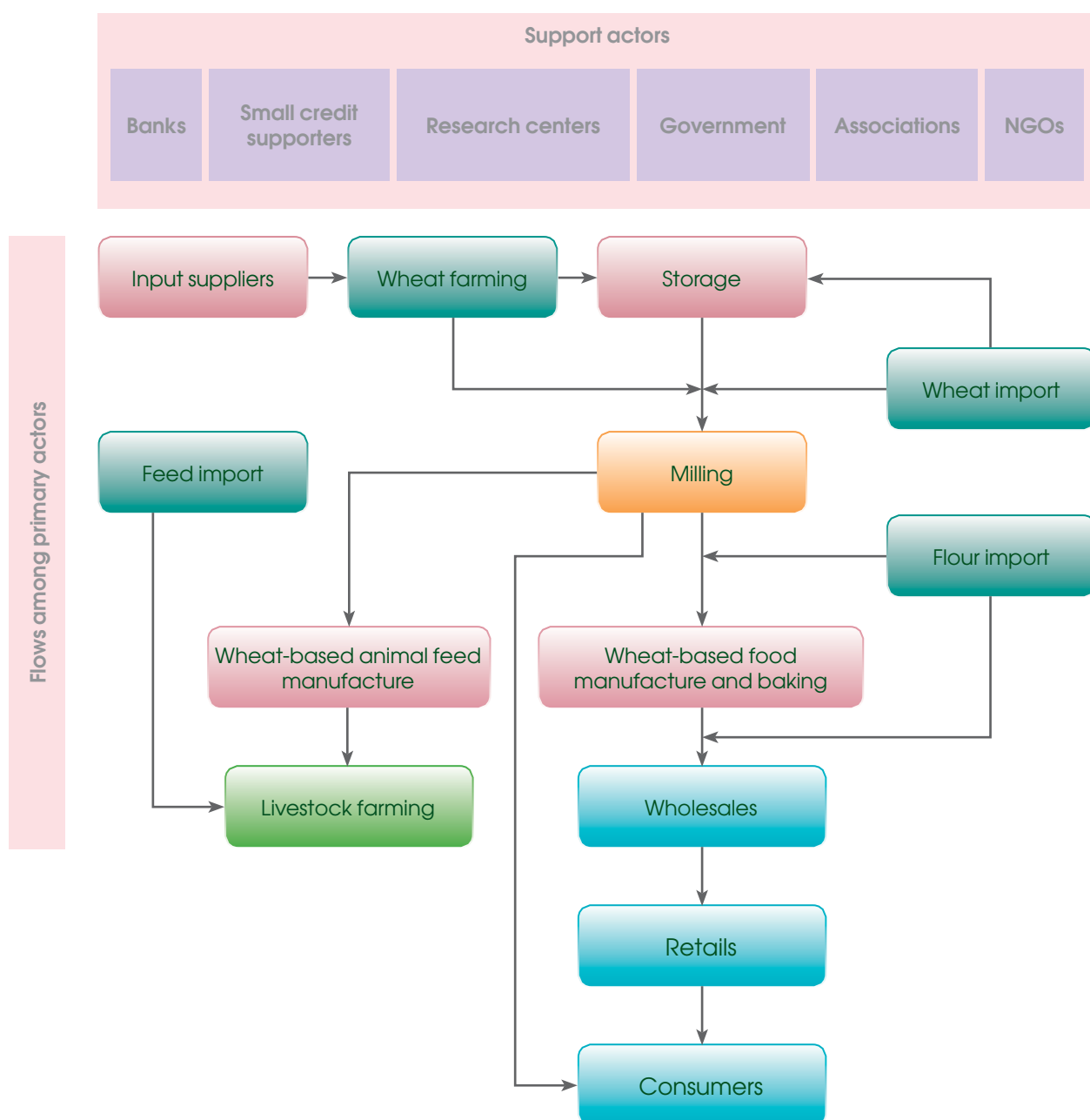
Financial organizations support stakeholders with funding operations and long-term investments. About 33 percent of farmers had a loan and only 16 percent intended to get one in the upcoming year (ACT 2017). Issues farmers face are high interest rates, high risks related to climate, production, unpredictability of selling prices due to market volatility and, as interviewees mentioned, cheating with advertised "low interest rate" credits that significantly increase at the stage of the final processing of documents. Financial institutions face the issue of non-performing agricultural loans that are higher than in other sectors and amount to 10 percent (Armbanks 2016).

### Donors

International donors and nongovernmental organizations implement agricultural projects in various rural communities. For example, the United Nations Development Programme (UNDP) Community Development Project in Yeghvard village established an agricultural machinery pool, created a grain seed revolving fund, and constructed a flour mill. In general, major problems with donor support include their project-based approach, lack of activity coordination, and unsustainability when the projects end.

### Producers

Producers are major stakeholders that generate most of the value adding function, including preparing the land, planting, adding fertilizers and pesticides, weeding, harvesting, post-harvest handling, and marketing. Producers, however, generate only enough income to survive. A major barrier at the

**Figure 2: Wheat Value Chain Functions and Actors in Armenia**

farmer level is the small (on average 3 to 5 hectares) and fragmented land plots and the large number of farmers who are unable to impel economies of scale. There is a lack of dialogue between farmers and processors that prevents them from effectively bargaining with other actors. Farmers also need access to local markets. International markets are highly competitive and tough to access. And farmers need access to information on input supply options, prices, commercialization of their production, and so on. Armenian farmers receive inadequate extension services (ACT 2017). There are no crop insurance

procedures and only poor access to machinery and storage facilities. Farmers are challenged to have stable and affordable access to inputs, such as high-quality seeds, quality irrigation, and transportation systems. Poor road conditions that result in high transport costs lead to lower farm-gate prices.

### Processors

**Mills:** These processors either provide services to farmers or purchase wheat from them. They process

both imported and local wheat. Quality control activities are conducted by visual inspection, without laboratory testing but using only primitive equipment. Small mills operating in villages mostly mill for feed. Larger mills in regional centers produce high-quality flour. Regional millers indicate that flour market monopolists prevent the entrance of local flour from regions to the main market of the capital city Yerevan. Processors are ready to handle increased volumes of wheat to meet increased domestic production. Many mills face the issue of limited supply, an issue that is deepened by increasing flour imports and reducing wheat imports (NSSA 2017).

**Bakeries:** There are about 500 bakeries in the country. They have a stable market, particularly for bread. Millers and supermarkets may have their own bakeries. Normally bakeries buy flour from mills or wholesalers, test the quality after baking, and return flour if the quality is low. Some bakeries, especially those producing “certified” bread from specific flour varieties, trust the flour mills with which they have long-lasting business relations. The issue is that currently no supplier provides any information about wheat variety. A problematic case was identified when a bakery participating in a school meals program had to leave the program because of the low quality of their bread and their inability to change to a different flour supplier. The flour supplier, which supplied low-quality flour (resulting in the unacceptable quality of the bread), had been imposed by one of the two monopolists.

## Traders

Wheat importers play an essential role in the supply chain. Their business significantly influences local farmers, who are not able to utilize economies of scale, feel enhanced competition from foreign producers, and have little bargaining power. Wheat importation is challenged by closed borders and limited options of land transportation. The wheat import market is also highly concentrated, with monopolists dictating the rules and capturing high profits.

## Policy Options

### 1. Enhance access to quality seeds

Better (improved) access to high-quality wheat seeds would be achieved by developing the domestic

seed production industry to allow the yield of wheat to increase, to reduce loss during growing through the plants’ better resistance to diseases and pests, and to improve the quality of wheat and flour. It would also improve the availability of seeds for local producers by lowering prices as a result of production localization, which would lead to an increased efficiency of wheat production and improve aspects of food security and nutrition such as boosting the availability and stability of the wheat supply and enhancing the quality of wheat products.

Armenia has significant potential for the development of wheat seed selection and production. One of the key factors favorable for this development is the availability of wild varieties of wheat, progenitors and close relatives of modern wheat varieties cultivated worldwide. For example, Erebuni National Reserve has a protected land plot with several wild species of wheat that became the progenitors of modern breeds of wheat worldwide (MA 1995). There are also favorable natural and climatic conditions: many natural zones, sunny days, and so on. Another important factor for the development of seed selection and production in Armenia is the accumulated scientific potential and the presence of substantial research institutions. Although a significant part of the scientific potential has been lost, with some effort it can be recovered.

The government could set objectives in its development of wheat seed selection and production by using the country’s unique natural resources along with its scientific potential. This would enhance food security and nutrition by meeting domestic needs for high-quality wheat seeds through local production and becoming an exporter of seeds and new varieties of wheat. Achieving these aims requires the following:

- ✓ Supporting the state seed selection and production stations for experimental work and scientific research activities. Government support is needed to increase funding for research, which should become one of the priorities in streams of agro-food financing. To enhance their experimental activities, it is necessary to restore the irrigation systems of these centers and upgrade machinery fleets and seed storage facilities.
- ✓ Subsidizing seed consumers and making purchasing seeds from local producers a priority.

- ✓ Cooperating with Eurasian Economic Community (EAEC) countries, including Russia, for seed selection and production and to search for mutually beneficial developments.
- ✓ Conducting a targeted policy of state promotion and support for the export of varieties and seeds to the world market.

Advantages of developing seed selection and production within the country are:

- ✓ Improving food security through enhanced stability of seed supply in terms of volumes and quality.
- ✓ Reducing seed cost, which is made possible by the lower cost, high educational level, and intellectual potential of the labor force in Armenia, as well as favorable natural conditions for the development of seed production. Cost reduction and quality improvement would lead to lower expenses and increased productivity of wheat production.
- ✓ Developing the scientific potential of the country.
- ✓ Increasing profits from the development of the seed industry and from exports of products with high added value.

Associated difficulties are:

- ✓ Finding money in the budget to finance development programs of seed selection and production with a long-term return;
- ✓ Arranging mechanisms to ensure effective spending of budget funds;
- ✓ Facing possible opposition from seed importers;
- ✓ Restoring the seed industry will take time, given that local producers can not yet fully meet domestic seed needs. During the transition period, some seeds need to be imported and quality control should be significantly enhanced

Enhanced access to quality seeds could also be obtained by importing top-quality seeds (“elite seeds”) and subsidizing seed acquisition by farmers without focusing on the fairly expensive policy of revival and

active development of seed breeding and production in the country. However, the shortcoming of this approach is the continued dependence on seed imports with its associated uncertainty in the volumes and cost of supplies. Moreover, the country would not receive income from the development of seed selection and production and would not utilize the unique potential in this field.

## 2. Reduce wheat loss

Reducing wheat loss would be a sustainable solution to increase food availability and nutrition, reduce pressure on natural resources, and improve farmers’ livelihoods. To reduce wheat loss, it is important to improve post-harvest conditions such as storage facilities. To stimulate investments in storage facilities, the government could apply tax incentives to investors, lower interest rates on investment loans, and grant special preferential terms to cooperative associations of wheat producers. Investments need to be made in equipment for drying, sorting, and cleaning wheat for the producers. It is important to ensure that recipients of incentives are the producers or cooperatives, not the monopolists. Support for investment in storage is needed, but it might not bring about the desired effect since farmers lack financial resources to take advantage of it. The government could also develop standard storage projects and provide all necessary documentation free of charge, as well as stimulate construction and production of appropriate equipment that would not only reduce loss but also increase jobs in relevant sectors. It would also allow farmers to pursue a more flexible marketing policy and thereby increase their incomes and the appeal of doing business in wheat production.

Finally, although food (particularly wheat) losses are significant, they are not adequately reflected in the official statistics. This may be one of the reasons for the government’s insufficient attention to the problem. There is a need to improve the information base for wheat loss, to clarify the methodology for estimating loss, and to monitor loss on regular basis.

## 3. Promote inclusive institutional food procurement

Inclusive institutional food procurement programs (IIFPPs) refer to undertakings that are purposefully

developed to connect institutional food demand to broader development objectives (such as increased income and reduced poverty, and the transformation of the local food supply system). In particular, IIFPPs offer opportunity for the economic inclusion of small farmers or vulnerable areas by tackling issues such as poor production, the abuse of monopolistic power, the lack of market access, and the weak bargaining power of smallholders (Kelly and Swensson 2017; Miranda, Thiam, and Klug 2017). Although state food procurement can cover a lot of institutions (hospitals, prisons, military bases, etc.), in the case of Armenia, as a start, procurement procedures and contracts could be customized for small farmers and entrepreneurs to serve the needs of the National School Feeding Program that is currently operating in several regions. That program aims to cover all regions; its main obstacle is the lack of local procurement practices, which result in family farming links that are not well embedded in the program (Harutyunyan 2017). However, the participation of local farmers in school food and nutrition programs could promote better diets and nutrition via the provision of diversified local food; at the same time it would enhance food and nutrition security for smallholder farmers by providing them with secure access to institutional markets and helping them move out of poverty.

In Armenia, the Law “On Procurement of the Republic of Armenia 2016” stipulates that the procurement process should ensure equal competitive conditions for possible participants and should not lead to unreasonable obstacles to competition in the procurement process (Article 13).<sup>2</sup> However, because of a number of constraints, small business actors such as mills, bakeries, and family farms (which together produce almost 98 percent of gross agricultural product) are not able to be a part of such an important source of sales. The traditional public procurement model is designed for large rather than small companies. This mismatch leads to a number of constraints faced by small actors, including rigid contracting mechanisms, irregular demand, long payment times, large volumes that they are unable to supply, inadequate transport and logistics, excessive bureaucratic procedures and food safety standards that need to be met (Kelly and Swensson 2017). Adapting public procurement policies and processes to small actors requires the implementation of a number of measures. These include extending the selection criteria by prioritizing the location of supply and waiving

complex bidding processes for small farmers, rural entrepreneurs, and other actors in the supply chain. This could be done through direct purchases at competitive prices, reduced payment periods, and more flexible quantities and delivery terms. Capacity building for solving the issue of unfamiliarity with and not understanding tendering and contractual procurement processes are also important.

A number of countries have modified their public procurement laws and procedures to link local food production to public procurement focusing on improving food security and small farmers’ livelihoods. For example, in the United Kingdom, the government introduced a radical package of measures to open up business to government and help small companies/organizations to bid (Cabinet Office 2011). In particular, the Government Procurement Pledge (2012) gives all types of potential providers, including smaller providers, simpler, more streamlined procurement processes (UK Government 2012). Contracts or programs are divided into smaller contracts, thereby enhancing access to public procurement opportunities for smaller actors. It also eliminates the unnecessary use of lengthy and costly procurement processes except for the most complex ones. An advanced step is the inclusion of social and environmental criteria (including nutrition and sustainability) in addition to the transitional cost factor for contract assessment. In Japan, the National Food Education Plan provides *chisan-chisho* (local production and local consumption) with 30 percent of the food used for public school meals locally produced (Otsuki 2013). In Brazil, the National School Feeding Programme also envisages that 30 percent of school food be delivered from family farming producers. Armenia also needs to adjust its procurement procedures to make them more inclusive for small farmers/entrepreneurs.

#### 4. Develop an agricultural market information system

The swift development of information and communication technologies (ICT), including Internet and cell phones, opens up new opportunities for increasing the organization of market players by developing effective agricultural market information systems (AMIS) (Galtier et al. 2014). As an agricultural information and marketing support tool, AMIS enables

<sup>2</sup> The Law on Procurement of the Republic of Armenia (2016) is available at [https://members.wto.org/cnattachments/2018/GPA/ARM/18\\_3943\\_00\\_e.pdf](https://members.wto.org/cnattachments/2018/GPA/ARM/18_3943_00_e.pdf)



farmers, processors, traders, consumers, investors, policy makers, researchers, and other stakeholders involved in the agricultural value chains to act and make well-informed decisions on how to add value. Overall, AMIS fosters the enhancement of public policies by increasing awareness of market realities, increasing market efficiency, improving market transparency, and promoting fairer and more efficient allocation of resources (FAO 2017; Galtier et al. 2014). Information on nutrition and health conditions—along with economic factors such as market conditions (including transport and storage, food availability, market prices, and population purchasing power) and timely warnings of forthcoming problems that identify emergency affected areas and populations and guide response options and planning—can contribute to improvement of food security and nutrition in the country (FAO 2017).

Based on the needs and priorities of policy makers and market players, different market information systems can be developed: public, private, professional organization—supported or linked to a commodity and/or geographical area (Galtier et al. 2014). AMIS of various modes exist worldwide—in Canada, Chile, the European Union, Mexico, Russia, the United States, Vietnam, and so on (FAO 2017; Kulistikova 2018).

Introduction of an AMIS in Armenia would be feasible taking into account that ICTs and e-governance are priority areas of development. In particular, the Sustainable Development Program (point 235) of Armenia envisages that the development of information technologies is the necessary and basic precondition required for the creation of the knowledge-based economy in general and the “Electronic Armenia” system in particular (e-Governance, e-Entrepreneurship, e-Education, and other e-systems).<sup>3</sup> Moreover, according to the Digital 2016 report, 70 percent of Armenia’s population are active Internet users and mobile connection is 100 percent.<sup>4</sup>

Introducing AMIS would help to promote networking and the sharing of experience; to improve farmers’ awareness of market opportunities and options and strengthen their bargaining power; to tackle the issue of the lack of coordination among various stakeholders, particularly farmers; to identify purchase locations and times for traders; and to

enhance governments’ capacity to take appropriate policy and planning decisions in support of agricultural growth. At the same time, the challenges of AMIS include a lack of financial resources and the need for persistent financial commitment; difficulty in maintaining those AMIS that are not integrated into an appropriate existing institutional system after the end of project support; poor accuracy and lack of timeliness of information provided; and the need for assistance in learning how to interpret market information; among others.

In Armenia, the model of a market information system for the wheat industry could be developed as a pilot program with the potential of expanding to the whole sector or replicating for other commodities. At the initial stage it could be a government-supported model of the wheat market information system. It could be hosted in public institutions (e.g., the Ministry of Agriculture) and funded from the state budget or donor project. This would increase the credibility of the system. It would also serve the purpose of improving public policies, ensuring market transparency, and disseminating information that is particularly matched to key stakeholders: farmers, traders, governing bodies, donors, and so on. This model could cover only wheat—a strategic commodity—at first, and later expand to cover a broader range of commodities. The model could be further developed to provide not only information services (on governmental purchases, regulatory and legislative changes, contracting forms, etc.) but also be linked to other agricultural production or marketing platforms supported by private enterprises that possess considerable ICT skills and employ a wide range of technological innovations.

Government support could also be directed toward incorporating a system of precision agriculture by taking responsibility for creating maps for precision farming, including detailed data on soil, weather, and climate conditions as well as providing recommendations on necessary agro-technical methods, volumes, and methods of applying fertilizers, seeds, water, and other data. These maps could be embedded or synchronized with advisory mobile applications.

AMIS could be further developed to integrate market services and institutions by offering services that link farmers to markets or enhance market

<sup>3</sup> Details about the program can be found at [http://www.nature-ic.am/res/pdfs/documents/strategic/SDP\\_01\\_eng\\_20081030.pdf](http://www.nature-ic.am/res/pdfs/documents/strategic/SDP_01_eng_20081030.pdf)

<sup>4</sup> Details about the Digital 2016 report can be found at <https://www.slideshare.net/wearesocialsg/digital-in-2016>

performance by supporting farmer organizations to promote collective marketing. This would be a very useful process for Armenia, taking into account the issue of its small farms and its need for networking and for consolidating production and marketing activities. In addition to essential services (inputs, credit, transportation, agricultural consultations, etc.), more comprehensive services—such as brokerage, commercial arbitration, warehouse receipt system, contract enforcement system, dissemination of quotes in real time (by electronic display panels, and text messages or interactive voice recognition systems)—could be incorporated.

## Assignment

Increasing the self-sufficiency of wheat in the country and enhancing the wheat value chain is a priority action for the Government of Armenia, which intends to develop and implement the required policy actions. To enhance the legitimacy of these actions, the government plans to hold a series of public hearings and discussions with stakeholders. After dividing into groups representing all of the stakeholders, perform the following tasks:

1. Analyze policy options and identify the priority policy interventions.
2. Identify and analyze bottlenecks for selected policy interventions.
3. Identify the technical, human, financial, and time availability limitations.
4. Develop the best collaborative frameworks that can benefit the whole chain.
5. Suggest advanced technological tools that can be brought to some parts of the value chain or to the whole value chain system to make it more effective and efficient.

## Recommendations

To improve the performance of the wheat value chain in Armenia, it is recommended that the country focus on introducing and utilizing scientific and high-tech achievements and innovations, including

information technologies, which are backed by the population's high level of education and access to the Internet as well as by accumulated scientific potential.

In particular, given the unique natural potential of Armenia and its scientific potential, it is recommended that the country ensure meeting domestic needs of high-quality wheat seeds from domestic production and to become an exporter of seeds and new varieties of wheat. This would enhance the roles and responsibilities of stakeholders in the seed chain, such as research organizations, seed production stations, farmers, and traders. The government would need to undertake regulatory activities during seed production, processing, and marketing. Overall, the use of high-quality seeds and compliance with agricultural technologies would increase the efficiency of wheat production. Wheat producers would get access to cheaper and higher-quality seeds, which would reduce their costs and increase production efficiency and profitability. To develop selection and seed production, it is necessary to support scientific research and development, to provide seed centers with the necessary material resources, and to pursue a targeted state policy of promoting the export of varieties and seeds to the world market. During the transition period, while domestic seed requirements are not yet satisfied, it would be necessary to improve the system of subsidizing the farmers' purchase of seeds, including extending the subsidies for purchases of quality seeds from local production.

It is also recommended that the government design and introduce a viable AMIS in Armenia to support production and marketing decision making for all stakeholders: farmers and entrepreneurs (traders, processors, etc.) as well as various types of government, development organizations, and researchers. For example, by using market information, farmers could choose to whom and under what conditions and price to sell, plan their production and harvest, and select optimal market channels. Traders in seeds, fertilizers, agricultural equipment, building materials, and transportation could also be established in the AMIS to contribute and profit from it. Farmers, processors, and traders would benefit from early warning about government policy changes or information on export market prices. Initially, an AMIS could be developed for the wheat industry that includes three main functions: (1) providing reliable, accurate, timely, and comparable information on weather,

production, marketing, and policy (performed by the established wheat market intelligence group with technical expertise); (2) encouraging timely discussion about urgent market issues and modalities to overcome them (facilitated by the feedback forum); and (3) providing strategic and operational decision making (implemented by the administration). The AMIS furthermore could expand its service scope to include credits, transportation and logistics, contract enforcement, and so on. Taking into account high investment costs, the AMIS could begin with special project funding until the public sector, in partnership with the private sector, is ready to take over its ownership and jointly promote and fund it.

## References

- ACT. 2017. *Study of SDC Direct/Indirect Beneficiaries in Rural Georgia and Armenia*. Final report. Tbilisi, Georgia: Swiss Cooperation Office for the South Caucasus. <http://alcp.ge/pdfs/28592cfe3b7ccb4bc792df1662badfeb.pdf>
- Ahouissoussi, N., J. Neumann, J. Srivastava, B. Boehlert and S. Sharrow. 2014. *Reducing the Vulnerability of Armenia's Agricultural System to Climate Change*. Washington, DC: World Bank.
- Alaverdyan, D. et al. 2015. "Analysis of Agricultural Production and Programs in Armenia." *International Journal of Innovation and Scientific Research* 17 (2): 466–73.
- Arka. 2018. "Georgia Promises 52% Discount on Railway Transportation of Grain to Armenia." Arka News Agency, August 31. [http://arka.am/en/news/business/georgia\\_promises\\_52\\_discount\\_on\\_railway\\_transportation\\_of\\_grain\\_to\\_armenia/](http://arka.am/en/news/business/georgia_promises_52_discount_on_railway_transportation_of_grain_to_armenia/)
- Armbanks. 2016. "Share of Non-Performing Agricultural Loans Grew to 11 Percent." Arka News Agency, May 30. <http://www.armbanks.am/en/2016/05/30/98455/>
- Avetisyan, S. 2010. *Agriculture and Food Processing in Armenia*. Yerevan: Limush Publishing House.
- Bobojonov, I., R. Teuber, S. Hasanov, V. Urutyan, and T. Glauben. 2016. "Farmers' Export Market Participation Decisions in Transition Economies: A Comparative Study between Armenia and Uzbekistan." *Development Studies Research* 3 (1): 25–35. <https://www.tandfonline.com/doi/full/10.1080/21665095.2016.1262272>
- Cabinet Office. 2011. "Government Opens Up Contracts to Small Business." Press Release. <https://www.gov.uk/government/news/government-opens-up-contracts-to-small-business>
- Dzorova, M. 2017. "The Impact of World Prices of Agricultural Products on Domestic Food Prices: The Case of Armenia." *Economics of Agricultural and Processing Industries* 2017 (4): 68–71 (in Russian).
- FAO (Food and Agriculture Organization of the UN). 2014. "SAVE FOOD: Global Initiative on Food Loss and Waste Reduction." Working paper. Rome: FAO. [http://www.fao.org/fileadmin/user\\_upload/save-food/PDF/FLW\\_Definition\\_and\\_Scope\\_2014.pdf](http://www.fao.org/fileadmin/user_upload/save-food/PDF/FLW_Definition_and_Scope_2014.pdf)
- . 2017. Building Agricultural Market Information Systems. <http://www.fao.org/3/a-i7151e.pdf>
- Galtier, F., H. David-Benz, J. Subervie, and J. Egg. 2014. "Agricultural Market Information Systems in Developing Countries: New Models, New Impacts." *Cahiers Agricultures* 23 (4-5): 232–44.
- Harutyunyan, N. 2017. *Sustainable School Feeding in Armenia*. The FAO Forum on Food Security and Nutrition Policy in Europe and Central Asia, Armenia country study. [http://www.fao.org/fsnforum/eca/activities/open-calls/FSN\\_policy\\_implementation](http://www.fao.org/fsnforum/eca/activities/open-calls/FSN_policy_implementation)
- Hecht, A. 2017. "Why Wheat Is a Highly Political Commodity." *the balance*, October 30. <https://www.thebalance.com/wheat-historically-more-political-than-crude-oil-3876921>
- HMF (Hrayr Maroukhian Foundation). 2013. *Monopolies in Armenia*. Yerevan: HMF. <http://www.maroukhianfoundation.org/english/wp-content/uploads/2013/02/Monopolies-eng-web.pdf>
- ICARE (International Center for Agribusiness Research and Education). 2012. *Assessment of Wheat, Barley and Emmer Wheat Value Chains in Armenia*. Yerevan: ICARE. [https://www.icare.am/uploaded\\_files/Assessment%20of%20wheat,%20barley%20and%20emmer%20wheat%20value%20chains\(2\).pdf](https://www.icare.am/uploaded_files/Assessment%20of%20wheat,%20barley%20and%20emmer%20wheat%20value%20chains(2).pdf)
- Kelly, S. and L. Swensson. 2017. *Leveraging Institutional Food Procurement for Linking Small*

*Farmers to Markets*. Rome: FAO. <http://www.fao.org/3/a-i7636e.pdf>

Kulistikova, T. 2018. “Smartseeds Will Digitalize Seed Trade.” <http://www.agroinvestor.ru/technologies/news/29961-smartseeds-otsifruet-torgovlyu-zernom/> (in Russian).

MA (Ministry of Agriculture). 1995. *Armenia: Country Report to the FAO International Technical Conference on Plant Genetic Resources*. Leipzig, Germany.

NSSA (National Statistical Service of Armenia). 2012. Yearbooks 2012. <https://www.armstat.am/en/?nid=82&year=2012>

NSSA (National Statistical Service of Armenia). 2014. Yearbooks 2014. <https://www.armstat.am/en/?nid=82&year=2014>

NSSA (National Statistical Service of Armenia). 2017. Yearbooks 2017. <http://www.armstat.am/en/?nid=82&year=2017>

Miranda, R., A. Thiam, and I. Klug. 2017. “Targeting Farmers in Institutional Procurement Programmes: Case Study of PAA Africa Programme in Senegal.” Working Paper 158, International Policy Centre for Inclusive Growth. <https://ideas.repec.org/p/ipc/wpaper/158.html>

Otsuki, K. 2013. “The Local Food Revolution in Brazil’s Schools.” *Al Jazeera*. <https://www.aljazeera.com/in-depth/opinion/2013/02/201322853527633979.html>

PFA (Policy Forum Armenia). 2016. “Monopoly Profits in the Wheat Flour Market in Armenia.” PFA Blog, June 14. <https://pfarmenia.wordpress.com/2016/06/14/monopoly-profits-in-the-wheat-flour-market-in-armenia/>

UK Government. 2012. Government’s Procurement Pledge. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/79361/Procurement-Pledge-01-11-12.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/79361/Procurement-Pledge-01-11-12.pdf)

Urutyanyan, V. and A. Yeritsyan. 2014. “Food Loss and Waste in the Armenian Agri-food Chains.” Presentation at the IAMO Conference on Regional Economic Cooperation in Central Asia, Halle, Germany, November 2014.

Urutyanyan, V., A. Yeritsyan, and H. Mnatsakanyan. 2015. *Country Report: Armenia*. ICARE. [http://www.agricistrade.eu/wp-content/uploads/2015/05/Agricistrade\\_Armenia.pdf](http://www.agricistrade.eu/wp-content/uploads/2015/05/Agricistrade_Armenia.pdf)

## Additional Readings

Bobojonov, I., R. Teuber, S. Hasanov, V. Urutyanyan, and T. Glauben. 2016. Farmers’ Export Market Participation Decisions in Transition Economies: A Comparative Study between Armenia and Uzbekistan.” *Development Studies Research* 3 (1): 25–35. <https://www.tandfonline.com/doi/full/10.1080/21665095.2016.1262272>

FAO (Food and Agriculture Organization of the UN). 2017. *Building Agricultural Market Information Systems*. <http://www.fao.org/3/a-i7151e.pdf>

ICARE (International Center for Agribusiness Research and Education). 2012. *Assessment of the Wheat, Barley and Emmer Wheat Value Chains in Armenia*. Yerevan: ICARE. [https://www.icare.am/uploaded\\_files/Assessment%20of%20wheat,%20barley%20and%20emmer%20wheat%20value%20chains\(2\).pdf](https://www.icare.am/uploaded_files/Assessment%20of%20wheat,%20barley%20and%20emmer%20wheat%20value%20chains(2).pdf)

## Abbreviations

<b>AMIS</b>	agricultural market information systems
<b>EAEC</b>	Eurasian Economic Community
<b>ICT</b>	information and communication technologies
<b>IIFPP</b>	inclusive institutional food procurement programs
<b>UNDP</b>	United Nations Development Programme





# Loss of Agricultural Produce in Horticulture and Its Impact on Food Security in the Kyrgyz Republic

*Eldar Kelemetov, Ekaterina Yakubovich*



## Executive Summary

The Food and Agriculture Organization of the United Nations (FAO) estimates that roughly one-third of the food produced for human consumption is lost or wasted.<sup>1</sup> Amazingly, while almost 800 million people—one out of nine—suffer from malnutrition, more than 1 billion metric tons of produce never make it to the table. This key challenge in the global food system seriously affects nutrition, health, and the environment. In terms of ensuring an adequate food supply, reducing losses in agricultural products is a priority.

The Kyrgyz Republic has tremendous potential in the sector of horticultural crops and berry production, especially short-season crops. Thanks to its clean environment, high-quality produce can be obtained. However, the nature of any horticulture operation causes significant loss during production, processing, storing, and selling produce, a loss that affects export opportunities and national food security.

The goal of this case study is to identify the key causes of loss occurring at all links in the value chain for fruits and vegetables and to develop policy measures to reduce loss while boosting the food security of the Kyrgyz Republic.

Key stakeholders in the horticulture sector are government bodies, producers, processing companies, sectoral associations, distributors, trading and purchasing companies, and consumers.

Policy measures aimed at reducing losses in Kyrgyz horticulture presented in this case study can be implemented in the short term; it is expected that these measures will directly impact the sector in question. Policy options are arranged in four groups and address the following issues: (1) policy issues related to the current lack of data on the volume of loss at each stage of the food value chain; (2) policy issues related to the production of horticulture products; (3) policy issues related to processing; and (4) policy issues related to domestic sales and export of products.

In order to ensure Kyrgyz food security, decision-makers should focus on policy measures related to improving data on the losses, production, and sale of horticulture products as well as to developing their

export. Clearly, improving the storage and sale infrastructure and building mutually beneficial relations between producers and processing and distributing companies are immediate priorities in horticulture.

## Background

### Losses in the Horticulture Products Value Chain and Their Impact on Food Security

Reducing food loss and waste helps to ensure food security and national food system sustainability in general. Studying the causes of food loss is a key element of designing effective policies aimed at reducing agricultural produce losses that occur in the horticulture product value chains of the Kyrgyz Republic.

Numerous studies (CGIAR, no date; FAO 2009; Gebhardt and Thomas 2002; HLPE 2014; Kummu et al. 2012; Roy, no date) stress the importance of food loss and waste and the need to reduce them to improve the food security and sustainability of food systems. However, the definition of the term loss still is a subject of much debate. Besides, often the terms *food loss*, *food waste*, and *agricultural produce losses and waste* are used interchangeably, and therefore need to be specified.

In the report published by the High Level Panel of Experts on Food Security and Nutrition (HLPE) of the Committee on World Food Security, *food losses and waste* are defined as “a decrease, at all stages of the food chain from harvest to consumption in mass, of food that was originally intended for human consumption, regardless of the cause” (HLPE 2014, p. 11).

*Food waste* refers to food appropriate for human consumption being discarded or left to spoil at the consumer level (HLPE 2014).

According to Shenggen Fan, Director of the International Food Policy Research Institute (IFPRI), *food waste* is a portion of agricultural produce losses and relates to discarding or alternative (non-food) use (including as fodder) of food produced for human consumption along the entire food delivery chain (Fan and Steer 2016). However, this definition too is far from

<sup>1</sup> For details about the Food and Agriculture Organization of the United Nations, see <http://www.fao.org/home/en/>

exhaustive. If horticultural products good for human consumption or processing for some reason are not sold and are used as fodder instead, there seems to be a contradiction as to whether it can be regarded as waste because, in essence, such products are used to support the production of animal products.

Food losses occur during both production and sale as well as during final consumption. The highest losses are observed in developed economies (in Europe and North America they are at 95–111 kilograms per capita annually). In Asia they are much lower (11 kilograms), but given incomparably lower incomes and a more challenging food situation this issue becomes relevant not only with respect to resource conservation but also in terms of food security. Food losses are caused not only by food system technology and economics but also—and no less important—by culture (FAO 2011; Folke et al. 2010).

The culture of food consumption in Central Asia in general and in the Kyrgyz Republic in particular differs from that of Western Europe because people in Central Asia have a more reverential attitude toward food saving not only because of purely economic factors but also because of local traditions, which put a huge emphasis on food preservation. The share of food expenditures in the Kyrgyz family budget varies between 63 percent and 71 percent depending on the cost of living in different parts of the country. Therefore people tend to consume all the food they buy. Consumers strive to prevent food spoilage and waste. Yet food preservation is of principal importance to the Kyrgyz Republic: although losses are relatively low during consumption, due to a great number of factors, huge losses inevitably occur during production and processing (FAO 2012; Minten et al. 2016).

Of course, food waste reduction is a global concern, but, as suggested earlier, of special relevance for food security of the Kyrgyz Republic are losses that happen during production, storage, processing, and sale. Therefore this study will consider **losses of agricultural produce** (physical mass and spoilage due to quality deterioration) as a reduction of the quantity of food in the country intended for human consumption at all stages of the food value chain—from harvesting to end consumption. Losses in horticulture cause deterioration in food quality (nutrition, value, appearance, marketability) and increased waste, making produce not suited for sale, consumption, or processing. Losses may be caused by many factors. Identification of the causes requires a comprehensive

analysis of all links in the food supply chain. Possible action at each individual stage should be regarded with consideration of all other links in the chain.

In the horticulture chain—from production to end sale—value is generated at successive stages of producing final products. Therefore losses of added value due to food quality deterioration or increased losses expressed in physical terms may occur at any stage (see Annex 1). It should be noted, however, that the causes and nature of losses in the value chain when producing specific berries, fruit, and vegetable crops would be crop-specific, and these aspects should be considered separately, by crop. Each crop requires relevant agricultural technology that ultimately determines the cost of production, quality, marketability, and so on. However, in this study such an approach is not feasible, and therefore the study presents a standard process whereby horticulture products losses are generated.

Interviews conducted for this study with the horticulture market participants demonstrated that the most losses occurred at the stages of fruit and vegetable production, harvesting, and storage. At the same time, respondents estimated that, depending on the type of product, losses may range from 5–10 percent (potatoes, apples) to 30 percent (strawberries, tomatoes, apricots). However, currently it is not possible to estimate the actual volume of occurring losses because a methodology for collecting data and reliable statistical information are lacking.

Losses occurring at all stages of the production, storage, and sale of fruits and vegetables that are mostly highly perishable and seasonal are inevitable costs related to technology. However, dramatic losses due to an inadequate connection between food chain links cause special concerns. Especially in the context of national food security, increased losses tend to aggravate the situation with food supply, affect incomes, increase expenditures, and reduce agricultural producers' profit margins.

Losses in the horticulture sector affect the country's food security and food supply because they reduce food availability and trigger the following negative implications:

- ✓ Losses affect the activity of farmers who participate in production, harvesting, and processing, with farmers sustaining losses or losing revenues.



- ✓ Losses result in food market tightening and cause food price inflation, which clearly affects consumers.
- ✓ Produce losses cause economic losses and reduced return on investment and slow development and social progress.
- ✓ Losses in the horticulture sector reduce the impact of public investments in agricultural production development, capacity building, training, and subsidies.

Potato production traditionally concentrates in the Issyk-Kul, Osh, Talass, and Chui regions. In 2016 they produced 60 percent of the country's total potato output. Vegetables and gourds are mostly produced in the Chui, Jalal-Abad, and Osh regions. In 2016 these regions accounted for 84 percent of the total output in the republic.

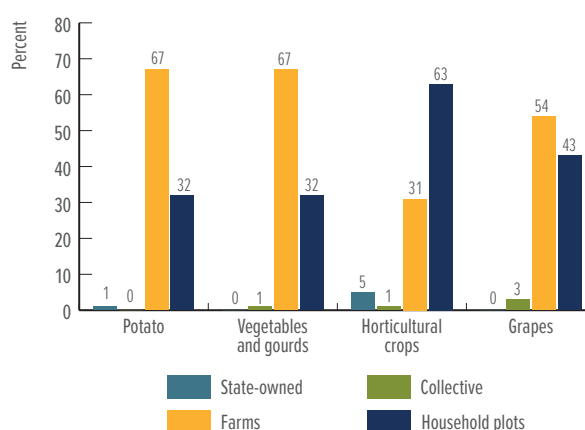
The Kyrgyz Republic's foreign trade occurs mostly within the countries in EAEU. However, a lot of food is imported from China.<sup>3</sup> Food imports make up a key component of food security in the Kyrgyz Republic.

## Horticulture in the Kyrgyz Republic: Current State and Development Trends

Most cultivated areas are used for grain crops; in 2017 they accounted for 617,000 hectares; 83,000 hectares were used for potatoes in the same period. Other vegetables and gourds took up 63,500 hectares. Many areas cultivated with crops are taken by horticultural crops—approximately 51,000 hectares during the period under consideration (Table 1, Figure 1).

Upon joining the Eurasian Economic Union (EAEU) in 2015,<sup>2</sup> the country opted for less expensive bread grain from Kazakhstan and Russia. This explained the subsequent shrinking of areas under grains in favor of vegetables, horticultural crops and gourds (Table 2, Figure 2).

**Figure 1: Structure of the Cultivated Area: Vegetables and Horticultural Crops by Farm Type, 2017**



Source: Authors, based on data from the National Statistics Committee of the Kyrgyz Republic, <http://www.stat.kg/ru/>

**Table 1: Areas Cultivated with Crops and Perennial Plantings, All Farm Types, 2013–17**

Crop	Area (hectares, thousands)					Percentage change 2017 to 2013
	2013	2014	2015	2016	2017	
Grains	645,203	657,591	641,980	614,540	616,939	95.6
Potato	80,517	78,892	84,488	82,155	83,034	103.1
Vegetables and gourds	52,993	54,180	62,746	62,045	63,515	119.1
Horticultural crops	50,681	51,614	51,175	51,369	51,369	101.4
Grapes	6,557	6,473	6,366	6,313	5,630	85.9

Source: Authors, based on data from the National Statistics Committee of the Kyrgyz Republic, <http://www.stat.kg/en/>

<sup>2</sup> The five member states of the Eurasian Economic Union are Armenia, Belarus, Kazakhstan, the Kyrgyz Republic, and Russia. Moldova is an observer member.

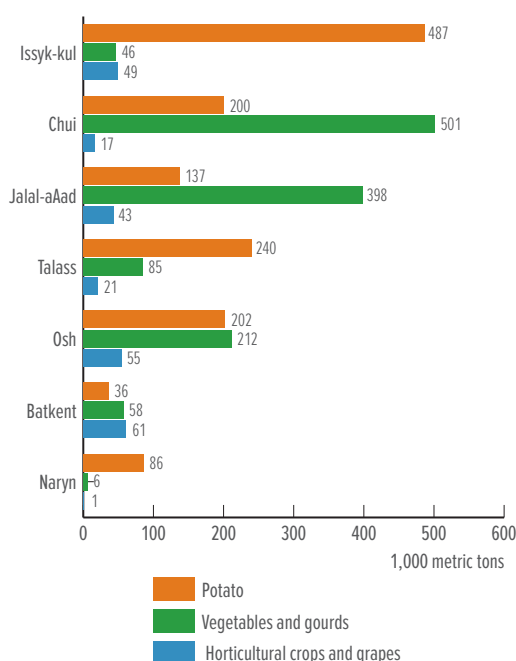
<sup>3</sup> For an overview of export support measures for agricultural and food products in the member states of the Eurasian Economic Union and the leading agricultural and food products exporters, see the Eurasian Economic Commission (EEC) at [http://www.eurasiancommission.org/en/act/prom\\_i\\_agroprom/dep\\_agroprom/monitoring/Pages/default.aspx/](http://www.eurasiancommission.org/en/act/prom_i_agroprom/dep_agroprom/monitoring/Pages/default.aspx/)

**Table 2: Fruit and Vegetable Production in the Kyrgyz Republic, 2012–16**  
*Metric tons, thousands*

Crop	Production volume, metric tons					Percentage change 2016 to 2012, %
	2012	2013	2014	2015	2016	
Potato	1,312.7	1,332	1,320.7	1,416.4	1,388.4	105.8
Vegetables and gourds	1,059.1	1,077.3	1,119.9	1,300.7	1,306.6	123.4
Horticultural crops	222.7	233.6	237	209.2	239.3	107.5
Grapes	7.9	8.1	8.5	5.7	8.6	108.9

Source: Authors, based on data from the National Statistics Committee of the Kyrgyz Republic, <http://www.stat.kg/en/>

**Figure 2: Fruit and Vegetable Production by Region, 2016 (1,000 metric tons)**



Source: Authors, based on data from the National Statistics Committee of the Kyrgyz Republic, <http://www.stat.kg/en/>

Food imports and exports fluctuate widely, and depend primarily on domestic and external demand (Table 3).

Import data for January–December 2017 suggest a significant increase in the import of gourds. Imports of melons and watermelons increased 8.9 times compared to the respective figures for 2016. Potato imports also grew significantly compared to 2016.

There has been growth in the export of all vegetables and fruits. However, producers and distributors

face problems when crossing the state border; this is discussed in more detail below.

## Policy Issues

Analysis of the current situation in the horticulture sector of the Kyrgyz Republic identified the following four policy issues: (1) issues related to the lack of data on the volume of loss at each stage of the food value chain; (2) issues in the horticulture production sector; (3) issues in the horticulture processing sector; (4) issues related to sales of products in the domestic market and their export.

### Policy Issues Related to the Lack of Data on the Volume of Loss at Each Stage of the Food Value Chain

Any recommendations aimed at reducing food loss should be based on reliable information about the actual volumes of deteriorated products at all stages of the food value chain. Data published in statistical yearbooks issued by the National Statistics Committee of the Kyrgyz Republic do not reflect the full picture of the losses in the horticulture sector. In several studies involving food loss issues (including the horticulture sector), data on losses were obtained by surveying some producers and further extrapolating the results to gross production, or based on averaged loss of production at each stage of the food value chain. Since data on losses are not recorded on a regular basis, it may be concluded that accurate information on the volume of food losses in the Kyrgyz horticulture sector is absent.



**Table 3: Foreign Trade in Vegetable and Fruit in the Kyrgyz Republic, 2016–17**

Crop	January–December 2016			January–December 2017			Growth (%), 2016–17		
	Metric tons	US\$, thousands	Average price (US\$/ kilo)	Metric tons	US\$, thousands	Average price (US\$/ kilo)	Weight	Value	Average price
<i>Import</i>									
Fresh potato	133.2	71.0	1.1	2,351.5	635.2	0.3	17.7	9.0	3.0
Fresh vegetables	23, 974.5	9,646.9	0.5	22,779.1	10, 124.9	0.7	1.0	1.0	1.5
Fresh fruits	69, 516.3	27,537.6	0.5	59, 595.7	37,821.6	0.8	0.9	1.4	1.7
Melons, watermelons, etc.	1,040.5	256.1	0.4	9,240.9	1,160.7	0.2	8.9	4.5	0.4
<i>Export</i>									
Fresh potato	1,237.4	203.7	0.2	2,976.9	1,381.1	0.5	2.4	6.8	2.4
Fresh vegetables	2,822.8	292.3	0.2	3,999.3	477.4	0.2	1.4	1.6	0.8
Fresh fruits	188.9	150.1	1.5	297.6	253.9	3.0	1.6	1.7	2.0

Source: Authors, based on the data from the State Customs Service under the Government of the Republic of Kyrgyzstan, <http://www.customs.kg/> (in Russian and Kyrgyz).

## Policy Issues in the Horticulture Production Sector

### Small-scale production of fruits and vegetables:

The land reform of 2010 resulted in 75 percent of the agricultural land of the Kyrgyz Republic becoming privately owned; 25 percent of land is owned by the state. More than 90 percent of vegetables, fruits, and berries produced come from the private sector (Абдурашитов 2015, in Russian). The majority of farmers are small-scale producers and perform the entire work cycle—from production to selling—on their own. Only 1 percent of farmers are organized into cooperatives. Poorly developed cooperation among farmers results in uneven production and high production and sales costs.

### Underdeveloped storage infrastructure for harvested products:

An acute shortage of storage facilities and warehouse infrastructure in the country affects the quantity and quality of agricultural produce in Kyrgyzstan (Government of the Kyrgyz Republic 2015). Interviews with producers conducted during the study revealed that, because of a lack of storage facilities and warehouse infrastructure, the losses of horticulture products can amount to up to 30 percent of the harvest.

**Difficulties in attracting loans for production development:** Issues in obtaining loans from outside financial resources and credit institutions may be

explained by a lack of relevant information among producers. Many banks are ready to provide credit to agricultural producers; however, producers do not have sufficient information about crediting programs. That is why most producers use their own financial resources to finance agricultural activities.

### Farmers' lack of knowledge about the production of certain types of crops that are in demand in the market:

Many farmers lack sufficient knowledge about harvesting technologies and satisfactory storage conditions. A lack of knowledge about modern cultivation technologies remains a serious obstacle; this is the result of a lack of experience among farmers and producing households as well as a shortage of modern equipment.

## Policy Issues in the Horticulture Processing Sector

### A lack of links between producers and processors of horticulture products:

During the era of market transformation in the Kyrgyz Republic, existing links between producers and processors of horticulture products were completely disrupted. Currently cases that establish strong long-term contractual obligations between producing companies and processing companies are rather rare because price fluctuations in the country's unstable market are quite high from

year to year (FAO 2016).<sup>4</sup> This means that a farmer who agrees to supply a product at a certain price can incur a heavy loss by the time the market price increases by several times above the price that was forecasted and to which the contract refers.

**The presence of obsolete material, technical resources, and processing technologies and inadequate financing of processing companies:** The share of processed vegetables and fruits in the republic is low and does not exceed 13–14 percent. In many cases processing enterprises use only 10 percent of capacity. Low volumes of processed crop products is one reason for high losses of harvested products, some of which are often left in the fields or rot in premises unsuitable for storing these products because they cannot be sold in the market. On the whole, low volumes of processed products discourage the growth of agricultural production for economic reasons (National Council for Sustainable Development of the Kyrgyz Republic 2013).

For example, only 20 percent of annual apricot production (50–70,000 metric tons) is sold in the Kyrgyz Republic, and only 1 percent is processed. Of the remaining apricots, 55 percent are used for dried fruit production whereas 25 percent or 17,500 tons simply rot. If the apricots had been processed, producers would have received more income. About 85 percent of dried apricots are sold at a low price to Tajikistan, where they are packed and re-exported to Russia and even to Europe. As a result, Kyrgyz dried apricots are sold under the Tajikistan brand, and currently Tajikistan is among key suppliers of this product to Russia.

A similar situation is observed for apples: annually 36 percent of the total apple production is used to feed livestock—this is some 91,800 metric tons. The apples could be used for juice production, but this possibility is not tapped.

Increase in product output is restricted by the limited financial means of processing enterprises as well as the seasonal nature of the work. These enterprises are not able to compete with processed agricultural products from neighboring countries because of the price, and most exported fruits and vegetables are exported fresh, where they are more competitive in price.

Around 90 percent of processing equipment is obsolete (it has been in use since Soviet times) and inefficient. However, lack of financing prevents upgrades and increased investment in new technologies.

**A lack of raw materials of standard quality on an industrial scale and a lack of own source of agricultural raw materials:** The source of agricultural raw materials for the sector is composed as follows: 74 percent of enterprises work with local Kyrgyz suppliers, 22 percent have their own farms, and 4 percent import raw materials. Because production is on a small scale, there is an issue with the supply of raw materials (agricultural produce) of sustained quality and quantities by producers.

### Policy Issues Related to Sales of Products in the Domestic Market and Their Export

**Difficulties faced by producers and processors entering the market:** Agricultural produce or processed products are supplied to consumer markets when there are no long-term relationships between producers, trading intermediary companies, processing companies, and so on. Fruits and vegetables produced by farmers are often sold at low prices, which depress producers' incomes. There are no incentives to produce more and producers cannot store, and in the case of overproduction they are forced to sell dirt-cheap—at prices below the cost of production. Overproduction or underproduction triggers price fluctuations in agricultural markets, which ultimately undermines people's standards of living.

**The underdeveloped system of product certification:** A serious barrier impeding the development of agricultural export is the underdeveloped system of product certification in conformity with international standards. This issue is stipulated primarily by a shortage of specialized phytosanitary laboratories that certify products for export (WFP 2017). Horticulture products from the Kyrgyz Republic—especially processed products (jams, juices, fruit drinks, canned fruits)—are very popular in Russia and Kazakhstan. However, a shortage of specialized laboratories generates issues when products enter EAEU countries.<sup>5</sup>

<sup>4</sup> See also the Food and Processing Industry Development Program of the Kyrgyz Republic for 2017–2021, available at <http://cbd.minjust.gov.kg/act/view/ru-ru/99895> (in Russian).

<sup>5</sup> For details about the Eurasian Economic Commission, see <http://www.eurasiancommission.org/en/Pages/default.aspx>

Some distributors exporting fruits and vegetables encounter problems at customs. For instance, if transport documentation for exported products is not prepared properly, distributors are not allowed to export and are stopped at the border. Therefore trucks with products that have not passed customs control come back. In this case distributors incur huge losses.

**The underdeveloped transport infrastructure:** One of the reasons for the deteriorated quality of horticulture products and a higher volume of physical losses on the way to consumers is the old transport infrastructure (roads) in the republic.

Furthermore, in the course of interviews with distributors, respondents reported the practice of illegal charges for transporting cargo across the border. For example, there are many checkpoints on the border for large 18-ton trucks; people call these checkpoints a system of “road corruption.” There is no procedure that allows chilled products to pass customs control quickly.

**The situation in the wholesale and retail outlets:** Trade in the Kyrgyz Republic traditionally happens at bazaars that are found in all regions of the country. Products from these bazaars are then sold in retail shops of various types. Products at such bazaars are sold by weight. Quality standards or any other product classifications are absent, and price and quality are basically unrelated. The bazaars are crowded and sanitary standards are poor. The bazaars offer some storage facilities but these are not equipped with cooling units.

The majority of markets and bazaars in the country do not have labs, so fruits and vegetables get to the markets without necessary inspections. This is a major source of concern.

Because of storage and selling conditions, a lot of vegetables and fruits are wasted. Often unauthorized waste dumping sites appear near the food markets. Rotting fruits and vegetables lure rats, parasites, and pests; fresh produce is affected and waste quantities increase.

**Difficulties with the direct export of processed products:** The output of the processing industry is not big enough to promote higher export. Among key export-related challenges, processors mention difficulties with exporting directly and small production

volumes. Furthermore, when processed products are sold domestically, often intermediaries are involved in both retail and wholesale transactions.

## Stakeholders

In this study stakeholders are people with an interest in a specific situation (functioning of the horticulture sector) who are its active participants: government bodies, agricultural producers, agricultural processing companies, sectorwide associations, distributors and trade and purchasing companies, and consumers.

### Government Bodies

The Ministry of Agriculture, Food Industry and Melioration of the Kyrgyz Republic is a key stakeholder in supporting the development of the horticulture of the country’s agribusiness and reducing losses of agricultural produce, because its aim is to ensure food security and develop agricultural production and food processing industry. Regarding the development of the horticulture sector, the ministry develops proposals concerned with the functioning of the processing sector; carries out agricultural research and supports innovation; provides advisory support; monitors the operations of phytosanitary laboratories, and so on.<sup>6</sup>

### Producers

Small private farms that emerged during market transformations in the course of privatization of land plots and assets of collective and state farms predominate in the horticulture sector of the Kyrgyz Republic. The data of the country’s National Statistics Committee show that as of January 2018, 413,457 peasant farms and individual entrepreneurs worked in agricultural production in the country.

Most farms do not have the financial resources, skills, or technologies to conduct efficient business in agriculture. Producers of fruits and vegetables are interested in increasing their market share and expect market barriers to lower. Producers want to be sure that they can sell the products they produce at a good price and avoid large losses. Producers

<sup>6</sup> See the Ministry of Agriculture, Food Industry and Melioration of the Kyrgyz Republic, <http://www.agroprod.kg> (in Russian and Kyrgyz).

are also interested in advisory services to get information on agricultural technologies, requirements about the products they plan to export, and market information. Access to subsidized loans and subsidies is especially relevant for them.

## Processing Companies

Currently 27 processing companies operate in the horticulture sector of the Kyrgyz Republic; they are mostly located in the Issyk-Kul and Chui regions. Horticulture products are processed into fruit juices, dried fruits, tomato juice, canned and marinated vegetables, fruit drinks, seasonings, tomato paste, and so on. Processing companies face difficulties in selling their products both in the internal and external markets; that is why they urgently need advisory assistance.

## Sectorwide Associations

Sectorwide associations that seek to coordinate the activities of food association members and define the trajectory of their development based on a collegial principle are interested in the development of the horticulture sector. Sectorwide unions and associations are set up to create the best economic conditions in the sectors where their members operate, provide information on a daily basis, and represent and protect the interests of their members.

The Association of Fruit and Vegetable Enterprises of Kyrgyzstan (AFVEK) brings together most fruit and vegetable enterprises in the Kyrgyz Republic.<sup>7</sup> It develops the horticulture sector and its enterprises by creating a good business environment and developing the market for processed products. It also actively participates in the law-making process, contributes to improvement of business climate and competitiveness of enterprises, and maintains a relationship with the authorities.

## Distributors and Trading and Purchasing Organizations

In the republic, 85 to 90 percent of sales are made through distributors. These distributors have transport, purchase products from producers or processors, and resell them at bazaars (small-scale wholesale or retail)

or directly to small-scale wholesalers. Distributors are interested in getting access to good-quality fruits and vegetables in specific amounts.

Domestic trade happens mostly through selling products to small-scale wholesalers at bazaars. Distributors are also closely involved in export-import operations. In addition to interacting with Kyrgyz export-import companies, they deal directly with foreign export-import companies or importers.

During the interviews representatives of distributor companies also reported an acute shortage of warehousing capacity (especially facilities equipped with cooling and freezing systems). According to distributors, this causes increased loss and waste of fruits and vegetables when purchasing produce and bringing it for processing and sale.

## Consumers

Rural and urban populations are consumers of fruits and vegetables and products that result from their industrial processing. However, there is one important point to note. While urban consumers mostly buy and consume fruits and vegetables, rural residents are also producers—they grow a lot of crops in household plots for their own consumption. Both urban consumers (who do not participate in output production) and rural consumers buy various types of horticulture products sold in the market at set prices during the year.

Consumers are interested in stable prices for seasonal horticulture products, product line expansion, and affordable vegetables and fruits of good quality that are accessible in required amounts in the market all year round.

## Policy Options

If food losses in the Kyrgyz horticulture sector are to be reduced, the causes of such losses and possible solutions need to be identified, taking into account local conditions and the nature of specific products. Stakeholder coordination is critical. In addition, policy-level efforts will be needed to improve policy measures related to losses and to design specific policies

<sup>7</sup> Further information about the AFVEK is available at <http://eng.afve.org/>

intended to account for losses at each stage of the food value chain and reduce food losses in horticulture.

One of the main causes of horticulture loss and waste—especially the loss and waste of perishable fruits and berries—is the low production concentration and consequent difficulties in supplying standardized and quality products to processing enterprises. Some production capacities of processing enterprises are idle; enterprises have seasonal work and operate only 5.5 months per year. The most common scheme of interaction with suppliers of horticulture products is that produce is supplied without a preliminary agreement and payment is made upon delivery. Most interviewed enterprises are not happy with the quality or amounts of produce they buy from farmers.

Based on the study above, several possible policy options to reduce such losses and improve food security of Kyrgyz Republic are suggested and substantiated.

## 1. Policy options related to improving accounting for losses at all stages of the food value chain

Estimating the level of food losses is a complex and time-consuming process because of the inconsistency of methodologies and approaches to loss definition and measurement. In addition, market participants who keep records of losses may be reluctant to share accurate data on the amount of their losses because this information is considered confidential. Requests from agencies gathering these data may be considered intrusive.

Taking this into account, instead of trying to develop or improve the methodology for estimating losses at each stage of the food value chain, the Ministry of Agriculture, Food Industry and Melioration and the National Statistics Committee should apply one of the existing practices that meet international standards for accounting for losses. The methodological recommendations of the European Union (EU) Platform on Food Losses and Food Waste or Russia's Food Loss Assessment Methodology may be considered.<sup>8</sup>

The EU platform on Food Losses and Food Waste was developed in 2016, bringing together EU institutions, experts from EU countries, and relevant stakeholders

who were selected on a competitive basis from applications received. The European standard for food loss and food waste accounting adopted as part of the platform provides for global accounting and quantification of food loss and food waste, and is designed for a wide range of stakeholders.

The Food Loss Assessment Methodology in Russia covers agricultural, procurement, processing and trading organizations, and provides statistical accounting of losses at all stages of the value chain (storage, processing, transportation, and sales). Given the close cultural and economic ties of the Kyrgyz Republic and the Russian Federation, this methodology could be successfully adapted to the conditions of the Kyrgyz Republic.

## 2. Policy options related to producing horticulture products

### *a. Improve storage and transportation infrastructure*

Storing produce correctly helps reduce losses and increase consumption of fresh produce during the year (Roy, no date). Loss reduction during storage offers great opportunities to increase agricultural produce consumption. Moreover, the delivery of produce from storage facilities for processing is a major requirement for ensuring the steady operation of processing companies, especially in winter and spring.

First, to better align storage with other horticultural complex components, it is necessary to better place storage facilities, building them primarily at production sites.

An analysis of the location of storage and processing facilities as well as their access to adequate raw materials confirms the need to pursue the following priorities:

- ✓ Rehabilitate old and construct new modern storage facilities and processing plants with resource-saving high-tech equipment using businesses' own financial resources and direct investment.
- ✓ Establish the necessary infrastructure for purchasing, storing, processing, and selling horti-

<sup>8</sup> For more information on this EU platform, see [https://ec.europa.eu/food/safety/food\\_waste/eu\\_actions/eu-platform\\_en](https://ec.europa.eu/food/safety/food_waste/eu_actions/eu-platform_en)



cultural products; improve wholesale markets and greenhouses; and produce purchasing stations, transportation networks, and so on.

Promising measures include the implementation of innovative technologies in fruit and vegetable processing. State-of-the-art processing and conservation technologies should be introduced at processing plants; this would contribute to nutrition and health value and dramatically increase shelf life.

#### *b. Promote public contracts for horticulture produce*

To ensure efficient and high-quality production, long-term storage, and the possibility of selling produce at a good price and bringing it to consumers, the system of public contracts should be introduced in the Kyrgyz horticulture sector. The development of the system of public contracts would provide the government with a tool to monitor quantities and production mix in the horticulture sector, protect the interests of farmers when they deal with processors and other firms that pose as price-setters, accelerate the achievement of national food security, and bring agricultural production to a new level.

#### *c. Develop cooperation in the horticulture sector*

The cooperation of producers is an important factor in increasing production volumes and improving the quality of grown vegetables and fruits. Such cooperation would help reduce losses at the stages of harvesting, storing, and transporting the product. Given the historically developed model of doing agribusiness in

the Kyrgyz Republic, characterized by a large number of small producers, a cooperative is the most viable form of interaction between entrepreneurs.

The system of cooperation needs to be developed along the following lines:

- ✓ Create multi-level cooperation.
- ✓ Create conditions for providing access of small entities to financial resources.
- ✓ Develop agricultural credit consumer cooperatives.

Under current conditions, cooperation among the Kyrgyz horticulture sector's producers offers an opportunity to put those producers on an equal footing with industrial, processing, and trading enterprises by creating a relatively large agricultural producer who will take full advantage of large-scale production. Such cooperation should be carried out by the Ministry of Agriculture with the use of activities and tools listed in Table 4.

#### *d. Develop the transportation, logistics, and warehouse infrastructure*

In implementing this policy option, it is proposed to build a network of wholesale logistics distribution centers equipped with modern cooling units.

Producers would store their products in the storage facilities for subsequent sale, while waiting for higher demand or price. Producers would also be able to sell their products to wholesale intermediaries, processing enterprises, and retailers right in the

**Table 4: Activities and Tools for Developing Cooperation in the Horticulture Sector**

Activities	Tools
Providing information	Organization of information campaigns (with involvement of the Association of Fruit and Vegetable Enterprises of Kyrgyzstan) among farmers with the aim of explaining benefits of cooperation Training workshops
Promoting the organization of cooperatives and expanding the activity of existing cooperatives	Provision of subsidies to agricultural cooperatives
Developing cooperation in priority types of activities (growing fruits and berries)	Provision of subsidies and grants to cover administrative expenditures to agricultural cooperatives
Developing the relationship between cooperatives and bodies of state power and the Association of Fruit and Vegetable Enterprises of Kyrgyzstan	Creation of a coordination council

field or from the storage facility. Development of the network of wholesale logistics centers would help reduce volumes of product losses and seasonal fluctuations of prices in the market and would ultimately help improve performance of horticulture producers.

However, issues of storage and warehouse construction should be addressed together with issues of the development of the rural logistics infrastructure, for example, the road system.

### 3. Policy options related to processing horticulture products

#### *a. Preparation of a strategy for developing the horticulture processing industry*

The objective of a strategy for development of horticulture processing industry would be to increase revenues of producers and the government from the sales of processed horticulture products in the domestic and foreign markets.

To achieve this objective, the following tasks should be undertaken:

- ✓ Increase quantities and improve the quality of horticulture produce.
- ✓ Improve the quality of processed products; expand the product line; and ensure these products are perceived in targeted markets as high quality, organic, and safe.
- ✓ Promote export products in the most promising markets and increase revenues per unit of export.

A whole set of measures could be undertaken to ensure that the agricultural producer prefers to sell harvested fruits and vegetables to processing companies in the Kyrgyz Republic rather than to wholesale buyers from other countries or intermediaries who export fresh fruits and vegetables.

#### *b. Financial incentives for farmers*

It is necessary to enable processing companies to pay agricultural producers in the timeframe and using payment methods convenient for farmers. Because both processing companies and farmers have no working capital in spring, large banks should open a

credit line to advance payments to agricultural producers. Credits from this credit line could be allocated to processing companies for up to two years, with a six-month grace period, so they could make advance payments to purchase horticulture produce.

#### *c. Legal mechanisms*

As an incentive for agricultural producers, a legal mechanism that allows processing enterprises to invest in farms by purchasing equipment and providing transport and storage facilities should be developed. Furthermore, rural producers should assume obligations to deliver a portion of harvested produce for processing.

#### *d. Contract enforcement*

Provision should be made for both agricultural and processing enterprises to be held responsible for any failure to fulfill their obligations.

### 4. Policy options related to improving the sales of horticulture products in the domestic market and in the export sector

To ensure a long-term relationship between supply and demand for horticulture products, this relationship should rely on a system of organized wholesale trade operating on the following principles:

- ✓ Streamline the distribution of local horticulture products and provide quality services through the system of wholesale food markets.
- ✓ Make efficient use of the existing infrastructure of marketplaces and possibly implement innovative elements of infrastructure.
- ✓ Provide easy access to reliable information for all trade participants.

#### *a. Create and promote a web-based trading platform*

Poor links between producers, processors, and consumers result in huge food losses. Products

that could be sold or at least processed into juices, tomato paste, canned fruit and vegetables, and so on are fed to livestock or wasted. A web-based exchange for agricultural products could serve as a tool for establishing sound relations between farmers, processors, and consumers in the Kyrgyz Republic.

Currently there is no popular web-based system in the Kyrgyz segment of the Internet that would help promote and advertise finished agricultural products. Kyrgyz farmers who use the web to advertise their products place such advertising on a popular Russian web-based platform—agrobazar.ru—which brings together agricultural producers, intermediaries, and consumers from a majority of post-Soviet countries.

Such a Kyrgyz web-based platform would inform potential buyers about mandatory steps to be taken during export transactions.

*b. Conduct an information campaign to improve the knowledge and skills needed to prepare the necessary documents for foreign trade deliveries*

Many exporters of fruits and vegetables produced in the Kyrgyz Republic face difficulties when they try to export their products across the border. The most-often cited reason for not letting products into neighboring countries is lack of required phytosanitary certificates.

A survey respondent from the Batkent region who sells strawberries to the Russian city of Surgut complained about the huge bureaucracy faced when crossing the Kazakh border. He argued that, in regard to the inspection authorities' attitude, only Kazakh customs officers would have an issue with him, and all the obstacles were put intentionally. His products had no problem entering into Russia. Very often such refusal to let him cross the border resulted in huge losses of his highly perishable products. He also indicated that all his colleagues faced similar issues. However, another respondent—a producer of canned food from the city of Cholpon-Ata in the Issyk-Kul region—argued that during his 25 years of experience as an exporter he had never encountered issues while crossing the border, and that improper export documentation was the reason that products of other producers were turned back.

Advice to potential fruits and vegetables exporters could come from the Ministry of Agriculture, Food Industry and Melioration and from the AFVEK. Such advice could be provided from time to time during capacity building workshops.

## Assignment

1. Analyze the potential implementation results of the proposed policy options regarding reduction of horticulture product losses from the perspective of various stakeholders.
2. Determine a compromise combination of policy options from the perspective of all stakeholders.
3. How will implementation of the proposed policy options impact the level of food security in the Kyrgyz Republic?

## Policy Recommendations

This study identified the main reasons for losses in the horticulture sector of the Kyrgyz Republic, assessed the extent of their impact on the country's food security, and developed and justified policy options to reduce these losses.

However, in order to ensure food security of the country, decision-makers should focus on policy measures related to the production and sale of horticulture products as well as to the development of their export.

In the context of policy options related to horticulture production, the first options to be implemented are those aimed at promoting a multilevel cooperative movement in the horticulture sector by organizing a public information campaign, providing subsidies and grants to agricultural cooperatives, developing a relationship between existing cooperatives and bodies of state power and the AFVEK. This relationship would enable the Ministry of Agriculture to provide guidance to farmers about what varieties of fruits and vegetables they should grow, help them avoid losses, increase the sales of grown products by improving supplies to large retail networks, and increase export volumes.

Another very important task is to improve the infrastructure of storage and transportation of horticulture products. Improving the location of storage facilities and expediting their construction at the places where fruits and vegetables are grown will help farmers avoid losses of harvested products and improve their incentives to increase production. At the same time, the development of a network of wholesale logistics centers would help reduce losses of produce in volume terms, reduce seasonal price fluctuations in the market, and, eventually, improve performance of horticulture producers.

In turn, the availability of steady volumes of produce output would have a positive impact on processing enterprises by allowing them to increase the share of local produce. As a result, production cost would drop and the competitiveness of the products in the market would increase.

In the context of policy options related to sales of horticulture products in the domestic market and increase in export volumes, an information campaign needs to be conducted among exporters to improve their knowledge and skills in preparing documents for foreign trade. This campaign could be organized with the support of the Ministry of Agriculture and the AFVEK. This would help avoid losses of products and the huge financial losses currently incurred by processing companies and retailers that sell their products abroad.

Implementation of the recommended policy options would offer an opportunity to involve all stakeholders in the process of reducing losses in the horticulture sector and would have a positive impact on the situation regarding Kyrgyz food security.

## References

- CGIAR. No date. "Food Waste." Big Facts Project. CGIAR CCAFS (Research Program on Climate Change, Agriculture and Food Security). <http://ccaafs.cgiar.org/bigfacts/food-waste/>
- Fan, S. and A. Steer. 2016. "Guest Commentary: 3 Steps for Tackling Food Loss and Waste." Global Food for Thought Blog, April 7, 2016. <https://www.thechicagocouncil.org/blog/global-food-thought/guest-commentary-3-steps-tackling-food-loss-and-waste>
- FAO (Food and Agriculture Organization of the United Nations). 2009. "Post-Harvest Losses Aggravate Hunger." Press Release, November 2, 2009. <http://www.fao.org/news/story/en/item/36844/icode/>
- . 2011. *Global Food Losses and Food Waste—Extent, Causes and Prevention*. Rome: UN FAO.
- . 2012. *Save Food: Global Initiative on Food Losses and Waste Reduction*. Rome: FAO.
- . 2016. *Review of Agricultural Trade Policies in the Post-Soviet Countries 2015–16*. <http://www.fao.org/3/a-i7327r.pdf>. (in Russian); summary available in English at <http://www.fao.org/3/a-i8083e.pdf>
- Folke, L.; L. Riisgaard, S. Ponte, F. Hartwich and P. Kormawa (2010). *Agro-Food Value Chain Interventions in Asia: A review and analysis of case studies*. Working Paper. November 2010. United Nations Industrial Development Organization (UNIDO). Vienna, Austria.
- Gebhardt, S. and R. Thomas. 2002. "Nutritive Value of Foods." U.S. Department of Agriculture, Agricultural Research Service, Home and Garden Bulletin 72.
- Government of the Kyrgyz Republic. 2015. *Food Security and Nutrition Program in the Republic of Kyrgyzstan for 2015–2017*. <http://cbd.minjust.gov.kg/act/view/ru-ru/98137> (in Russian).
- HLPE (High Level Panel of Experts on Food Security and Nutrition). 2014. *Food Losses and Waste in the Context of Sustainable Food Systems*. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome 2014. <http://www.fao.org/3/a-i3901e.pdf>
- Kader, A. A. and R. S. Rolle. 2004. *The Role of Post-Harvest Management in Assuring the Quality and Safety of Horticultural Produce*. Rome: FAO.
- Kummu, M., H. de Moel, M. Porkka, S. Siebert, O. Varis, and P.J. Ward. 2012. "Lost Food, Wasted Resources: Global Food Supply Chain Losses and their Impacts on Freshwater, Cropland, and Fertiliser Use." *Science of the Total Environment* 438: 477–89.
- Minten, B., T. Reardon, S. D. Gupta, D. Hu, and K. A. S. Murshid. 2016. "Wastage in Food Value Chains in Developing Countries: Evidence from the

Potato Sector in Asia.” *Frontiers of Economics and Globalization* 16: 225–38.

National Council for Sustainable Development of the Kyrgyz Republic. 2013. National Sustainable Development Strategy of the Kyrgyz Republic for 2013–2017. <http://stat.kg/en/nsur/>

Roy, S. K. No date. “On-Farm Storage Technology Can Save Energy and Raise Farm Income.” Presentation. <http://ucce.ucdavis.edu/files/datastore/234-2143.pdf>

WFP (World Food Programme). 2017. *Kyrgyz Republic Country Strategic Plan (2018–2022)* <https://docs.wfp.org/api/documents/7e55367689834942b3976b9bbf19fd9/download/>

Абдурашитов А. Рыночная трансформация аграрной экономики Кыргызской Республики. Бишкек: Изд-во КРСУ, 2015. 267 с. (in Russian).

## Recommended Literature

Bond, M., T. Meacham, R. Bhunnoo, and T. G. Benton. 2013. *Food Waste within Global Food Systems: A Global Food Security Report*. Global Food Security Programme. <https://www.fcrn.org.uk/research-library/global-food-security-programme-food-waste-report>

IFPRI (International Food Policy Research Institute). 2018. *2018 Global Food Policy Report*. Washington, DC: International Food Policy Research Institute.

von Grebmer, K. J. Bernstein, N. Hossain, T. Brown, N. Prasai, Y. Yohannes, F. Patterson, A. Sonntag, S.-M. Zimmermann, O. Towey, and C. Foley. 2017. *Global Hunger Index: The Inequalities of Hunger*. Washington, DC: International Food Policy Research Institute; Bonn: Welthungerhilfe; and Dublin: Concern Worldwide.



## Abbreviations

<b>AFVEK</b>	Association of Fruit and Vegetable Enterprises of Kyrgyzstan
<b>EEC</b>	Eurasian Economic Commission (regulatory body of the EAEU)
<b>EAEU</b>	Eurasian Economic Union
<b>EU</b>	European Union
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>HLPE</b>	High Level Panel of Experts on Food Security and Nutrition
<b>IFPRI</b>	International Food Policy Research Institute
<b>NSC</b>	National Statistics Committee of the Kyrgyz Republic

## Annex 1

### The Process of Loss Generation in the Horticulture Products Value Chain

Production	Storage and transportation	Treatment and processing	Distribution and sales	Consumption
<i>Stages of the value chain</i>				
At the growth or harvesting stage	After harvesting the products are taken to storage facilities or transported	Preparation of the products for sale (packaging, labeling) and industrial processing of the products	Sale of the products at wholesale and retail markets	Losses of end food products: food products turn into waste at the consumers' end—that is, with the population and catering firms
<i>Losses</i>				
Berries, fruits, and vegetables bruised or deformed during harvesting	Products get damaged because storage conditions are not met and the size of storage facilities is not adequate	Fruits and vegetables are damaged during pre-sale treatment (crushed, deformed during handling); products (mainly berries and small fruits) spilled during processing	Products have been sorted out because of lower quality as a result of physical damage at previous stages or because they do not meet requirements in the sales market (marketable conditions, packaging)	A certain portion of consumer fruits and vegetables and the products of their processing (dry berries and fruits, jelly, etc.) inevitably turn into food waste during cooking and consumption by end users.
Produced agricultural products cannot be sold because they do not meet quality standards	Pest and fungi infestation of 'healthy' products, decay of products bruised and damaged during harvesting	Some harvested fruits and vegetables have been sorted and graded and found not suitable for pre-sale treatment or industrial processing	Product losses at sales outlet because of damage, loss of marketable conditions, or expired shelf life	For some reason not all cooked food was consumed.
A part of harvest is left in the fields and orchards during machine harvesting	n.a.	n.a.	If in the case of export, the products do not meet the exporter's requirements or documents have not been prepared correctly, the products are sent back to the producer; when the products are sent back, the level of losses of perishable products during transportation increases.	n.a.
Harvest left to rot in the fields and not collected by the producers because there is no sales market	n.a.	n.a.	n.a.	n.a.

Note: n.a. = not applicable.



# Assessment of the Efficiency of Organic Agriculture Development in Uzbekistan

*Valery Koshelev, Saodat Dusmuratova*



## Executive Summary

Organic agriculture is becoming more and more attractive—not only for consumers who prefer healthy food, but also for farmers who are motivated by society at large to manage their farms in a manner friendly to the environment and who want to earn more income.

Currently, Uzbekistan does not have a developed organic sector—its domestic organic food market does not exist. Nevertheless, Uzbekistan has significant potential to develop an organic sector.

The objective of this case study is to estimate the potential of organic farming for Uzbekistan and identify reasonable public measures that can be taken to support the transformation from conventional to organic agricultural production. To achieve this objective, several activities are needed:

- ✓ Study the economic aspects of organic agriculture operation globally and assess the chances of using this experience in Uzbekistan
- ✓ Assess the potential for developing an Uzbek organic sector and identify the most attractive segments of the organic world market for Uzbekistan as well as potential for developing its domestic market
- ✓ Develop a mechanism for defining quantitative financial policy measures to support farmers

who are going to convert from conventional to organic production, test this approach with one of the small pilot farms with probable scenarios of public support, and develop recommendations for further implementing this mechanism through the design of a national program for organic agriculture development

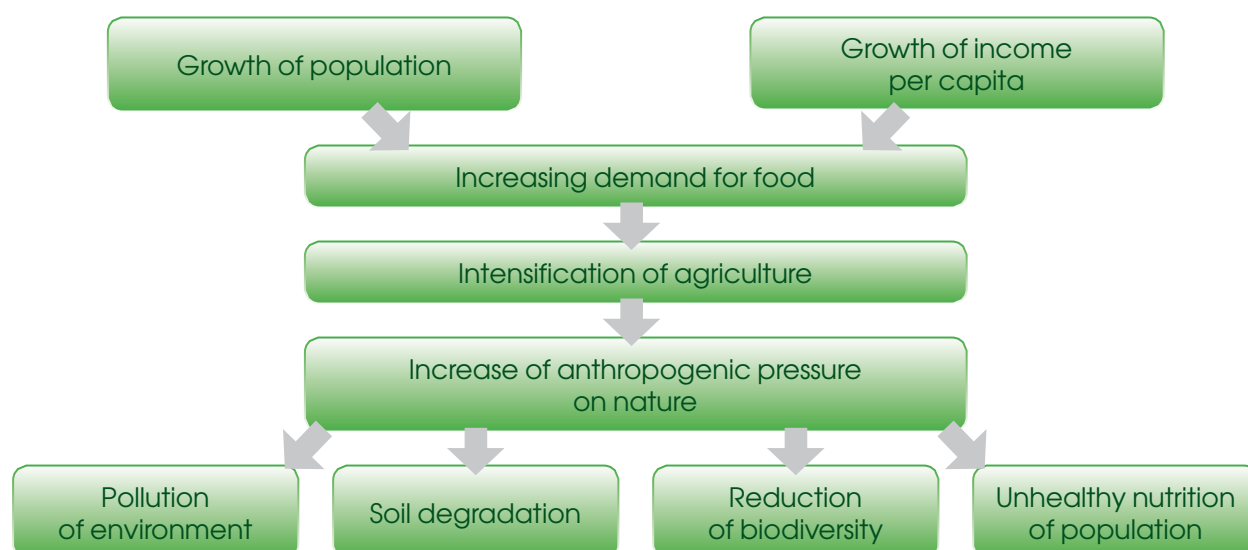
In this study several policy options are discussed: implementing legislative support for the organic sector; establishing favorable economic conditions; popularizing healthy nutrition; supporting infrastructure projects; and supporting scientific research, educational programs, and rural extension services aimed at organic sector development.

Many stakeholders stand to benefit or lose from the development of organic agriculture in Uzbekistan: the population in general, farmers, state institutions, companies that process food and produce inputs, traders, public organizations, and academic institutions.

## Background

The history of the development of the agricultural sector of the economy in the 20th century reveals a sharp increase in the anthropogenic burden on the natural resources due to the intensification of agriculture (one significant factor among several); this in turn is caused by population growth and increased demand for food (Figure 1).

**Figure 1: Elements of the Increased Burden on Natural Resources**





One way to ensure the sustainable development of rural areas, preserve biodiversity, create favorable conditions for protecting the environment, and supply people with environmentally safe and healthy food is to transition from traditional to organic agricultural production.

In international regulations, organic production is defined as “an overall system of farm management and food production that combines best environmental practices, a high level of biodiversity, the preservation of natural resources and the application of high animal welfare standards” (McEldowney 2018). Organic farmers have to follow four principles established by the International Federation of Organic Agriculture Movements (IFOAM) in 2005: the principles of health, ecology, fairness, and care (IFOAM Organics International, no date). They are also prohibited from using synthetic fertilizers, pesticides, genetically modified organisms (GMOs), antibiotics (at least for prophylactic purposes), synthetic feed additives, and some other unauthorized substances. Organic agriculture should be adapted to local conditions, friendly to the environment, and as natural as possible (see Figure 2 for a representation of the organic cycle).

According to Rundgren (2006), for example, organic agriculture contributes to food security and food safety by:

- ✓ Increasing yields in low-input areas;
- ✓ Conserving biodiversity and natural resources on the farm and in the surrounding area;
- ✓ Increasing farmers' incomes. This can be achieved through higher yields, higher

(premium) prices, lower costs (for inputs), or combinations of these three;

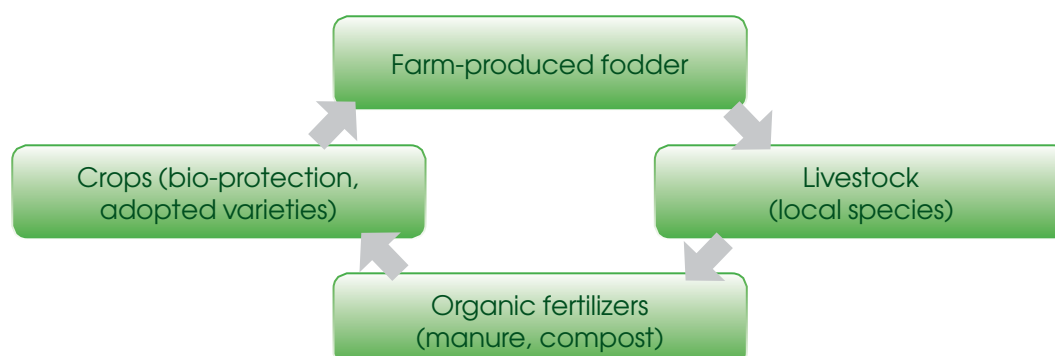
- ✓ Producing safe and varied food. Organic agriculture eliminates the very real risks associated with exposure to pesticides and other toxic chemicals. Moreover, according to a series of international studies, organic food in many cases is of higher quality than its conventional counterpart. For example, organic tomatoes are 50 percent higher in vitamin C content than conventional tomatoes, and eating organic fruits and vegetables could increase antioxidant intake by 20–40 percent (Shade 2014); and
- ✓ Being sustainable in the long term.

Because of these advantages, during the last two decades the world market for organic food has been developing much faster than the total food market (Figure 3). Since 2000 the world organic market has grown by almost five times, while the total food market has grown by less than three times (from US\$500 billion to US\$1,400 billion) (МННП 2017).

Organic production has been increasing not only because of the extra profit that can be earned by farmers and other stakeholder groups. Part of the work consists of promoting non-economic values, such as maintaining a healthy lifestyle, protecting agricultural traditions, and integrating local communities (Goszczyński and Kniec 2011).

Organic agriculture is becoming more and more attractive not only for consumers who prefer healthy food (even at higher prices) but also for those farmers

Figure 2: Cycle of Organic Agriculture



who accept the philosophy of organic agriculture, are convinced that they should manage their farms in a manner friendly to the environment, and intend to earn higher incomes. According to IFOAM and the Research Institute of Organic Agriculture (FiBL), the geography of organic farming has also been widening the last several years: more and more countries have introduced organic methods into their agriculture (Figure 4), including 87 countries (2016) that have their own national organic regulations. The total organic agricultural land area has increased by almost five times (Figure 4).

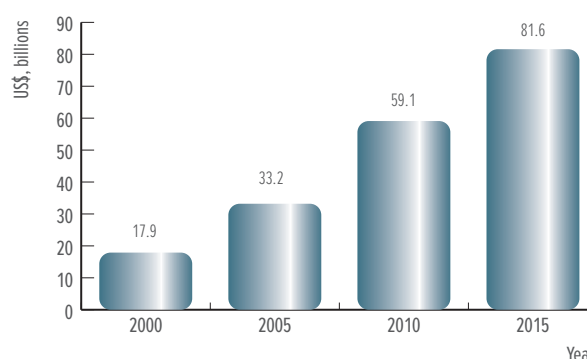
Uzbekistan does not currently have a developed organic sector (Table 1). In 2016, there were only 660 hectares of organic arable land in the country certified by an Austrian certification body called “Austria Bio Garantie GmbH.” Almost all products yielded from this area were exported abroad. There is no internal certification agency in Uzbekistan. Nevertheless, Uzbekistan has significant potential for development.

Agriculture is one of the most important sectors of the Uzbek economy. It contributes 18 percent to the country’s GDP and provides employment for 3.62 million people (27 percent of the total employed population). In the last two decades Uzbekistan has progressed well in agriculture and has attained not only food self-sufficiency but also established a big potential for exporting many agricultural products including fruit, vegetables, and potatoes (Nurbekov et al. 2018). In terms of the total value of export, vegetables and fruits occupy the second position after natural gas (Министерство внешней торговли 2018).

Future organic fruit, vegetables, and potatoes sector in Uzbekistan can definitely be considered to be a significant contributor to food security on the national and even the global level. However, the development of the organic sector requires substantial efforts to be made by the Uzbek government and the whole society.

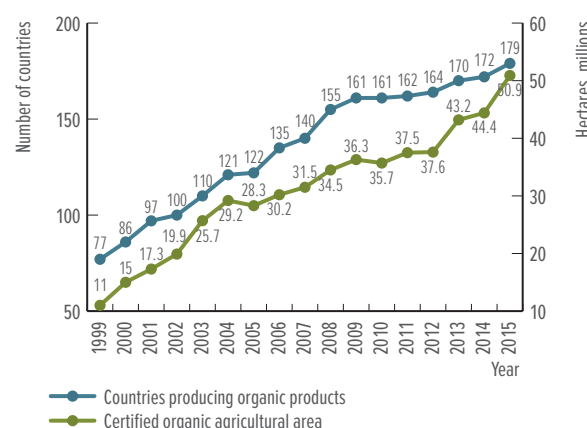
As international experience shows, besides improving the quality of food for the population and protecting nature, organic farming provides additional opportunities for producers to increase the profitability of their businesses. However, creating a production system based on the principles of organic agriculture requires complying with certain economic, institutional, and environmental

**Figure 3: World Organic market**



Source: FiBL Statistics on organic agriculture, <https://www.organic-world.net/statistics.html>

**Figure 4: Number of Countries Producing Organic Products and Certified Organic Agricultural Area**



Source: FiBL Statistics on organic agriculture, <https://www.organic-world.net/statistics.html>

**Table 1: Uzbekistan’s Share in the World’s Organic Production**

Indicator	World	Uzbekistan	Ratio of Uzbekistan to world (%)
Agricultural area, million ha	1,500	25	1.67
Organic certified area, thousand ha	50,900	0.66	0.00
Share of certified area in total agricultural area, %	3.4	0.03	X
Population, millions	7,200	33	0.46
Organic market turnover, US\$ million	81,600	0	0
Organic market turnover per capita, US\$	9.72	0	0

Source: IFOAM and FiBL, <https://www.ifoam.bio/> and <https://www.fibl.org/en/homepage.html>

Note: ha = hectare.

conditions, which is very difficult—often almost impossible—for a potential producer to achieve without external support.

Massive transfer from conventional methods to organic ones can become a reality for farmers only when they are convinced of its financial attractiveness. The effect of the conversion consists of two main parts: (1) higher prices for organic products, which significantly exceed the costs, and (2) potential financial (and institutional) support of the state directed to encourage organic agriculture development.

Conditions for developing the organic sector in Uzbekistan are considered to be quite favorable. In particular, demand is high in the world organic market for certain products produced in Uzbekistan because of the unique climatic and other natural conditions in the country. These products include grapes, raisins, cherries, nuts, certain types of pulses, vegetables, and cucurbits. They differ favorably from the same products in other countries by their taste and quality (Центр экономических исследований 2016). Moreover, market prices for these organic products are significantly higher than the prices for the same conventional products. For instance, organic raisins are 20–25 percent more expensive and net returns may exceed operational and total costs by about 20–200 percent, depending on the quality and the yields of a certain vineyard (Vasquez et al. 2008). This means that organic production may increase incomes both for the farmers and for the national economy if the country sells organic products on the world market.

Domestic organic market in Uzbekistan does not exist now (Nurbekov et al. 2018). This is because of the poor awareness of the population of the advantages of organic agriculture and also due to relatively low average household income in the country.

However, domestic market capacity also has the potential to develop because of the steady growth of the population's real income (11.7 percent increase over the past 15 years) (Государственный комитет по статистике Республики Узбекистан 2017). Step by step, Uzbekistan can develop its domestic organic food market, targeting the group of consumers who are relatively rich and stimulating organic production. In the long term this market will probably be developing while the purchasing power of the population is increasing.

Furthermore, conversion to organic production in Uzbekistan may not be as costly as it is in some other countries. Over the past two decades, most of the country's farmland has passed the phase of natural self-cleaning. Because of a lack of financial resources, most producers do not use (or use in limited quantities) mineral fertilizers, chemical plant protection products, and genetic engineering technologies; avoiding these products and technologies is one of the most important requirements of organic agriculture.

In other words, the conversion period in most cases may be shorter and cheaper in Uzbekistan than elsewhere. In addition, if the government is interested in the development of the organic sector, these relatively smaller costs may be reasonably shared between the state and farmers and will definitely attract farmers, decrease their risks, and facilitate farm transformation.

Different studies of the world organic market trends mentioned above show that organic products are in great demand and the market is growing fast. In this regard, it is clear that Uzbekistan has very good opportunities for occupying a niche in the global market, especially a niche of organic fruits and vegetables because of their specific properties and quality. This opportunity can be realized as soon as these organic products are produced and offered to the market.

The situation on the domestic market is quite different. There is no demand for organic food in Uzbekistan so far. Thus first it is necessary to stimulate demand for organic food and to develop an organic market. Of course, this will take some time, but for the long term, organic farmers have additional opportunities to produce and sell their products to the local population and food processors.

## Policy Issues

Despite the Uzbek government having paid rather a lot of attention to the development of the national agri-food sector, organic agriculture has not made any significant progress for several reasons. The crucial reason is the lack of efforts directed toward creating policy tools to promote an organic philosophy in the minds of both producers and consumers. At this stage, there are several bottlenecks to developing the organic sector in Uzbekistan.

## A System of Legislative Support

Each country with a developed organic agriculture sector has its own related legislative system consisting of legal regulations about the functioning of the organic sector and standards defining production, packaging, marketing, selling, and so on. All these legislative documents are based on the common principles of the organic agriculture declared by IFOAM; they are similar to each other and to international documents—the Codex Alimentarius (Codex Alimentarius, no date) and the international food standards of the United Nations Economic Commission for Europe (UNECE Trade Programme, no date), among others—to some extent. Nevertheless, they reflect the specific features of each country's policies, level of economic development, historical experience, climatic conditions, geographical location, unique food markets, and so on.

The system of legislation establishes common rules for production and the food market. Complete legislation is necessary for all stakeholders: it helps them organize the organic food value chain and protects producers, traders, importers, exporters, and input and service providers from unfair competition.

## Economic Conditions

The development of organic agriculture (like almost any other sector) depends on the demand and supply dynamics and ratio. There is a strong demand for exporting Uzbek fruits, vegetables, and potatoes (including organic products) to neighboring countries (Russia, Kazakhstan, Afghanistan, and the Kyrgyz Republic make up 91 percent of Uzbek exports in this sector) and even to the United Kingdom, Austria, China, and India (Центр экономических исследований 2016). Export prices are much higher than domestic prices. This is why the government is stimulating exporting companies to increase volumes and diversify their range of products and geographical channels of export. At the same time, the export of fruits and vegetables amounts to only about 4 percent of total production (Центр экономических исследований 2016). The rest—almost 18.5 million metric tons—are sold inside the country, and a significant portion of this could be organic fruits and vegetables if there were demand and supply. There is reason to believe that the demand has definite room to grow:

the population's real incomes and purchasing power are continually increasing. Supply will grow when the potential producers are confident that demand is growing and their business is financially efficient.

Converting from conventional to organic style of production is a costly and risky process for producers and other stakeholders. In all countries with a developed organic sector, national governments promoted the process by a set of tools: appropriate pricing support, favorable taxation, procurement policy, provision of grants, and setting a preferential lending system (low interest rates, grace periods, etc.).

## Awareness of the Population

The Uzbek organic sector is supposed to be oriented mostly to export in the short term. Strategically, however, the domestic organic food market also has significant potential. This potential depends on several factors; one of the most important is the population's understanding of what organic food is and the advantages organic agriculture provides.

## Farmers' Cooperation

According to official data of Uzbek statistics (Goskomstat) the dehkan (small-size) farms generate more than 80 percent of total crop production (Новиков 2017). If even a small part of these farms decide to convert from conventional to organic production, they would be able to fill a niche in the domestic and world organic fruit, vegetable, and potato market. However, these farms produce a small amount of products each and operate separately from each other. At the same time importers/exporters and retailers need rather large allotments.

## Infrastructure

There is a lack of modern innovative storage and processing facilities in Uzbekistan. Organic food makes specific demands on those facilities. For instance, organic food should be stored separately from other products and processed by separate equipment; packaging should meet the specific requirements of organic standards, and so on (Nurbekov et al. 2018).

## Research, Education, and Extension

Organic agriculture is an innovative sector of the economy. It applies modern, high-tech methods, and tools and uses multipurpose ideology. The sector is constantly developing and modernizing. Progress in its development depends on the quantity and quality of fundamental and applied research conducted and on the qualifications of the staff employed by the sector.

- ✓ Agricultural producers
- ✓ Public organizations
- ✓ Research institutions and universities

## Stakeholders

It is logically correct to consider the development of organic agriculture as an investment project: it needs financial, material, and intellectual investments and has all the attributes of a project. In particular it is targeted to achieve definite results; it is limited in resources and time (it cannot be infinite in time); it consists of coordinated and coherent activities; project inputs are supposed to result in project outputs but with certain time lag, and so on.

According to world practice, the most implemented investment projects unite several participants/stakeholders with their incentives. Each stakeholder has its own interest. These interests may not match and sometimes may even be contradictory and conflicting. In this case, stakeholders should look for appropriate measures to resolve the conflicts and align their interests. A project will be successful only if all participants (partners and stakeholders) are sure that the project addresses their interests.

Introducing organic methods and technologies makes many changes in different systems such as agricultural production, food processing, input supply, food retail, environment, and education and research. Therefore a number of benefiting and losing parties that have direct and indirect interests are involved in this process.

The following stakeholders should benefit from the development of organic agriculture in Uzbekistan:

- ✓ Society as a whole
- ✓ The state, represented by various institutions
- ✓ Agricultural companies

## Society

The main incentives of the society as a whole come from the goals and principles of organic agriculture. The transition to organic principles ensures healthy nutrition and an improvement in the quality of life of the population. Food production is carried out using resource-saving technologies in environmentally friendly conditions that prevent the depletion of soil fertility and pollution of the environment. Organic farming contributes to saving natural resources for future generations. All this gives organic agriculture a high value for society.

## State Institutions

The state institutions with legislative and executive power represent and implement the interests of the population and society. Legislative institutions (national and regional parliaments) develop and adopt related laws directed to organic agriculture development. Executive bodies (national and local governments, ministries, departments, etc.) provide financial, institutional, and other tools; develop economic and organizational mechanisms; and implement state organic agriculture development programs.

## Agricultural Companies

The organic food sector applies specific technologies, materials, and other inputs that are different from inputs used in conventional production. Therefore industries and companies that produce biological plant protection products, veterinary drugs, organic fertilizers, organic seeds, and packaging materials put their products on the market; they are interested in organic market growth and development.

Food processing companies occupy a big niche in the value chain. They create higher value added, and the larger the market, the higher incomes they earn. This incentive makes them interested in organic sector development.



That is also true of trading companies, retail chains, and specialized stores selling organic products. The bigger the demand for organic food in the market, the bigger the retailers' turnover.

## Agricultural Producers

Agricultural producers of all organizational and legal forms, either already producing or getting ready to switch to organic products, should be the most interested stakeholders. They are motivated by possible financial benefits (including government support) and by their awareness that their activities do not damage nature, save resources for the future generations, provide people with healthy food, make a positive contribution to society.

## Public Organizations

There are several public organizations in Uzbekistan whose activities are aimed at protecting the environment and public health. They consider organic agriculture to be one of the key instruments for solving many ecological and healthcare problems.

## Research Institutions and Universities

Organic agriculture is an innovative sector of economy. It requires continual research and highly qualified specialists in different scientific fields (plant and animal breeding, biotechnologies, ecology, etc.). In this regard, it defines a crucial role of research institutions and universities.

Because a domestic organic food market does not exist in Uzbekistan, the stakeholders' incentives are currently limited. In the short term, the export of organic products has real potential. Under these conditions, only producers, exporters, and state institutions are currently more motivated (at least financially) in the development of organic agriculture.

Besides those stakeholders who benefit from the development of organic production, some of stakeholders lose. For instance, the companies that produce and supply chemical pesticides, mineral fertilizers, and GM crop seeds forbidden by organic rules may lose some profit. However, they can avoid their losses by diversification of their businesses

toward producing biological pesticides, fertilizers, and so on.

## Policy Options

Producing organic food for export purposes in Uzbekistan has obvious advantages and would certainly bring financial benefits to the country. Uzbek agriculture not only supplies the population with a sufficient amount of fruits, vegetables, potatoes, and other products but also produces surplus for export. Export brings higher incomes both to the farmers (sometimes three to four times higher than domestic sales) and to the whole country via state institutions regulating export quotas, tariffs, and taxes. According to the world market experience and Uzbek export practice, the prices for organic products may substantially differ from the prices for conventional products. The price of organic products exported from Uzbekistan varies widely; it generally ranges from 20 to 30 percent above the price for conventional products, but can sometimes reach 100 percent (Nurbekov et al. 2018).

Therefore creating conditions for the development of organic production and stimulating export by the state would increase incomes of the farmers, traders, and some other stakeholders as well as in-flows into the national budget.

Moreover, the state may also create conditions for developing the domestic organic market—a motivation system for potential producers, traders, input suppliers, and other stakeholders to diversify their businesses with organic activities. The government and other authorities could use a number of tools available in financial, economic, ecological, institutional, and social policies. These tools (preferential tariffs, reduced taxes, subsidies, environmental payments, free consulting services, etc.) could stimulate the farmers and other stakeholders to transform their businesses toward organic production.

## Non-Economic Measures Stimulating the Development of Organic Agriculture

**Creating/establishing a system of legislative support:** There are currently no laws or national

standards regulating the production, storage, transportation, certification, or labeling of organic products in Uzbekistan. In the last two years a draft version of the law developed with Food and Agriculture Organization of the United Nations (FAO) support has been circulating with the authorities but has not yet been approved.

The national legislation, which is under development now, should be synchronized with international regulations—otherwise local producers, exporters, and importers will face serious difficulties with the certification, inspection, acknowledgment, and trading of the produced organic food. For example, according to existing European Union (EU) regulations, if a local producer decides to export his or her product to the EU, he or she has to apply for inspection by one of the European certification bodies that are accredited in the EU (UNCTAD 2003). This procedure can be simplified if the national certification system is harmonized with the European one. The process of harmonization is rather complicated because the rules vary in different countries and regions. Therefore, to export not only to EU but also to Asia, national regulations should meet both European and Asian requirements.

**Creating awareness of the population:** Several activities in the government arsenal are intended to achieve a better understanding of organic agriculture by people: popularization by mass media, advertisement, and education. Study programs with special courses or modules explaining the substance of the issue can be provided at all levels of education—from primary school to higher education and lifelong learning programs.

**Promoting farmers' cooperation:** Because individual farms produce a small amount of products and operate separately but importers/exporters and retailers need rather big allotments, the dehkan farms have to combine their resources, products, and efforts to meet market requirements. Cooperation among the farmers can solve this problem. Therefore the state could use its policy instruments to encourage and support cooperation of farms in the areas of joint storage, sales of products, and food processing as well as input supply and sharing joint assets.

**Developing infrastructure:** Modernizing storage and processing facilities needs a great deal of investment into infrastructure. This is the subject of the related state policy: which infrastructure projects

can be financed from the national budget and which by private investors, and what kind of government support is needed.

**Facilitating research, education, and extension:**

To develop an innovative organic sector, existing research institutions and universities should be oriented toward specific areas related to organic agriculture. Special courses, training seminars, and full BSc, MSc, and PhD study programs could be offered to different target groups of agronomists, animal science specialists, ecologists, and economists as well as extension agents and local and national authorities responsible for promoting organic agriculture.

Significant decisions that change a farm's business model need to be supervised by highly qualified and skilled experts. Conversion from conventional to organic farming requires a lot of changes—not only in technologies and methods of farming but also in the farmers' minds. That is why it is necessary to use agricultural extension service support. Unfortunately, the Uzbekistan national policy framework in the field of agricultural extension systems is in the very beginning stages of development. There is a clear need for formal extension systems to be revitalized, and the key role in achieving this should be played by the state as mediator, supporter, and facilitator (Kazbekov and Qureshi 2011).

## Economic Measures Stimulating the Development of Organic Agriculture

The Uzbek government—which has declared organic agriculture to be one of the priorities of its national economic development (Nurbekov et al. 2018)—should be aware that this would require significant measures of economic support.

A farmer will never decide to convert his farm to organic principles if he is not convinced that it is financially beneficial. In order to verify that the conversion from conventional to organic production can be financially beneficial to a farmer, the state should support this conversion to make it attractive. A detailed cost-benefit analysis and feasibility study of the conversion projects at the micro-level should be conducted. In the case of an infeasible or financially inefficient project, the results of these calculations would provide the opportunity to define the amount of government support needed to make it feasible and efficient. So far, the domestic organic

market does not exist in Uzbekistan, the export of organic products is limited, and the number of the organic producers is scanty. Such an analysis at the first stage is needed for each case of transformation, and decisions to support producers should be made individually.

## Example of a Farm that Transitions to Organic Agriculture

A farmer, Ulugbek Toirov, produces potatoes on an irrigated area of 1 hectare in the Tashkent region. He has discovered that there is an opportunity to produce organic potatoes and sell them at a 40 to 50 percent higher price.

According to the research (Seufert, Ramankutty, and Foley 2012), organic yields are typically lower than conventional yields, ranging from 13 percent lower yields (when best organic practices are used) to 34 percent lower yields (when the conventional and organic systems are most comparable). Lacking more precise information, he assumed that the yield per hectare of organic potatoes (20 metric tons/hectare) at his farm would be 20 percent (between 13 percent and 34 percent) lower than the yield of conventional potatoes (25 metric tons/hectare). A review by De Ponti, Rijk, and van Ittersum (2012) confirms that organic arable yields average 80 percent of conventional production.

According to the organic regulations for the conversion from conventional to organic practices, he has to stop applying mineral fertilizers and any chemical pesticides. He is also obliged to use certified organic seeds and biological means of plant protection. Moreover, he has to adapt his farm to the new organic technologies and pass an official certification procedure during the first three years (the conversion period). The conversion period assumes the fulfilment of all requirements and rules of organic agriculture. A certificate is awarded to the farm at the end of the conversion period. This means that the products produced before the final certification cannot be sold at organic prices. Only after the products are officially recognized can they be sold as organic products. The certification procedure is conducted annually (during the three years of the conversion period) and requires laboratory analysis of soil, products, and so on. The farmer has to pay the fees for the certification and laboratory services. Furthermore, the farmer has to cover the

annual costs of monitoring and control conducted by a certification agency.

To decide to convert from conventional to organic production, Ulugbek Toirov calculated existing (Table 2) and estimated operational costs for the conversion period (Table 3) and full organic period (Table 4). In these tables, total costs of each resource per hectare are divided into two parts: fixed costs (independent from the yield per hectare) and variable costs (costs that depend on the yield). It is necessary to have opportunities to make variant calculations. For example, costs for seeds are defined by the expression:

$$\begin{aligned} &\text{Rate of planting tubers (3.5 metric tons/hectare)} \times \\ &\quad \times \text{Planted area (1 hectare)} \times \\ &\quad \times \text{Price of seeds (4 million som/metric ton)} = \\ &\quad = 14.00 \text{ million som.} \end{aligned}$$

$$\begin{aligned} &\text{Harvesting costs} = \\ &= \text{Harvesting costs per metric ton (0.12 million som)} \times \\ &\quad \times \text{Yield (25 metric tons)} = 3.00 \text{ million som.} \end{aligned}$$

The technology of organic potato production differs from conventional technology. In this particular case, organic technology prohibits the application of chemical fertilizers and pesticides and requires the use of certified potato seeds. Changes in technology incur changes in costs. Moreover, costs of sales for organic potatoes are higher because promoting a new good on the market requires more money.

Ulugbek Toirov is one of the farmer/innovators in Tashkent region. He was the first to introduce a new technology of potato production adjusted to local conditions. He refused normal tillage, cultivation, cutting of furrows, and manual hoeing. The seeds are put right on the surface of soil and covered by straw that protects them from high temperatures and does not allow weeds to grow. Moreover, it reduces the harvesting costs because potato tubers lie on the surface and they just need to be collected (Figure 6).

There are no differences between production costs in Tables 3 and 4 because the technology is the same in these two cases. However, the costs of sales differ because during the conversion period potatoes are sold at the conventional price, but after certification the potatoes can be sold as organic product at organic prices; this requires more expenditure to find new retailers. These costs are divided into both fixed

**Table 2: Operational Costs for Potato Production under Conventional Technology “Without Project”**

Inputs / Items	Costs		Price, million som per unit	Costs, million som		
	Fixed per hectare	Variable per metric ton		Fixed	Variable	Total
Seeds, metric tons	3.50		4.00	14.00	0.00	14.00
Organic fertilizers (manure), metric tons	30.00		0.0667	2.00	0.00	2.00
Chemical fertilizers, metric tons:						
N		0.04	2.60	0.00	2.60	2.60
P2O5		0.02	5.00	0.00	2.50	2.50
K2O		0.02	1.20	0.00	0.60	0.60
Pesticides (chemical), million som	1.00	0.00	X	1.00	0.00	1.00
Straw, million som	1.00	0.00	X	1.00	0.00	1.00
Planting, million som	0.80	0.00	X	0.80	0.00	0.80
Zero tillage, million som	0.50	0.00	X	0.50	0.00	0.50
Harvesting, million som	0.00	0.12	X	0.00	3.00	3.00
Irrigation (manual), million som	0.00	0.12	X	0.00	3.00	3.00
<b>Total production costs</b>						<b>31.00</b>
Costs of sales, million som	0.00	0.0231	X	0.00	0.58	0.58
<b>Total costs</b>						<b>31.58</b>

**Table 3: Operational Costs for Potato Production under Organic Technology for the Conversion Period: “With Project” (Years 1–3)**

Inputs / Items	Costs		Price, million som per unit	Costs, million som		
	Fixed per hectare	Variable per metric ton		Fixed	Variable	Total
Seeds, metric tons	3.50		6.00	21.00	0.00	21.00
Organic fertilizers (manure), metric tons	30.00		0.0667	2.00	0.00	2.00
Straw, million som	1.00	0.00	X	1.00	0.00	1.00
Biological plant protection agents, million som	2.00	0.00	X	2.00	0.00	2.00
Zero tillage, million som	0.50	0.00	X	0.50	0.00	0.50
Planting, million som	0.80	0.00	X	0.80	0.00	0.80
Harvesting, million som	0.00	0.06		0.00	1.20	1.20
Irrigation (manual), million som	0.00	0.12		0.00	2.40	2.40
Annual monitoring costs, million som	11.685	0.00	X	11.69	0.00	11.69
<b>Total production costs</b>						<b>42.59</b>
Costs of sales, million som	0.00	0.0231	X	0.00	0.46	0.46
<b>Total costs</b>						<b>43.05</b>

and variable costs because some money is spent to find new channels of selling, advertising, and so on—and this expense does not depend on how much is sold. Another expense is the costs of presale preparation of the product, transportation to retailers, and other costs that depend on the quantity to be sold. The expression is:

$$\begin{aligned} & \text{Fixed costs per hectare (0.30 million som)} \times \\ & \quad \times \text{Planted area (1 hectare)} + \\ & + \text{Costs of selling per 1 metric ton (0.035 million som)} \times \\ & \quad \times \text{Yield (20 metric tons)} = 1.00 \text{ million som.} \end{aligned}$$

The data of Table 5 show the main indicators for the situations “Without Project” (if the farmer rejects the



**Table 4: Operational Costs for Potato Production under Organic Technology: “With Project” (Year 4 and Ongoing)**

Inputs / Items	Costs		Price, million som per unit	Costs, million som		
	Fixed per hectare	Variable per metric ton		Fixed	Variable	Total
Seeds, metric tons	3.50		6.00	21.00	0.00	21.00
Organic fertilizers (manure), metric tons	30.00		0.0667	2.00	0.00	2.00
Straw, million som	1.00	0.00	X	1.00	0.00	1.00
Biological plant protection agents	2.00	0.00	X	2.00	0.00	2.00
Zero tillage, million som	0.50	0.00	X	0.50	0.00	0.50
Planting, million som	0.80	0.00	X	0.80	0.00	0.80
Harvesting, million som	0.00	0.06	X	0.00	1.20	1.20
Irrigation (manual), million som	0.00	0.12	X	0.00	2.40	2.40
Annual monitoring costs, million som	11.69	0.00	X	11.69	0.00	11.69
<b>Total production costs</b>						<b>42.59</b>
Costs of sales, million som	0.30	0.035	X	0.30	0.70	1.00
<b>Total costs</b>						<b>43.59</b>

**Figure 6: The Whole Process of Organic Potato Growing—from Planting to Harvesting**



Photo credits: Ulugbek Toirov.

**Table 5: Main Indicators**

Indicator	“Without Project”	Conversion Period (Years 1–3)	“With Project” (Year 4 and ongoing)
Prices, million som/metric ton	25.00	25.00	36.25
Production for sale, metric tons	25.00	20.00	20.00
Revenue, million som	625.00	500.00	725.00
Operational costs, million som	31.58	43.05	43.59

project of transformation from conventional to organic production) and “With Project” (if he converts his farm to the organic type). The indicators for the conversion period are presented separately because there are some differences in revenues and costs because of the reduced yields and fixed prices in comparison with “Without Project.”

The investment costs in this case are limited by the costs of certification and laboratory services (Table 6). In other cases, there can be other requirements of the projects and other additional investment costs (purchasing machinery and equipment, land reclamation, irrigation, etc.).

**Table 6: Certification Costs per Year of Conversion Period**

Certification Requirement	Som, millions
Laboratory services	1.000
Initial certification costs	7.783
Total certification costs	8.783

Project efficiency analysis conducted in accordance with the World Bank or UNIDO international Project Analysis methodology adapted to agricultural specifics by (Gittinger 1982) provides economic and financial evaluation of investment projects. This evaluation uses benefit-cost analysis, and it is based on the comparable analysis of the situations “With” and “Without” project, taking opportunity cost of capital into account. Table 7 provides calculations of cash flows for both situations for the period of 10 years (equal to the period of operation of the existing irrigation system—the most expensive asset used in the project) under the following parameters:

- ✓ Discount rate = 10,00 percent (equal to opportunity cost of capital)

- ✓ Price conversion rate = 1.45 (shows that the price of organic potatoes is 45 percent higher—in between the range of 40–50 percent mentioned above—than the price of conventional potatoes)

- ✓ Yield conversion rate = 0.8 (shows that the yield of organic potatoes per hectare is 20 percent less than the yield of conventional potatoes)

The net present value (–39.37 million som) of the project is negative and the internal rate of return (7 percent) is lower than the opportunity cost of capital (rate = 10 percent). This means that the project is financially inefficient in spite of the fact that the net benefits “With” the project after the conversion period (681.42 million som) is significantly higher than the net benefits “Without” the project (593.42 million som). If the government is interested in developing organic farming, it should use some supportive tools to motivate the farmer to make positive decision and start transformation. Let us suppose that the Uzbek government decides to subsidize certification costs and the costs of purchasing organic potato seeds during the whole conversion period (Table 8).

After recalculation we can see that NPV becomes positive (+34.7 million som) and IRR (13 percent) is higher than the opportunity cost of capital. Therefore government support works out and the project turns into a financially efficient project.

All parameters used in the calculations are estimated before the feasibility study is conducted and have the most probable meanings. Calculations with these parameters provide the basic version of project evaluation. Nevertheless, the actual development of events is never exactly the same as initially planned. That is why it is necessary to test systematically what happens to the earning capacity of a project if events differ from the estimates made about them in planning. In other words, we need to conduct a sensitivity analysis that is a means of



**Table 7: Financial Analysis: Conversion without Subsidies**  
*Som, millions*

Years	1	2	3	4	5	6	7	8	9	10
<b>"Without Project"</b>										
Costs										
Production costs	31.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00
Costs of sales	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Total operational costs	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58
Benefits:										
Revenue	625.00	625.00	625.00	625.00	625.00	625.00	625.00	625.00	625.00	625.00
<b>Net benefits</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>
<b>"With Project"</b>										
Costs:										
Investment costs:										
Certification and laboratory services	8.78	8.78	8.78							
Total Investment costs	8.78	8.78	8.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Operational costs:										
Production costs	42.59	42.59	42.59	42.59	42.59	42.59	42.59	42.59	42.59	42.59
Costs of sales	0.46	0.46	0.46	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total operational costs	43.05	43.05	43.05	43.59	43.59	43.59	43.59	43.59	43.59	43.59
Total costs	51.83	51.83	51.83	43.59	43.59	43.59	43.59	43.59	43.59	43.59
Benefits:										
Revenue	500.00	500.00	500.00	725.00	725.00	725.00	725.00	725.00	725.00	725.00
Total benefits	500.00	500.00	500.00	725.00	725.00	725.00	725.00	725.00	725.00	725.00
<b>Net benefits</b>	<b>448.17</b>	<b>448.17</b>	<b>448.17</b>	<b>681.42</b>	<b>681.42</b>	<b>681.42</b>	<b>681.42</b>	<b>681.42</b>	<b>681.42</b>	<b>681.42</b>
Incremental Net benefits	-145.3	-145.3	-145.3	87.99	87.99	87.99	87.99	87.99	87.99	87.99
Cumulative Incremental Net benefits	-145.3	-290.5	-435.8	-347.8	-259.8	-171.8	-83.78	4.21	92.20	180.20
Compound factor	110%	121%	133%	146%	161%	177%	195%	214%	236%	259%
Discounted Incremental Net benefits	-132.05	-120.0	-109.1	60.10	54.64	49.67	45.15	41.05	37.32	33.93
Discounted Cumulative Incremental Net benefits	-132.05	-252.1	-361.2	-301.1	-246.5	-196.8	-151.7	-110.6	-73.29	-39.37

Note: Net present value (NPV) = -39.37 million som; the internal rate of return (IRR) = 7 percent.

dealing with uncertainty about future events and values. A sensitivity analysis is done by varying one element or a combination (in the Scenario Analysis case) of elements and determining the effect of that change on the measure of the project's worth (Gittinger 1982). For example, in the basic version presented above, the price of organic potato seeds is 6 million som per metric ton. Each percent of increase of this parameter will decrease the NPV by 2.21 percent (elasticity coefficient); if the price of organic potato seeds increases by 45.2 percent (8.71 million som per metric ton – switching value), then the NPV with subsidies will be equal to zero.

This feasibility study has been performed for a particular farm producing potatoes to illustrate methods of calculation and substantiate quantitative measures of support. This approach can be executed for any other farm with a different specialization and in other natural and economic conditions. The government could introduce a national program with institutional and financial support on the basis of individual micro-level calculations for each individual farm that is willing to convert to principles of organic production. This mechanism would provide measures addressed to each farmer and save the national budget from unreasonable expenditures.

**Table 8: Financial Analysis: Conversion with Subsidies***Som, millions*

Year	1	2	3	4	5	6	7	8	9	10
<b>"Without Project"</b>										
Costs:										
Production costs	31.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00
Costs of sales	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Total operational costs	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58
Benefits:										
Revenue	625.00	625.00	625.00	625.00	625.00	625.00	625.00	625.00	625.00	625.00
<b>Net benefits</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>	<b>593.42</b>
<b>"With Project"</b>										
Investment costs:										
Certification and laboratory services	8.78	8.78	8.78							
Total Investment costs	8.78	8.78	8.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Operational costs:										
Production costs	42.59	42.59	42.59	42.59	42.59	42.59	42.59	42.59	42.59	42.59
Costs of sales	0.46	0.46	0.46	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total operational costs	43.05	43.05	43.05	43.59	43.59	43.59	43.59	43.59	43.59	43.59
Total costs	51.83	51.83	51.83	43.59	43.59	43.59	43.59	43.59	43.59	43.59
Benefits:										
Revenue	500.00	500.00	500.00	725.00	725.00	725.00	725.00	725.00	725.00	725.00
Subsidies covering certification costs	8.78	8.78	8.78							
Subsidies covering seed purchasing	21.00	21.00	21.00							
Total Subsidies	29.78	29.78	29.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total benefits	529.78	529.78	529.78	725.00	725.00	725.00	725.00	725.00	725.00	725.00
<b>Net benefits</b>	<b>477.95</b>	<b>477.95</b>	<b>477.95</b>	<b>681.42</b>	<b>681.42</b>	<b>681.42</b>	<b>681.42</b>	<b>681.42</b>	<b>681.42</b>	<b>681.42</b>
Incremental Net benefits	-115.5	-115.5	-115.5	87.99	87.99	87.99	87.99	87.99	87.99	87.99
Cumulative Incremental Net benefits	-115.5	-230.94	-346.41	-258.42	-170.42	-82.43	5.57	93.56	181.55	269.55
Compound factor	110%	121%	133%	146%	161%	177%	195%	214%	236%	259%
Discounted Incremental Net benefits	-105	-95.43	-86.75	60.10	54.64	49.67	45.15	41.05	37.32	33.93
Discounted Cumulative Incremental Net benefits	-105	-200.40	-287.16	-227.05	-172.42	-122.75	-77.59	-36.54	0.77	34.70

Note: Net present value (NPV) = 34.7 million som; the internal rate of return (IRR) = 13 percent.

## Assignment

1. Taking into account the Uzbek government's commitment to develop the organic food sector, list and substantiate possible policy measures of high priority for promoting this development.
2. Using the data and the calculation results for the pilot farm of Ulugbek Toirov presented above, perform the following tasks:
  - a. Build up your own calculation tables for the financial analysis of the potato project using a spreadsheet (Excel) and the Project Analysis methodology presented in Gittinger (1982).
  - b. Conduct a sensitivity analysis and define parameters/factors having the most and the least influence on the project's efficiency.
  - c. Find the switching values (values at which NPV becomes zero) of selected factors.

- d. Find other options (besides subsidies covering certification costs and costs of purchasing potato seeds during the conversion period) for measures of government support that would make the project financially efficient.
- e. Determine the sufficient level of state subsidies per hectare for the case when the price for organic potatoes is higher than the price for conventional potatoes only by 30 percent, 20 percent, and 10 percent.

## Policy Recommendations

Even though non-economic measures are critical to developing both a domestic organic sector and an export-oriented one, offering economic support is a critical measure that is needed to encourage farmers to convert from traditional to organic agriculture. If the government in Uzbekistan prioritizes the development of organic agriculture in the country, it should consider allocating budget resources to provide support to organic producers during the conversion period.

## References

- Codex Alimentarius: International Food Standards. <http://www.fao.org/fao-who-codexalimentarius>
- De Ponti, T., B. Rijk, B., and M. K. van Ittersum. 2012. "The Crop Yield Gap between Organic and Conventional Agriculture." *Agricultural Systems* 108: 1–9.
- Gittinger, J. P. 1982. *Economic Analysis of Agricultural Projects*, second edition. Baltimore and London: The Johns Hopkins University Press.
- Goszczyński, W. and W. Knieć. 2011. "Strengthening Alternative Agro-Food Networks in the Eastern European Countryside." *Eastern European Countryside* 17 (1): 5–20. <https://content.sciendo.com/view/journals/eec/17/1/article-p5.xml>
- IFOAM Organics International. No date. Principles of Organic Agriculture. <https://www.ifoam.bio/en/organic-landmarks/principles-organic-agriculture>
- Kazbekov, J. and A. S. Qureshi. 2011. "Agricultural Extension in Central Asia: Existing Strategies and Future Needs." IWMI (International Water Management Institute) Working Paper No. 145. [http://www.cawater-info.net/bk/iwrm/pdf/iwmi\\_2012\\_e.pdf](http://www.cawater-info.net/bk/iwrm/pdf/iwmi_2012_e.pdf)
- McElDowney, J. 2018. "Organic Farming Legislation Revision of EU Regulation on Organic Production and Labelling of Organic Products." Briefing: EU Legislation in Progress. [http://www.europarl.europa.eu/RegData/etudes/BRIE/2018/614743/EPRS\\_BRI\(2018\)614743\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2018/614743/EPRS_BRI(2018)614743_EN.pdf)
- Nurbekov, A., U. Aksoy, H. Muminjanov, and A. Shukurov. 2018. *Organic Agriculture in Uzbekistan: Status, Practices and Prospects*. Tashkent: FAO. <http://www.fao.org/3/i8398en/i8398EN.pdf>
- Rundgren, G. 2006. *Organic Agriculture and Food Security*. Germany: International Federation of Organic Agriculture Movements (IFOAM).
- Seufert, V., N. Ramankutty, and J. A. Foley. 2012. "Comparing the Yields of Organic and Conventional Agriculture." *Nature* 485: 229–32. <https://www.nature.com/articles/nature11069>
- Shade, J. 2014. "The Nutritional Benefits of Organic Fruits and Vegetables." *Whole Foods Blog*, September 11, 2014. <https://www.wholefoodsmarket.com/blog/nutritional-benefits-organic-fruits-and-vegetables>
- UNECE Trade Programme. No date. Working Party on Agricultural Quality Standards (WP.7). <https://www.unece.org/trade/agr/standard>
- UNCTAD (United Nations Conference on Trade & Development). 2003. *Organic Fruit and Vegetables from the Tropics: Market, Certification and Production Information for Producers and International Trading Companies*. New York and Geneva: United Nations. [http://unctad.org/en/Docs/ditcom20032\\_en.pdf](http://unctad.org/en/Docs/ditcom20032_en.pdf)
- Vasquez, S. J., J. Hashim-Buckey, M. W. Fidelibus, L. P. Christensen, W. L. Peacock, K. M. Klonsky, and R. L. De Moura. 2008. "Sample Costs to Produce Grapes for Organic Raisins." University of California Cooperative Extension. [https://coststudyfiles.ucdavis.edu/uploads/cs\\_public/4c/a0/4ca06eb4-7a30-4693-a715-2de2556f5b89/graperaisinorgvs08.pdf](https://coststudyfiles.ucdavis.edu/uploads/cs_public/4c/a0/4ca06eb4-7a30-4693-a715-2de2556f5b89/graperaisinorgvs08.pdf)
- Государственный комитет по статистике Республики Узбекистан, 2017. Анализ развития

уровня жизни и благосостояния населения в Республике Узбекистан. – <https://stat.uz/ru/ofitsialnaya-statistika?catid=0&id=2061>

Министерство внешней торговли, 2018. География экспорта Республики Узбекистан по итогам первого полугодия. – <https://nuz.uz/ekonomika-i-finansy/34530-top-10-stran-s-naibolshim-obemom-tovarooborota-s-uzbekistanom-za-yanvar-iyun-2018-goda-infografika.html>

МНИАП, 2017 – <http://мниап.пф/project-export/>

Новиков В., 2017. В Узбекистане более 80% сельхозпродукции производится на личных подворьях. Новости Узбекистана. – <https://nuz.uz/ekonomika-i-finansy/34398-v-uzbekistane-bolee-80-selhozprodukcii-proizvoditsya-na-lichnyh-podvoryah.html>

Центр экономических исследований, 2016 ([www.cer.uz](http://www.cer.uz)), ПРООН, 2016 ([www.uz.undp.org](http://www.uz.undp.org)).

Аналитический доклад – 2016/09. Повышение производственного и экспортного потенциала плодовоощной отрасли Узбекистана: проблемы и перспективы.

## Additional Readings

Gittinger, J. P. 1982. Economic Analysis of Agricultural Projects, second edition. Baltimore and London: The Johns Hopkins University Press.

Nurbekov, A., U. Aksoy, H. Muminjanov, and A. Shukurov. 2018. Organic Agriculture in Uzbekistan: Status, Practices and Prospects. Tashkent: FAO. <http://www.fao.org/3/i8398en/i8398EN.pdf>

Органическое сельское хозяйство: экономические аспекты трансформации: монография / В. М. Кошелев, А. В. Пешкова. – М.: Издательство РГАУ-МСХА, 2013. – 140 с.

## Abbreviations

<b>EU</b>	European Union
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>FiBL</b>	Research Institute of Organic Agriculture
<b>GMO</b>	genetically modified organism
<b>IFOAM</b>	International Federation of Organic Agriculture Movements

## Appendix

### Suggested Teaching Methodology Based on the Cornell Case Study Approach

The case studies presented in this publication were developed for use in graduate and undergraduate teaching using a participatory social entrepreneurship teaching methodology developed by Professor Per Pinstруп-Andersen, Cornell University. Initially used for teaching at Cornell University, this type of case studies were subsequently adopted by other universities in the United States, Africa and Asia. The overall objective of the methodology is to strengthen the analytical capacity of the students within the context of a simulated food policy context. Evaluations by students during the 14 years the methodology has been used have been consistently positive and enthusiastic. To be successful, the methodology requires preparations by both students and instructors prior to each class. The case(s) to be discussed should be made available to the students at least a week prior to the class and it is critically important that all students have read the case study prior to coming to class and be prepared to discuss the pros and cons of various policy options from the point of view of each stakeholder group identified in the case study.

The class should be run as a simulated role-playing meeting of stakeholder group representatives interested in the particular food policy issue to be discussed. One or two students, who should simulate the role as external consultant(s), should give a 10 to 15 minute overview presentation of the case, with emphasis on the policy options identified in the case study and a policy recommendation. Each of the remaining students should be assigned the role of a stakeholder group representative. The assignment may be made a week ahead of the class session or at the beginning of the class session. Then a debate moderated by the instructor follows, in which each stakeholder representative expresses his/her position about the various policy options and the consultants' recommendation.

The moderator should guide the debate by following up on the points made and seek the response of other stakeholder groups. The moderator should call on specific representatives as needed to maintain an exciting, cohesive, and fast-moving debate. Attempts should be made to arrive at a consensus around the consultants' recommendation or one or more policy options. In cases when no consensus can be obtained (likely to be the majority of cases), a brief discussion should be held on the relative power of each stakeholder group and which one is likely to make the final decision about the policy option to be pursued. The length of the debate section of the class depends on the length of the class session. In a 50 minute class session, the debate portion should be limited to 25 minutes, leaving the last 10 to 15 minutes of each class session for the instructor to pull the findings of the debate together and relate them to the broader food policy issue within which the case study belongs. Such a "mini-lecture"—in which the students' experience from the debate and the written version of the case study is placed in a broader food policy context—is critically important.

In order to ensure that all students participate actively, it is recommended that the class size be limited to 20–25 students. Although the methodology was developed for real-time classroom instruction, it could also be used in online distance learning, particularly if real-time video-based interaction among the students could be included. While the above-mentioned mini-lectures would help ensure a cohesive

food policy course, experience at Cornell University indicates that the integration of a few lectures based on a textbook would further strengthen the cohesiveness of the course. The textbook used at Cornell is *Food Policy for Developing Countries* by Per Pinstrup-Andersen and Derrill Watson, Cornell University Press, 2012.





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