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The potential for expanding wheat production in Kazakhstan

Analysis from a food security perspective

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THE POTENTIAL FOR EXPANDING WHEAT PRODUCTION AND EXPORTS IN KAZAKHSTAN

An analysis from a food security perspective

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FOREWORD / EXECUTIVE SUMMARY

Foreword

Wheat (*Triticum* spp.) is one of the most important staple foods of humankind. About 37 per cent of the world's population relies on it as their main cereal; it accounts for some 20 per cent of all food calories consumed by humans, and annual world wheat production has risen to over 600 million tonnes, more than one third of total global cereal output.

Central Asia is a major player in international wheat production. During the period 2006-2011, the Russian Federation (hereinafter: Russia)-Ukraine-Kazakhstan (RUK) region contributed 14 per cent of total world grain exports (including rice) and 21 per cent of world exports of wheat. By 2021, RUK wheat exports are projected to exceed those of the United States by 87 per cent, indicating that the region has great potential to contribute to strengthening world food security. Although Kazakhstan is the smallest wheat producer in the RUK region; globally it ranks twelfth in wheat production and sixth in wheat exports, with a forecast production in 2017-2018 of 13.5 million tonnes. Flour exports in 2017-2018 are projected at 3,200,000 tonnes, making Kazakhstan the second-largest flour exporting country (after Turkey), and accounting for 19 per cent of global flour export market share. Beyond the Commonwealth of Independent States (CIS), Afghanistan and Iran are the leading destinations for Kazakh wheat.

This report assesses the contribution of Kazakhstan to domestic, regional and global food security in the short and medium terms. It considers the potential of Kazakh farms to increase sustainably their output and exports. It does so by reviewing the critical elements essential for, and limitations to, increased sustainable growth and competitiveness of the Kazakh wheat sector. It analyses the contribution of the transition process to the development of the farming sector, including rural households and agro-industries. Emphasis is placed on the farm level, especially the role of the farm structure in the country and the policy context (including regulations on land markets and support policies). Consideration is also given to the associated risks of production and accessibility, particularly, but not only, to environmental constraints and climate change, governance and structural constraints, knowledge and technology transfer, logistics and infrastructure, competition and international market standards to fulfil both domestic and regional demand, as well as international/global markets.

Executive summary

The Republic of Kazakhstan (herinafter: Kazakhstan) is the world's ninth-largest country and the largest landlocked country. With 16.7 million inhabitants and a territory of 2,725 thousand km^2 (larger than Western Europe), it is one of the least densely populated. Oil and gas are by far the leading economic sectors, and the agricultural sector is economically relatively small, accounting for only 4.8 per cent of Kazakhstan's Gross Domestic Product (GDP) in 2016. Nevertheless, agriculture employs about 18 per cent of the workforce and agriculture covers about 70 per cent of the country's land area. Given this abundance of land and the fact that yields are low compared to regional levels, Kazakhstan is considered to have a large agricultural potential.

Located at the far eastern reach of the Eurasian wheat belt, globally Kazakhstan is ranked twelfth in terms of wheat production and sixth for wheat exports. Wheat is an important component of Kazakhstan's export trade and the country plays a key role in local, regional and international food security. However, although much of the agricultural area is sown to wheat, the yield per hectare is below regional and international levels. Thus, despite a range of uncertainties (including environmental and political issues) and an underdeveloped infrastructure, Kazakhstan's development as a reliable and sustainable source of global wheat supply is of strategic importance.

Structure of the farming sector

Kazakhstan has more than 846,000 km^2 of agricultural land, composed of 205,000 km^2 of arable land and 611,000 km^2 of pasture and hay land. Arable land thus constitutes less than 10 per cent of the country's total land area, but its availability per inhabitant (1.5 ha) is the second highest in the world. Livestock (dairy products, leather, meat and wool) and grain (wheat, barley, cotton and rice) are the most important agricultural commodities.

Following the dissolution of the Soviet Union, the farm sector was affected by the disruption of supply chains. According to World Bank data, the annual growth rate of agricultural value-added between 1990 and 2001 was -3.22 per cent. Although comparison of individual years is not advisable due to the yield volatility and generally poor climatic conditions of the 1990s, in 1996-2000 average output was 50 per cent lower than in 1987-1991. The long-term decline had bottomed out by the end of that decade and the average yield over the five-year period 2004-2008 was 8 per cent higher than that of the period 1986-1990, which was the peak of the so-called intensive technology movement in the Soviet Union. Although it has still not been fully reversed, it and the agrarian sector has since demonstrated clear economic growth, with an average annual 4.5 per cent increase in physical volume to 2011.

Under the 2003 *Land Code*, private ownership of agricultural land with full ownership rights was introduced, and the sale and purchase of land was legalised. Because of this, a market in agricultural land emerged and 864.5 thousand hectares of state agricultural land were sold between 2004 and 2010. As a result of land reform and restructuring of the ownership of the former collective farm sector, the share of individual farms in total agricultural land utilised increased from around 0.6 per cent in 1990-1992 to 52 per cent in 2009-2011. Nonetheless, the so-called agro-holding companies continue to play a major role in Kazakhstan agriculture: by the mid-2000s around fifteen very large grain holdings had emerged and agricultural enterprises produced 69 per cent of Kazakhstan's grain in 2011.

The structure of agricultural output in Kazakhstan has major regional variations. The so-called North Kazakh Grain Region (NKGR) of North Kazakhstan, Kostanay and Akmola, the three *oblasts* that specialise in grain growing, produces much of the country's farm output in terms of value. The average farm size differs considerably by region and in 2009 agricultural enterprises in the northern wheat region were on average bigger than the national average.

The policy context

The Government of Kazakhstan sees agriculture as a priority sector and is seeking to improve its competitiveness and increase the level of investments, but the lack of access to finance for agribusiness firms, especially for small- and medium-sized enterprises, is a substantial barrier. To improve access to finance, funding needs to be allocated more efficiently by creating an open, decentralised and competitive agro-finance market. There are *special tax regimes* for agricultural enterprises and individual farms. In addition, food processors benefit from a reduced rate of value added tax (VAT) on a relatively broad range of products. In 2004, the *Law on Mandatory Crop Insurance* introduced mandatory insurance for all crop producers. In terms of business climate, Kazakhstan has been improving substantially in recent years, but trade and investments barriers remain problematic.

Agricultural policy objectives in Kazakhstan during the first decade after independence from the Soviet Union concerned a fundamental transition to a market-based system which included land reform, farm restructuring and reform of agricultural finance and support systems. The *Agriculture and Food Programme for 2003-2005* (AFP) marked the start of active promotion of agricultural growth. The AFP's stated objectives were to (a) ensure food security; (b) establish an efficient agro-industrial system; (c) increase sales of farm products in domestic and foreign markets; and (d) optimise state support for agriculture. JSC KazAgro National Management Holding was formed in January 2007 as a joint stock company and was expected to play a leading role in the development of agriculture.

The current sectoral programme for agriculture, the *Programme for Development of Agro-Industrial Complex in the Republic of Kazakhstan* in 2013-2020 (*Agribusiness 2020*), was approved in February 2013. The programme's main policy objective is to create conditions to enhance agro-business competitiveness. It includes new credit support instruments, such as interest rate subsidies and credit guarantees, and additional emphasis has been placed on assisting local producers to face competition in view of integrating international trade.

Market price support is the dominant component of Kazakhstan's producer support estimate (PSE). The largest single policy measure is *per hectare payments*, contributing 10 per cent of Kazakhstan's total PSE in 2010-2012. Also, *per tonne payments* are applicable to the livestock sector. A range of *direct subsidies* for variable and fixed inputs constituted 13 per cent of the total PSE in 2010-2012 and, in addition to direct payments, *prices of diesel* for agricultural producers are regulated during the sowing and harvesting periods. The annual volume of *concessional credit* has steadily expanded since the mid-2000s.

Around 20 per cent of total support to agriculture is directed to general services and support to food processors. Expenditure on general services for agriculture (such as transport infrastructure, water and land management, plant and animal health and food safety systems, education, research, information and knowledge dissemination actions) in Kazakhstan has increased steadily since the beginning of the 2000s, albeit from a very low base in the 1990s.

Belarus, Kazakhstan and Russia agreed to form a *Customs Union* (CU) in 1995, and this was extended to include Kyrgyzstan in 1996 and Tajikistan 1999. Kazakhstan's trade policy instruments are now largely formed within the framework of the CU, which has led to the harmonisation of sanitary, phytosanitary and technical regulations on agro-food and to relaxed border controls. For Kazakhstan the alignment of tariffs among the CU members largely consisted of an increase in tariffs for agricultural products, although these have since been reduced during the World Trade Organization (WTO) accession negotiations. Kazakhstan finally became the 162nd WTO member on 30 November 2015.

Wheat production and processing

The main wheat production regions of Kazakhstan are located on the rich and productive chernozem and kashtan soils of the mainly-flat northern/north-central territories. During the period 2010-2012, the NKGR accounted for 85.7 per cent of the country's total wheat output (of which spring wheat comprised 90 per cent). The north of Kazakhstan, owing to its dry climate, produces good quality hard wheat. Some winter wheat is grown in the south of the country, but represents a minor share of Kazakhstan's total wheat production. Irrigated production predominates in the south of the country where cereals are produced on 14.5 per cent of the land. Nationwide, cereals now occupy almost 50 per cent of irrigated areas.

Between 1995 and 2012 the average area under wheat in Kazakhstan was 12,855,600 hectares (i.e. around 50 per cent of all arable land) and the average annual harvest was 12,070,565 tonnes. Average yields varied from 0.9 to 1.3 t/ha, and this fluctuation in the average yield per hectare has been the main cause of the considerable variation in total annual output of wheat: variations in the latter have been three times larger than the changes in the area under wheat.

Although weather remains the single most important determinant of grain yield in Kazakhstan, arguably the most important technological factor contributing to the apparent improvement in Kazakh grain yield is the increased use of certified planting seed, which by 2004 had increased to 94 per cent. Improvements in crop management practices supported by the increasing State subsidies have also contributed to the recent growth and relative stabilisation of wheat yields in Kazakhstan.

The milling industry plays a major role in the primary processing of wheat, while secondary processing is dominated by the bakery, confectionery and pastry segments. Since 2007, Kazakhstan has made much progress in the implementation of international quality standards in the grain and flour sector. However, the proportion of flour, groats and meal in processed grain and wheat products has increased, while the share of bakery and pasta products has declined.

Environmental resources and challenges

Kazakhstan has five main and about nine intermediate climate zones. Winter in the north of the country is long and cold. Most of Kazakhstan's plain is desert where the climate consists of long, hot summers, cold winters and high air aridity. All agricultural areas are characterised with low annual precipitation (150-320 mm). Global warming will have an impact in Kazakhstan: temperature is projected to rise by about 1°C, and annual precipitation is expected to decline. According to scenario and modelling results, the climate zone boundaries may shift northward, and wheat yields may be reduced by more than 25 per cent.

Soil erosion, salinisation and nutrient depletion also constrain crop productivity. Especially in areas with low rainfall, strong winds dry out the seedbed and erode the soil. Nowadays nearly half of the agricultural lands in Kazakhstan have humus levels of just 2-4 per cent. The unsustainable use of intensive tillage is the primary reason for this degree of soil erosion and decline in soil fertility. Salinisation has affected about 12 per cent of the total area of irrigated land. Fertiliser use, at 5 kg/ha (a fraction of the amounts applied in the late 1980s), is low and leads to nutrient-poor soils, contributing to the low average crop yields in Kazakhstan.

Agricultural pests (including locusts) cause substantial problems, and nearly half the total cultivated area in Kazakhstan is infested with weeds, including 2.5 million hectares infested with black oats (*Avena strigosa* Schreb.), leading to significant wheat harvest losses.

Machinery, equipment and logistics

Kazakhstan's machinery stock is old: only about 5 per cent of the country's tractors and combine harvesters are less than six years old, while more than 80 per cent have been in use for more than twelve years. Since its establishment in 2000, KazAgroFinance has provided farmers with loans to purchase agricultural machinery, while some large grain-producing companies have obtained loans from commercial banks to purchase new equipment. Despite these measures, levels of purchases of new equipment remain low and it is estimated that up to 2 million tonnes of grain are lost annually due to machinery-related delays at harvest.

There were 229 elevators in operation in Kazakhstan in 2010, and the total capacity of the grain storage facilities was about 14 million tonnes. Some analysts considered that 3-4 million tonnes of grain were lost due to insufficient storage capacity or transportation problems in 2012. The Kazakh Government is trying to build new capacity through KazAgroFinance, but the speed of the reconstruction and new building are only moderate. The industry grinds about 5 million tonnes of wheat per year to produce about 4 million tonnes of wheat flour, which means an average mill capacity utilisation of less than 50 per cent. Most of the largest mills have been constructed during the past ten years, and most of them are equipped with up-to-date technologies.

The competitiveness of Kazakh wheat exports is much affected by the transactional costs associated with shipping, and controlling and cutting these costs is a key competitiveness factor. The densities of the railway and road networks in Kazakhstan, at 5.1 km/100 km^2 and 3.2 km/100 km^2 respectively, are relatively low. Much of the road network is unpaved and many of the paved roads are in poor condition. For the Kazakh internal market, most of the wheat and wheat flour is shipped by rail. The country is reasonably well linked to the Central Asian railway network, and this is the most cost-effective way of transporting goods internationally. The Kazakh Government recognises the need for investment in transport infrastructure and is committed to the expansion and upgrading of the road and rail networks.

Domestic consumption, exports and prices

Food wholesalers play a major role in the Kazakh wheat distribution system and chain: in 2012, there were 174 registered wholesalers operating in the Kazakh food market, 45 of which were bread wholesalers and 52 were flour wholesalers. The food retail market is highly fragmented: 98.7 per cent of retail units were small and micro businesses in 2012 but large outlets have been gaining ground.

The role of Russia, Ukraine and Kazakhstan (RUK) in the global wheat trade is growing steadily, in the marketing years of 2010-2011 and 2012-2013 their combined exports amounted to 24 million tonnes, with which they occupied the second-largest export position globally. Kazakhstan is the smallest member of the RUK group, and wheat exports have varied considerably over the period 1987-2013, from a low of 1.4 million tonnes in 1991 to a high of 11.1 million tonnes in 2011. Kazakhstan processes much of its wheat production and is a major exporter of wheat flour: it exported 3.6 million tonnes in the marketing year 2011-2012, but flour export volumes also fluctuate considerably from year to year. The main export markets for Kazakhstan are the dominant wheat importing countries in the region, the most important of which include (first and second neighbour countries) Tajikistan, Uzbekistan, Kyrgyzstan and Afghanistan.

The Kazakh International Commodity Exchange was established in 1996, for trading in wheat, cash and futures. In 2009 this was replaced by the Eurasia Trading System, a joint venture between a Kazakh state entity and the Russian Federation's Russian Trading System.

A wheat price intervention system is operated by the (Kazakh) Food Contract Corporation (FCC). In addition, since 2002 the FCC has been engaged in commercial grain trading but its operation did not help to reduce the fluctuations of wheat prices. A market information system run by KazAgroMarketing collects weekly wheat prices, tariffs for mills and elevators benefits, weekly retail and wholesale prices of foodstuffs.

Prospects for wheat production in Kazakhstan and its potential role in food security

Together with Russia and Ukraine, Kazakhstan is considered as a 'future main player' in world grain supply. Many observers have indeed argued that Central Asia, and especially Kazakhstan, has the potential to enhance local, regional and global food security by expanding grain production and exports.

We have reviewed three earlier studies that make credible attempts to map out the future developments in agriculture in Central Asia, in particular with respect to wheat production in Kazakhstan. The FAO Regional Office for Europe and Central Asia study embraces the Caucasus and Central Asian region, while the study by IAMO, Halle (Saale), Germany, concentrates on the main grain producing regions in northern Kazakhstan. The Food and Agricultural Policy Research Institute (University of Nevada, USA) analysis focuses on global wheat projections, but also includes country-specific projections for Kazakhstan.

Overall, the three studies agree on the potential for expanding wheat production in Europe and Central Asia and the important role the region will play in increasing the exports of cereals to developing countries in the future. Russian and Ukraine would provide most of the additional exports from the region. Exports from Kazakhstan have in the past years been almost completely absorbed by net imports from other countries in the region, and this is likely to remain the main destination for Kazakh wheat exports, even though it may increasingly contribute to exports outside the region as well.

The increase in wheat exports from the region is expected to come mainly from increases in yields, which are projected to increase by about 20 per cent by 2050 – even though the projected yield levels remain far below those attainable. Analysts disagree on whether the total arable land area in the region will increase. While there is still an estimated 210 million hectares of unused land suitable for farming in the region, much of it may be not readily available and its use may not be economically viable due to remoteness and lack of infrastructure. Others argue that Kazakhstan will increase the harvested area of wheat by about 4 per cent in the next decade. Given the projected increases in yields, and the potential decline in per capita consumption as GDP rises in Kazakhstan, the country's wheat exports are likely to increase.

Nevertheless, the studies highlight some challenges that are preconditions for further growth in wheat production and exports. A decline in the agricultural workforce, and especially the lack of qualified labour, could pose challenges for wheat production in the future. The wheat sector would also benefit from improved transparency in the land market and a more competitive and a less centralised agricultural credit system. And while the studies project an intensification of wheat production and higher crop yields, climate change and water shortage will remain limiting factors.

Overall, Kazakhstan has a great potential for expanding its wheat production and exports in the future. As such, it could play a non-negligible role in fulfilling local, but especially regional, food security. By compensating for the export fluctuations of other major players, it could have an important stabilising role on the world market for wheat and thereby contribute to global food security. Nevertheless, this positive view on the future of Kazakh wheat production is highly conditional on several factors. Climate change may lead to considerable yield losses, although increased fertiliser use and sustainable practices could mitigate the effects. In addition, investments in infrastructure and machinery will be essential to unlock the wheat potential of the country and to compensate for the potential consequences of climate change, water scarcity and soil degradation.

1 INTRODUCTION

1 Introduction

The European Union (EU) is currently providing assistance to several Commonwealth of Independent States (CIS) countries via its *European Neighbourhood and Partnership Instrument*, which is designed to promote the development of countries covered by the EU's European Neighbourhood Policy. Kazakhstan is recognised as a beneficiary of this programme. This position is consistent with Kazakhstan's *Path to Europe 2009-2011* programme which aimed to bring the country to a new level of strategic partnership with EU Member States, including in areas of economic cooperation (MFA, 2008). Since the country declared its independence from the Soviet Union in December 1991, it has emerged as a key economy in Central Asia.

The Republic of Kazakhstan is the world's ninth-largest country and the largest land-locked country but, with 16.7 million inhabitants, it is one of the least densely populated. Its territory is 2,725 thousand km^2 – larger than Western Europe (Figure 1.1). Oil and gas are by far the leading economic sectors, and the agricultural sector is economically relatively small, accounting for only 4.8 per cent of Kazakhstan's GDP in 2016. Nevertheless, agriculture employs about 18 per cent of the workforce, according to World Bank data, and covers about 70 per cent of the country's land area. Given this abundance of land, Kazakhstan has great agricultural potential.

Located at the far eastern reach of the Eurasian wheat belt, globally Kazakhstan is ranked twelfth in terms of wheat production and sixth for wheat exports. Wheat is an important component of Kazakhstan's export trade and the country plays a key role in local, regional and international food security. However, although much of the agricultural area is sown to wheat, the yield per hectare is below regional and international levels. Thus, despite a range of uncertainties (including environmental and

FIGURE 1.1: PHYSICAL MAP OF KAZAKHSTAN.
Source: http://www.ezilon.com/maps/asia/kazakhstan-physical-maps.html.

political issues) and an underdeveloped infrastructure, Kazakhstan's development as a reliable and sustainable source of global wheat supply is of strategic importance.

This report assesses the potential of Kazakh wheat production from a food security perspective. Following this introduction, Chapter 2 sets out the general policy context, with a focus on agriculture. Chapter 3 describes the transformation over recent decades of the farm structure in Kazakhstan, land reform, and the categories of agricultural producers. Chapter 4 provides an overview of the agricultural policy instruments. Chapter 5 covers wheat production and the processing sector. Chapter 6 assesses the major environmental challenges and Chapter 7 considers the state of the infrastructure and equipment. Chapter 8 discusses the trends in consumption, exports and prices of wheat and flour. Finally, Chapter 9 summarises the findings of some recent studies on the medium-term prospects for the Kazakh wheat sector, and concludes.

2

POLICY CONTEXT

2 The policy context

2.1 | The general business environment

2.1.1. Business environment and competitiveness

Overall, Kazakhstan scores relatively well in terms of business environment. The annual *Doing Business* report prepared by the World Bank and the International Finance Corporation ranks countries according to the ease of doing business there, using a set of Doing Business Indicators, namely: starting a business; dealing with construction permits; getting electricity; registering property; getting credit; protecting investors; paying taxes; trading across borders; enforcing contracts; and resolving insolvency. Kazakhstan currently ranks 36th (WB/IFC, 2018), much above the other Central Asian countries, which are ranked as follows: Kyrgyzstan: 77th; Tajikistan: 123rd and Uzbekistan: 74th, while Turkmenistan is not ranked. This is thanks to recent improvements (in 2004, Kazakhstan ranked only 74th) related to several business reforms (FAO, 2013) including:

- Making *starting businesses* easier by eliminating the requirement to pay in minimum capital;
- Making *getting credit* easier by introducing new grounds for relief from an automatic stay during rehabilitation proceedings;
- Strengthening its *insolvency process* by introducing an accelerated rehabilitation proceeding;
- Strengthening *investor protection* by regulating the approval of transactions between interested parties and by making it easier to sue directors in cases of prejudicial transactions between interested parties; and
- Making *paying taxes* easier.

Kazakhstan still does not score very well in terms of *getting credit* and *cross border trading* (WB/IFC, 2018).

In terms of competitiveness, Kazakhstan is ranked 51st on the Global Competitiveness Index (cf. 72nd in 2010-2011 among 139 countries). By contrast, Tajikistan is ranked at 100 and Kyrgyzstan at 107, while Uzbekistan and Turkmenistan are not included. However, Kazakhstan is ranked only 103rd for *innovation* and 99th for *business sophistication* factors. Schwab (2013) identifies the five biggest barriers to doing business in Kazakhstan as:

- An inadequately educated workforce;
- Corruption;
- Tax regulations;
- Access to financing; and
- Inefficient government bureaucracy.

One indicator (of 16) within the goods market efficiency pillar is *agricultural policy costs*[4]. Here, Kazakhstan was ranked in 48th place, with a score of 4.2 (Schwab, 2013).

2.1.2. Foreign investments in the agro-food sector

Kazakhstan has a 'generally liberal' investment climate in all sectors of the economy (FAO, 2013). UNCTAD (2012) ranked Kazakhstan as seventh among the top ten economies on the Foreign Direct Investment (FDI)[5] Attraction Index (among 181 economies) in 2011 and the second among the top five host and home economies of FDI flows in 2010-2011. Hence, the country has shown a strong performance in attracting FDI, particularly in

[4] How would you assess the agricultural policy in your country? [1 = excessively burdensome for the economy; 7= balances the interests of taxpayers, consumers, and producers]. 2011-2012 weighted average.

[5] A 'Foreign Direct Investment' (FDI) is one made by a company or entity based in one country, into a company or entity based in another country. FDIs differ substantially from indirect investments such as portfolio flows, wherein overseas institutions invest in equities listed on a nation's stock exchange.

extractive industries. More than 70 per cent of FDI is directed to the oil and gas sector, but FDI into the food and beverage industry has been steadily increasing as well, mainly in vegetable oil, dairy and meat (especially sausage) production, although it accounted for only 0.36 per cent of total FDI in 2009 (FAO, 2013).

The legal basis for foreign investment in Kazakhstan is set out in the following regulations: the *Law on Limited Liability Companies and Additional Liability Companies (1999)*, the *Law on Investments (2003 with amendments in 2012)*, the *Law on State Registration of Legal Entities and Registration of Branches and Representative Offices (2008)*, the *Law on the Legal Status of Foreign Nationals (2009)* and the *Law on Special Economic Zones of Kazakhstan (2011 with amendments in 2012)*.

2.1.3. Improving access to finance

Agriculture is now seen as a priority sector by the Government of Kazakhstan, a position that is driven by several considerations (OECD, 2013a):

- A desire to compensate for the decline the agricultural sector experienced during the early transition period;
- Development of agriculture is part of the overall strategy for economic diversification to reduce dependency on energy income;
- Agricultural output growth has been viewed as a key factor of food security, a view that has strengthened since the onset of the high food price volatility in 2008.

The Government therefore seeks to improve the sector's competitiveness and increase the level of investments. However, a significant barrier is the lack of access to finance for agribusiness firms, especially for small- and medium-sized enterprises (SMEs). In 2011, the amount of credit extended to agriculture accounted for 3.6 per cent of all bank credit in Kazakhstan. The sector faces the following major challenges (OECD, 2013a):

- *Information asymmetries*: commercial banks deliver the bulk of the loans to the most profitable and largest borrowers but have limited transactions with agribusiness SMEs due to poor information about their creditworthiness. Agribusiness companies lack financial education and knowledge about bank instruments;
- *High transaction costs*: reaching agribusiness SMEs in remote areas and processing their loan applications is costly for banks considering the low returns expected. Reaching banks in urban areas, gathering the necessary information and filling in complex application forms remains a challenge for agribusiness SMEs and can discourage them from engaging in loan transactions;
- *High risk of agro-business*: agriculture is considered a risky business given, for example, the uncertainties of output due to weather conditions. This contributes to a high rate of delinquent loans. In addition, a lack of collateral, credit history and guarantees on the part of agribusiness companies increases the risks perceived by lenders;
- *Low competitiveness of agriculture*: the competitiveness of this sector is substantially lower than that of other sectors, especially extractive industries;
- *Favoured position of state lenders*: KazAgro agencies benefit from access to state finance on preferential terms, which diminishes the incentives of private banks to enter the agricultural credit market.

To improve access to finance, funding needs to be allocated more efficiently by creating an open, decentralised and competitive agro-finance market, rather than relying on credit concessions. OECD (2013a) listed the three main areas for policy reform as:

- *Strengthening Credit Partnerships* (CPs) by enforcing the framework of CPs to promote autonomy and accountability, expanding membership among agribusiness companies in CPs, and developing the services provided by CPs to include representation, advisory, training and access to technology;
- *Increasing the liberalisation of the agro-finance market* by improving the transparency of KazAgro management and the efficiency of its programmes, and attracting foreign investors – including banks – to the agribusiness sector;
- Improving state policies by designing and implementing a Credit Guarantee Scheme to guarantee loans and reduce risk, disseminating accounting standards to SMEs, and improving information on credit history.

2.1.4. Taxation

A new Tax Code came into force on 1 January 2009 and amendments took effect on 1 January 2012. The social tax was reduced and the corporate income tax was cut from 30 to 20 per cent (in 2010; it was due to fall to 15 per cent in 2014) and introducing a flat-rate personal income tax of 10 per cent (FAO, 2013). The general value added tax (VAT) rate is 12 per cent but exports of goods, processing of goods within the Russia-Kazakhstan-Belarus Customs Union and international transport are exempt from VAT.

There are *special tax regimes* for agricultural enterprises and individual farms (Table 2.1). Agricultural enterprises in various legal forms and rural co-operatives who represent taxpayers which have the status of legal entities benefit from a 70 per cent discount on six key business taxes: land tax (or land use payment for land tenants), property tax, social tax, VAT, corporate income tax and tax on vehicles (OECD, 2013b). For individual farms, who are not obliged to maintain official bookkeeping and who represent taxpayers with the status of 'non-legal' entities, these six taxes have been replaced with a Single Land Tax. Members of rural households are eligible only for personal taxes. Agriculture is exempt from VAT. Certain goods that are imported temporarily are fully or partially exempt from payment of customs duties and taxes, including professional equipment, goods imported for demonstration purposes, shipping containers, and advertising materials.

In addition to agricultural producers, tax concessions are granted to food processors who benefit from a reduced VAT rate on a relatively broad range of products (OECD, 2013a). This concession was first introduced in 1998, when the VAT rate on processed foods was cut to one half of the standard rate and further to 30 per cent in 2008. Thus, with the current standard VAT rate in Kazakhstan at 12 per cent, agro-food processors are effectively eligible for a 3.6 per cent VAT rate. The scope of processors covered by this concession is explicitly defined and covers most of the agro-food processing industry.

Tax type	Standard regime	Special regime	
		For legal entities (agricultural enterprises)	For non-legal entities (individual farms)
Land tax (for privately owned land)	Between KZT 0.48/ha and KZT 202.65/ha depending on the type of land and fertility score	30% of standard rate	Single Land Tax: between 0.1 and 0.5% of the estimated cadastre value of land depending on land size
Land use payment (for rented state-owned land)	Same as land tax	30% of standard rate	
Property tax	From 0.1 to 1.5% of property value depending on the type of owner	30% of standard rate	
Social tax	11%	30% of standard rate	
Vehicle tax	Minimum reference indicator set annually	30% of standard rate	
Personal income tax	10%	Not applicable	
VAT	12%	30% of standard rate	Not eligible
Corporate income tax	10% for agricultural activity	30% of standard rate	Not applicable

TABLE 2.1: PRINCIPAL TAXES FOR COMMERCIAL AGRICULTURAL PRODUCERS AND TAXATION REGIMES.
Source: OECD (2013a).

2.1.5. Insurance

The *Law on Mandatory Crop Insurance*, which introduced mandatory insurance for all crop producers, was adopted in 2004. Insurance is provided by private insurers and agents and applies to crop damage or destruction arising from adverse natural conditions. The insurance premium is fixed by law. Insurance payments are calculated on the basis of a producer's loss, defined as the difference between the costs for one hectare of production of the destroyed crop and the income derived usually from that crop, multiplied by the tillage affected by the natural damage. A commission composed of the state authorities, insurant, insurer and insurance agent establishes the areas affected. In the case of natural disaster, the government refunds 50 per cent of insurance payments to the insurer (Ceyssens, 2006).

Year	Number of policies	Insured area (million ha)	Crop area insured (%)
2005	19,008	10.5	—
2006	13,619	9.1	59
2007	25,446	12.1	78
2008	33,957	14.5	84
2009	32,165	15.0	82
2010	17,389	12.7	68
2011	15,768	13.6	75
2012[1]	9,869	11.2	61

TABLE 2.2: PENETRATION OF COMPULSORY CROP INSURANCE IN KAZAKHSTAN, 2005-2012.
- not available
[1] as of July 2012
Source: Fund for Financial Support of Agriculture data via OECD (2013a)

The administration of the budgetary funds to support mandatory crop insurance has been the responsibility of the Fund for Financial Support of Agriculture (FFSA), but in 2012 this function was transferred to KazAgroMarketing, since the latter has more extensive local networks. Three private insurance companies and 39 mutual insurance companies take part in the scheme. The number of policies increased steadily up to 2009, but since then has declined, possibly because of difficulties producers face when settling indemnities with insurance companies (Table 2.2). Insurance penetration is higher in *oblasts* with a bigger share of large-scale enterprises and better infrastructure, such as Akmola, Kostanay, East and North Kazakhstan. In 2011, the FFSA transferred KZT 1.1 billion of subsidies to insurers; the level of outlays was substantially increased in that year following the drought in 2010.

2.2 | Agricultural policy

Agricultural policy objectives in Kazakhstan during the first decade after independence from the Soviet Union concerned a fundamental transition to a market-based system which included land reform, farm restructuring and reform of agricultural finance and support systems. OECD producer support estimates (PSE) for the Russian Federation (hereinafter: Russia) and Ukraine were highly positive up to 1991, and then fell dramatically in the first half of the 1990s to negative values. This picture almost certainly applies to Kazakhstan as price liberalisation removed the benefit of receiving output prices at above and key inputs at below world levels (OECD, 2013a).

2.2.1. Policy reform

The *Agriculture and Food Programme for 2003-2005* (AFP) marked the start of active promotion of agricultural growth. The oil boom, on the one hand, caused concerns about lack of economic diversification but, on the other, provided revenues for public support, including the AFP. The Ministry of Agriculture's budget increased from KZT 26 billion in 2001 to KZT 81 billion in 2005, and its share of the total national budget went up from 2.5 to 6.5 per cent during this period (OECD, 2013a). The AFP's stated objectives were to (a) ensure food security; (b) establish an efficient agro-industrial system; (c) increase sales of farm products in domestic and foreign markets; and (d) optimise state support for agriculture.

The AFP provided general services support to agriculture aimed at improving infrastructure and product quality. Incentives were provided through a substantial expansion of preferential credit schemes, machinery leasing, and fertiliser and fuel subsidies. The budget allocated for state purchases increased considerably. The annual spending of the Food Contract Corporation (FCC, Box 2.1) on grain purchases rose from KZT 7.7 billion per year in 2000-2002 to KZT 30.7 billion in 2003-2005, and the annual volume of wheat purchases more than doubled during the latter three years (OECD, 2013a). Agricultural enterprises and individual farms were granted considerable tax concessions under a special tax regime.

Rural development and social issues have also become more prominent on the policy agenda. Under the *Programme for Development of Rural Territories for 2004-2010*, support was given to the improvement of rural settlements, the reconstruction and renovation of rural infrastructure, and the development of economic activity in rural areas. This programme saw the start of the monitoring of the socio-economic situation in rural areas and the resettlement of rural residents in areas with more favourable economic and environmental conditions.

Box 2.1
The Food Contract Corporation and food security in Kazakhstan.

The FCC, established in 1997, is the largest grain trader in Kazakhstan and is responsible for purchasing the national production, for maintenance of grain reserves and market intervention. The FCC stabilises prices on the domestic market through interventions. It operates on the basis of the *Law on Grain (2001)*, according to which public grain stockholdings are maintained by an agent on the basis of a contract. Producers with a grain area over 250 hectares are obliged "to participate in the establishment of state grain resources" through priority sales of grain to the FCC. The activities of FCC are as follows:

- Ensuring the food security of the country by purchasing grains for state resources;
- Providing short-term loans for input purchases;
- Purchasing grains to regulate domestic markets and stabilise grain prices;
- Exporting grain;
- Providing seed loans for purchases from the state seeds resources for sowing;
- Crediting field and harvest works to support grain producers (the rate of interest is 8 per cent per year);
- Implementing investment projects for the expansion of the Kazakhstan grain export routes, deep processing of grain and the formation of grain production clusters.

According to the *Law on Grain (2001)*, the state grain resources for mobilisation, food security, fodder provision and regulation of the grain market must be maintained by purchases at market prices. The FCC is responsible for maintaining about 500,000 tonnes of grain in the state reserves. The FCC procures grain directly from farmers and makes limited use of tender or auction procedures (ADB, 2001). At the beginning of the year, the government fixes the amount of grain to be purchased for security purposes and the price to be paid.

Source: adapted from OECD (2011).

2.2.2. Institutional arrangements for managing agricultural policy

The following arrangements are in place at the national level (OECD, 2013a):

- The *Ministry of Agriculture* is the principal government body responsible for the administration of agricultural policy. Its five subordinate committees are: State Inspection of the Agro-industrial Complex, Veterinary Control, Water Resources, Fisheries Management and Forestry Management;
- *KazAgroHolding* was established at the end of 2006 through a merger of seven state agencies, which became KazAgro's subsidiaries (Box 2.2). It is a stock company fully owned by the state and is the main institution implementing public support programmes.
- *KazAgroInnovation* brings together institutions performing research and development (R&D); knowledge and technology transfer; promotion and implementation of

innovative investments in agribusiness, and other related activities;

- The agencies subordinate to the *Committee for State Inspection in the Agro-industrial Complex*, and *Committee for Veterinary Control* comprise the national

Box 2.2
KazAgro National Management Holding JSC and its development strategy 2011-2020.

KazAgro National Management Holding was formed in January 2007 as a joint stock company (JSC) under the laws of the Republic of Kazakhstan by the Government of the Republic of Kazakhstan. The company was established under *Decree no. 220 of the President of the Republic of Kazakhstan* on 11 December 2006, regarding certain questions on development of agriculture complex with the purpose of state policy realisation of the formation and development of a competitive and export-oriented agriculture industry. The mission of the Holding is to implement state policy on stimulating industrial development of agribusiness complex on the principles of efficiency, transparency and effective corporate governance of the Holding structures. It has seven, 100 per cent owned principal subsidiaries:

- National Company Food Contract Corporation JSC;
- KazAgroProduct JSC;
- KazAgroFinance JSC;
- Agrarian Credit Corporation JSC;
- Fund for Financial Support of Agriculture JSC;
- KazAgro Garant JSC;
- KazAgro Marketing JSC.

There are four strategic directions of activities:

- Stimulating labour production growth in agribusiness complex through industrialisation and diversification;
- Participation in ensuring food security of the country through the development and management of the domestic food market;
- Facilitation of agribusiness complex export potential development and implementation;
- Increase of corporate management quality and transparency of the Holding activities.

The principal activities are: maintenance of state grain reserves at the levels required to supply the population of Kazakhstan with grain and grain products, timely grain replenishment, lending, and investing in finance leases to the agricultural sector, financing infrastructure for preparation, processing, storage and supply and distribution of agricultural products, financing non-agricultural entrepreneurship in rural areas and marketing research. Also, the Group acts as a guarantee for compensation of losses related to storage of the grain.

The vision of the Holding is to be a leading company in the implementation of state policies to improve the industries of agribusiness complex of the Republic of Kazakhstan by 2020. As the financial operator of the major strategic projects for agriculture, the Holding will provide an affordable, targeted and effective use of state and attracted resources implementing the further development of the industrial, information and service infrastructure of agriculture. By 2020 the Holding and all its subsidiaries will receive corporate governance ratings, which will confirm the high culture of corporate development of the Holding group of companies on the basis of transparency and higher standards of human development.

Sources: Government of the Republic of Kazakhstan (2011) and KazAgro (2013).

phytosanitaty and veterinary system. Most represent diversified territorial networks. Quality certification of traded agro-food commodities is the responsibility of *KazAgrEx*;

According to the *Law on Private Entrepreneurship* (2006), six non-government organisations are currently accredited by the Ministry of Agriculture to review every business-related regulation: *Farmers' Union*, *National Economic*

Box 2.3
Producer and industry organisations in the agro-food sector of Kazakhstan.

The following organisations participate in agricultural policy formulation, but only at the review stage of policy documents when it is difficult to make a significant contribution. They are not actively involved in the policy-making process because their members do not yet appreciate the benefits of collective action and are reluctant to contribute towards its costs:

- The *Grain Union of Kazakhstan* was formed in 1997 on the basis of the Association of Grain Exporters and is a non-profit organisation consisting of grain companies. Its aim is to protect the interests of its members, in particular, in the development and implementation of state agricultural programmes, laws and regulations. Its mandate is also to develop the grain market. It provides regular training and issues reviews of the grain market. The Union provides members with inputs and machinery, and markets grain on the domestic and export markets.
- The *Union of Poultry Farmers* was created in 1999. It represents 56 poultry farms and companies. Its aim is to prepare and submit proposals to state bodies on the development of the poultry industry including state support measures and legislation, and on the development of poultry breeding. The Union also provides information services to its members.
- The *Farmers' Union* is an association of individual farmers established in 2003. Its primary aim is to consolidate individual farmers to protect their rights and interests, promote programmes for the development, and to support entrepreneurship in agriculture. The Union has more than 6,000 members from all regions of Kazakhstan. It is well organised, with funding from members and their insurance company.
- The *Meat Union* was registered in 2009 as a non-profit organisation which unites enterprises in the meat production and processing. It co-ordinates the activities of enterprises engaged in the meat business, and presents and protects their common interests.
- The *Kazakh Cotton Association* was established in 2004 as a co-ordinating and advocacy body for the cotton industry.
- The *Union of Food Processing Industries* was founded in 1997, unifying the leading agro-food processing enterprises. Its aim is to protect the interest of domestic producers and to promote the development of the food business.
- The *Union of Millers and Bakers* was created in 2001 following the reorganisation of the Millers of Kazakhstan Association established in 2000. It includes about 30 companies which represent vertical structures that integrate bakers and millers. Its main aim is to represent the member's interests *vis-à-vis* the executive and legislative branches of government.

Source: OECD (2013a).

Chamber 'Atameken Union', *Kazakhstan's Cotton Association*, *Republican Association of Ore and Metal Ore Mining Enterprises*, and the *Union of Food Processing Industries of Kazakhstan* (Box 2.3).

2.2.3. Future policy challenges

KazAgroHolding is expected to play a leading role in the development of agriculture during the decade to 2020. Eight subsectors (fruit and vegetables, grain, meat, milk, oil crops, poultry, sugar, and wool) have priority over other products such as honey or cotton (OECD, 2013a). Since October 2009 these subsectors have benefited from priority loans from KazAgroHolding, and larger subsidies or lower interest rates on loans/leasing. Regions are responsible for implementation, but central control is intended to ensure coherence. Pomfret (2013) highlights the following possible shortcomings of current policies:

- Evaluation of policies is primarily in terms of quantitative targets, mostly for output, with little concern for allocative efficiency;
- Socio-economic and environmental concerns are referred to, but do not appear to have a high priority in practice;
- Agricultural policy is almost entirely supply-side oriented. For example, the FCC does little to help farmers to increase the unit value of their sales by creating international awareness of Kazakhstani quality standards or by improving supply chains;
- Some goals are poorly articulated or inconsistent. For example, although reference is made to public good provision, the share of funds devoted to infrastructure has fallen;
- Implementation is bureaucratic, and policies are poorly coordinated. Farmers complain of the difficulty in knowing what support is available and how to obtain it;
- Division of responsibilities among government ministries (Education, Agriculture, Employment and Ecology) is not accompanied by coordination.

Pomfret (2013, p. 6) comments that "[A] feature of policymaking in Kazakhstan is the government's flexibility in learning and adapting policies; this will be tested in the evolution of its agricultural policies". The range of agricultural policy agreements and instruments adopted by the Kazakh Government over time are discussed in Chapter 4, following a review in the next chapter of the structure of the farming sector in Kazakhstan.

3

STRUCTURE OF THE **FARMING SECTOR**

3 Structure of the farming sector

Kazakhstan has more than 846,000 km^2 of agricultural land, composed of 205,000 km^2 of arable land and 611,000 km^2 of pasture and hay land. Arable land thus constitutes less than 10 per cent of the country's total land area, but its availability per inhabitant (1.5 ha) is the second highest in the world after Australia (2.1 ha). Livestock (dairy products, leather, meat and wool) and grain (wheat, barley, cotton and rice) are the most important agricultural commodities.

3.1 | Agrarian reforms in post-Soviet Kazakhstan

3.1.1. Historical background

Until the mid-1800s, agriculture in the territory of Kazakhstan was traditionally pastoral and nomadic. With increasing Russian control, Slavs settling in the rain-fed lands of the south-east introduced sedentary farming, and some nomads began to plant winter grain. After the 1860s, when Central Asia was incorporated into the Russian Empire, cotton became the key crop in the irrigated regions of the Syrdarya Valley in southern Kazakhstan, although Kazakhstan remains a much smaller cotton producer than its Central Asian neighbours.

During the Soviet period, two significant developments occurred:

- The most dramatic change was the enforced collectivisation of 1928-1929, which was accompanied by a huge reduction in the number of livestock and by famine;
- The second important policy decision was the *Virgin Lands* programme introduced in the 1950s in the steppe land of northern Kazakhstan. This brought about 25 million hectares into cultivation (i.e. over 60 per cent of current arable land), and Kazakhstan became a major producer of wheat and barley. However, variable climatic conditions led to volatile harvests, and the soils in some of the new lands were unsuited to long-term cultivation – about 30 per cent, according to WB (1992). (Part of the land brought into grain production at this time was abandoned in the 1990s, especially in Aktyubinsk, Kostanay and North Kazakhstan *Oblasts*).

In the late Soviet era, agriculture benefited from budget subsidies, input and market support, as well as from non-agriculture-specific subsidies such as cheap fuel and transport. During the final decades of the Soviet era, a prime aim of Soviet policy was to raise the output of the livestock sector in order to increase living standards through higher consumption of meat and dairy products. Meat output in the Soviet Union increased by 60 per cent during the 1970s and 1980s, supported by the import of feed grains and soybeans from the United States and elsewhere. In the 1980s Kazakhstan exported 300,000 tonnes of meat, 250,000 tonnes of milk, and 150 million eggs per year to other Soviet republics (Pomfret, 2013). During this period, grain and cotton farmers received favourable prices for their produce. In 1991, of 39 million hectares of cultivated land, 65 per cent was devoted to cereals and 33 per cent to fodder crops.

Following the dissolution of the Soviet Union in December 1991, the farm sector, like the economy as a whole, was affected by the disruption of supply chains both for inputs and to markets. Owing to other more pressing priorities, government policy toward agriculture in the 1990s was largely one of neglect. During the 1992-1994 hyperinflation, the terms of trade in agriculture deteriorated considerably; farmers' input prices increased by at least twice as much as output prices (De Broeck and Kostial, 1998). These price adjustments occurred just as the previous support system was collapsing.

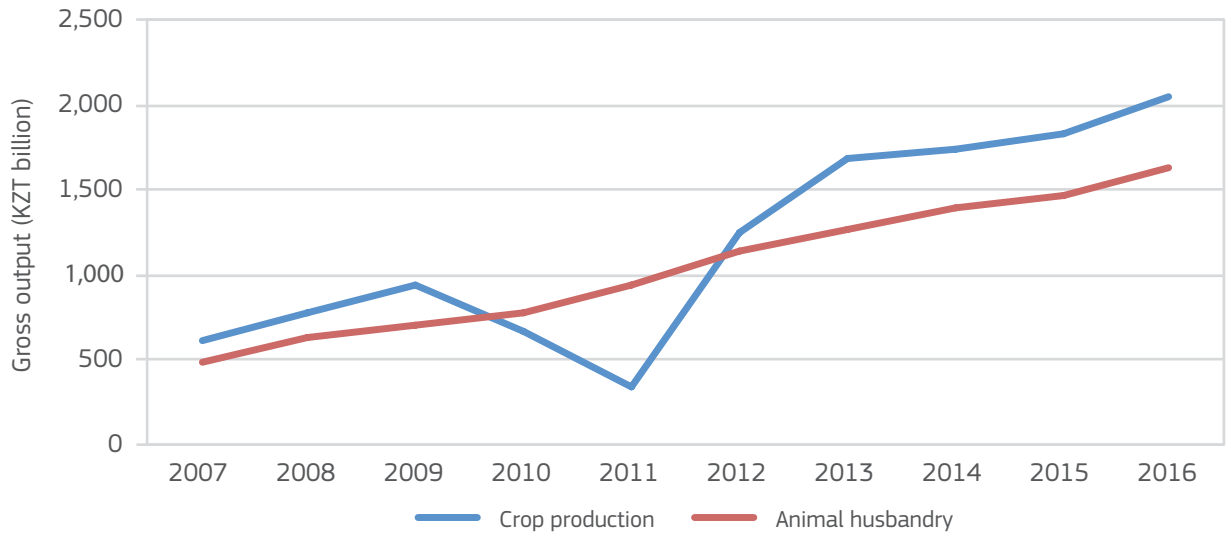

FIGURE 3.1: ANNUAL GROSS OUTPUT OF CROP PRODUCTION AND ANIMAL HUSBANDRY IN KAZAKHSTAN, 2007-2016.
Data sources: Statistical yearbooks of the Ministry of National Economy of the Republic of Kazakhstan.

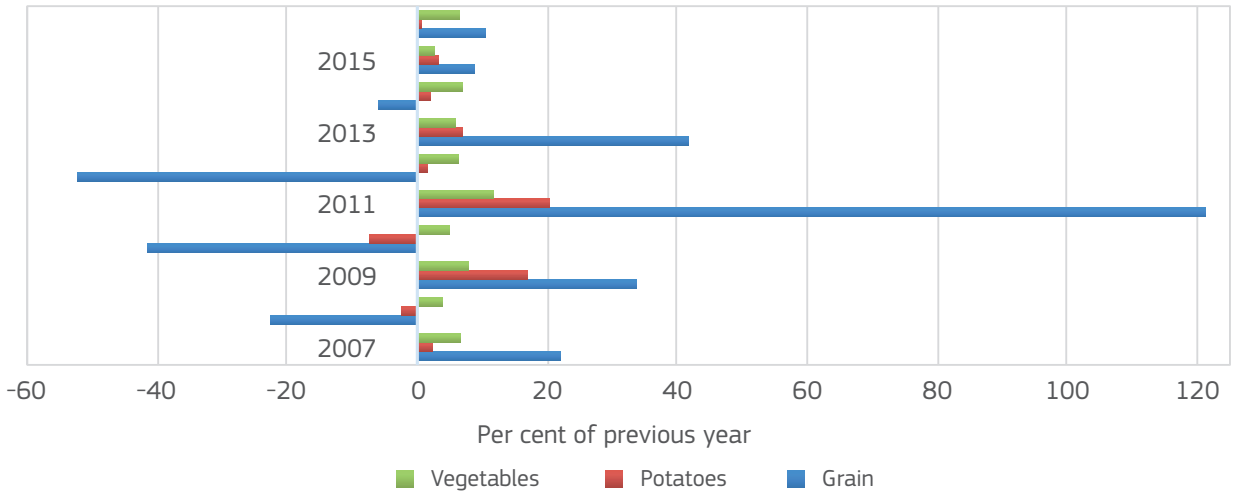

FIGURE 3.2: GROSS HARVEST INDICES OF THE MAIN GROUPS OF PLANT PRODUCTS ACROSS ALL TYPES OF FARMS IN KAZAKHSTAN (PER CENT OF PREVIOUS YEAR), 2007-2016.
Data sources: Statistical yearbooks of the Ministry of National Economy of the Republic of Kazakhstan.

In the second half of the 1990s, the farm sector was caught up in a profound debt crisis as considerable resources were withdrawn from production. About 19 million hectares on which crops had been grown a decade earlier were no longer used by the early 2000s, and in the former collective farm sector livestock inventories fell to 20 per cent of their 1990 levels (OECD, 2013). Output fell substantially after 1990. According to World Bank data, the annual growth rate of agricultural value-added between 1990 and 2001 was -3.22 per cent. Although comparison of individual years is not advisable due to the yield volatility and generally poor climatic conditions of the 1990s, in 1996-2000 average output was 50 per cent lower than in 1987-1991. The long-term decline had bottomed out by the end of that decade and the average yield over the five-year period 2004-2008 was 8 per cent higher than that of the period 1986-1990, which was the peak of the so-called intensive technology movement in the Soviet Union. Although it has still not been fully reversed, it and the agrarian sector has since demonstrated clear economic growth (Figures 3.1 and 3.2).

3.1.2. Privatisation of land and property of collective and state farms

Agrarian reforms progressed unevenly after their introduction in 1991. They were temporarily suspended in 1992-1993 and restarted in 1994-1995, but the rate of reform decelerated in 1996-1997. Although privatisation in principle broke up large farms, in practice many farms remained essentially unrestructured. When farms went bankrupt during the second half of the 1990s, farmers, mechanics and others in the rural economy received land or equipment in lieu of wages (OECD, 2013a). Former state farm managers and local authorities continued to exercise considerable power in the sector. As in the Soviet era, household plots produced a large share of output, especially of milk, meat and fruit and vegetables. Real, far-reaching changes and financial restructuring of farms only began again at the end of the 1990s.

The Presidential *Decree on Land* of 22 December 1995 officially recognised private land ownership in Kazakhstan. The Decree set out the principles of (a) state ownership of agricultural land with rights of private use under 99-year leases and (b) division of the lands of restructured agricultural enterprises among workers, including teachers and medical workers among others employed in the social sphere in rural areas, and pensioners. By 1997, 2,270,000 shares covering 118 million hectares had been allocated, and by 2002 the share owners had exercised their rights as follows (Dudwick *et al.*, 2007):

- 18 per cent, largely belonging to managers, specialists and their families, were used to form corporate farms;
- 29 per cent were used to form individual farms;
- 4 per cent were sold to commercial farms;
- 3 per cent were transferred to other people;
- 18 per cent were unclaimed or returned to the state; and
- 28 per cent, mainly those of pensioners, workers in the social sphere, and people employed in other businesses, were sub-leased.

In 2001 the *Law on Land in the Republic of Kazakhstan* reduced the length of long-term land lease from 99 to 49 years. The 2003 *Land Code*, which was implemented two years later, removed uncertainties about agricultural land property rights[6]. As an alternative to the 49-year land lease from the state, private ownership of agricultural land with full ownership rights was introduced, and the sale and purchase of land was legalised. Because of this, a market in agricultural land emerged and 864.5 thousand hectares of state agricultural land were purchased between 2004 and 2010 (OECD, 2013a). After 2008, however, the rate of purchase fell sharply, possibly because of the global economic slow-down.

The slow and at times uncertain reform of land tenure led earlier analysts to emphasise lack of genuine change, while later analysts have seen it as an ongoing and incomplete process[7]. The mobility of agricultural land in Kazakhstan remains low, resulting from a combination of an inactive land market and a lack of flexibility in land leasing. Enterprising farmers have little opportunity to expand by purchasing neighbouring property. According to the Land Resources Agency of the Republic of Kazakhstan, in 2011 only 1 per cent of total land classified as 'land designated for agricultural use'[8] was privately owned, with the remaining land leased from the state (Table 3.1). The land rental payment is determined on the basis of a land tax, which is probably undervalued (OECD, 2013a). Furthermore, under the current tax regime individual farmers pay a Single Land Tax of 0.1-0.5 per cent of the cadastral value of land with no further rental charges, i.e. a minimal price for land use which is guaranteed for 49 years. These low land taxes are viewed as an impediment to the re-allocation of agricultural lands to more efficient users. Leaseholders paying a low rent to the state on a 49-year lease are often, perhaps unsurprisingly, unwilling to opt for private ownership. Current proposals to reform land taxation include a re-evaluation of agricultural land to reflect more appropriately its quality and market value.

[6] USAID (2005) describes and analyses the 2003 *Land Code*. The comparative analysis of Csaki *et al.* (2006) of agrarian reform in formerly centrally-planned economies includes Kazakhstan among the 'moderate reformers'.

[7] See, for example, Gray (2000), Lerman *et al.* (2004), Dudwick *et al.* (2007) and Petrick *et al.* (2011).

[8] The category 'land designated for agricultural use' differs from the category 'total agricultural land'. Thus, as of 1 November 2011, Kazakhstan's total agricultural land was 222 million hectares, whereas 'land designated for agricultural use' was 94 million hectares. A large part of agricultural land, predominantly pastureland, was located in the Land Reserve, Forest and Water Reserves, in special protected areas, urban and rural settlements, and industrial and transport entities.

	Number of land parcels, thousand	Area*	
		Thousand ha	%
Total area for agricultural use	761	93,388	100
of which:			
privately owned	561	930	1
leased	200	92,458	99
of which:			
in temporary lease	198	90,950	97
in permanent lease	1	1,508	2

TABLE 3.1: LAND IN KAZAKHSTAN DESIGNATED FOR AGRICULTURAL USE BY LEGAL FORM OF USE AS OF 1 NOVEMBER 2011.
* Land for agricultural purpose does not include agricultural land in the Land Reserve, the Forest Reserve, the Water Reserve, land in special protected areas, urban and rural settlements, and land occupied by industrial and transport entities.
Data source: Land Resources Agency of the Republic of Kazakhstan, via OECD (2013a).

Agricultural enterprises also benefit from substantial concessions on land payments. Petrick *et al.* (2011) explain this situation by the fact that the state is not seeking to maximise its revenues (hence the low rents). The result is that the incentive to buy state land or cede it to other users is weak, to the extent that part of the leased land remains unutilised. The attractiveness of land purchase is further reduced by complicated administrative procedures and, furthermore, owing to the instability of previous land reforms, some producers are not confident that property rights are secure. Apart from the weak incentives for land transfer through the land market, short- and medium-term adjustments in land use outside the land market are made more difficult by the ban on sub-leasing land (Petrick *et al.*, 2013). In practice, however, some informal subleasing occurs.

Since 2000, agricultural performance has improved substantially and tenure arrangements are now more transparent. However, Pomfret (2013, p. 2) observes that "the path to land reform has left a legacy of weak land markets and difficulty in using land as collateral". The institutional arrangements are inadequate for coherent agricultural and rural development. He goes on to say that "While farm output has increased, interventionist policies and distrust of market mechanisms lead to resource misallocation and hamper productivity growth. In times of plenty, resource misallocation can seem a minor problem, but if a goal of diversification is to make the non-oil sector more resilient, then inefficient policies that promote an output mix determined by officials will not succeed in achieving this goal".

3.2 | Categories of agricultural producers

The farms in Kazakhstan can be divided into three categories:

- Agricultural enterprises;
- Private (or peasant) farms;
- Subsidiary household plots.

Agricultural enterprises, being the successors of the state and collective farms of the Soviet era, are mainly large-scale operations (Figure 3.3) and produce commodities on a strictly commercial basis. The average size of the 5,000 enterprises that are involved in grain production is about 3,000 hectares, but large-scale operations dominate the grain production sector. According to the Agency of the Republic of Kazakhstan on Statistics (ARKS), 77 per cent of the total grain output from agricultural enterprises was produced on enterprises that are larger than 5,000 hectares (ARKS, 2006). The share of Kazakh grain produced by agricultural enterprises increased from 54 per cent in 2003 to 63 per cent in 2007 and currently they account for about 65 per cent of production.

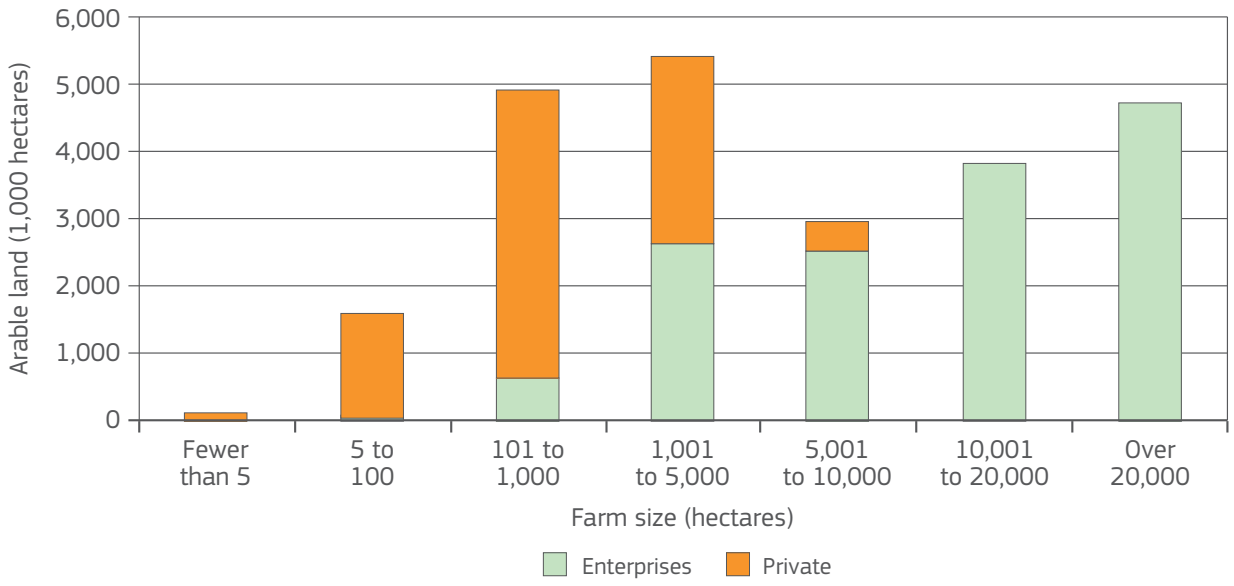

FIGURE 3.3: THE DISTRIBUTION OF ARABLE LAND IN KAZAKHSTAN ACCORDING TO OWNERSHIP (2009).
Source: Lindeman (2009).

Individual or 'peasant' farms are typically family farms and are substantially smaller than the agricultural enterprises (Figure 3.3). This type of farm has emerged since the early 1990s as a result of the policy of developing family-type farming and, according to the 2006 statistical survey, 95 per cent of the farms were at that time smaller than 1,000 hectares. Nearly 200,000 peasant farms are involved in grain production, accounting for about 35 per cent of the country's output. Like agricultural enterprises, peasant farms produce commodities chiefly for sale rather than for private consumption, but official data indicate that grain yields per hectare on peasant farms are significantly lower than on agricultural enterprises. This yield gap can in large part be attributed to the aging machinery fleet on peasant farms; peasant farms typically cannot afford to lease or purchase new equipment.

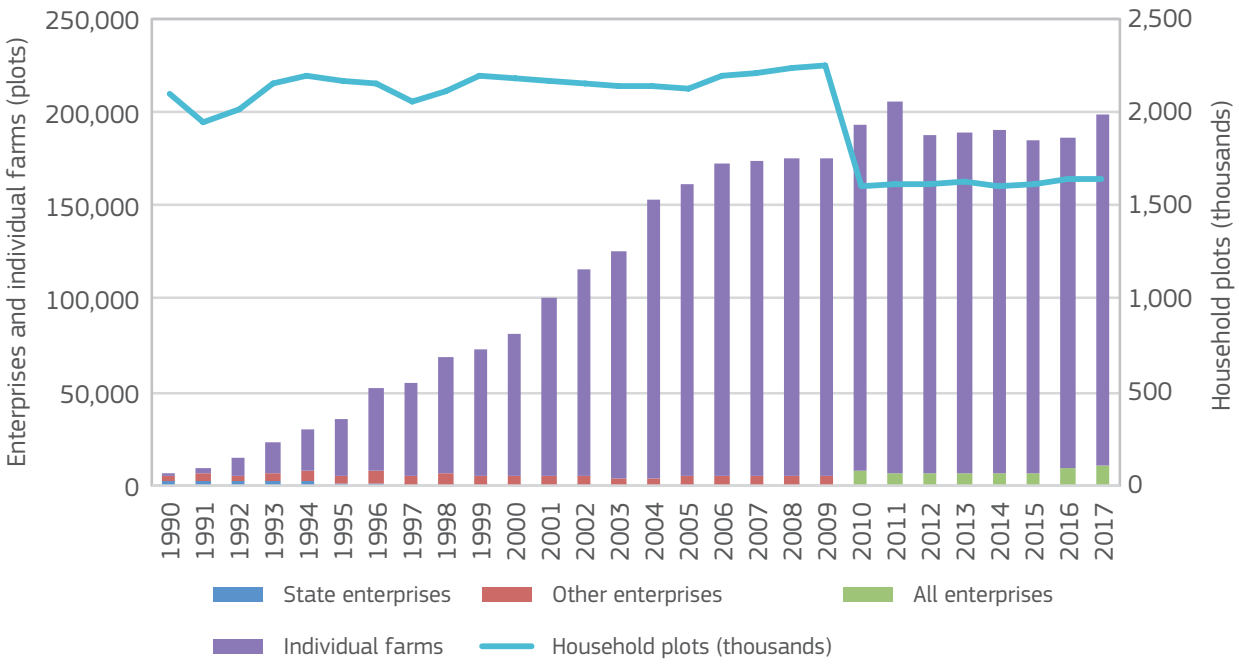

FIGURE 3.4: NUMBER OF OPERATING FARMS IN KAZAKHSTAN BY TYPE, END OF YEAR, 1990-2017.
Data sources: 1990-2009: OECD (2013a) and 2010-2017: ARKS (2018). The definition of farm types differs between sources, explaining the discontinuity at the year 2010.

Household farms are small personal (family) subsidiary plots (average size 0.15 hectares) that are used to produce crops or livestock chiefly for personal consumption. These land parcels also existed throughout the Soviet period. The 3 million household farms in Kazakhstan produce less than 1 per cent of the country's grain but account for 50 per cent of its poultry inventory and 85 per cent of its cattle.

Land reform and restructuring of the ownership of the former collective farm sector has led to a significant transformation of the farm structure (Figure 3.4). The number of household plots has been rather constant over the years, at around 1.7 to 2.2 million, depending on the source of data. The large structural transformation consists of the change of ownership from a small number of large state-led collective farms to individually-owned farms, resulting in an impressive increase in the number of operating farms. The number of active operations[9] that emerged from the former collective farms increased from under 5,000 in 1990 to 188,616 in 2012 (OECD, 2013a), of which:

- 6,197 were units which maintained their collective organisation in various legal forms, called 'agricultural enterprises' (average size just over 8,000 hectares), and
- 182,419 newly-emerged individual farms (average size of 270 hectares)[10].

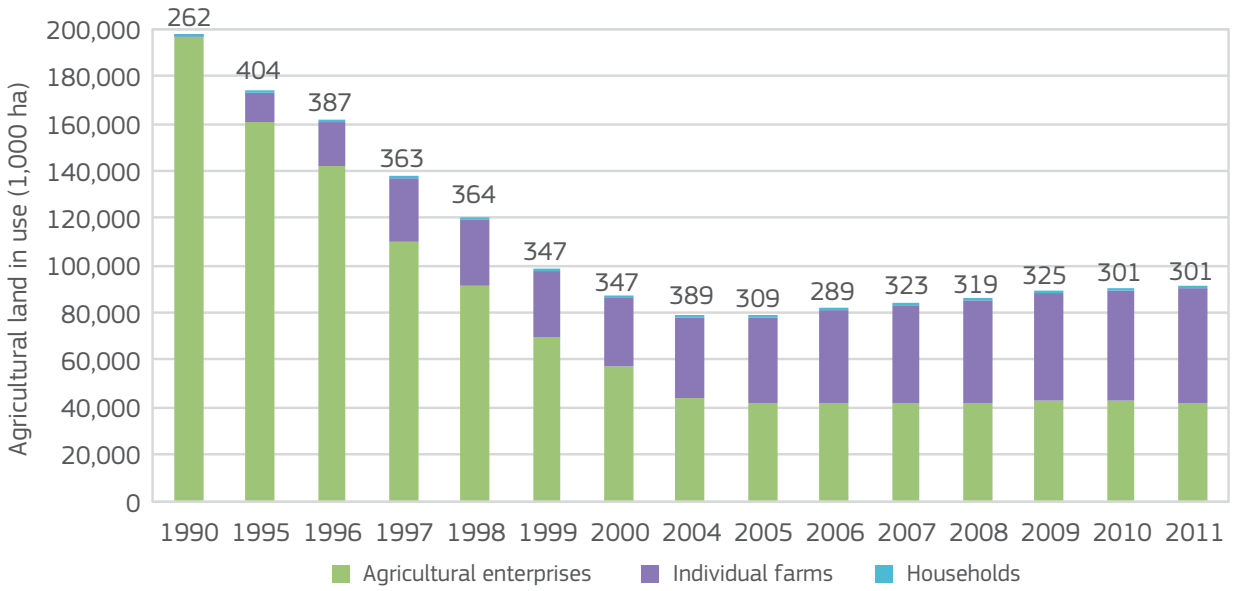

FIGURE 3.5: AGRICULTURAL LAND (INCLUDING ARABLE LAND, PASTURE LAND, HAY LAND AND OTHER LAND) IN USE BY DIFFERENT FARM TYPE (THOUSAND HECTARES).
Note: as the land area farmed by households (in blue) is hardly appreciable, the area is shown in figures on top of the bars. As explained in the text, enterprises exploit very little of the pasture land, and in reality much of this land is used by households, even though it does not appear as such in the statistics.
Data sources: ARKS (2011) and OECD (2013a).

Among the remaining large agricultural enterprises, the so-called agro-holding companies[11] play a major role in Kazakh agriculture. Agro-holdings evolved from grain trader and exporter companies, which then integrated – by what is referred to as 'backward integration' – secondary and primary processing industries, wheat production, elevator and input enterprises. Such a company typically operates as an umbrella company for numerous individual agricultural enterprises, providing operating capital and marketing channels for commodities produced on the farms. By the mid-2000s, around fifteen very large grain holdings had emerged. For example, Ivolga-Holdings controlled about one million hectares of farmland and owned eleven elevators in Kazakhstan (as well as 140,000 hectares and ten elevators in Russia) and accounted for 500,000-700,000 tonnes of grain exports

[9] Official statistics distinguish between 'registered' and 'active' agricultural entities. At the end of 2011 there were 214,008 registered agricultural enterprises and individual farms, of which 188,616 were active entities.

[10] According to the Kazakh Ministry of Agriculture, the rapid increase in the number of individual farms is due to the tax incentives which prompted many agricultural enterprises to re-register as individual farms.

[11] In Figure 3.4, included under 'other enterprises' until 2009 and under 'all enterprises' thereafter.

from Kazakhstan per year (Wandel, 2009). Oshakbayev (2010) estimated that the three largest ago-holdings controlled 700,000 hectares of sown area in the so-called North Kazakh Grain Region (NKGR) of North Kazakhstan, Kostanay and Akmola, the three *oblasts* that specialise in grain growing, produce much of the country's farm output by value, while the 15 agro-holdings controlled 35.0 per cent of the area under grain. In Kostanay *Oblast*, over 40 per cent of the agricultural area is held by the four largest holding companies.

The transformation of the farm structure and relocation of production factors has reversed the relative importance of large-scale and small-scale production. Little change has occurred in the share of agricultural land occupied by households, which – with average household plots of less than 0.15 ha – remains marginal. The agricultural land area occupied by household plots increased between 1990 and 1995, but since then has declined slightly. The area sown with agricultural crops is slightly lower, but has also remained stable over the past decade. During the same period a major reallocation has taken place between agricultural enterprises and individual farms. The share of the latter in total agricultural land utilised increased from 0.6 per cent on average in 1990-1992 (ARKS, 2011) to about 50 per cent in 2008, and the distribution has remained more or less stable since then (Figure 3.5).

The same structural transformation has taken place in terms of area sown with agricultural crops, although only rather recent data are available (Figure 3.6). The share of individual enterprises in sown area after the transformation has remained more or less constant at about 38 per cent. Large enterprises still account for more than 60 per cent, and household plots only 1 per cent of the total area sown.

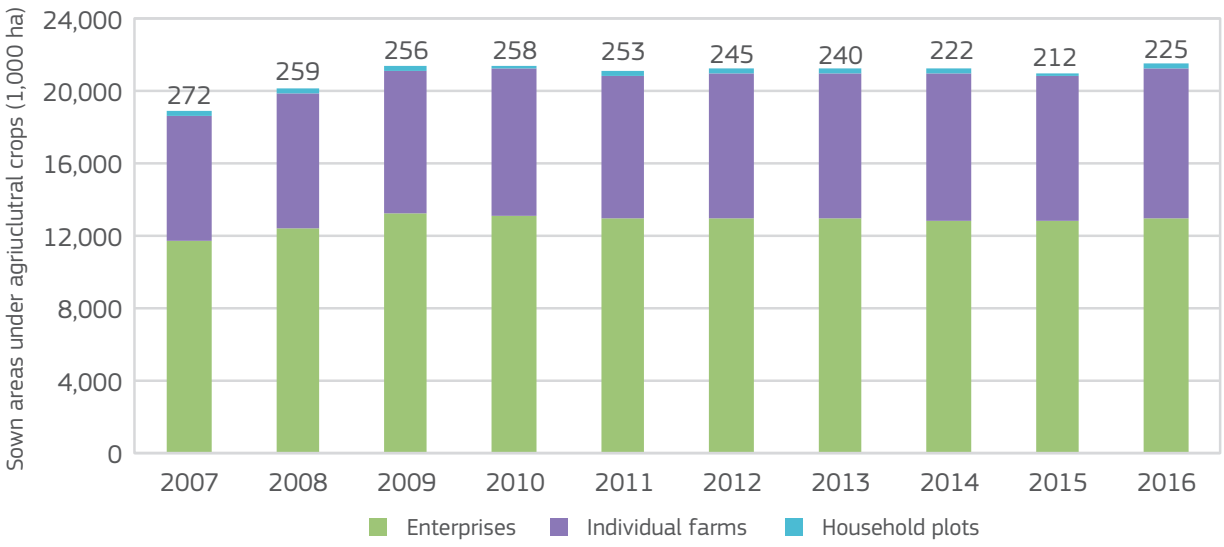

FIGURE 3.6: SOWN AREAS UNDER AGRICULTURAL CROPS IN KAZAKHSTAN BY TYPE OF AGRICULTURAL ENTITY, 2007-2016.
Note: as the land area farmed by households (in blue) is hardly appreciable, the area is shown in figures, on top of the bars.
Data sources: ARKS (2017).

Agricultural enterprises which produced almost two thirds of total gross agricultural output in 1990 (ARKS, 2011), contributed just one third in 2007, and their share further declined to less than one quarter in 2016. The share emanating from individual farms and household plots accordingly increased, from one third to over three quarters of total output between 1990 and 2009 (ARKS, 2011), and has remained more or less stable since then (Figure 3.7).

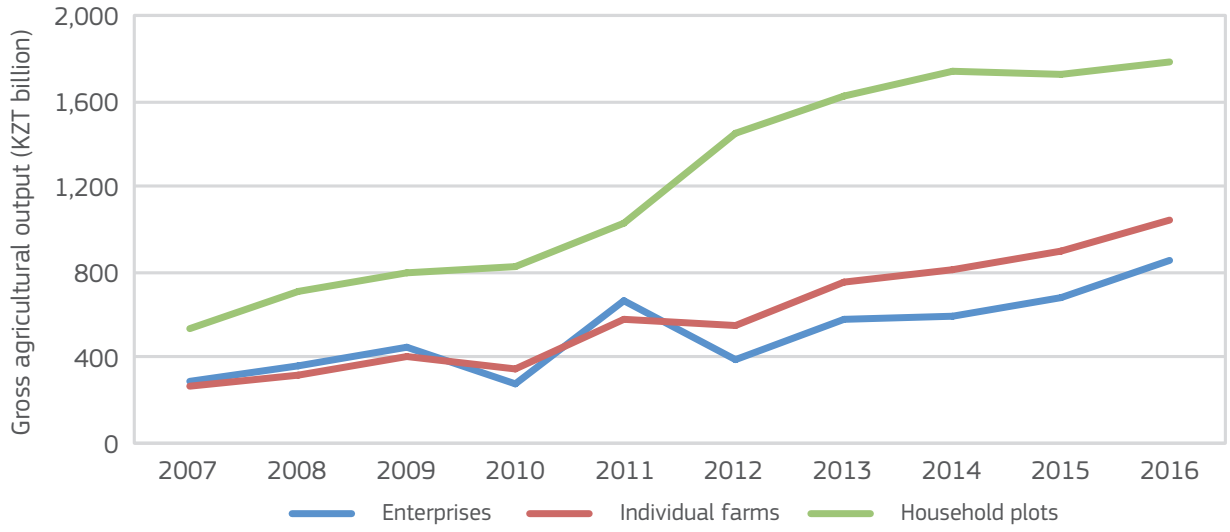

FIGURE 3.7: GROSS AGRICULTURAL OUTPUT AT CURRENT PRICES IN KAZAKHSTAN BY TYPE OF AGRICULTURAL ENTITY, 2007-2016.
Data source: ARKS (2017).

These shares in total production disguise significant variations in the contribution of different farm types to the output of specific products. There is a correlation between type of farm, land structure and output mix. Data from the Agency on Management of Land Resources of the Republic of Kazakhstan on the breakdown of land use between pasture and arable land in agricultural enterprises and individual farms illustrates this connection. Compared to individual farms, a larger share of the total land of agricultural enterprises is classified as arable and they exploit little of the available pasture which is, through formal or informal arrangements, in part used by rural households (OECD, 2013a). Indeed, livestock inventories fell to marginal levels in the agricultural enterprises during the 1990s, leaving rural households as the principal agricultural units that kept livestock. Individual farms have smaller portions of arable land, with pasture land constituting almost three quarters of their lands. In 1990-1992 households kept slightly less than one third of the total livestock inventory, but livestock numbers on household plots increased rapidly from the first half of the 2000s onwards and by 2007-2009 this share had risen to 80 per cent. This explains the relatively important and increasing contribution of rural households to wool, milk and meat production, and explains their large contribution to total gross agricultural output.

ARKS data show that agricultural enterprises are the dominant producers of grain (64 per cent in 2016, comparable to previous years, Figure 3.8) and eggs (64

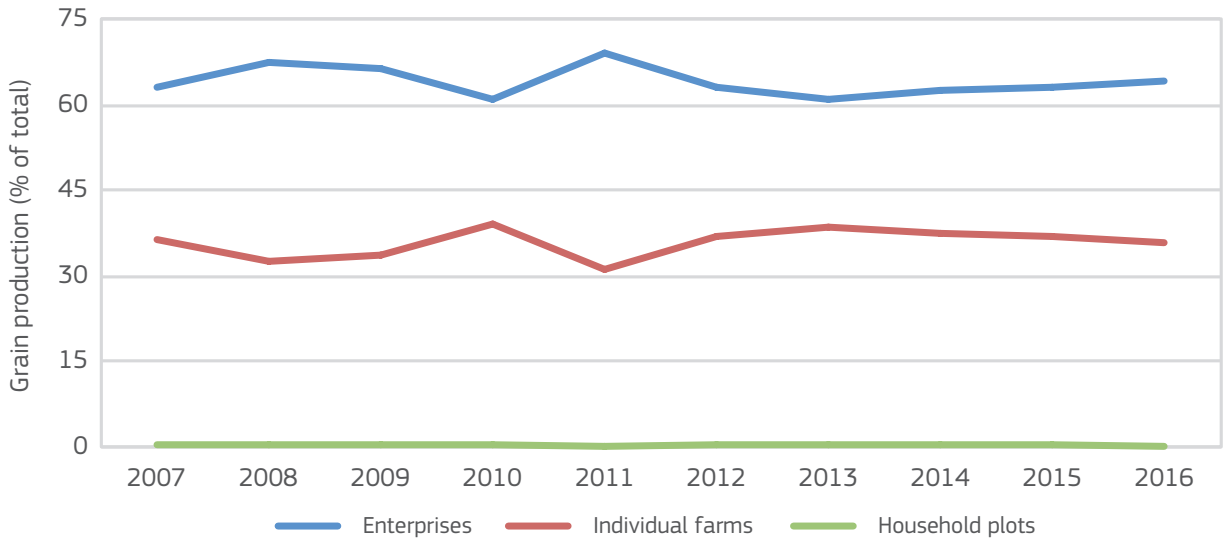

FIGURE 3.8: PRODUCTION OF GRAIN (INCLUDING RICE) AND LEGUMES IN KAZAKHSTAN BY TYPE OF AGRICULTURAL ENTITY, 2007-2016.
Data source: ARKS (2017).

per cent). Within these, agro-holdings play a major role: Akimbekova (2006), cited by Wandel (2009), estimated that about 40 holding companies operating in the grain sector controlled around 30 per cent of grain farm land and produced about two thirds of all grain sold both on the domestic and foreign markets. Private 'peasant' farms accounted for an average of 36 per cent of the grain (including rice and legumes) output, but dominated the production of cotton (97 per cent), sunflower seeds (68 per cent) and sugar beet (80 per cent) (ARKS, 2012). The remaining sectors, i.e. livestock and horticulture, are concentrated in rural households, whose share of grain production between 2007 and 2011 was just 0.2 per cent. By contrast, in 2011, household plots produced 88 per cent of milk, 76 per cent of meat, 71 per cent of potatoes, 68 per cent of wool and 49 per cent of vegetables (OECD, 2013a).

3.3 | Regional variations in agriculture

Because land lease arrangements play an important role, the areas under wheat differ from the farm areas themselves, thus the wheat producing area figures comprise the aggregates of the enterprises or farms' own cropping area plus the leased lands. In terms of wheat growing areas, the sector was composed of the following categories in 2009 (OECD, 2013a): below 1,000 hectares: 17 per cent; 1,000-8,000 hectares: 25 per cent; over 8,000 hectares: 58 per cent.

The structure of agricultural output in Kazakhstan has major regional variations (Figure 3.9). The NKGR produces much of the country's farm output by value (Figure 3.10). Most of the sunflowers and other oil crops are produced in the eastern *oblasts* of Pavlodar, East Kazakhstan and Almaty. Cotton and rice, both of which depend on irrigation systems based on the Syrdarya River, are cultivated in South Kazakhstan and Kzylorda *Oblasts* respectively. Almaty *Oblast* has mixed farming with both irrigated agriculture in the south and rain-fed agriculture in the eastern foothills. Even within *oblasts*, there are substantial differences in local conditions. For example, in the parts of North Kazakhstan and Kostanay adjacent to the Russian border which feature more reliable rainfall and better soils,

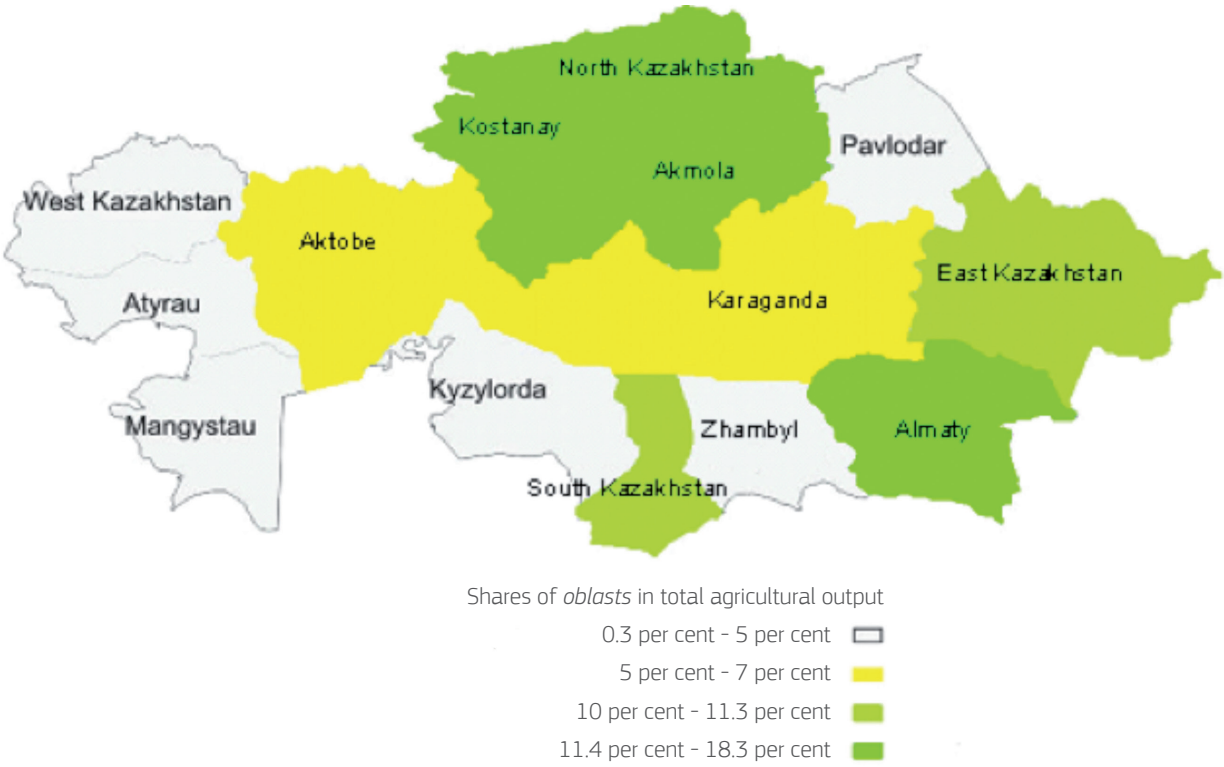

FIGURE 3.9: REGIONAL SPECIALISATION OF AGRICULTURE IN KAZAKHSTAN, 2008-2010 AVERAGE.
Data source: ARKS, 2012.

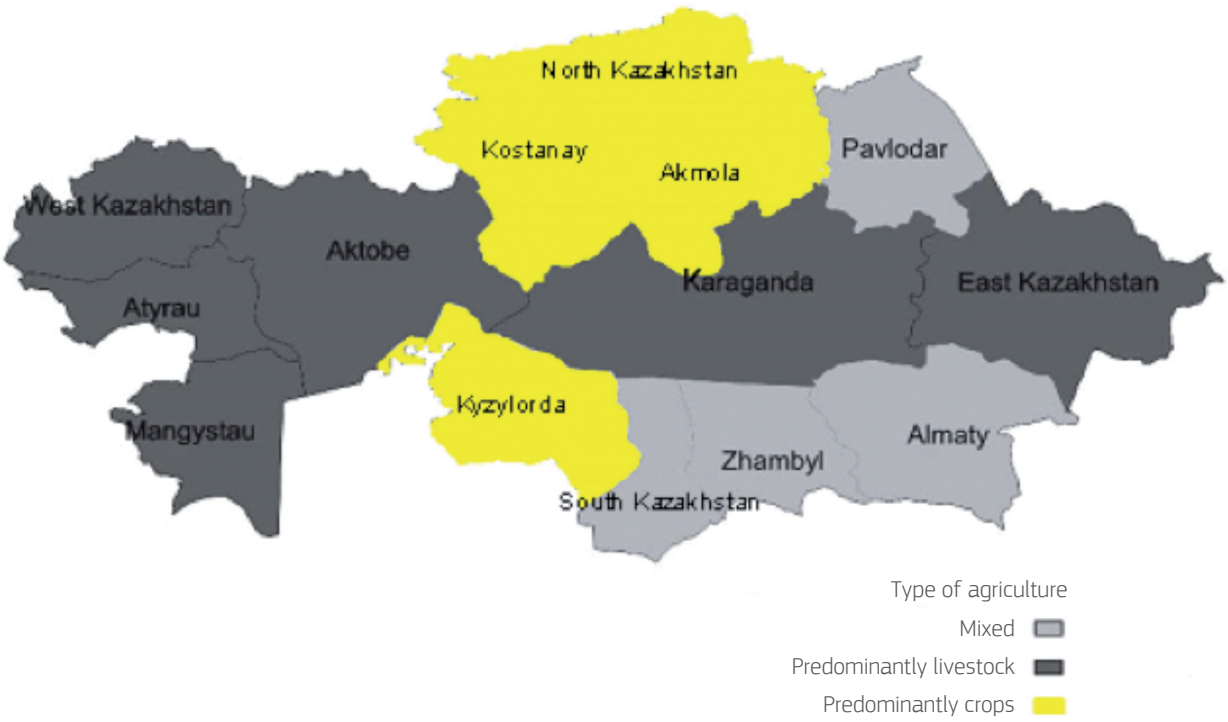

FIGURE 3.10: CONTRIBUTION OF REGIONS TO TOTAL AGRICULTURAL OUTPUT IN KAZAKHSTAN, 2009-2011 AVERAGE.
Data source: ARKS, 2013.

wheat yields are two to three times greater than in the southern part of Kostanay *Oblast* or in Akmola *Oblast*.

The average farm size differs considerably by region (Figure 3.11). In 2009 the average size of an agricultural enterprise in Kazakhstan was 8,356 hectares, but in Mangistau *Oblast* it was 359,100 hectares. Agricultural enterprises in the other *oblasts* in the western and central regions (Atyrau, Aktobe, Karaganda and Kyzylorda) were on average bigger than the national average, as they were

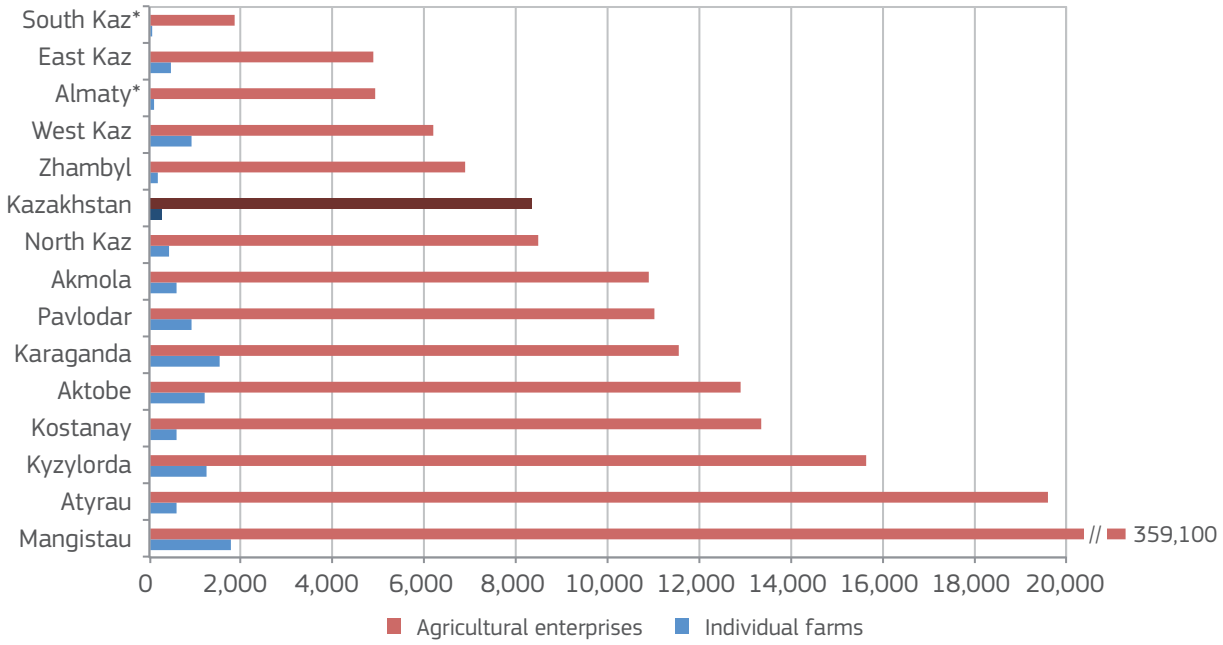

FIGURE 3.11: AVERAGE LAND SIZES OF AGRICULTURAL ENTERPRISES AND INDIVIDUAL FARMS IN KAZAKHSTAN BY REGIONS, 2009 (HA).
* In 2009, average size of individual farm in South Kazakhstan was 29 hectares; 95 hectares in Almaty Oblast; 1,500 hectares in Astana city area; and 29 hectares in Almaty city area.
Data sources: ARKS (2012) and OECD (2013a).

in the NKGR. The *oblasts* of Zhambyl (average of 6,878 hectares), Almaty (4,938 hectares), East Kazakhstan (4,872 hectares) and South Kazakhstan (1,869 hectares) were at the other extreme. Individual farms also showed large regional variations in size, from 1,782 hectares in Mangistau to 29 hectares in South Kazakhstan and 95 hectares in Almaty *Oblast*. These regional variations indicate that where economies of scale are more pronounced, farms are larger and agricultural enterprises more prevalent. Where they are less strong, for example in cotton and in mixed farming in the south-east, individual farms have become the norm.

3.4 | Contribution of agriculture to GDP and employment

In 1991 just over one quarter of the workforce was formally employed in agriculture, although agricultural output accounted for less than 15 per cent of GDP. With the rapid growth of oil output, agriculture's share of GDP declined from 34 per cent in 1990 to under 5 per cent in 2011. The long-term trend in employment is less clear due to a change in the definition of employment which has substantially increased the number of employed in agriculture since the 2000s[12]. Comparing within the periods when the series were consistent, the trends in shares of agriculture in employment and in GDP diverged in the 1990s, while in the 2000s the average annual number of workers at agricultural enterprises declined steadily from 142.8 thousand in 2007 to 117.4 thousand in 2011 (ARKS, 2012). Indeed, during the 1990s people moved to the countryside as a coping mechanism (OECD, 2013a), but the onset of economic growth in the 2000s brought on rural-urban migration.

The declining share of agriculture both in GDP and employment observed in Kazakhstan in the 2000s was common to other emerging and OECD economies. However, agriculture in Kazakhstan continues to be the largest sector in terms of employment (26 per cent of the total) and there is a considerable gap between labour productivity in this sector and the rest of the economy. There is also a shortage of skilled labour in agriculture (Petrick *et al.*, 2011).

[12] Agricultural employment figures were revised in 1999 in connection with the introduction of the new classification of the economic sectors, then again in 2001; in accordance with the ILO methodology, persons involved in agricultural activity within rural households were included in the self-employed category.

4

AGRICULTURAL POLICY **INSTRUMENTS**

4 Agricultural policy instruments

In this chapter, domestic policy instruments, general services to agriculture, and trade policy instruments and agreements are described in three separate subsections.

4.1 | Domestic policy instruments

In the first decade of Kazakhstan's independence, the principal domestic policy instruments were state purchases and a limited number of input subsidies. These instruments were coupled with non-tariff trade regulation (export restrictions, and export and import licensing). During the 2000s, the scope of policy instruments was broadened and a special tax regime for agriculture emerged. The decline in the livestock inventory referred to above resulted in Kazakhstan becoming a net importer of livestock products in the mid-2000s, and per tonne payments were introduced and rapidly increased in size and product coverage. Per hectare payments were introduced in 2007 with the intention to diversify crop production, and the scale and scope of concessional credit was expanded (OECD, 2013a).

The current sectoral programme for agriculture, the *Programme for Development of Agro-Industrial Complex in the Republic of Kazakhstan* in 2013-2020 (*Agribusiness 2020*), was approved in February 2013. The programme's main policy objective is to create conditions to enhance agro-business competitiveness. It maintains the approach described above of boosting agricultural production as part of the strategy to diversify the national economy. It includes new credit support instruments, such as interest rate subsidies and credit guarantees, and additional emphasis has been placed on assisting local producers to face competition in view of integrating international trade. Other objectives associated with agricultural development, such as the sustainable use of resources and rural development, are not included in this programme. It was planned to allocate KZT 3.1 trillion over the eight years of the programme's implementation, of which 80 per cent would be provided from the national budget, 7 per cent from local budgets, 10 per cent through the emission of government securities and 3 per cent from the state KazAgroHolding and its daughter companies, such as the FCC (OECD, 2013b).

4.1.1. Market price interventions

Market price support (MPS) is the dominant component of Kazakhstan's producer support estimate (PSE): over two thirds of support is provided through MPS, due to border protection for livestock products and interventions in the grain sector (OECD, 2013b).

A negative MPS for wheat was recorded for almost all years during the period 1995-2011 (exceptions being 2005-2006 and 2009-2011); in other words, wheat producers in Kazakhstan generally received prices below those of external markets (OECD, 2013a). Wheat prices are affected by the pricing policy of the FCC, and in recent years FCC has implemented a countercyclical approach depending on the market situation. Thus, in some years, wheat is subjected to export restrictions, as was the case in 2008, or receives support through state purchases (in 2009) and export transportation subsidies (in 2009-11). Added to this is uncertainty caused by *ad hoc* measures taken by Russia. For example, from 15 August 2010 the Russian government imposed a ban on grain exports after abnormally hot and dry weather destroyed over one third of Russia's grain harvest. The world grain market responded with an increase in prices. The ban was lifted on 1 July 2011 (RT News, 2011).

Price policy interacts with other factors that contribute to the gap between domestic and international wheat prices. The considerable infrastructure deficiencies in Kazakhstan (discussed below) prevent domestic agents from benefiting fully from the higher prices found in external markets. It is also suggested that access by private business to the existing infrastructure is crowded out by the FCC with its domestic and export operations. Thus, the estimated MPS for wheat – indeed for all commodities in Kazakhstan – results from policy operations in markets with weak infrastructure and organisation, and OECD (2013a) notes that the effects of both these factors on prices are closely intertwined.

4.1.2. Per tonne and per hectare payments

Per tonne payments were first provided in 2006 for poultry only, but coverage was rapidly extended to almost all livestock products, including poultry, beef, pig meat, sheep, milk, eggs and wool. In 2010-2012, over two thirds of all payments went to poultry and egg producers (OECD, 2013b). Total spending on such payments during these three years amounted to 7 per cent of the total PSE and 20 per cent of the budgetary transfers in the PSE.

Per hectare payments is the largest single policy measure, contributing 10 per cent of the total PSE in Kazakhstan in 2010-2012 (OECD, 2013b). These payments are provided for government approved 'priority crops' including grains, oilseeds, sugar beet, forage crops, horticultural crops, cotton and potatoes. The exact list of such crops is determined for each region by local authorities. The reasons for the introduction of per hectare payments were:

- To ensure that support is actually going to the priority crops – in this case, plantings serve as straightforward evidence;
- Concern that current crop production practices lead to soil depletion and water over-use. Per hectare payments were supposed to stimulate improved cultivation practices.

Rates of payment differ between crops, and can further vary for some crops depending on the cultivation technology used. For example, producers are eligible for higher payment rates if they apply drip irrigation or, in the case of grain, comply with 'scientific' requirements. However, substantial delays in the transfer of payments mean that producers tend to make production decisions largely without factoring in the availability of payment at the time of planting. Although the programme did not yield the expected outcomes in terms of crop diversification, it is foreseen that KZT 240 billion will be allocated for per hectare payments during the eight-year period of the *Agribusiness 2020* programme (OECD, 2013b).

4.1.3. Subsidies and price controls

Direct subsidies for variable and fixed inputs constituted 13 per cent of the total PSE in the period 2010-2012 and over one third of budgetary transfers in the PSE (OECD, 2013b). The main payments for crop producers include subsidies for mineral fertilisers and chemicals, elite seeds, subsidies for delivery of irrigation water, and maintenance of permanent plantations. Livestock producers receive subsidies to purchase feed and pedigree livestock.

Seed support is available to all crop producers. Farmers are compensated up to 40 per cent of the cost of purchasing elite seeds. For priority crops the producers of original seeds receive 40 to 100 per cent of the cost of production. This support is paid per hectare and from 2009 the rates of support per hectare have been differentiated according to the level of technology used in the farm. The subsidy is twice as high for farmers using resource-saving technologies, as opposed to traditional technologies. In order to receive the subsidy, until 2010 producers of elite seeds were required to sell the seeds at a certain price. The farmers who sold the seeds at the price that did not exceed the average market price (KZT 39,000 per tonne) were eligible for a subsidy of KZT 19,330 per tonne in 2009 (OECD, 2011).

In addition to direct payments, *prices of diesel* for agricultural producers are regulated during the sowing and harvesting periods when the government imposes a ban on the export of diesel fuel in an effort to keep seasonal price increases in check. Fuel prices are subsidised by a similar percentage and in a similar manner to fertiliser prices (i.e. through payments to fuel suppliers, not direct subsidies to farms). Upper price limits and total volumes supplied at regulated prices are fixed.

4.1.4. Credits and tax concessions

The annual volume of *concessional credit* has steadily expanded since the mid-2000s, from around KZT 24 billion in 2004 to KZT 214 billion in 2012. In 2010-2012 it contributed the same share to the total PSE (7 per cent) as per tonne payments (OECD 2013b). Fundamental obstacles to commercial lending for agriculture in the early transition period caused Kazakhstan to set up a fully administered system based on the provision of public funds at fixed interest rates, with state agencies the sole providers of such concessional credit. These agencies include (OECD, 2013b):

- the FCC, which provides loans for field works;
- KazAgroFinance, a state agency created in 1999 which implements financial leasing of machinery and livestock;
- the Agrarian Credit Corporation,[13] offering various kinds of loans to medium-size borrowers; and
- the Fund for Financial Support of Agriculture, which provides loans to micro-borrowers and their associations.

In 2011 the daughter companies of KazAgroHolding managed approximately 60 per cent of the entire agricultural credit portfolio (OECD, 2013b). Commercial lending dominates the flow of new credit to agriculture, accounting in 2010-2011 for around three quarters of the total amount of new loans. Commercial credit is predominantly taken by large-scale borrowers that are profitable and able to provide adequate collateral, while the concessional credit system is oriented to small and medium borrowers. According to OECD (2013a), the latter accounted for 96 per cent of

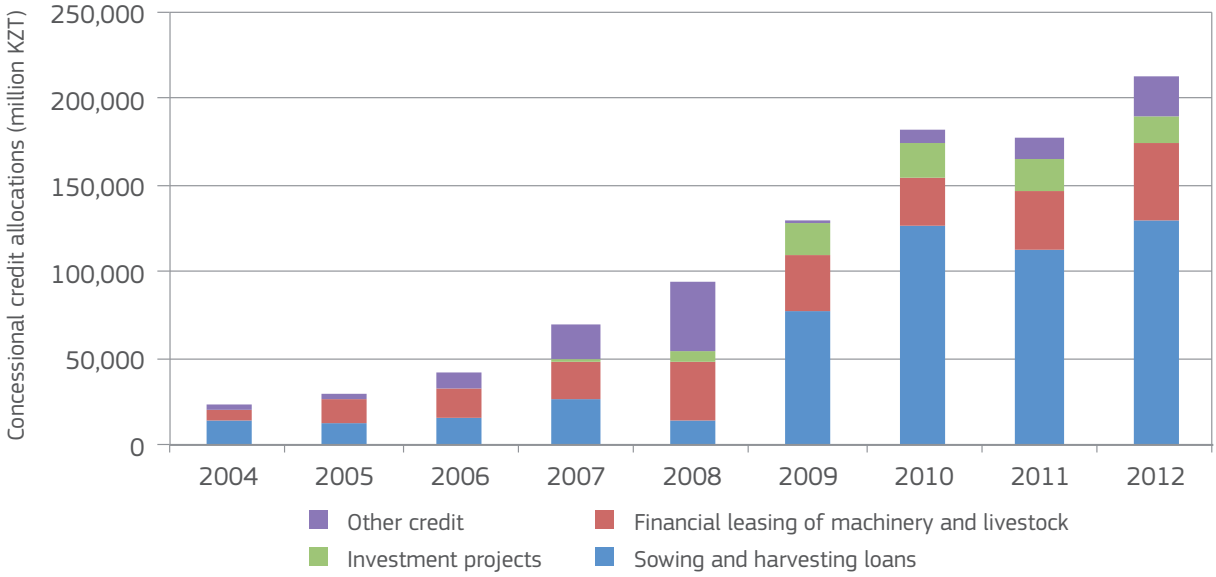

FIGURE 4.1: KAZAKHSTAN: CONCESSIONAL CREDIT ALLOCATIONS IN 2004-2012 (KZT MILLION).
Projects credited through KazAgroFinance.
Source: KazAgroFinance, figures taken from OECD (2013a).

[13] The Agrarian Credit Corporation was created in 2001 with the objective to develop a nation-wide network of Credit Partnerships and to act as a wholesale lender to these associations.

total KazAgroHolding credit issued in 2011. Concessions are in the form of fixed reduced interest rates, which vary depending on the term and purpose of the loan and on the origin of credit resources. In recent years, these funds have been substantially reoriented towards credit for sowing and harvesting (short term loans are provided at interest rates varying from 4 to 12 per cent per annum) and state-selected investment projects (Figure 4.1).

Both agricultural producers and food processors benefit from concessional credit and preferential *leasing of machinery and equipment* through a programme implemented by KazAgroFinance. Direct subsidies to interest rates and leasing fees are also available if loans or leasing are provided by commercial companies.

4.2 | General services provided to the agricultural sector

While almost 80 per cent of total support to agriculture is provided to producers individually, the rest is directed to general services and support to food processors (OECD, 2013a). Financing of activities that provide general benefits to the agricultural sector is measured by the General Services Support Estimate (GSSE) indicator. To achieve its stated agricultural development goals, it is necessary for Kazakhstan to correct the major deficiencies in transport infrastructure, water and land management, plant and animal health and food safety systems, education, research, information, and knowledge dissemination actions. Expenditure on general services for agriculture in Kazakhstan has increased steadily since the beginning of the 2000s, albeit from a very low base in the 1990s when due to the economic recession the funding for these areas was dwarfed (Figure 4.2).

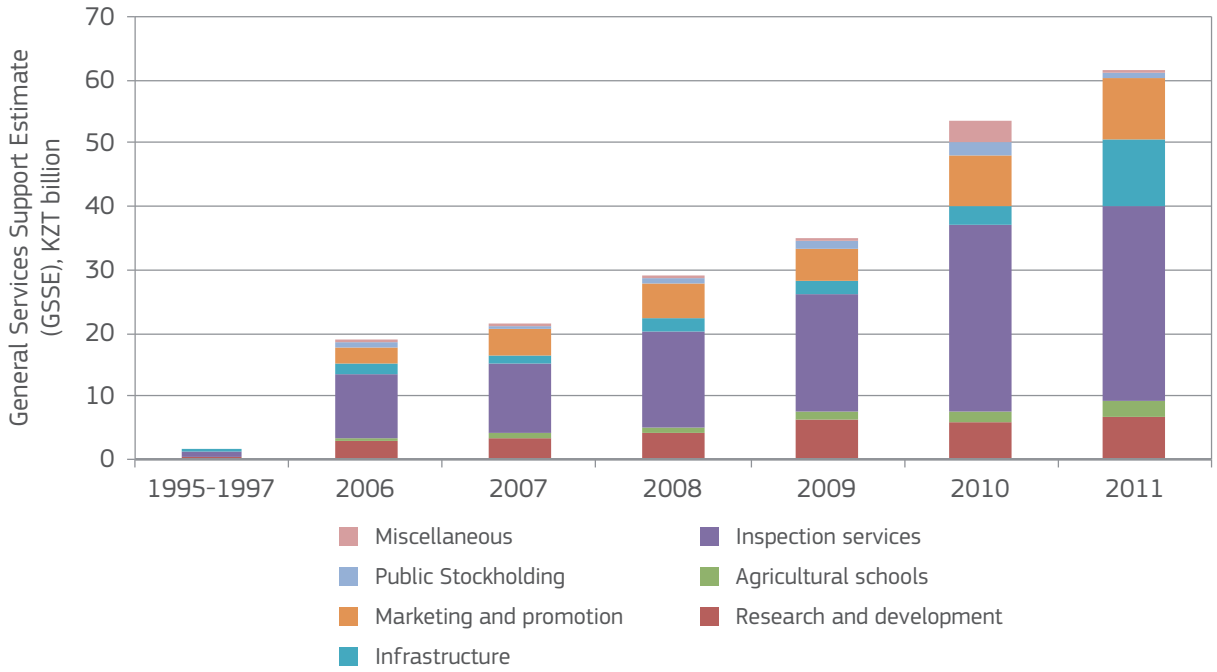

FIGURE 4.2: LEVEL AND COMPOSITION OF GENERAL SERVICES SUPPORT ESTIMATE IN KAZAKHSTAN, 1995-2011, IN KZT BILLION.
Source: OECD (2013a).

The most important increases in funding concerned the financing of *inspection services* (phytosanitary and veterinary systems). The top *veterinary* bodies in Kazakhstan are the Direction of Veterinary and Food Safety, which carries out strategic and regulatory activities, and the Committee for Veterinary Control and Supervision, which has control and supervisory functions. Both are based within the Ministry of Agriculture. Also, the share of private veterinary services has increased substantially in recent years, notwithstanding the shortage of investment. The top *phytosanitary* body in Kazakhstan is the Direction of State Phytosanitary Inspection and the Committee for State Inspection of the Agro-Industrial Complex, which are subordinate structures of the Ministry of Agriculture.

Another rapidly growing GSSE expenditure was *marketing and promotion*, an area which did not exist under the planned economy. Marketing and promotion expenditures have focussed on improving the competitiveness of agricultural products, developing agro-food processing and the warehouse receipt system, and the development of market information systems in rural areas (OECD, 2013a). KazAgroMarketing was created in 2003 as a state agency to disseminate market information, advice and promotion, training, and business assistance. It has a network of 160 rural information and consultation centres that operate across all country regions. Since its creation, the key activity of KazAgroMarketing has been price monitoring. It covers 138 basic food items in all country regions.

Funding for *research and development* has also increased since the mid-1990s, in particular since 2008. KazAgroInnovation, established in 2007, fully owned by the government and the umbrella institution for agricultural research in Kazakhstan, it currently incorporates 23 research institutes with their 26 regional branches, 14 experimental stations, and six innovation and analytical centres. These institutions cover practically all fields of agricultural research and operate in all regions of the country. OECD (2013a) states that the applied research programme for the agro-industrial complex for 2009-2011 focussed on six priorities:

- Creation and improvement of stress-resistant crop varieties and resource-saving technologies;
- Improvement of technologies for processing and storage of agricultural products;
- Creation and improvement of agricultural animal breeds, modern animal feeding and keeping technologies, and development of veterinary medicines and vaccines;
- Development of machinery complexes for moisture- and energy-saving technologies and systems of water supply for remote farms;
- Rational management of natural resources; and
- Scientific principles for strategic agricultural development.

The *Law on Science* (2011) stipulates that basic state financing should be given to research and technical activities in order to cover expenditure on research infrastructure, services, facilities and administration. This basic financing is complemented by project and grant financing. According to the Kazakh Ministry of Agriculture, in 2011 the share of agriculture in total public outlays for research was estimated to be 12 per cent.

Compared to R&D, *agricultural education* continues to receive much less funding. OECD (2013a) notes that ten higher education institutions train specialists for the agro-business sector in 18 disciplines. There are also 168 rural vocational schools for technical and professional education in 25 disciplines. The agricultural sector in Kazakhstan faces acute shortages of skilled and highly skilled labour. Several factors contribute to this situation. One is that agriculture is a low-paying sector. In addition, living and working conditions in rural areas are much less favourable than elsewhere.

KazAgroInnovation began to set up an *extension system* for agricultural enterprises and individual farms in 2009, and this currently includes ten knowledge dissemination centres operating in eight regions (OECD 2013a). These were to be extended during the period 2010-2014 and, by 2015 five new extension centres were to be established so that all regions are covered. In addition to knowledge dissemination centres of KazAgroInnovation, 160 rural information consulting centres operate as structural divisions of KazAgroMarketing.

Infrastructure financing includes water management and land reclamation. The highest level of spending occurred between 2001 and 2003 when a large project to improve irrigation and drainage systems was implemented. However, towards the end of the 2000s, the funds directed for infrastructure improvement decreased substantially (OECD, 2013a).

4.3 | Trade policy agreements and instruments

Concerns about ensuring domestic food supplies restraining food price inflation were the main drivers of trade policy in the early 1990s. A fairly liberal import regime was combined with restrictive export measures (OECD, 2013a). Export licensing and export quotas were actively applied until the mid-1990s, while the key agro-food items were imported at zero tariffs and faced few non-tariff barriers. In 1996, however, import tariffs were imposed on several key imports, while export restrictions were relaxed. Since the mid-1990s, the government has

begun signing bilateral and regional trade agreements within the CIS, and Kazakhstan's trade policy instruments are now in large part formed within the framework of the Customs Union (CU) between Belarus, Kazakhstan and Russia described below.

4.3.1. Regional trade agreements

The ECO and bilateral trade agreements

In 1992 Kazakhstan joined the *Economic Cooperation Organisation* (ECO), an inter-governmental regional organisation established in 1985 by Iran, Pakistan, and Turkey to promote the sustainable socio-economic development of the member states (OECD, 2013a). On 6 March 2000, a Framework Agreement on ECO Trade was signed to enhance trade relations among the members through an agreement aimed at liberalising regional trade, and the ECO Trade Agreement was finalised and signed in 2003. Kazakhstan has also signed and implemented five bilateral free trade agreements with CIS countries, namely Kyrgyzstan (1995); Uzbekistan (1997); Ukraine (1998); Georgia (1999) and Armenia (2001). These agreements propose to abolish all unjustified restrictions in trade, but OECD (2013a) states that they have not been fully effective in doing so. Kazakhstan had also signed about 30 bilateral agreements with non-CIS countries by 2010. The impacts of these bilateral and regional arrangements on Kazakhstan's trade policies, other than the CU discussed below, have in general been minimal.

The Eurasian Economic Community

Kazakhstan's most important regional economic integration framework is based on the former *Union of Five* (Belarus, Kazakhstan, Kyrgyzstan, Russia and Tajikistan). In January 1995, Belarus, Kazakhstan and Russia signed an agreement to form a Customs Union, and this was extended to include Kyrgyzstan in 1996 and Tajikistan 1999 (Figure 4.3). In 2001 the Union of Five became the *Eurasian Economic Community* (EurAsEC), after the ratification of the Treaty signed by the member countries in October 2000. EurAsEC aims to develop the Common Economic

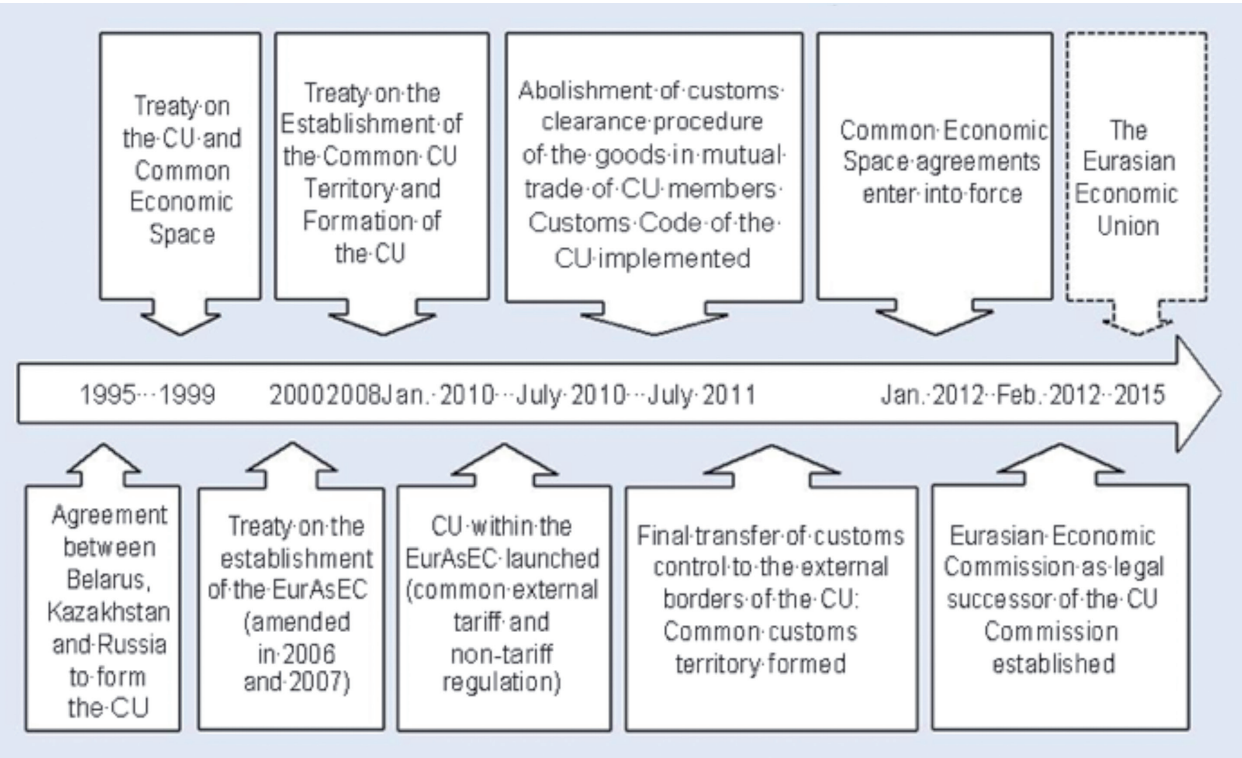

FIGURE 4.3: TIMELINE OF EURASIAN INTEGRATION.
Source: Yacheistova (2012)

Space (CES) between its members, as described below. The renaming was intended as a catalyst to completing tariff harmonisation by 2005, but little progress was made at that time according to OECD (2013a). The ultimate goal was an Eurasian Economic Union which came into force on 1 January 2015. The three founder members, Belarus, Kazakhstan and Russia, were soon joined by Armenia and Kyrgyzstan.

The *Customs Union* (CU), which was set up after three EurAsEC members (Belarus, Russia and Kazakhstan) signed a Treaty on the Establishment of the Common Customs Territory and Formation of the CU in October 2007, is the principal pillar of EurAsEC. Intense harmonisation of the trade-related regulatory base and preparations for a common customs regime took place as a consequence. The Treaty forms a single undertaking together with subsequent agreements: the signatories must apply all the terms or withdraw from the CU (OECD, 2013a). Since 2007, 80 such agreements have been adopted by the member countries. In July 2010, a common customs code, customs rules and common external tariff came into effect. These measures have treaty status, taking precedence over national trade laws and regulations, and can only be revised by agreement among the CU members. Customs clearance and control procedures at the Kazakh-Russian border were abolished on 1 July 2011. The work on the CU legal framework continues: in the agro-food area it is focused on further harmonisation of World Trade Organization (WTO) Sanitary and Phytosanitary (SPS) and technical regulations between the CU members and with the WTO requirements. The integrated customs area forms part of EurAsEC and is managed by the regulatory bodies of EurAsEC (Box 4.1).

Box 4.1
EurAsEC and Customs Union institutions.

The following institutions have been developed within the EurAsEC framework:

- *The Interstate Council* unites national heads of state and the heads of government. Its role is to define the overall strategy and set directions for the Community policies, including policies related to the agro-food sector, food safety, transportation, energy, labour, and international activities of EurAsEC;
- *The Inter-Parliamentary Assembly* consists of delegates appointed by each member country according to the size of the country. It co-ordinates EurAsEC legal policy and creates conditions for harmonising legal codes of the member states;
- *The Community Court of Justice* is responsible for resolving disputes on issues of economic importance and which may concern the implementation of laws or treaties adopted by EurAsEC.

In 2007, a *CU Commission* was established whose main task was to ensure the functioning and development of the CU at the supranational level. Its decisions were legally binding and effective in domestic law without the need for adoption of a special legislation. Within the framework of the CES, on 1 February 2012 a *Eurasian Economic Commission* (EEC) was created that took over the duties of the CU Commission to become a single permanent regulatory body of the CU and the CES. Beyond the competences previously held by the CU, the EEC will also cover areas of macroeconomic, competition and energy policies, industrial and agricultural policy, natural monopolies, state and municipal purchases, international trade in services and investment, transport, currency policy, protection of intellectual property, migration policy, and other.

Source: adapted from OECD (2013a).

For Kazakhstan, the establishment of the CU involved an increase in tariff levels on agro-food products which were largely aligned with those applied by Russia, including the introduction of tariff rate quotas on meat. Jandosov and Sabyrova (2011a and 2011b) reported a substantial increase in tariff protection: the total trade-weighted average import tariff changed from 4.30 to 12.56 per cent after the adoption of the common CU tariff (the weights were based on 2009 imports, and the CU tariffs accounted for Kazakhstan's transition rates applicable in the second half of 2011). For agriculture and hunting, and the services in these two sectors, the respective weighted average tariff increased from 4.35 to 12.07 per cent.

The three CU members signed a Declaration on Eurasian Economic Integration in November 2011 and the introduction of a *Common Economic Space* followed in January 2012. This anticipates the development of a harmonised legal base, a common infrastructure, and co-ordination on tax, monetary, currency and other policies. In January 2013, a draft Concept of Co-ordinated Agro-Food Sector Policy was prepared. This covers issues concerning state support, market regulation, technical and phytosanitary regulation, export enhancement, innovations and exchange of information in agriculture (OECD, 2013a) and is intended to lay the basis for a future EurAsEC agreement on a co-ordinated agro-industrial policy.

4.3.2. The WTO process

Kazakhstan applied to join the WTO in 1996 (Hindley, 2008). Although negotiations initially progressed quickly, the process slowed after 1998 when the government introduced *ad hoc* trade restrictions. The negotiations slowed again in the late 2000s amid the uncertainties on the implementation of the CU. Also, in 2008, Kazakhstan imposed export restrictions in response to the spike in world grain prices. At the same time, the expansion of agricultural subsidies introduced more potential obstacles to agreement on a protocol of accession and the list of commitments. Some of these obstacles, such as the temporary export restrictions, were subsequently removed, and progress was made on making legislation on food safety and marketing standards and on plant and animal health compatible with the principles laid down in the WTO SPS and Technical Barriers to Trade Agreements (Kalymbek and Alimshanova, 2013). Kazakhstan finally became the 162nd WTO member on 30 November 2015.

4.3.3. Trade policy instruments

OECD (2013a) summarises the history of trade policy in Kazakhstan: Export restrictions were imposed in the first years after independence to limit the outflow of essential commodities. In 1994-1995, however, considerable trade liberalisation began: export quotas were cancelled, the list of licensed products was shortened, and export duties were simplified (and abolished in 1996). Liberalisation slowed down in the decade after 1998 when, in response to the negative impacts of the 1998 Russian crisis on Kazakhstan's economy, tariff and non-tariff regulations were introduced to protect local producers. The most important recent change in trade policy occurred in July 2010 when, prompted by the formation of the CU, a common customs code, customs rules and a common external tariff came into effect.

Import tariffs and tariff rate quotas

Tariffs are the main trade policy instrument in Kazakhstan. Tariff policy was relatively stable until 2006 when import tariffs for agricultural products, in particular bovine, swine and poultry meat, milk powder and white sugar, were increased. In 2007, meat import tariffs were again increased. In 2009, in addition to frozen bovine and poultry meat, non-*ad valorem* tariffs were introduced for swine and sheep meat in preparation for the implementation of the CU. The proportion of Harmonised Commodity Description and Coding Systems ten-digit tariff lines in the agricultural sector (HS 1-24) with zero duty rates fell from 18 per cent in 1996 to 4 per cent in 2010 and the number of tariff lines with non-*ad valorem* duties rose to 42 per cent. Most Favoured Nation (MFN) tariffs were highest for white sugar and meat products, followed by dairy products (OECD, 2013a). The lowest tariffs were applied to raw sugar, vegetables and cereals, with the exception of rice and non-seed potatoes.

Under the common external tariff of the CU introduced in July 2010, the main changes for agricultural products were the Tariff Rate Quotas (TRQs), with combined tariffs applied to meat imports. In 2010-2012, the TRQs were administered by the national governments. The TRQ provides substantial protection, with over-quota tariff rates varying between 50 per cent for beef and 80 per cent for poultry meat (OECD, 2013a). Kazakhstan's accession to the CU led to a substantial increase in import tariffs, but Isakova (2013) assessed the overall impact on imports to be 'relatively small'. By comparing the levels of Russia's MFN tariffs in 2011 (which for the agro-food group generally correspond to the CU's MFN tariffs applicable also for Kazakhstan) with Russia's final WTO-bound rates in 2020, Shepotylo and Tarr (2012) assessed the likely future evolution, due to the implementation of Russia's WTO accession commitments, of the common CU tariff. The degree of tariff changes can strongly depend on whether these changes are measured on the basis of simple average or trade weighted tariffs. Based on the weighted average tariffs, the most important tariff reductions among these selected groups are estimated for live animals, meats, oilseeds and beverages.

Temporary export bans and export subsidies

The authority to impose non-tariff measures on exports to third countries currently rests with the EurAsEC Commission. As with temporary restrictions on imports, the Commission can authorise national measures, but a CU member has yet to request the Commission to do so. A CU party may unilaterally impose a temporary non-tariff measure if it, among other specified cases, is aimed at the 'prevention or reduction of a critical shortage in the domestic market for food or other goods essential for the domestic market' (EurAsEC, 2009).

Until 1997, reduced rail transportation tariffs were applied to agricultural goods on the grounds of Kazakhstan's remoteness from major agricultural markets and poor connection to waterway transport routes (Mosoti and Gobena, 2007). No information is available on the policies related to transportation pricing during the period from 1997 to 2009, but since 2009 the government has provided transport subsidies for grain exports. Following the bumper wheat harvest crop in 2009, in November of that year the government reduced the cost of transportation of the grain exported through Russian and Chinese territories. This was explained by the need to free storage facilities in the northern region for the new crop by moving grain out to export markets. In August 2011, the Government again approved the continuation of a transport subsidy for wheat for 2011 and 2012 (OECD, 2013b). As of August 2012, the grain transportation subsidy was discontinued.

5

WHEAT PRODUCTION **AND PROCESSING**

5 Wheat production and processing

This chapter reviews, firstly, wheat production and yields in Kazakhstan, secondly, the characteristics of wheat production and, thirdly, the primary and secondary wheat processing industries in the country.

5.1 | Wheat production areas and yields

There is a very strong territorial concentration in grain production in Kazakhstan, and this has been increasing. The main wheat production region is located on the rich and productive chernozem and kashtan soils of the mainly flat northern/north-central territories (Figure 5.1) and, owing to its dry climate, produces good quality hard wheat. In the period 2010-2012, the NKGR accounted for 85.7 per cent of the country's total wheat output (of which spring wheat comprised 90 per cent). In terms of the reported spring 2013 planted area, the dominant grain and wheat producing *oblasts* were North Kazakhstan (31.2 per cent), Kostanay (29.5 per cent) and Akmola (32.5 per cent). The output of these *oblasts* is supplemented by production in Akmaty, Karaganda and East Kazakhstan, with a combined share of 8.0 per cent in the total output (Zharmagambetova and Flake, 2013). Some winter wheat is grown in southern Kazakhstan, but the annual harvest is a minor share of the country's total wheat production.

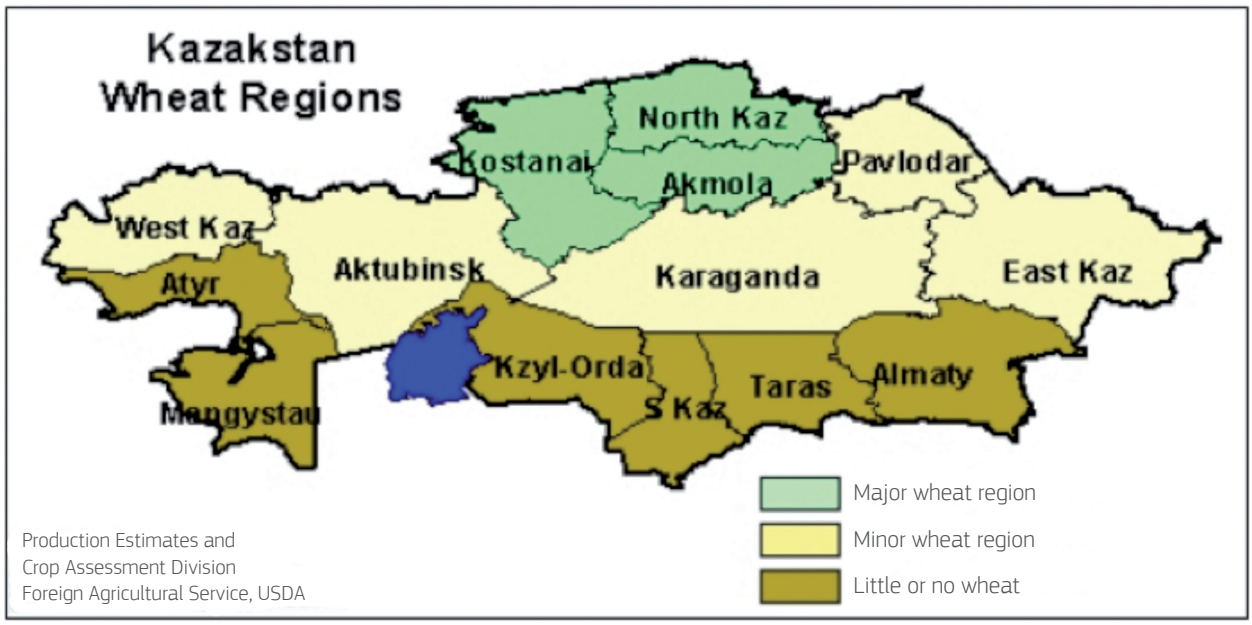

FIGURE 5.1: WHEAT REGIONS OF KAZAKHSTAN.
Source: USDA (2005).

The average area under wheat in Kazakhstan between 1995 and 2012 totalled 12,855,600 hectares (i.e. around 50 per cent of all arable land), with the smallest area recorded in 1999 (8,741,000 hectares) and the largest in 2009 (14,280,000 hectares). Hence, Kazakh grain production is dominated by wheat. The average total annual harvest (in the period 1995-2017) was 12,070,565 tonnes, with the lowest quantity harvested in 1998 (4,700,000 tonnes) and the highest in 2011 (22,732,000 tonnes) (Figure 5.2).

The performance of Kazakh wheat production varies widely due to climatic and agronomic factors rather than to the size of the cropping area. Over time, average yields have varied from 0.9 to 1.3 t/ha, and this fluctuation in the average yield per hectare has been the primary cause

of the considerable variation in total annual output of wheat: variations in the latter have been three times larger than the changes in the area under wheat. This is a consequence of several factors. Among climatic factors the risk elements are related mainly to the uneven distribution of precipitation as well as to the absolute amount of precipitation in a given crop year that can range from water scarcity or aridity to drought. Agronomic factors include various aspects of wheat husbandry: the crop site conditions, the biological bases used including the choice of variety, the level of farming and the size and structure of farms, the use of agrochemicals, the means and the quality of soil tillage, and that of harvest and transport.

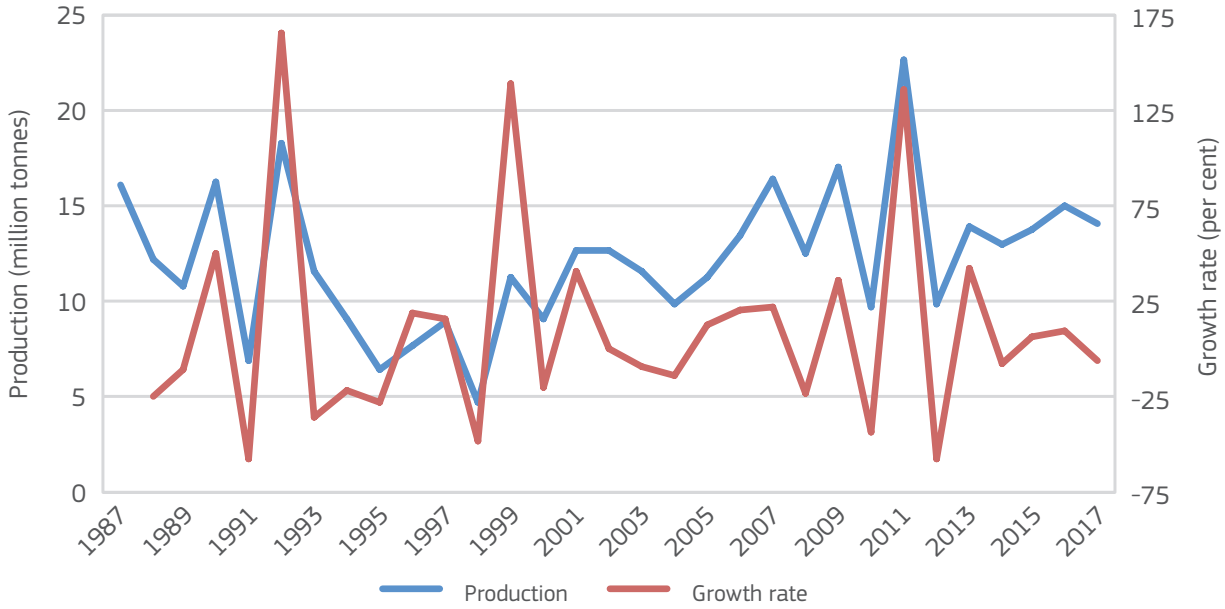

FIGURE 5.2: WHEAT PRODUCTION IN KAZAKHSTAN 1987-2017.
Source: USDA (2018).

Such a wide fluctuation in output makes any planned development of the appropriate levels of drying, storage and processing capacities virtually impossible. This fluctuation, along with the variations in the initial wheat stocks, also affects the levels of wheat exports. According to USAID-WFP data from 2011, the degree of fluctuation declined between 2010 and 2011 (19.0 per cent), but it is still much greater than in Pakistan, another country with a wheat export potential in the region (10.0 per cent). In the key Kazakh wheat and flour export markets the coefficient of variation in wheat production exceeds the Kazakh level: Afghanistan: 31 per cent, Tajikistan: 21 per cent and Kyrgyzstan: 20 per cent.

5.2 | Characteristics of Kazakh wheat production

There are two ways to increase agricultural output: increase the cultivated land area or augment yields on existing land. In Kazakhstan the prospects for the former are limited, thus, there is a pressing need to increase the wheat yield per unit production area in the country.

Although weather remains the single most important determinant of grain yield in Kazakhstan, arguably the most important technological factor contributing to the apparent improvement in Kazakh grain yields is the increased use of certified planting seed. In 2002, only 50 per cent of planting seed was certified; the remaining 50 per cent was 'common' seed (seed reserved from the previous year's harvest). Some 30-40 per cent of small farms used mainly farm-saved wheat seed which was not regularly inspected by government authorities and was often sown without being treated against diseases. Seedborne diseases such as *Ustilago* spp. and *Tilletia* spp. can only be controlled by efficient seed treatments. Although there are no data to support this, the indications are that large, commercial farms were involved in similar seed use practices. In 2004, the State provided subsidies

for chemical disinfection of planting seeds. By 2004, the use of certified seed had increased to 94 per cent, including an increase in the use of elite seed (top-quality certified seed) from 37 to 57 per cent. Most agricultural enterprises use only first-reproduction seed (similar to certified seed in the U.S.) or higher-quality elite seed. The State also provides support to research facilities, paying 40 per cent of the R&D costs for breeder and foundation seed.

Improvements in crop management practices supported by the increasing State subsidies have also contributed to the recent increase and relative stabilisation of Kazakh wheat yields. In Kazakhstan, cereals are sown between early May and early June (Figure 5.3), although the precise timing is highly influenced by weather conditions. Oats are sown first, followed by wheat and barley. Spring wheat is generally sown in the second half of May. Rainfall is especially critical for the production of spring wheat in the seed setting period (end of June to beginning of July), because the temperature is the highest at this time. Barley harvest starts in early August, and the combine harvesters usually work until mid-October.

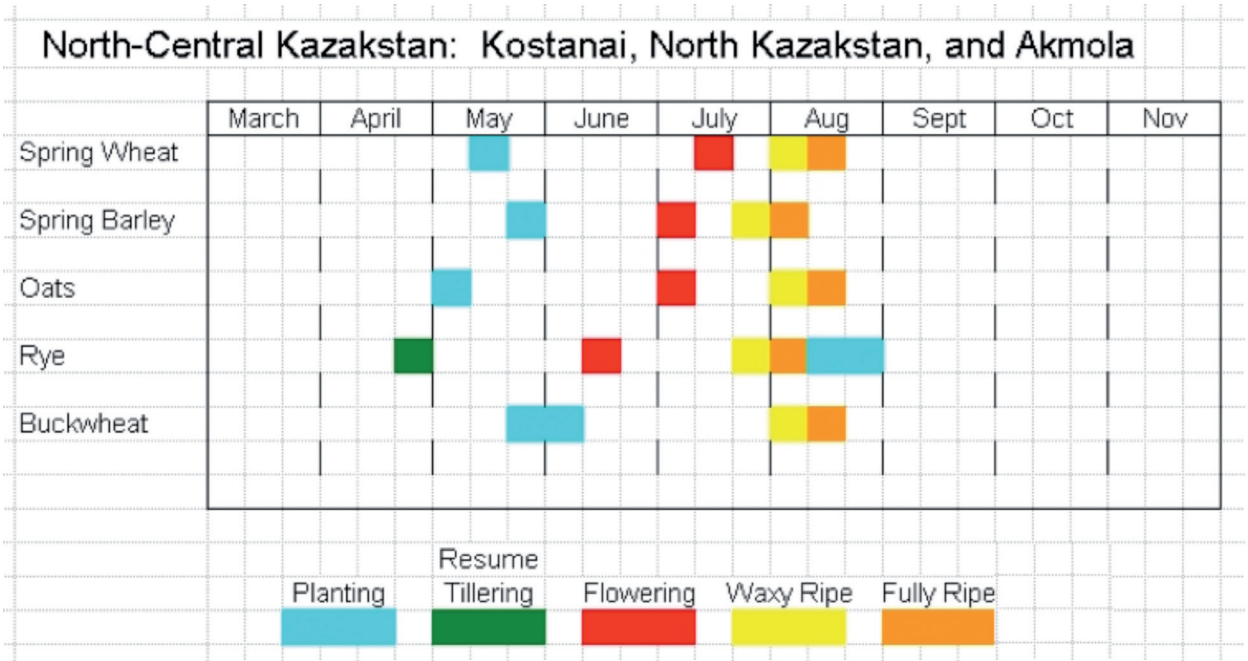

FIGURE 5.3: THE CEREAL CROP ROTATION SYSTEM AND SOWING TIME IN KAZAKHSTAN.
Source: USDA (2005).

	All	Kazakh selection	Foreign selection	Joint selection
Winter wheat	25	14	9	2
Winter durum wheat	1	—	1	—
Spring wheat	53	27	23	3
Spring durum wheat	15	6	8	1
Winter barley	5	2	3	—
Winter rye	12	1	11	—
Winter triticale	2	2	—	—
Spring barley	27	16	10	1
Oat	12	1	10	1
Maize	49	15	27	7
Sorghum	3	—	3	—

TABLE 5.1: CEREAL VARIETIES USED IN KAZAKHSTAN.
Source: own composition.

Region			
Akmolinskaya	**Kostanaiskaya**	**Pavlodarskaya**	**North Kazakhstan**
Spring wheat			
Tselinnaya 24	Kazakhstanskaya early-ripening	Saratovskaya 29	Kazakhstanskaya early-ripening
Kazakhstanskaya early matured	Lutescens 32	Kazakhstanskaya 15	Irtyshanka 10
Saratovskaya 29	Kazakhstanskaya 19	Omskaya 9	Saratovskaya 29
Altaiskaya 50	Karabalykskaya 90	Omskaya 18	Omskaya 18
Tselinnaya 3C	Omskaya 20	Kazakhstanskaya 19	Omskaya 19
Akmola 2	Saratovskaya 29		
Tselinnaya jubilee	Eritrosperum 35		
Omskaya 19	Omskaya 18		
Kazakhstanskaya 15	Irtyshanka 10		
Karabalykskaya 90			
Spring durum wheat			
Bezenchukskaya 139	Bezenchukskaya 139	Bezenchukskaya 139	Altaika
Damsinskaya 90	Damsinskaya 90	Omsky ruby	Omsky ruby
Omsky ruby	Omsky ruby		
Spring barley			
Tselinny 5	Donetsky 8	Donetsky 8	Donetsky 8
Tselinny 30	Medicum 85	Tselinny 91	Medicum 85
Tselinny 91	Kedr/cedar	Tselinny 91	Kedr/cedar
Donetsky 8	Arna	Medicum 85	Odessky 100
Omsky 87	Granal		Omsky 87
Odessky 100			

TABLE 5.2: SPRING WHEAT AND SPRING BARLEY VARIETIES AVAILABLE IN KAZAKHSTAN BY REGION.
Source: own composition.

The possibility of crop rotation is limited because of the small number of cultivated crops, and wheat is often cultivated in a partial monoculture system of 3-5 year phases. In general, in two consecutive years of wheat, then one or two years of spring barley or oats are sown, after which the area is left fallow for one year. In a seven-year rotation, wheat, barley or oats are cultivated. Sometimes wheat is sown in four consecutive years. There are no data on the incidence of permanent monocropping, but the cropping structure *vs* arable land data suggest that the proportion is considerable. Thus, the area sown to wheat may vary between two thirds and three quarters of the available arable land area annually, which is unsustainable.

Wheat production efficiency can also be increased by using genetically distinct varieties. There are several varieties of cereals in use in Kazakhstan (Table 5.1) but Kazakh wheat production is almost fully based on the use of bread wheat (*Triticum aestivum* L.), and within that species spring varieties predominate. Increasing the proportion of winter wheat and durum wheat production (Table 5.2) in the area sown may be an option.

A wide range of types of wheat variety is available in Kazakhstan (Table 5.3). Although in some other crops the number of available foreign-bred varieties exceeds the number from Kazakhstan, most winter and spring wheat varieties have been bred domestically.

Wheat class	Spring				Winter	
	State trial		Breeding trials		State trial	
	1998	2005	2004	2006	1998	2005
Super hard	3	3	—	—	—	—
Hard	65	60	68	22	25	20
Medium hard	25	23	4	59	50	45
Mixed	7	9	17	19	12	15
Medium soft	—	5	9	-	13	13
Soft	—	—	—	—	—	—

TABLE 5.3: CLASSIFICATION OF KAZAKHSTAN WHEAT VARIETIES BY HARDNESS.
Source: Abugalieva and Peña (2010).

The quality of wheat is generally poor in Asian countries – except for Kazakhstan – and about 82-83 per cent of the output falls into low categories, mostly suitable only for animal feed (Brovi and Solbrandt, 2012). Uzbekistan is the only other country in the region that is in a relatively favourable position, as about 50-55 per cent of the wheat it produces is of milling quality. Most of the wheat produced in Kazakhstan (2007: 73 per cent; 2008: 90 per cent) met the milling industry's specifications, comparing favourably even to Ukraine and Russia.

Wheat produced in Kazakhstan has high protein content: about 35-40 per cent of the total output has protein contents of 12-14 per cent, while 50-54 per cent of the wheat produced contains over 14 per cent protein. Kazakh wheat competes with the North American dark northern spring wheat and the Australian premium wheat category (OECD, 2011). A comparison of the Kazakh and Australian wheat varieties provided the following results (Abugalieva and Peňa, 2010):

- Wheat hardness: The parameters of the Kazakh wheats are similar to those of the Australian wheat categories (medium to hard);
- Grain protein and ash content: the parameters of the Kazakh wheats are better than those of the Australian ones;
- Flour yield: Kazakh wheats are excelled by the Australian varieties;
- Wheat gluten and gluten index: Kazakh wheat varieties are similar to the Australian prime hard and Australian hard grades.

In addition to variety, wheat quality depends heavily on the circumstances of production and the characteristics of post-harvest handling. The quality of wheat is a complex phenomenon comprising several factors, the most important of which may include the following:

- Basic physical parameters: weight, size, volume, density, colour etc.;
- Toxicological parameters: pesticides, bacteria, heavy metals, protein contact dermatitis, mould, radioactivity levels;
- Compositional parameters: moisture, protein, fat, starch, fibre, amino acid, gluten characteristics, spout/weather damage, dough, characteristics, pasting performance;
- Process parameters: temperature, time, concentration, pressure, speed, image/colour etc.

Eight quality parameters are taken into account in wheat breeding in both the USA and in Europe, while 11 parameters are considered in wheat breeding in Kazakhstan (Table 5.4). Ten parameters are evaluated and taken into account in state-controlled variety trials in Kazakhstan. The following parameters are tested in Kazakhstan in wheat procurement:

- Grain vitreousness/substitute grain hardness;
- Gluten content/indirect protein content;
- Gluten elasticity/extensibility balance.

Grain quality traits	Breeding			State trials	Purchase	Export
	USA	Europe	KZ	Kazakhstan (KZ)		
Hardness	✓	–	✓	✓	–	–
Vitreousness	–	–	✓	✓	✓	–
Sedimentation: (sodium dodecyl sulphate)	✓	✓	–	–	–	✓
Sedimentation: Zeleny	–	✓	–	–	–	✓
Sedimentation: (accumulation rate)	–	–	✓	–	–	–
Protein content	✓	–	✓	✓	–	✓
Mixograph	✓	–	–	–	–	–
High molecular weight gluten subunit composition	–	✓	✓	–	–	–
Gluten content and quality	–	–	✓	✓	✓	✓
Milling	✓	✓	✓	✓	–	–
Gluten content (flour)	–	✓	–	–	–	✓
Protein content (flour)	✓	–	–	✓	–	✓
Dough mixing properties (Farinograph)	✓	–	✓	✓	–	–
Dough strength and extensibility (Alveograph)	–	✓	✓	✓	✓	✓
Grain sprouting susceptibility (Falling number)	–	✓	✓	✓	–	✓
Bread making quality	✓	✓	✓	✓	–	–

TABLE 5.4: GRAIN QUALITY PARAMETERS USED IN WHEAT BREEDING, TESTING, PURCHASE AND EXPORT.
Source: Abugaliev and Peňa (2010).

5.3 | The primary and secondary wheat processing industries

The milling industry plays a dominant role in the primary processing of wheat (for human consumption and for use as animal feed), while secondary processing is dominated by the bakery and the confectionery, as well as the pastry (macaroni, noodle and other flour-based products) segments (Table 5.5). In terms of cereal equivalent, some 30 per cent of the grain output (average of years 2007-2011) was processed by entities in the primary grain processing industries. The processing ratio varied significantly depending on the volume of the grain output: in 2008 it was 25.5 per cent while in 2010 it was 56.9 per cent (Aluisio, 2013).

Description	2007	2008	2009	2010	2011	Index %
Cereal and vegetable flour, mixes thereof	2,756	2,449	3,794	4,474	4,664	169.2
Groats, meals and pellets, other grain products	40	43	41	50	41	102.5
Ready feeds for livestock	459	353	304	398	445	96.9
Primary processing industries	3,255	2,845	4,139	4,922	5,150	158.2
Freshly baked bread	695	655	660	737	732	105.3
Macaroni, noodles, cusses and similar flour products	111	111	113	124	145	130.6
Secondary processing industries	806	766	773	861	877	108.8
Primary and secondary industries	4,061	3,611	4,912	5,783	6,027	148.4
Grain output without legumes	20,003	15,493	20,711	12,006	26,522	265.2

TABLE 5.5: THE MOST IMPORTANT GRAIN (WHEAT) BASED PROCESSING INDUSTRY OUTPUT (1,000 TONNES).
Source: ARKS (2012).

Wheat and flour grading in Kazakhstan is carried out in accordance with standards under state control. There are five grades in use for wheat, with the first grade being the highest quality and the fifth grade the category of wheat used primarily as animal feed. According to OECD (2011) data, 89 per cent of the Kazakh wheat output fell into category 3 class in 2008. The quality of flour is assigned to three categories: prime, first and second grade – the categories and grades of wheat have not quite been worked out in line with the market's requirements.

In the context of the *AFP 2003-05* the Kazakh government placed emphasis, as one of its key objectives, on the introduction and application of international quality standards in the grain and flour sector. Since 2007, Kazakhstan has made considerable progress in the implementation of international standards and has adopted several new laws, including new legislation on the Safety of Food Products. Kazakhstan is a member of the *Codex Alimentarius* Commission and of the International Standardisation Organisation, and a signatory to the WTO SPS Agreement. The introduction of international quality management systems was accelerated from 2007 onwards, when aids covered 50 per cent of implementation costs of quality management systems (ISO-9000, ISO-22000, HACCP). In January 2012 (KAZNEX-INVEST, 2012):

- The 357 largest export oriented agro-business undertakings had ISO and HACCP quality control systems;
- Eight of the 14 bakery and pastry companies had ISO international quality management systems, two of them had Kazakh national systems in place;
- Thirteen of the 53 milling companies listed in KAZNEX-INVEST (2012) had ISO-9000, one had ISO-22000 and seven had Kazakh quality management systems (41.5 per cent in total);
- Five of the 12 pastry companies had ISO-9000 international quality systems and three had Kazakh quality systems;
- Only two of the feed manufacturing companies had ISO or Kazakh national quality systems in place.

The structure of processed grain and wheat products has gradually shifted towards lower added value containing products, the proportion of flour, groats and meal has increased, while the share of bakery and pasta products has declined. A total of 2,638 enterprises operated in the food sector in 2009 (FAO, 2010a), making up some 30 per cent of the total number of manufacturing enterprises. The great majority of these enterprises were SMEs.

Adaptation to the expected differentiation in domestic consumer demand and better adaptation to export requirements will not be possible without substantial

development of R&D activities. Technological innovation is taking place primarily in wheat production, especially in large agricultural enterprises, but there is little such innovation in small enterprises, in primary and secondary processing and in the wholesale and retail trade. Product development and the introduction of modified and new products are necessary requirements in primary and secondary wheat processing in both the domestic and the export markets if producers and processing businesses are to maintain or improve their competitiveness.

No accurate data are available concerning the grain sector's R&D expenditures, consequently these can only be estimated from indirect data. The proportion of R&D expenditures in the Kazakh agro-business sector (0.26 per cent, FAO, 2011) is rather low by international standards. Some 11-13,000 scientists are working in R&D in Kazakhstan, of which only 19.4 per cent work for business organisations, while the share of state organisations (research institutions, higher education institutions) is 51.4 per cent. Other data also reflect low levels and poorly-developed R&D activities. Only 4 and 5.7 per cent respectively of businesses were engaged in innovation in 2008 and in 2011 (ARKS, 2012). These percentages are assumed to be even lower in wheat production and in primary and secondary wheat processing. The low level of R&D activity depends on the share of SMEs, which is very high in the wheat growing and processing industries. Gross direct investment in R&D accounted for a mere 0.01 per cent of such investments. The proportion of expenditure on technological innovation fluctuates extremely widely from year to year. As an average of the period 2007-2011, enterprise expenses made up 23 per cent of total expenditure but the proportion of state (central and local) expenditures, at just 5.9 per cent, was also low. In this segment, 60.5 per cent of the expenditure originates from external, foreign sources (ARKS, 2012).

6

ENVIRONMENTAL **RESOURCES AND CHALLENGES**

6 Environmental resources and challenges

Several environmental issues in Kazakhstan are relevant to agriculture, and most can be traced back to the Soviet era. If these issues are unresolved, they could cause more damage in the future as the consequences of climate change, water loss and soil degradation, take hold. Other issues considered in this chapter are crop pests (including weeds) and chemical control, and the environmental impacts of mining.

6.1 | Climate and climate change

6.1.1. Climate zones

The vast size of Kazakhstan and the distance from the ocean results in the country having a sharp continental climate with a shortage of rainfall. Owing to its size, Kazakhstan has five main and about nine intermediate climate zones which determine the weather in each area (Figure 6.1). Winter in the north of the country is long and cold (in some years, temperatures in Astana fall to -52°C), but there are also thaws up to 5°C. In the north, the shortest season is spring which lasts approximately 1.5 months. Summer lasts approximately three months and winter extends from October to April. Most of Kazakhstan's plain is desert where the climate consists of long, hot summers, cold winters and high air aridity. Snow primarily starts to fall in November and can continue until April. In these zones different soils, and on the soils different farming systems, have evolved (Table 6.1).

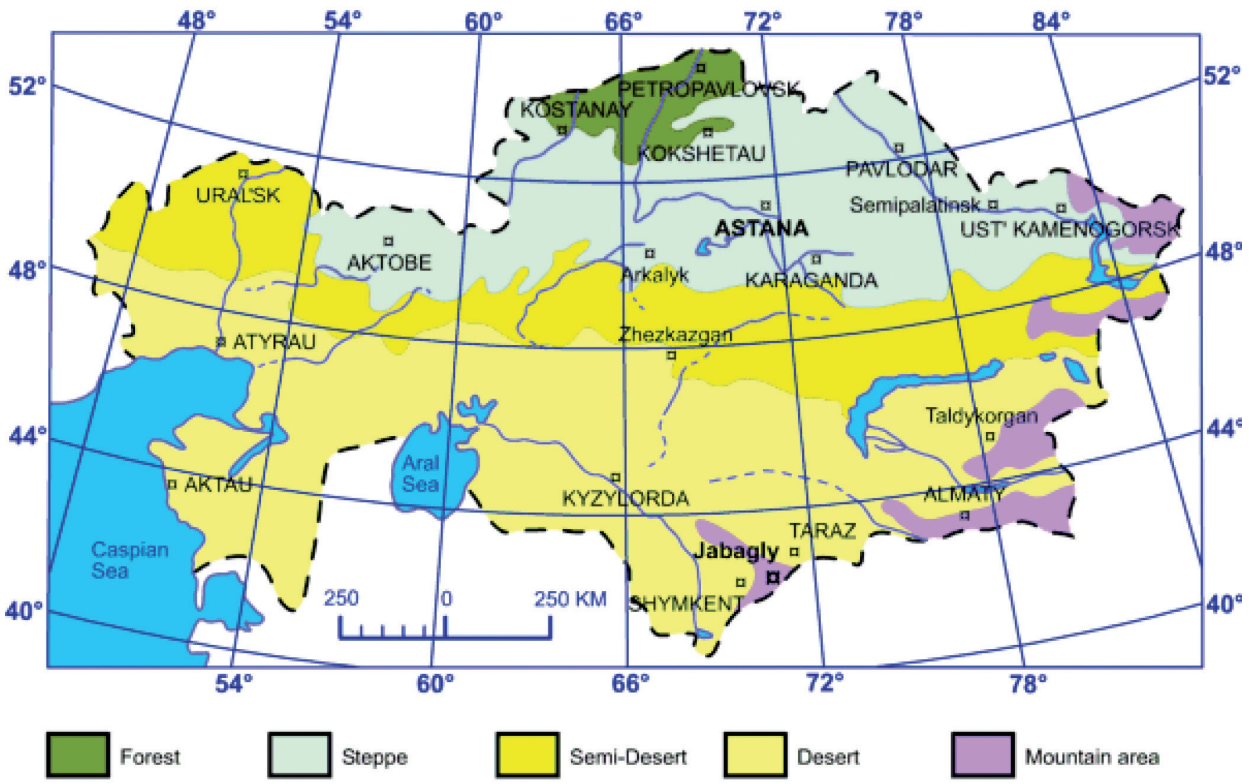

FIGURE 6.1: KAZAKHSTAN'S CLIMATE ZONES.
Source: Khaidarov (2010).

Climate zone	Rainfall/ (mm/yr)	Soil type	Cultivation	Arable land (m ha)
Forested steppe	320-340	Black and washed-out chernozem	Non-irrigated crop production	2.1
Steppe	270-310	Ordinary and southern chernozems	Primary non-irrigated crops	10.2
Dry steppe	230-250	Dark kastanozem	Unstable crop and animal production	6.5
Semi-desert	200-230	Light kastanozem	Livestock, grazing, farming oasis, irrigated farming	0.5
Desert	120-150	Brown and grey-brown takyr desert types	Livestock, grazing, irrigated farming	0.4
Foothill desert steppe	200-300	Grey forest soils, light kastanozem	Irrigated and non-irrigated crops, livestock and grazing	1.4
Foothill steppe	120-170	Grey-brown takyr type	Livestock, irrigated crops	0.8
Mountain steppe	300-400	Dark kastanozem	Non-irrigated crops and horticulture	0.9
Mountains	730-750	Subalpine and alpine soils, kastanozem, brown mountain soils and chernozems	Grazing and pasture management in low-lying areas	
Kazakhstan total	277-322	–	–	22.8

TABLE 6.1: THE CLIMATE ZONES AND SOIL TYPES IN KAZAKHSTAN.
Data sources: WB (2018), see also Saparov (2014).

6.1.2. Climate change

The global climate has gone through dramatic changes in the past. Extreme meteorological events, especially droughts, water and wind erosion, and desertification have frequently afflicted agriculture, and it has always been necessary to be prepared for such weather anomalies. There is, however, increasing evidence that human activities are contributing to climate change at an unprecedented rate. Although there are some uncertainties concerning the nature of global climate change, on some points there is general agreement. Firstly, there is evidence of global temperature change of measurable magnitude and an observed ascending trend during the past centuries. Secondly, a rapid rise of atmospheric carbon dioxide concentrations is evident (IPCC, 2013). The 'greenhouse effect' is accepted evidence. On the other hand, topics such as climatic variability, weather cycles, environmental, economic and social impacts, and anthropogenic causes as well as the global and regional diversity of phenomena are still the subject of further studies.

Global warming will have an impact in Kazakhstan (IPCC, 2013), where human activities are significantly altering the natural systems. The country has a most peculiar geographic location regarding the possible impacts of any sort of climatic changes. The climate of the region had always been highly variable. Regional water loss is a historical process that can result in desertification. The different scenarios in the IPCC climate model show that the temperature will increase in Central Asia (IPCC, 2013). Regarding Kazakhstan, two points can be noted. Firstly, temperature will rise, with a magnitude of about 1°C. Secondly, annual precipitation will decline. It is important to note that there is no definite trend in the variability of annual and seasonal rainfall in Kazakhstan, but there has been a pronounced decrease in total annual rainfall in the sandy region of Moinkum and Lake Zaisan. In the Urals, in the extreme northern parts of Kazakhstan, and in the Saryarka zone, total rainfall is increasing. Because of expected wetter and warmer conditions, wheat yields could increase. But as a consequence of cereal monoculture, the milder winters and the increased precipitation, some plant pathogens such as brown rust (*Puccinia recondite* f. sp. tritici), bunt (*Tilletia caries* DC., *Tilletia foetida* Wallr.) or fusarium (*Gibberella zeae* Schwein., *Fusarium graminearum* Schwabe, *Fusarium culmorum* (W.G. Sm.) Sacc) could cause bigger economic losses.

According to climate change scenarios based on modelling, further temperature increases with no significant increase in precipitation may lead to a drier climate. In parallel, the climate zone boundaries may shift northward, and wheat yields may be reduced by more than 25 per cent. The flora, fauna and the field management options are likely to change too as higher temperatures will modify the whole

ecosystem. It may be that the current climate zones in Kazakhstan will disappear, leaving just desert and semi-desert. The rising temperature may lead to less rainfall and more unexpected negative and destructive weather events.

6.2 | Soils and soil degradation

6.2.1. Soil types

In Kazakhstan 86 per cent of the territory is plain. There are three major types of soils on the plains: chernozem-black earth (north of 52°N), chestnut-coloured soil (south of 52-48°N) and fulvous soil (south of 52-48°N):

- *Chernozem*, black earth is common for the most northern part of the country; this area consists of North Kazakhstan, a large part of Kostanay *Oblast*, the northern parts of Akmolinsk, Pavlodar, Aktubinsk and West Kazakhstan *Oblasts*. The area is 25.5 million hectares, or 9.5 per cent of the country. The black earth is divided into three sub-types: lixiviate black earth in the south part of the forest-steppe natural area, the 'normal' black earth and south black earth that are typical for steppe area. In terms of fertility, the first two sub-types consist of humus (6-8 per cent), almost black coloured, while in the south black earth the percentage of humus is lower (4-6 per cent). The black earth area is situated mostly on steppe plains of good water availability and this is the main wheat region of the country.

- *Chestnut-coloured soils*, located more south than the black earth. They occupy a large part of central Kazakhstan, the north of the Caspian lowland and the plains of East Kazakhstan *Oblast*. These soils are located on dry-steppe and half-desert zones of the country. They occupy 90.6 million hectares or 34 per cent of the country. The chestnut soils in Kazakhstan are divided into three sub-zones: (a) the black-chestnut coloured soils of the dry steppes; (b) the chestnut-coloured soils of dry steppes; and (c) the light-chestnut coloured soils of the semi-desert zone. The soil fertility decreases towards the south of the country. The black-chestnut coloured soil and chestnut coloured soil consist of only 4.5-3.0 per cent of humus, while the light chestnut coloured soils of the semi-deserts are characterised with low humus contents (3.0-2.0 per cent). The black-chestnut coloured and chestnut coloured soils of the dry steppes are fit for rain-fed agriculture and livestock farming, and the light-chestnut coloured soils of the semi-deserts are mainly used as animal pastures.

- *Fulvous soil*. More south of the chestnut coloured soil area there are deserts with fulvous and grey-fulvous soils. The desert area in Kazakhstan is 120 million hectares, or 44 per cent of the territory of the Republic. It covers almost all the southern part of Kazakhstan. The humus content is 2.0-1.0 per cent, and it is mainly in the livestock farming region.

6.2.2. Soil degradation

Humus content and erosion

Crop productivity in Kazakhstan is constrained by the dry continental climate with a short growing period. This difficulty of management is more complicated when in April and May the strong winds (that can reach 15-20m/s) dry out the seedbed. Erosion is a problem too in those places where the rainfall reaches 20-40 mm/day. Nowadays, nearly half the agricultural lands in Kazakhstan have humus levels of just 2-4 per cent (Table 6.2). In Northern Kazakhstan alone, there are about 12 million hectares of ploughed land that require erosion protection, and over 5 million hectares are subjected to severe soil erosion (Suleimenov, 2006). Recent research data indicate that

about 50 per cent of the soil organic matter has been lost since the initial cultivation started (Yermukanov, 2005). The loss of humus in the productive soil layers has reached 20 to 25 per cent in just two to three decades. The primary reason for this extent of soil erosion, and decreasing soil fertility, is the use of intensive tillage, which increases both the erosion risk and the decomposition of native soil organic matter. The average autumn runoff from cropland deep tilled with wide sweeps amounted to 20 to 60 mm, whereas the runoff from stubble and grassland was two to four times more intensive (Suleimenov, 2006).

Humus content (%)	Share of land (%)
more than 6	4.7
4-6	23.9
2-4	46.5
less than 2	24.9

TABLE 6.2: THE FREQUENCY OF DIFFERENT SOIL HUMUS CONTENTS IN KAZAKHSTAN.
Source: Suleimenov (2006).

Unsustainable land practices, non-rational use of natural resources and environmental pollution have led to varying degrees of land degradation and desertification in all regions of Kazakhstan (Almaganbetov and Grigoruk, 2008). The loss of soil productivity arising from soil degradation has been masked for several decades after initial cultivation, because the inherently high initial soil organic matter content allowed sufficient mineralisation of nitrogen from the organic matter to maintain adequate soil fertility. In some areas, soil degradation linked to intensive tillage has degraded fertile cropland to the point where it has had to be abandoned. In others, large amounts of arable land produce poor crops because of degraded soils, even during years with favourable weather conditions (Gan *et al*., 2008). With the intensive soil tillage systems, the soil also loses its fertility in lower layers because incorrect use of tillage equipment (plough, disc) leads to soil compaction, which in turn leads to inadequate crop growth and yield loss. Some research in northern Kazakhstan suggests that soil tillage, especially deep tillage, is an important component of water conservation, and that deep sub-surface tillage ensures more efficient snowmelt infiltration compared to shallow tillage on fine-textured soils.

Salinisation

Salinisation has affected about 12 per cent of the total area of irrigated land. A much greater agricultural impact, however, has come from the salt- and pesticide-laden soil carried by the wind from as far away as the Himalayan Mountains and the Pacific Ocean. As a result of the drying up of the Aral Sea (which started when the intensive irrigation began in Kazakhstan and the Syr-Darya and the Amu-Darya rivers could not flow into the sea), major changes have occurred in the current Syr-Darya delta and on the dried bed of the Aral Sea. The negative factor is also the process of salt-dust transfer over long distances. At the Kazakhstan part of the Aral Sea, three large sources emitting sand-salt aerosols into the atmosphere have formed and their influence can be observed at a distance of 200-250 km and more (Saparov, 2014). The area of dust distribution and deposition is about 25 million hectares. Deposition of this heavily saline soil effectively sterilises the land.

6.2.3. Fertilisation

One reason for the low average crop yields in Kazakhstan is the low quantities of fertilisers used. Kazakhstan's agriculture (including wheat production) is highly extensive. Fertiliser use, at 5 kg/ha, is low in comparison to the main competitor wheat exporters, namely Russia (13 kg/ha) and Ukraine (30 kg/ha) (OECD, 2011). In terms of the climatic and soil conditions, a much larger quantity is required. The professionally appropriate minimum dose of nutrient would be 20-25 kg per hectare. As an average of the years 2007-2011, 45,100 tonnes of fertiliser were used (100 per cent of nutrient equivalent), of which nitrogen, phosphate and potassium made up 57.4, 40.4 and 2.2 per cent respectively. A total of 80.7 per cent of the fertiliser input was used in grain production, but even so fertilisers are applied to only some 4.7 per cent of the total cropping area (ARKS, 2012).

This low fertiliser use is accompanied by an underdeveloped fertiliser industry (despite Kazakhstan having large stocks of raw materials) that turns out relatively low-quality products. The eight fertiliser manufacturing companies in Kazakhstan have an annual average manufacturing

capacity of 200,000-300,000 tonnes. Although a large share of domestic production is exported (between 39 and 78 per cent in 2006-2010), Kazakhstan is a substantial net importer of fertilisers. The main exporters of mineral fertilisers to Kazakhstan are Uzbekistan, Ukraine and Russia.

	2007	2008	2009	2010	2011	2012
Mineral fertilisers, 1,000 tonnes	59.0	30.9	56.4	37.7	41.5	102.2
of which:						
nitrogen	37.5	16.3	29.5	22.5	23.9	82.0
phosphate (including ground phosphate rock)	20.5	14.4	26.1	13.0	16.8	19.7
potassium	0.9	0.2	0.8	2.3	0.8	0.5

TABLE 6.3: USE OF MINERAL FERTILISERS BY AGRICULTURAL ENTERPRISES IN KAZAKHSTAN (IN 100 PER CENT OF NUTRIENT EQUIVALENT).
Source: ARKS (2012).

Fertiliser consumption is now supported by government subsidies. The government reduces the price that enterprises pay for mineral fertiliser by 40 per cent, not through direct subsidies to farmers but through subsidies to fertiliser producers. The use of mineral fertiliser has tripled since 1999 and in 2012 agricultural enterprises in Kazakhstan used a total of 102 thousand tonnes of mineral fertiliser (Table 6.3). Nonetheless, current application rates represent only a fraction of the frequently excessive amounts applied during the peak of the so-called 'intensive technology' movement in the late 1980s when the agricultural sector benefited from massive State subsidies. The environmental consequences of excessive application of fertilisers are well known. Excess nitrogen is flushed out into the groundwater and causes nitrate pollution. Phosphorous and potassium are less mobile than nitrogen, so these two elements accumulate in the soil and can cause overdose diseases.

6.3 | Water and irrigation

The highest point (7,010 m) in Kazakhstan is mount Khan Tengri and the lowest point (132 m) is in the Karagiye depression. Many of the mountain tops in the Altay and Tien Shan province are snow covered and this is the source of most of Kazakhstan's rivers and creeks. Except for the rivers Tobol, Ishim and Irtysh, which flow through Kazakhstan (Table 6.4), all the rivers flow into the Caspian Sea or just vanish somewhere in central and southern Kazakhstan between the steppes and desert (Figure 6.2). Several surface waters are seasonal; they dry out in summer. The three largest surface water bodies are Lake Balkhash, the Caspian Sea and the Aral Sea, of which both seas are only partially within Kazakhstan.

Currently, the most pressing environmental problem for Kazakh agriculture appears to be a continuing decline of the annual precipitation. The long summer droughts and high air temperatures of recent years have underlined the seriousness of this problem. According to Sarsenbekov and Ahmetov (undated), about 90 per cent of Kazakhstan's territory is arid zone with low humidity. Water availability, at 20,000 m^3/km^2, is one of the lowest in Eurasia. The average precipitation is 250 mm/year while for wheat at least 350 mm, and preferably 500-600 mm, are needed to maintain crop development.

Irrigated areas are essential for food production in Kazakhstan. While areas suitable for irrigated agriculture cover about 5 million hectares, water resources, especially in the south of the country, are limited. There are eight large river basins and more than 96,000 km of irrigation canals. The total annual water discharge in Kazakhstan is 100.9 km^3 of which 56 km^3 originates in the country itself, with the rest coming from neighbouring countries. Available water resources (minus those needed for maintaining good water quality and for ecological needs) represent 42.6 km^3 per year. Over 70 per cent of water is used for irrigation but efficiency of production per irrigated hectare is sub-optimal.

Major rivers	Average annual discharge (km³)		Available water resources under different levels of supply (%)		Current use of water (km³)
	Total	From neighbouring countries	75	95	
Total in Kazakhstan	110.9	43.9	32.6	26.0	36.6
of which:					
Syr-Darya	17.9	14.2	9.8	9.3	12.0
Ili	17.8	11.1	4.3	3.4	5.2
Karatal, Lepsy, Ayaguz etc.	10.0	0.3	2.7	2.0	3.6
Irtysh	33.8	7.8	10.8	8.4	5.4
Ishym	2.3	–	0.4	0.1	1.0
Nura	0.8	–	0.2	–	1.1
Sarysu	0.4	–	0.1	–	0.4
Tobol	0.6	–	0.1	–	0.5
Torga	1.4	–	0.2	–	0.5
Shu	282.4	–	2.0	1.6	2.7
Talas-Assa	1.4	0.7	1.0	0.7	1.4
Ural	9.5	6.5	0.6	0.3	2.0
Emba, Sagiz	0.8	–	0.2	–	0.2

TABLE 6.4: WATER RESOURCES OF KAZAKHSTAN.
Source: Ismukhanov and Mukhamedzhanov (2003).

FIGURE 6.2: THE HYDRO-GEOGRAPHY OF KAZAKHSTAN.
Source: CIA World Fact Book (2018).

Prior to the transition to the market economy, approximately one third of agricultural products came from irrigated lands, although this represented only 5-6 per cent of the farmed area. In southern Kazakhstan the produce from irrigated farming often represented two thirds of the total produced in Kazakhstan. Irrigation farming peaked in 1986 with regular irrigation of 2.4 million hectares. At that time 1,034 million hectares were irrigated in the Syr-Darya river estuary. By the beginning of the 1990s the area of irrigated lands exceeded 2.3 million hectares and the share of products from irrigated areas reached almost one third of the gross production output of farming. After that the productivity of irrigated lands decreased (Table 6.5) and for several years there was no further development of irrigation agriculture, but rather a deterioration of the existing structures due to the virtual absence of government financial support. Compared with 1990, total water consumption has decreased by 42.6 per cent, with a 33.9 per cent decrease in agriculture. Almost one million hectares of irrigated lands are now out of

production; there has been an increase in poor water use practices and construction and rehabilitation have been suspended. As a result, the quality of formerly-irrigated lands is gradually deteriorating.

Crops	1986	1990	2000
Wheat (average)	3.3	3.5	2.6
Cotton	2.6	2.7	1.9
Sugar beet	27.8	25.4	14.6
Vegetables	18.9	17.8	13.7
Potatoes	12.3	10.1	6.4
Perennial herbs for hay	5.1	6.8	5.7

TABLE 6.5: CROP YIELDS ON IRRIGATED LANDS IN SOUTHERN KAZAKHSTAN, 1986-2000 (TONNES/HA).
Source: Ismukhanov and Mukhamedzhanov (2003).

At present, the area of irrigated lands totals 2.36 million hectares, but only 1.38 million hectares are in good condition. Lands are mainly surface-irrigated by a method with a low level of mechanisation. Overhead irrigation is used on an area of about 660,000 hectares. There are 96,387 km of irrigation canals, of which 20,620 km are lined, and 9,467 km are pipelines. The length of the collector-drainage system is 14,902 km. Irrigated farming predominates in the south of the country (Table 6.6) where cereals are produced on 14.5 per cent of the land. Nationwide, where formerly cereals were grown on 30 per cent of irrigated areas, today they are produced on almost 50 per cent.

Irrigation system	Area of irrigated lands (1,000 ha)	Actually irrigated, (1,000 ha)	Volume of water intake (million m³)	Volume of return waters (million m³)	Volume of the use of non-return water resources (million m³/year)
South Kazakhstan Oblast					
Mc 'Dostyk'system	125,320	123,800	66,070	211,222	448,848
CHAKIR	65,553	57,925	478,939	153,260	325,679
Kyzylkumsky large tract	76,043	66,100	733,741	243,797	498,944
ARTHUR	203,680	193,890	1,281,140	409,965	871,175
incl. the Arys River basin	108,000	102,801	823,300	263,530	560,000
Shauldersky system	29,280	27,872	-	-	-
Arys-Turkestansky system	66,400	63,217	457,610	146,435	311,175
Total: S. Kazakhstan *Oblast*	470,596	441,715	3,153,890	1,009,244	2,144,646
Kyzylordinsky Oblast					
Toguskensky large tract	31,842	25,810	414,036	144,913	269,123
Zhanakorgano-Shiiliysky system	45,454	36,840	591,031	206,861	384,170
Right-bank Kyzylordinsky	26,437	21,427	343,756	120,315	223,441
Left-bank Kyzylordinsky	88,449	71,687	1,150,089	402,531	747,558
Right-bank Kazalinsky	16,440	13,324	158,453	55,459	102,994
Left-bank Kazalinsky	20,637	16,726	267,859	93,751	174,108
Total: Kyzylordinsky *Oblast*	229,259	185,810	2,925,224	1,023,830	1,091,394
Total in the Syr-Darya River	699,855	627,525	6,079,114	2,033,740	3,236,040

TABLE 6.6: AVERAGE ANNUAL VOLUMES OF THE USE OF NON-RETURN AND RETURN WATER RESOURCES IN IRRIGATION SYSTEMS OF THE SYR-DARYA RIVER BASIN IN KAZAKHSTAN.
Source: Ismukhanov and Mukhamedzhanov (2003).

In Kazakhstan, rational use of water resources is a top priority. The ever-growing demand for water and the continuing deterioration of water quality resulting from pollution of all kinds require urgent and efficient measures to safeguard sustainable development of agriculture and fisheries, as well as other important sectors of the national economy. Expenditure on irrigation increased again in 2011 due to emergency works on the overhaul and repair of inter-farm water channels, irrigation and drainage systems. Under the Land Amelioration programme, based on the monitoring and assessment of the conditions of the land, recommendations are produced for a more rational

use of land, irrigation water, and for measures to prevent salinisation, alkalisation, irrigation erosion and declining fertility. These recommendations serve as the basis for planning land reclamation and water management, as well as providing operational services to users of the irrigation systems. Each farm has a fixed and registered water allocation. During water shortages, water is pro-rated according to the crop water requirement norms: higher value cash crops usually having first priority (FAO, 2007).

6.4 | Pests and chemical control

6.4.1. Crop pests and diseases

Significant problems are caused by pests and diseases, from outbreaks of highly-destructive migratory insects to diseases causing epiphytotics (epidemics) across vast areas. These pests and diseases can devastate thousands of hectares of crops and threaten national food security. One of the biggest crop pest problems in Kazakhstan is locusts, which can cause serious damage in the cereal sector. Hoppers and adults can also cause significant damage to lucerne, red- and sugar-beet, many Solanaceae including potato and tobacco, crucifers including cabbages, sunflower, Polygonaceae and medicinal cultures, cotton, flax, castor oil plant, walnut, water melon, vegetables, sesame, young plants of various fruit species, mulberry, forest arboreal and bushy species, and grapes, as well as pastures and hay lands. Cultivated Gramineae are also consumed; the Italian locust (*Calliptamus italicus* L.) can be a serious pest of wheat, millet and oats. Mainly the leaves are consumed, but grains, bark and fruits of bushes and trees are also eaten. Sowings of grain cereals are also targeted (FAO, 2010b).

6.4.2. Chemical control

Integrated pest management (IPM) was once widely practiced in Kazakhstan. IPM/ecology-based pest control approaches were extensively developed and practiced in the 1970s and 1980s in the Soviet Union, which was an early adopter of IPM. The approach incorporated biological control technologies, monitoring and forecasting, and agronomic and other means to control pests and reduce pesticide use. The post-1991 socio-economic changes in the agrarian sector transformed the large-scale, highly mechanised and knowledge-intensive farming (using IPM) into a mainly small-scale and simplified farming technological system (Toleubayev, 2009).

The collapse of collective farming after 1991 and the unified plant protection system that went with it had a problematic impact on pest control practices and brought about a crisis in the IPM perspective. Sustainable approaches to pest control were substituted by an exclusive focus on chemical pest control, leading to indiscriminate pesticide use. Pesticide imports increased from about 2,000 tonnes in 1999 to 17,000 tonnes in 2006. This figure only accounts for imports through official channels: the volume of pesticides smuggled into the country is not known. Industry was able to fill in the institutional gap in knowledge and infrastructure for pest control quickly. The numerous fragmented farmers were unable to pursue an IPM approach because the organisations that could have delivered such measures were severely handicapped or disappeared (Toleubayev, 2012). The focus of plant protection research also shifted from IPM/ecology-based studies to pesticide testing (Toleubayev, 2009). IPM and no-tillage or low-tillage technologies are currently spreading in Kazakh agriculture (According to Derpsch and Friedrick (2009), Kazakhstan is one of the ten countries with the highest shares of no-till areas), and sustainability can be achieved with good education and improved environmental and agro-ecological behaviour by farmers.

According to specialists at the Ministry of Agriculture, nearly half the total cultivated area in Kazakhstan is infested with weeds, including 2.5 million hectares infested with black oats (*Avena strigosa* Schreb.). Between 1999 and 2002, farmers applied virtually no herbicides to control black oats and infestation was having a significant negative effect on yields. In 2002, farmers began using herbicides against black oats on approximately 320,000

hectares. In 2003, treatment expanded to 1.0 million hectares thanks to government subsidies of about USD 2 million which reduced farmers' cost of chemicals by 30 to 40 per cent. Herbicide subsidies increased to nearly USD 3 million in 2004 and the treated area grew to about 1.4 million hectares. Specialists report that weed infestation has declined by about 15 per cent every year since the anti-black oat campaign was launched.

7

MACHINERY, EQUIPMENT **AND LOGISTICS**

7 Machinery, equipment and logistics

The physical infrastructure required for wheat production and trade includes agricultural (field) machinery, post-harvest storage and milling facilities, and transport infrastructure.

7.1 | Agricultural machinery

One of the biggest constraints in the Kazakh grain sector is the lack of equipment due to farmers' financial constraints. The overall stock of agricultural machinery and equipment has declined substantially during the past 20 years (Table 7.1). Agricultural enterprises are in the most favourable position in this regard but even they are facing a machinery shortage. According to the ARKS (2013), the number of working tractors and combines declined by roughly 75 per cent over the preceding ten years, and the area to be harvested by each combine more than doubled despite a significant reduction in the planted area. Kazakhstan's machinery stock is old: only about 5 per cent of the country's tractors and combine harvesters are less than six years old, while more than 80 per cent have been in use for more than twelve years. Hence a major modernisation programme is needed.

Type of machinery	2000	2011
Tractors with installed machinery	121,086	153,485
Grain seeders	80,030	89,260
Grain harvesters	42,305	47,197

TABLE 7.1: KAZAKH AGRICULTURAL ENTERPRISES' YEAR-END STOCKS OF AGRICULTURAL MACHINERY, 2000 AND 2011.
Data source: OECD (2013a).

In 2000, the Kazakh Government tried to address the machinery shortage with the establishment of the State leasing company KazAgroFinance. Within a programme of leasing and lending through KazAgroFinance, farmers received loans amounting to KZT 34.3 billion and purchased 1,363 units of agricultural machinery, including 375 tractors, 111 seed drills, 690 harvesters, 59 units of special equipment and eight units of processing equipment. At the same time, a few of the country's largest grain producing companies obtained loans from commercial banks to buy new equipment. In 2010, the value of tractors leased by agricultural producers was KZT 9,674 million. Machinery leasing was concentrated in the grain and oilseed *oblasts* of Akmola (32.8 per cent), East Kazakhstan (30.8 per cent) and Kostanay (13.8 per cent). The total value of leased grain combine harvesters was KZT 18,889 million, with the northern grain region accounting for over 80 per cent of this (OECD, 2013a). Despite these measures, levels of purchases of new equipment remain low and substantial grain losses area due to machinery-related delays at harvest.

Agricultural equipment is mostly imported. Kazakhstan's domestic manufacturing industry is still not sufficiently developed, although the numbers of tractors and seed drills produced in the country have been increasing steadily since 2006 (Table 7.2). Nonetheless, they still make up hardly 1 per cent of such machines in use. The few companies producing agricultural machinery are mainly joint ventures with Belarus, Russia or China. Larger (250 hp) tractors are typically used in Kazakhstan's northern spring-sown wheat producing areas, while in the southern region where winter wheat is produced, the typical tractor size is 100-150 hp.

	2006	2007	2008	2009	2010
Tractors	51	118	244	477	657
Seeders	3	0	0	11	150
Harvesting platforms	222	259	367	188	79
Mowers for tractors	0	0	0	0	2

TABLE 7.2: NUMBERS OF UNITS OF AGRICULTURAL MACHINERY PRODUCED IN KAZAKHSTAN, 2006-2010.
Data source: OECD (2013a).

7.2 | Post-harvest storage and milling facilities

7.2.1. Post-harvest storage

Following harvest, wheat is usually delivered firstly to the farm's barn floor. From the farm, wheat may be delivered to grain elevators for drying, cleaning and storing, or to mills. Some producers may store grain to sell at a later date, hoping for a higher price, but small farmers usually cannot afford their own storage and drying facilities. Thus, the bargaining position of smaller farmers is affected by their lack of access to storage facilities, while for the very large farms with their own elevators or warehouses, the problem is less acute.

Insufficient or inadequate post-harvest storage can have severe economic consequences, with damage to wheat caused by various borers, beetles and weevils being no exception. Rodents can also cause major losses during storage, and in major grain growing regions, field mice numbers can sometimes very rapidly build up to plague proportions because of the ready availability of food. Grain arriving at an elevator is mixed with deliveries from other farms. The old and outdated horizontal storage facilities and the storage capacities of non-certified elevators do not make it possible to preserve the quality of wheat or to trace changes in its quality status. According to OECD (2013a) interviews, wheat quality is often downgraded at take-over – primarily in the case of small scale farms – the effects of which were estimated to be worth 14 USD/tonne in the case of the downgrading of gluten and about 10 USD/tonne in the case of the upgrading of humidity. Hence, current elevator practices do not provide stimuli to grain producers to improve quality because differentiation of grain by quality when it enters an elevator is almost non-existent (OECD, 2013a).

Most grain goes to an elevator; licensed elevators may issue warehouse receipts which confirm the delivery of grain and property rights (OECD 2013a). There were 229 elevators in operation in Kazakhstan in 2010, while the total capacity of the grain storage facilities was 14,127,800 tonnes. As crop harvests vary significantly from year to year, the storage availability situation changes. For example, excess storage capacity existed in the 2010/2011 season, when only 12 million tonnes of grain were harvested. In contrast, the elevator capacity was less than the 23 million tonnes of wheat harvested in 2011/2012. There are other solutions for grain storage: (a) 6.7 million tonnes of storage capacity of warehouses; and (b) 7.8 million tonnes of storage capacity of elevators. There were only three years (2004, 2010 and 2012), when the capacities of the 212 grain-receiving enterprises were sufficient. But overall, Kazakhstan has more than enough storage capacities to cope with the current gross harvest rates. The Kazakh Government tries to build new capacity through KazAgroFinance, but the speed of the reconstruction and new building of granaries are only moderate.

Overall, grain storage capacity should be increased. Some analysts expected that 3-4 million tonnes of grain, or 10-13 per cent of the harvest, was lost due to insufficient storage capacity or transportation problems in 2012. On the other hand, according to some experts the problem was not real. Only a small number (one third or one half) of the grain elevators in Kazakhstan were completely full. Many private entrepreneurs do not use grain elevators at all: they place dryers directly beside piles of harvested grain. They dry and bag grain on the spot, and such grain does not need to be stored in elevators before it is sold.

The grain elevator capacities are concentrated primarily in the main grain – particularly wheat – growing areas in the north of the country. A total of 62.4 per cent of elevators – and 74 per cent of the grain storage capacities – operate in the NKGR which between them turn out 85 per cent of the total wheat production (average of 2010-2012). The

average elevator capacity in the main wheat producing districts is 73,200 tonnes, while the average elevator capacity in Kazakhstan as a whole is 61,700 tonnes. The capacity available in the given grain producing regions is sufficient for receiving 83 per cent of the grain produce. In four of the 13 *oblasts* (Kyzylorda, West Kazakhstan, Aktyubinsk and Zhambyl) there is surplus capacity, while in the other nine regions, including the NKGR, there are substantial deficits: North Kazakhstan: 36 per cent; Kostanay: 22 per cent and Akmola: 15 per cent.

7.2.2. Flour milling

An increase in Kazakh flour exports during the 2000s resulted in the increasing importance of the milling industry as a buyer of domestic wheat. Deliveries to millers increased from 1.8 million tonnes in the 2000/2001 marketing year to 4.1 million tonnes in 2010/2011. Owing to the relative simplicity of milling and the scalability of investments, it became an attractive activity for local entrepreneurs. Mills procure wheat either directly from farmers or through local traders. Grain elevators and mills are usually situated within 100-150 km of a farm.

The total aggregated share of the grain milling (flour, starches and starch products, bakery and pastry) sector within the Kazakh food and beverages industry is 31 per cent (milling: 17 per cent, bakery and pastry: 14 per cent). The combined share of these industries within the food sector was 37 per cent (Aluisio, 2013). Many the enterprises operating in the milling industry apply up-to-date, fully automated technologies. The number of enterprises in the milling sector has increased substantially from the 31 mills in operation in 1990 with a 3 million tonne wheat equivalent combined capacity. The number had grown to 2,300 by 1998, after which it dropped significantly, to 650 mills by 2009 (with a total capacity of 9 million tonne wheat equivalent). In 2013 there were just 200-250 mills still in business of which only about 100 were actually operating, and even many of these ran only a few months per year (McKee, 2013). The installed capacity of the mills still in operation was thought to be enough to grind 12 million tonnes of wheat to make 9 million tonnes of flour.

The industry grinds about 5 million tonnes of wheat per year to produce about 4 million tonnes of wheat flour according to the millers' association (League of Grain Processors and Bakers). This means an average capacity utilisation of less than 50 per cent. The largest mills have capacities of up to 500 tonnes/day, while the average milling capacity is 150-200 tonnes/day. Most of the largest mills have been constructed during the past ten years, and most of them are equipped with up-to-date technologies. The largest milling enterprises include Zernovaya Industrya (three plants, Uralsk, Aktoba and Kostanay, with a total aggregate capacity of 1400 tonnes/day), Tsesna Astyk (Astana), East-Kazakhstan Milling and Feed Combine (Semey), Altyn Dan (Shymkent) and Romana. The excess capacity strengthens 'black' trade, primarily in local markets and in cross-border exports. Recent years have seen the closure of mills with capacities of 10-50 tonnes/day and in the coming years smaller, less efficient, poorly-capitalised mills will continue to close to remove excess capacity from the sector. McKee (2013) reported that the Ministry of Agriculture has proposed to remove the subsidies on interest paid by milling companies, having determined that 30 to 40 milling companies would be sufficient.

Locality	Number of mills	Total flour production (t)	Share of total flour output (%)	Export share (%)	Export volume flour (t)
Clusters					
Kostanay	110, but 31 >50 t/day	1.1 million	27	70	800,000
Shymkent	25 > 50 t/day	800,000	20	80	640,000
Karaganda	10	500,000	13	70	350,000
Non-clusters					
Almaty region	4	300,000(?)		30(?)	90,000
Astana	3	1.3 million(?)		40(?)	80,000
Other cities and regions	50-100	4 million		20(?)	200,000
Total wheat flour volume					2.2 million

TABLE 7.3: GEOGRAPHICAL CLUSTERS OF FLOUR MILLS IN KAZAKHSTAN.
Data source: McKee (2013).

There is a strong regional concentration in the milling industry, and most milling capacity, particularly for export, is concentrated in three geographic clusters. In order of importance they surround the cities of Kostanay, Shymkent and Karaganda (Table 7.3). Almost half of Kazakhstan's flour is produced by mills in the northern grain region, otherwise mills and pasta production are distributed around the country mainly to serve population centres such as Almaty, Astana, Petropavlovk and Semipalatinsk.

Many market participants are operating in the bakery and pastry industry (main players: Sultan JSC, Korona Export LLP, Tsesna Astyk Concern and Grain Industry JSC) but the average capacity is small and the average company size is medium by international standards. The past few years have seen the construction of large plants that are competitive even in international markets, such as Zernovaya Industria's macaroni factory with a 60,000-tonne output capacity.

7.3 | Transport infrastructure

Transport is often a neglected element in agricultural operations. Kazakhstan has to transport its raw materials, semi-finished and finished products over large distances to both its internal and its external markets. Rail and road transport costs make up approximately 11 per cent of the total costs of all products, in contrast to the international average of 4.0-4.5 per cent. The best part of the transport system is made up of the 88,400 km of public roads and the 14,205-km railway network. Even so, the densities of the railway and road networks in Kazakhstan are relatively low. For the railway network it is 5.1 km/100 km^2 (in Tajikistan and Uzbekistan it is 6.6 and 9.8 km/100 km^2 respectively), but the road density is even lower: 3.2 km/100 km^2 (Kyrgyzstan, Uzbekistan and Tajikistan: 17, 18.6 and 21.4 km/100 km^2 respectively). However, both rail and road transport are better organised than in neighbouring countries. Kazakhstan has 3,900 km of navigable inland waterways, most of which, however, are not suitable for wheat transport (ADB, 2009). Transport capacity is insufficient for bumper harvests, and pushed up the cost of storage and freight charges in 2011/2012 (OECD, 2013a).

Besides the low quality and capacity of roads, another problem is empty return journeys, which also increases transport costs and makes transport and logistics services less competitive. Sixty per cent of respondent businesses quoted public infrastructure as a problem for their business development (OECD, 2011).

7.3.1. The road network

Road transport plays a major role in the wheat market, primarily between producers and elevators, and it is also important in exports to Afghanistan. But much of the road network is unpaved and many of the paved roads are in poor condition. Kazakhstan has practically no Class I and Class II roads. The quality of the roads varies across regions. The road density is relatively favourable in the NKGR as about 27.3 per cent of the total road network is to be found in these three *oblasts*. There is no major road link in the centre of the country (for example from Zhezqazqhan to Aral) between the east and west part of the country (Figure 7.1). This can result in significant detours for transporters.

Kazakhstan has only 73 enterprises offering logistics services. Service providers are express and courier companies, customs brokers and freight forwarders, or manufacturers and traders. Kazakhstan has a number of logistics centres, free trade zones and exhibition marketplaces to facilitate the production, warehousing, transportation and final sale of products (ADB, 2009). Internal demand for high quality logistics services, however, is not met by supply. According to OECD (2011), more than 50 per cent of responding businesses faced problems with regard to transport means which affected production.

FIGURE 7.1: MAIN ROAD MAP OF KAZAKHSTAN.
Source: http://www.turkey-visit.com/kazakhstan-map.asp.

7.3.2. The rail network

FIGURE 7.2: THE ROUTE OF GRAIN IN KAZAKHSTAN, BASED ON KTZ NETWORK.
Source: own elaboration based on railway map of Kazakhstan (http://en.wikipedia.org/wiki/Qazaqstan_Temir_Zholy).

For the Kazakh internal market, most of the wheat and wheat flour is shipped by rail. Between 2007 and 2011 the amount of grain transported by rail declined from 11.1 million tonnes to 7.1 million tonnes, the latter equalling 39 per cent of the average annual wheat production. This relatively low figure is partly explained by the low level of processing. The share of grains (in terms of tonnes) is decreasing and it is marginal (only 4 per cent) within the total railway transport performance. Rail transport is dominated by coal, along with iron and manganese ore, which make up a total of 53.7 per cent of the total railway transport performance (ARKS, 2012).

The Kazakhstan State Railway Company (Kazakhstan Temir Zholy, KTZ) has contracted with the Systra Company to design and build more than 1,000 km of high speed line between Astana and Almaty (Railway Gazette, 2013). This investment reflects the Kazakh government's commitment to railway improvement. As with the roads, there is currently no central railway connection between the east and west of the country (Figure 7.2). The arrows represent the main routes of grain exports from the production territories. Kazakh grain is exported to some Islamic countries via the Caspian Sea.

Kazakhstan is quite well linked to the Central Asian railway network, and this is the most cost-effective way to transport goods internationally. Investment in the network would help to connect the producers with the markets but many actors from the sector prefer road transport rather than the railway, although both need serious reconstruction. It could be because of the flexibility, or the need for less investment by the companies (buy a truck or lorry).

7.3.3. Rolling stock

The overwhelming majority of the produce transported by rail is shipped in conventional railway wagons, while transport by special grain wagons plays a relatively minor role. There are no container facilities. Grain terminals and grain terminal development projects play an important role in internal and export market logistics (Lyddon, 2013):

- FCC JSC (Kazakh government grain operator) was planning to implement a 400,000-tonne terminal development project by 2015 (in the South Kazakhstan – North Kazakhstan, Aktobe and Mangystau *Oblasts*);
- In the 2010-2011 marketing year KazAgroHolding commissioned 14 grain terminals (with a total grain capacity of 313,000 tonnes), while in 2013 it was completing the construction of five terminals with a total capacity of 61,000 tonnes;
- Grain terminals in export markets: Ventspils, Latvia-Kazakh, Joint venture terminal (1.5 million tonnes/year), Baku (Azerbaijan) Grain terminal to the Western Caspian Region (Georgia and Armenia);
- Joint venture terminal Azerbaijan Planeta L. and the Kazakh Akbiday, 600,000 tonnes capacity, Kish Grain terminal, Amirabad (North Iran), Iran-Kazakh joint venture, 53,000 tonnes capacity.

Products can be stored en route. In the period 2007-2011, Kazakhstan had on average 99,125 railway wagons (between 94,900 and 107,800) in service. The Kazakhstan government regularly replaces and modernises the cargo wagons. It is estimated that Kazakhstan needs up to 53,000 freight wagons by 2020 due to substantial write-downs and retirement of current stock. In 2011 the Russian and Kazakh railway companies signed a contract concerning the common use of 10,000 grain wagons. A joint venture was established in 2012 between Rosagrotrans (Russian) and Kaztemirtrans, and now it has become the largest shipping company, with 45,000 railway wagons in its ownership and using another 6-8,000 leased wagons. The objective of the joint venture is to improve the utilisation of the shipping capacity by coordinating the Russian, the Ukrainian and the Kazakh market (regions, seasons, product structure) and by setting up a common grain pool. Other sources stated that KTZ would buy another 19,000 freight cars by 2015[14]. These important steps can lead Kazakhstan to make its way in Central Asia as a major logistical axis.

[14] http://www.railwaypro.com/wp/?p=10222.

7.3.4. Port facilities

The Kazakh port infrastructure is of low quality and limited importance for the wheat sector. There has been no notable construction in recent years. The important ports in Kazakhstan are situated on the coast of the Caspian Sea, which is land-locked. Furthermore, they ares of only limited suitability as it is rather shallow (the north of the Caspian Sea has an average depth of only 5-6 metres), it freezes over in the winter and is navigable only for vessels up to 3-5,000 tonnes. Even so, port capacities are insufficient, for example the Aktau Port has a capacity of 0.5 million tonnes per year. Only some 30 per cent of the exports to Iran and to the countries of the south Caucasus are transported through this route to the key markets (McKee, 2007).

A total of 22 cargo vessels were used in transport goods by water, along with 60 barges (ARKS, 2012). A 'medium' number of registered shipping companies are present in the shipping market, specifically, in the shipping of grain. The shipping of grain is dominated by seven companies. The number of companies participating in Kazakhstan in shipping – particularly, in the shipping of grain – was 'medium'; the total number of registered forwarding companies was 78.

7.4 | Logistics flows in the Kazakh wheat sector

More than two thirds of the population of Kazakhstan lives outside the main wheat producing or nearby regions. Less than 20 per cent of the total population lives in the NKGR (including Astana) (ARKS, 2012). Thus, the relatively large distance between the wheat producing regions and the more densely populated regions of the country where demand is concentrated is an unfavourable circumstance with regard to the transportation of wheat and wheat flour in the internal market. The geographical distribution of the Kazakh wheat producing areas is also unfavourable from the aspect of exports, due to the following circumstances:

- The main wheat growing areas are close to the most important wheat growing areas of the main competitor, Russia;
- The grain growing areas of the Central Asian countries making up Kazakhstan's important export markets are located in their respective areas closer to their Kazakh borders. Areas with shortages of wheat in comparison to demand are located further away;
- Some of the target countries of Kazakh exports – Iran, Turkey – have seaports as well, providing major alternative opportunities for imports;
- It involves great transit transport distances for Kazakh grain to be delivered to Europe, the Middle East or in the Far East, entailing high transport costs, transit fees and trade barriers (e.g. the distance to the port of Vladivostok is about 5,000 km).

The most important trade flows in the exports of Kazakh wheat and wheat flour include the following (Karaganada, Kokshetau and Astana):

- Caspian Sea (Aktau) → Iran, South Caucasus (Georgia, Armenia, Azerbaijan);
- Russian transit to Back Sea → Middle East;
- Russian transit to Eastern European countries and EU (Ventspils Grain Terminal in Latvia);
- Shymkent in South Kazakhstan;
- Toshkent in Kyrgyzstan → Uzbekistan Transit → Khujand (Tajikistan);
- Toshkent in Kyrgyzstan → Uzbekistan Transit → Samarkand, Dushanbe (Tajikistan);
- Toshkent in Kyrgyzstan → Uzbekistan Transit → Mazar-e Sarif (Afghanistan);
- Toshkent in Kyrgyzstan → Uzbekistan Transit → Bukhara (Turkmenistan);
- Dostyk, Kazakhstan, Almaty region → China.

The transport costs are made up of several items, as listed below:

- From farm gate to elevators;
- From elevators to export exit points;
- From export exit points to external markets.

The farm gate to elevator shipping costs were estimated (OECD, 2013) to be about USD 20 per tonne assuming a 150-180 km distance in 2010, added to which is a variety of post-harvest costs (receipt, drying, cleaning) in an estimated total amount of USD 14 per tonne, plus costs of storage (USD 2 per tonne per month).

The costs of shipping to the main exit points towards the export markets comprised three items: transport costs

(mainly by rail), other costs and port costs. The transport costs showed a wide variation depending on the export target market concerned (Table 7.4). The other transaction costs were made up of the following items (OECD, 2013a): certificate of quality and compliance, certificate of origin, phytosanitary certificate, certificate of quality of SGS, customs clearance, customs broker, storage (one month), unloading, identification seal, fumigation costs (USD 7.4 per tonne). Added to this were the so-called 'non-official' costs to an amount of USD 3.4 per tonne (45.9 per cent), leading to a total aggregate cost of USD 10.8 per tonne.

The high costs of shipping to China result from the rather restrictive phytosanitary procedures and restrictions applied in the case of Kazakh wheat transit (the target markets are Japan and Korea). An OECD comparison (OECD, 2013a) showed that the high costs of transport to terminal constituted a major disadvantage for Kazakhstan in comparison to its main international competitors (2008 figures): Kazakhstan: USD 70 per tonne; Russia: USD 58.0 per tonne; Ukraine: USD 30 per tonne and France: USD 20 per tonne.

Export exit point	Delivery basis	Transport (USD/t)	Other costs[1] (USD/t)	Port charges (USD/t)	Total costs (USD/t)	Direction
Aksarayskaya rail station (Russia, Astrakhan *Oblast*)	DAP	25.9	10.8	–	36.7	Black Sea ports, Azerbaijan and Georgia
Tobol rail station (Kostanai *Oblast*)	DAP	8.1	10.8	–	18.9	Black and Baltic sea ports
Aktau port (South-West Kazakhstan)	FOB	45.6	10.8	14.0	70.4	Iran, Azerbaijan, and Georgia
Saryagash station (South Kazakhstan)	DAP	29.3	10.8	–	40.1	Uzbekistan, Turkmenistan, Iran, Afghanistan and
Lugovaya station (South Kazakhstan)	DAP	23.6	10.8	–	34.4	Kyrgyzstan
Dostyk rail station (South-East Kazakhstan)	DAP	23.1	30.4	–	53.5	China and South-east Asia

TABLE 7.4: TRANSPORTATION COSTS FROM ELEVATORS TO EXPORT EXIT POINTS, EARLY 2012 (DAP: DELIVERY AT PORT, FOB: FREE ON BOARD).
Data sources: OECD (2013a) based on data of the Kazakh Ministry of Agriculture.

Indicative transportation costs between export exit points and external markets are shown in Table 7.5. Wheat shipping costs are also significantly affected by the so-called trading risks generating substantial implicit extra shipping costs. According to OECD (2013a) estimates, in high yield years these costs add up to USD 51.6 per tonne, while in low yield years they amount to USD 19.6 per tonne in extra costs. The trading risks include the following: waiting for elevators, rail cargo shortage, busy terminal (delay), FCC priority block, rail cars delay, ship delay and higher charge of Centre of Transportation Service.

Exit/entry point	Delivery basis	Freight cost via		Port charges	Total	Importing countries
		Russia	Ukraine/ Latvia/ China			
	USD/tonne					
Azov (Russia)	FOB	45.9	–	20.0	65.9	Turkey, Jordan and EU
Ventspils (Latvia)	FOB	85.3	11.0	16.0	112.3	North Africa and EU
Kherson (Ukraine)	FOB	63.0	21.0	20.0	104.0	Turkey, North Africa, and Middle East
Novorossisk (Russia)	FOB	49.1	–	25.0	74.1	Turkey, North Africa, and Middle East
Lianyungang (China)	FOB	–	57.0	12.0	69.0	Japan, South Korea, and South-east Asia
Sarakhs (Turkmenistan)	DAP	42.0	–	–	42.0	Iran
Naushki (Mongolia)	DAP	73.5	–	–	73.5	Mongolia

TABLE 7.5: TRANSPORTATION COSTS BETWEEN EXPORT EXIT POINTS AND EXTERNAL MARKETS, 2011 (DAP: DELIVERY AT PORT, FOB: FREE ON BOARD).
Data sources: OECD (2013a), based on data of the Ministry of Agriculture.

7.5 | Future developments

The correct machinery (tractors, lorries etc.) are needed with clean, non-leaking bunkers that protect the harvested grain during its transport. Loading and discharging should be done in a safe way so as not to cause mechanical damage to the grain. Moisture and any physical and biological pollution should be avoided during operations. Growers and private grain traders cited inadequate storage and transport facilities as their major problem (OECD, 2013a).

In order to stimulate the development of the transportation sector and improve regional and sub-regional co-operation and utilise fully the geographic advantages, the Kazakh Government elaborated and approved the *Strategy of Transport Sector Development to 2015*. Construction and upgrading of infrastructure would require an investment of USD 26 billion. The ultimate goal of the Strategy was to ensure accelerated development of the transport and logistics sector in line with the economic development strategy of the State. The Strategy was supposed to be implemented in two stages: 2006-2011 and 2011-2015. Implementation was expected to upgrade the national transport system and create an efficient transport network on a par with best international standards and practices. Financing of the infrastructure on self-sufficiency principles would ensure sustainable development and maintenance at a high technical level (OECD, 2011).

The competitiveness of Kazakh wheat exports is massively affected by the transactional costs associated with shipping. They have a particularly strong negative impact in high-yielding years when the prices are low in both the world and the regional markets. Controlling and cutting transport and transaction cost is a key competitiveness factor in Kazakh wheat exports. Quantitative and regional coordination of wheat production and storage and shipping capacities, reducing the fluctuation of wheat production, infrastructure development projects, improved transport organisation and cutting the non-official costs are essential requirements.

8

DOMESTIC CONSUMPTION, **EXPORTS AND PRICES**

8 Domestic consumption, exports and prices

Wheat and wheat products play a significant – in some periods dominant – role in the Kazakh agribusiness sector in both the domestic and the export markets. According to product balance data, medium scale changes have taken place in the structure of the utilisation of cereals, particularly of wheat, during the period 1990-2012 (Table 8.1). These changes were driven by two opposing trends: the share of exports grew from 34.3 to 40.0 per cent, while the share of domestic consumption fell from 42.8 to 37.8 per cent. Domestic utilisation declined to 92.2 per cent (-0.4 per cent/year), partly due to a decrease in animal feed consumption of 65.7 per cent (-1.6 per cent/year), and a modest increase in food, seed and industrial consumption to 115.4 per cent (+0.9 per cent/year). Exports grew to 111.8 per cent (+0.7 per cent/year) (USDA, 2017). The components of utilisation fluctuated substantially during this period (Table 8.2).

Item	1990-2012 average (%)	2008-2012 average (%)
Initial stock	22.6	22.0
Exports	34.3	40.0
Domestic utilisation of animal feed	15.5	12.6
Food, seed and industrial consumption	27.3	25.2
Imports	0.3	0.2
Total	100.0	100.0

TABLE 8.1: CHANGES IN THE STRUCTURE OF THE UTILISATION OF WHEAT IN KAZAKHSTAN, 1990-2012.
Data source: USDA (2018).

Item	Average (1,000 tonnes)	Average difference, (1,000 tonnes)	relative deviation (%)
Food, seed and industrial consumption	4,189.0	465.8	11.1
Total domestic consumption	6,566.5	1,132.3	17.2
Wheat output	11,855.6	3,173.1	26.6
Domestic feed consumption	2,377.5	725.5	30.5
Exports	5,257.7	1,836.5	34.9
Initial stocks	3,457.1	1,509.5	43.7

TABLE 8.2: WHEAT UTILISATION IN KAZAKHSTAN, 1990-2012.
Data source: USDA (2018).

8.1 | Domestic consumption

8.1.1. Retail products derived from wheat

The main processed flour-based products include bakery and pasta, macaroni and noodle products. The composition of production of flour and processed wheat products is as follows: flour: 75.7 per cent; bakery products: 20.8 per cent and pasta and noodle products: 3.5 per cent (Aluisio, 2013). The structure of the exports of flour and processed products is as follows: flour: 95.4 per cent; bakery products: 3.9 per cent and pasta and noodle products: 0.7 per cent.

There are net exports of flour and bakery products (+58.5 per cent and +8.1 per cent respectively) and net imports in the pasta and noodle category (-7.5 per cent).

Expenditure on food and beverages in 2012 accounted for 36.5 per cent of total consumer expenditure, of which bread and bakery products accounted for 17.0 per cent. Bread and cereal consumption in 2000 and 2010 was 123.6 and 122.4 kg/person/year respectively (Aluisio, 2013). The bread and cereal consumption segment is practically 'saturated'; demand in the market may be affected positively only by population growth, the average rate of which was 1.7 per cent/year between 2008 and 2011. The increase in household income and the process of urbanisation (the urban population increased by 2.8 per cent/year between 2008 and 2011) are not currently having a positive impact. The consumption of bread and cereals is dominated by wheat flour products, along with rice products and rye bread. Products made from wheat flour (white wheat bread, wheat flour, pasta and macaroni) account for 63.9 per cent of consumption in this segment, while products made from rice and rye account for 36.1 per cent. In view of the above shares of expenditure, bread and flour-based products have an important influence on inflation as well; consequently, the changes in costs within the supply chain, strategic cost management and the controlling of costs are important factors in maintaining the quantity and value of domestic consumption.

Eating out accounts for a relatively small proportion of total consumption both in general and in the category of bakery, flour and flour-based products. The growth of the eating-out segment is a trend observed primarily among urban populations, dominated by the practice of ordering food by telephone or online (primarily among young people) and the various forms of take-away services, in contrast to eating in restaurants. One trend observed in the market in both the consumption of foodstuffs at home and in eating out is an increase in the role of 'snack foods'. Tea and coffee consumption is substantial and it is regularly accompanied by baked dishes and sweets, muffins or buns, while dried and salted breads (*sukhariki*) are eaten while drinking beer and vodka (Euromonitor International, 2013).

Another major segment of wheat consumption besides food, seed and industrial consumption is the manufacture of feed mixes for livestock production. The consumption of wheat as feed in livestock production dropped significantly, to 15.2 per cent of the 5,258,000 tonnes recorded in 1990, after which it grew continuously at varying rates, but even by 2012 it was still only 2,000,000 tonnes. The demand for cereals for animal feed has been falling as a consequence of a substantial decline in meat production. Pig meat production dropped from 275,000 tonnes to 79,000 tonnes (28.7 per cent) and broiler production meat dropped from 111,000 tonnes to 24,000 tonnes (21.6 per cent). Meat consumption has increased substantially since 1998 but it is still below the 1990 level. After the financial crisis of 2008, total meat consumption increased from 48.8 kg/person/year to 65.9 kg/person/year by 2011. The increase in meat consumption was covered by exclusively domestic production in the case of pig meat, while over 50 per cent of the increased broiler meat consumption was supplied from imports. A successful livestock production development programme is one important prerequisite for boosting domestic livestock feed consumption. Pet food production is becoming an increasingly important segment of the consumption of cereals for animal feed – its value increased by 131.5 per cent between 2007 and 2011 (USDA, 2018).

8.1.2. Structure of the wholesale and retail sectors

Food wholesalers play a major role in the Kazakh wheat distribution system and chain. According to OECD (2012), there were 174 registered wholesalers operating in the Kazakh food market, 45 of which were categorised as bread wholesalers and 52 as flour wholesalers. No accurate data are available on the number of registered wholesale product exporters or export sales revenues. Interviews with representatives of the trade and data in the technical literature show that the cereal exports of the largest exporters amount to an estimated 300-500,000 tonnes in terms of wheat equivalent, a small to medium quantity in relation to the US, European and Asian enterprises that dominate the multinational markets. In addition to *economies of scale* considerations, another important disadvantage in competition for the Kazakh exporters stems from *economies of scope* since these exporters are specialised primarily in exporting wheat and wheat flour. International participants dealing in a wider

range of cereal and processed flour-based products as well as oilseeds have a stronger bargaining position in the export markets.

The Kazakh domestic food market is dominated by home consumption and most of the food consumed originates from retail units. The food retail market is highly fragmented, with many market participants. According to ARKS (2012) there were 95,653 retail units in 2011, 98.7 per cent of which were small and micro businesses, while large enterprises made up only 0.1 per cent of the total number. The retail market is dominated by Kazakh-owned enterprises; those in foreign ownership (fully foreign owned and joint ventures with foreign members) make up just 12.9 per cent – among small trading enterprises businesses belonging to the latter category make up 16.9 per cent, while they account for 15.0 per cent of medium-sized enterprises. The total grocery retail turnover was KZT 2,788.2 million in 2012, 7.2 per cent of which was made up of bread, bakery and confectionery products (ARKS, 2012). The main indicators of Kazakh food retail and domestic market are shown in Table 8.3.

Indicator	2000	2005	2006	2007	2008	2009	2010	2011
Retail sales (USD Mio)	7,134	17,249	27,720	34,155	34,155	29,581	33,708	39,351
Retail: food (USD Mio)	4,433	10,477	13,119	16,650	20,414	17,651	20,040	22,227
Retail sales growth (% p.a.)	-3.1	14.0	10.0	12.0	3.5	-1.3	6.3	7.2
EIU retail and wholesale network rating (5=high)	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0

TABLE 8.3: KEY INDICATORS OF THE RETAIL AND DOMESTIC MARKET IN KAZAKHSTAN, 2000-2011.
Data source: Economist Intelligence Unit (2012).

Aluisio (2013) put the number of outlets selling consumer goods at 121,810, 0.7 per cent of which was made up of markets (open markets), 43.4 per cent of non-specialised stores, 42.8 per cent of specialised stores and 13.1 per cent of universal stores. The average store floor area is less than 100 m^2 and this is suitable for the presentation of only a limited range of products, while the sales turnover/outlet ratio is also low. For grocery stores a 200-400 m^2 store floor area may be regarded as a concentrated retail outlet form. The main characteristics of retail outlets can be seen in Table 8.4.

Category	Number of units	Store floor area (m^2)	Store floor area per outlet (m^2)
Open markets	829	178,565 (POS)	215 outlets
Non-specialised stores	52,901	2,462,913	46.6
Specialised stores	52,100	3,567,356	68.5
Universal stores	15,980	1,196,137	74.9

TABLE 8.4: THE MAIN CHARACTERISTICS OF KAZAKH RETAIL OUTLETS SELLING CONSUMER GOODS.
Data source: Aluisio (2013).

In recent years some profound changes have begun in the structure of retail trade with hypermarkets and supermarkets gaining ground (Table 8.5). The hyper- and supermarket category is dominated mostly by domestically-owned enterprises with one or a few units. Large hyper- and supermarket stores currently account for around 10-15 per cent of total retail revenue. The Turkish chain Ramstore and Russian Vester entered the retail market in 1999 and 2008 respectively, and the German chain Metro set up wholesale operations in 2009[15]. The main chains in Kazakh ownership include SM Market (Gros), Magnum C+C (cash and carry), Green and Arzan. The Almaty supermarkets have established some supply chains and play a role in ensuring quality control and guaranteed purchases from contracted suppliers. Such patterns can be expected to become increasingly important for farmers in Kazakhstan as local and foreign supermarkets expand their operations (Euromonitor International, 2013).

[15] Metro opened stores in Almaty, Shymkent and Karaganda in 2010 and 2011, and announced plans to invest EUR 300 million in opening 10-15 stores in Kazakhstan. In late 2010 the government announced that it planned to increase the share of large chain stores in retail revenue from a current 10-15 to 50 per cent by 2014.

Retail outlet form	Share in sales revenue (%)	Growth rate (%)
Hypermarket	2.8	178.0
Supermarket	21.2	11.3
Independent small grocery	43.4	-12.7
Other	32.9	7.9
Grocery retailing	100.0	5.6

TABLE 8.5: THE SHARES AND THE GROWTH RATES OF THE VARIOUS RETAIL OUTLET FORMS, 2007-2012.
Data source: Euromonitor International (2013).

In Kazakhstan, the prepared meals market also is highly fragmented. No reliable data are available concerning the different forms of eating out (hotels with restaurants, restaurants, coffee bars etc.) or the numbers of units. The total food service sales revenue amounted to KZT 3,617 million (Euromonitor International, 2013), equalling 13 per cent of the retail sales revenue. Consumer food service chains account for 19.5 per cent of the total (Table 8.6). The most important food service chains include the following (Euromonitor International, 2013):

- Fast food chains: Burger King, KFC/ Rostik's – KFC, Red Dragon (Chinese), Begemot Food tents;
- Corporate food service chain: Today (Fast food and restaurant quality service);
- Local chains: Dastarkhan, Jubileyniy, Stolichniy.

Item	Sales revenue 2012 (KZT million)	Growth rate 2007-2012 (%)	Share (%)
Independent consumer food service	2,913	14.4	80.5
Consumer food service chains	705	76.3	19.5
Total food service	3,618	22.8	100.0

TABLE 8.6: CHANGES IN THE STRUCTURE AND SALES REVENUE FROM PREPARED MEALS, 2007-2012.
Data source: Euromonitor International (2013).

Kazakhstan was ranked 19th out of thirty countries by Global Retail Development Index in 2012, while in 2013 it was ranked 11th (A.T. Kearney, 2013), showing that it can be a suitable target country for foreign working capital. The values of the various elements composing the index (on a scale of 1-100) are as follows: market attractiveness: 44.1 per cent; country risk: 51.9 per cent; market saturation: 76.2 per cent; time pressure: 57.8 per cent. The transformation of the primary and secondary processing industry (milling bakery, pastry, macaroni and confectionery) is a process that can be best represented by a 'U' shaped curve. The first phase of the process is a concentrated socialist industry. In the second phase many SMEs appeared after privatisation and the liberalisation of the market, resulting in some cases in massive excess capacities (milling industry). Restructuring in the third phase leads to the concentration of the markets, through mergers and acquisitions and by the entry of new large-capacity – primarily export oriented – enterprises.

According to the Global Retail Development Index (A.T. Kearney, 2013) *window of opportunity analysis*, Kazakhstan is in the opening phase of the life curve of the spreading of retail chains, with the following main characteristics: growing middle class, consumers willing to explore organised forms, government relaxing restrictions, and minority investment in local retailers. The next decade is likely to see a big increase in the influx of foreign investment in the retail trade, including the food retail segment. The process is positively affected by increasing consumer income and growth of spending, positive consumer attitude to organised retail formats, declining unemployment rate and growth of the urban population. The SMEs holding on in the market are expected to specialise in niche markets (local markets, special products). One major threat facing bakery and confectionery industry participants may be the development by hypermarkets and supermarkets of their own in-store capacities.

8.2 | Exports

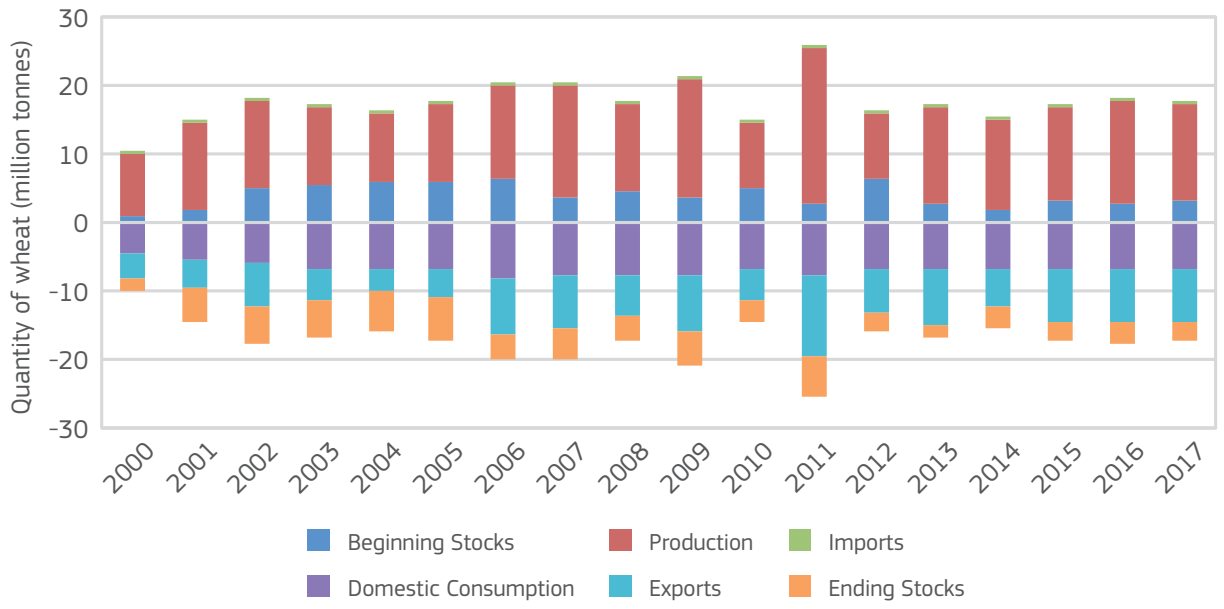

FIGURE 8.1: THE WHEAT BALANCE OF KAZAKHSTAN, 2000-2017.
Data source: USDA (2018).

The Eastern Europe and Central Asia region, including Kazakhstan, saw major changes in the wheat export and import positions between 1990 and 2012 (Figures 8.1 and 8.2). The role of the RUK countries (Russia, Ukraine and Kazakhstan) in the global wheat trade is growing steadily, in the marketing years of 2010-2011 and 2012-2013 their combined exports amounted to 24 million tonnes, with which they took the second largest export position. Looking at recent numbers on wheat exports from Kazakhstan illustrates the large fluctuations in Kazakh wheat exports: 21.1 million tonnes exported during marketing year 2009-2010 compared to 11.0 million tonnes in 2010-2011 (Zharmagambetova and Flake, 2013).

FIGURE 8.2: KAZAKHSTAN WHEAT TRADE YEAR EXPORTS AND IMPORTS BY MARKET YEAR, 1987-2017.
Data source: USDA (2018).

As the largest wheat exporter in Central Asia, Kazakhstan's most important partner countries included Russia, China, Ukraine, Pakistan, Uzbekistan, Iran, Turkmenistan, Armenia, Georgia, Kyrgyzstan, Tajikistan, Azerbaijan, Turkey and Afghanistan. Each of these countries (including Kazakhstan) evolved from being net importers into net exporters during the period under review: +4,428,000 tonnes. For example, Russia improved its wheat export-import position by 20.9 million tonnes, China by 10.4 million tonnes, Ukraine by 6.3 million tonnes, Kazakhstan by 6.3 million tonnes, Pakistan by 2.5 million tonnes, and Uzbekistan by 1.1 million tonnes. Only two of these countries were net exporters (Kazakhstan and Turkey, 4.0 million and 1.6 million tonnes respectively) between 1991 and 1995, while between 2008 and 2012 five countries became net exporters, four reduced their net imports, and five saw their positions deteriorate, as net imports increased in Georgia, Kyrgyzstan, Tajikistan, Azerbaijan and Afghanistan, while Turkey, formerly a net exporter, turned into a net importer (USDA, 2018).

Among the Kazakh cereal export markets, apart from the former Soviet Union countries (2008/2009 marketing year: 61 per cent, 2012/2013 marketing year: 55 per cent), other countries (primarily Afghanistan and Iran, with 35 per cent and 14 per cent respectively) had a significant share, while the role of Russia (4 per cent and 31 per cent, respectively) fluctuated heavily (USDA, 2018). Most Kazakh wheat and flour exports went to immediately neighbouring countries (Turkmenistan, Kyrgyzstan, Uzbekistan and Azerbaijan) that formed the core markets. Exports to the non-former Soviet Union (for the most part, second neighbouring) countries and to Russia grew when there was a relative shortage of supply in the regional market. In these markets Kazakhstan functions as a 'residual' market participant, an exporter when owing to over-production the stocks of Kazakhstan increase, while when there is a relative shortage the additional demand is met from Kazakh stocks. This market position generates significant additional stockpiling costs.

In addition to wheat, Kazakhstan also exports significant amounts of wheat flour. In 2016, Kazakhstan accounted for 11 per cent for the flour trade, coming second only after Turkey, which held a share of 24 per cent (USDA, 2017). A total of 3.6 million tonnes of wheat flour was exported in the marketing year of 2011-2012, with an expected 2.3 million tonnes in the marketing year of 2012-2013 and some 3 million tonnes in the marketing year of 2013-2014. The main export markets are the dominant wheat importing countries, the most important of which include (first and second neighbour countries) Tajikistan, Uzbekistan, Kyrgyzstan and Afghanistan (Lyddon, 2013).

8.3 | Prices

8.3.1. Trends in prices

Supply and demand in the international wheat market – including Central Asian markets – is rather inelastic (MacAulay, 2011), as a consequence of which world market prices for wheat are highly volatile: even small changes in supply may cause major price changes. The relationship between the growing export volume and ratio of the RUK countries and the world market price fluctuations was studied by Kemény *et al.* (2012). The rate of fluctuation of the international wheat prices between 1980 and 2010 averaged 6.0 per cent (mean: 0.0601), standard deviation was 3.2 per cent (s.d. 0.0318). The correlation between prices and the net exports of the former Soviet Union countries shows a weak positive relationship. The correlation between the share in export and the fluctuation of international prices was also weak but positive (export share coefficient 0.3890).

The international markets of grain (including wheat) are characterised by what is referred to as the Law of One Price, according to which the price difference between international markets is equal to the transport costs. Price co-integration between the Kazakh internal market, the regional markets and the international markets is an important prerequisite for the efficient functioning of the market. In the case of Kazakhstan this is, according to the Head of FCC (Panorama, 2011) as follows: FOB Black Sea price minus transport costs.

Using Kazakh weekly elevator-level prices of wheat, Brosing and Yorbol (2005) found only limited price integration in three market spots (Petropavlovsk, Kokshetau and Karaganda) between March 1998 and December 2004. The lack of price co-integration is explained by a variety

of factors including special geographical location (the short distance to the Russian market), distance to other domestic markets and market power differences among market participants (oligopoly, market structure), high shipping costs and weak market infrastructure.

According to Chabot and Tondel (2011), the correlation between Kazakhstan and the USA in terms of wheat prices is relatively close, Canada and Argentina: USA Gulf: 0.87, Canada St. Laurence: 0.85, Argentine (upriver) 0.87, but in relation to the main international competitors (price integration across the USA, Canada and Argentine) it is low (cf. 0.92-0.95). Thus, Kazakhstan has much to do to facilitate price co-integration, including price equalisation across different markets. The most important tasks in this respect include development of the infrastructure, the information system and the price risk management system along with removing trade barriers. Price co-integration is similar among Central Asian markets that are regarded as Kazakhstan's key markets: Kabul 0.85, Mazar-e Sharif 0.90 (Afghanistan), Dushanbe 0.92, Khujand 0.86, Kurgan – Tyube 0.88 (Tajikistan).

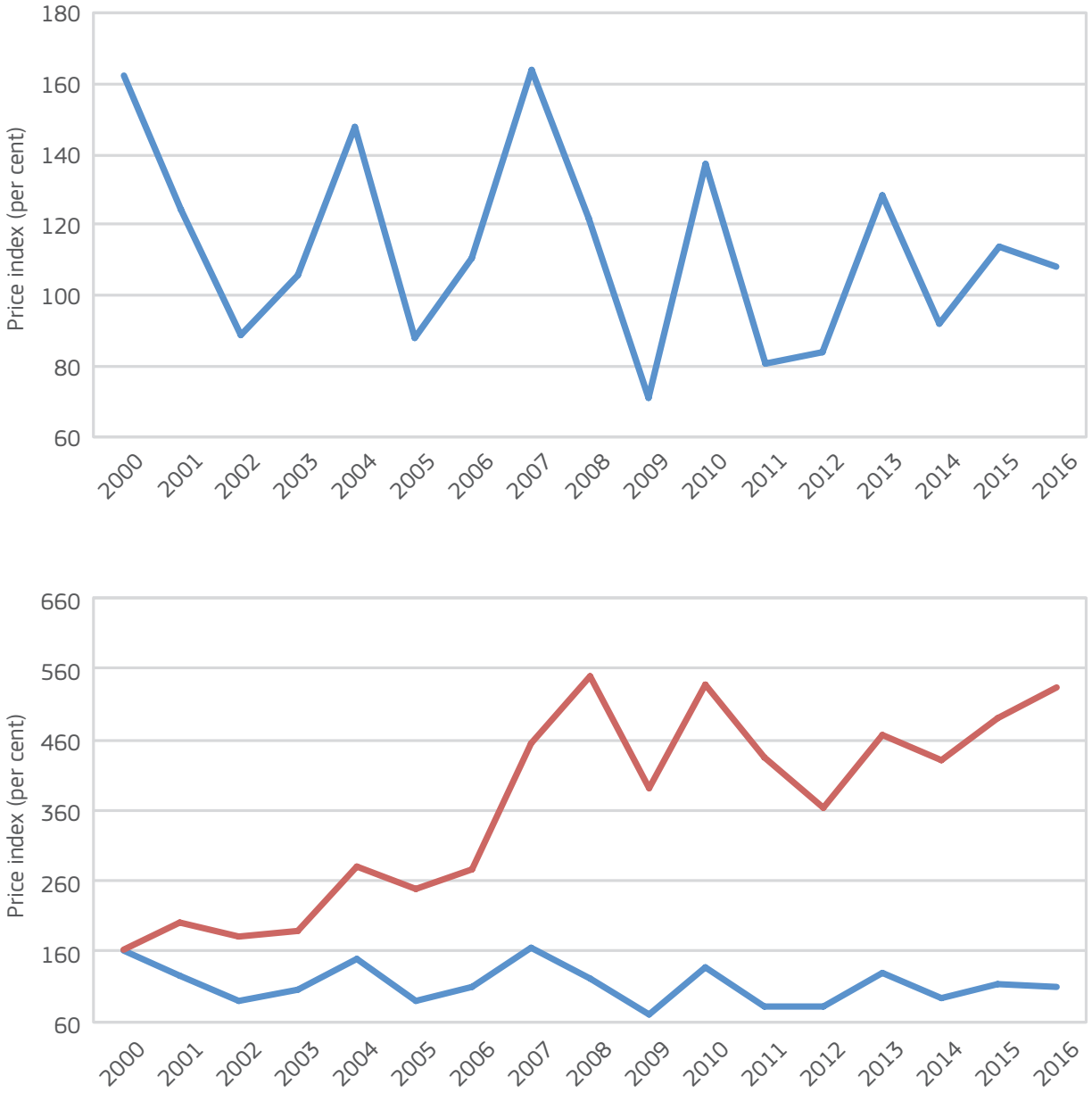

FIGURE 8.3: WHEAT NOMINAL PRICE INDEX (PREVIOUS YEAR = 100 PER CENT), 2000-2016.
Data source: Statistical yearbooks of the Ministry of National Economy of the Republic of Kazakhstan, Prices in agricultural, forest and fish in Republic of Kazakhstan 2012-2016, published in 2017.

The nominal wheat prices index shows the strong volatility between 2000 and 2016 (Figure 8.3). The real price fluctuates in 3-4 year cycles, with the lowest prices in the recent period in 2009, 2011 and 2012 (Figure 8.3). This volatility is hardly transmitted into wheat flour and bread prices. The average price of premium wheat flour was nearly four times the price of regular wheat, with massive fluctuations (minimum: 2009, 3.5 times, maximum: 2007: 5.4 times the price of regular wheat). The average price of bread made from premium wheat flour was five times the average producer price of wheat (Table 8.7), also with significant fluctuation (minimum 2008: 4.6, maximum 2007: 6.5) (ARKS, 2012).

Description	2007	2008	2009	2010	2011	Index
Wheat producer price KZT/kg	17	27	26	22	29	170.6
Wheat flour, highest grade KZT/kg	91	107	91	93	99	108.8
Bread from highest category flour	111	123	123	127	144	129.7

TABLE 8.7: WHEAT, WHEAT FLOUR, BREAD CONSUMER PRICES IN KAZAKHSTAN 2007-2011 (1USD=280 HUF).
Data source: ARKS (2012).

Even nominal wheat prices have been fluctuating substantially, as during the period between 1999 and 2011 its average price showed a 23.25 USD/tonne fluctuation, corresponding to a 40.5 per cent relative deviation from the simple arithmetic average price. For the fluctuation in real prices, the relative deviation was only 3.0 per cent. The OECD Country Capability Survey questionnaire survey (OECD, 2013a) covering 150 wheat-producing and processing enterprises ranked the problems stemming from the fluctuation in wheat prices first among the top five challenges (with 80 per cent). The significance of the problem is clearly indicated by the fact 'access to financing' was ranked only third (50 per cent) among these top challenges.

There are two major types of price risk faced by wheat-producing and processing enterprises: the spot price risk (selling or buying prices – market average price differences) and the forward/future price risk (selling, present and future buying prices, sell or store decision). The market institutions play a major role in mitigating price risks, among which the following are regarded as dominant: the level of the development of the price information system, the role and impacts of the state intervention system and public warehousing, and the role and significance of the commodity futures market.

The Kazakh International Commodity Exchange was established in 1996, for wheat, cash and futures trading. The trading system adopted by the Exchange was an open outcry and screen-based system. A total of 404 contracts were registered in 1996, with a low trade volume on the spot and futures market. There were no contracts in derivatives on the Exchange (Belozertsev *et al.*, 2011). Owing to the difficulties of economic transition, to the transformation of the ownership structure of agriculture, financing and financial problems and the high inflation rates, the commodity exchange was not functioning effectively. Instead, it was operating in the way of an electronic 'bulletin board' spot exchange. A commodity exchange is suitable for mitigating future/forward price risks by way of hedges and option contracts. The crucial price risk management functions of commodity exchanges are as follows:

- Price risk management by offering forward and future (hedges and options) contracts;
- Counterparty risk mitigation through financial guarantees, alleviating thereby the risk of the aborting of contracts;
- Price transparency improvement through clear price disclosure rules and transparent price information system.

2009 saw the establishment of the Eurasia Trading System (ETS), a joint venture between a Kazakh state entity and Russia's Russian Trading System. The ETS commodity exchange is primarily a venue for spot wheat transactions, with wheat classes 1-5, the lots being 65 or 650 tonnes on the ETS. The prices are inclusive of VAT and are denominated in KZT. The ETS terms of delivery are EXW or DAF (ICC, 2000). On 9 October 2013 the ETS websites showed 7 October 2013 prices. No futures wheat prices were to be found on the website. The ETS has 21 members (brokers and dealers). In addition to trading in grains – including wheat – the joint venture also trades in oil products, metals, gold and platinum. In 2010 its spot trade value was USD 458 million while its futures trade

value was USD 74 million. The following trading forms are operating on the ETS: anonymous auctions, direct trades, repurchase agreements, state purchases and derivates (hedges, options). The ETS is regulated by the Act on Commodity Exchanges adopted in November 2009. The volume of the trade in agricultural products is relatively low; wheat accounts for 8-10 per cent of the trade. The bulk of trade is in spot transactions; pricing is based on Dutch Reserve Auction. The ETS does not guarantee clearing and settlement (Zvyagin, 2011). At present the ETS is suitable for managing spot market price risks but, due to the low proportion of futures contracts, it is not suitable for effective management of forward price risks.

8.3.2. The wheat price intervention system

The wheat price intervention system – state resources – is operated by the FCC. The key elements of the State Resource system are: food grain reserve, feed resources, seed resources, disposable grain resources and local stabilisation resources. When producers deliver wheat to the elevators, they are given state-procured 'grain receipts' as proof of ownership. Thereafter they can sell the wheat to the FCC, to traders or milling companies. According to the *Grain Act (2001)* producers with more than 250 hectares of grain producing areas are obliged to participate in the establishment of state grain reserves on a mandatory basis, functioning through FCC's right of first refusal ('priority sales of grain to FCC'). This priority sales scheme operates in two forms: spot market sales (autumn) and forward contracting (spring).

In addition, since 2002 the FCC has also been engaged in commercial grain trading. During the period 2002-2011 the commercial share of total grain purchases (FCC) varied between 6 and 47 per cent, while the commercial share of total grain sales was between 9 and 41 per cent. FCC's domestic grain procurement amounted to between 1 and 5 million tonnes, while it sold between 0.5 and 3.5 million tonnes.

FCC's operation did not help to reduce wheat price fluctuations, partly due to its substantial share in the grain trade and also to the failure to adopt a normative regime in the setting of procurement prices. In the operations of the FCC, the state grain resource managing function should be segregated from the commercial function and a normative price formula should be introduced for the purposes of intervention procurements. The situation is further complicated by the fact that the FCC and the National Association Union of Kazakhstan's Farmers signed an agreement to create a single grain holding (Kosolopova, 2013).

One key prerequisite for the efficient and effective operation of the wheat sector is transparent operation of the market information and price information system. The market information system is run by KazAgroMarketing, the most important market-related duties of which are:

- collection of domestic market (including price) information;
- dissemination of market information;
- monitoring of market prices (138 basic food items);
- collection and dissemination of international food market information and prices.

Market prices are collected for the following: weekly wheat prices, tariffs for mills and elevators benefits, weekly retail and wholesale prices of foodstuffs. Other important functions include the collection of domestic and foreign wheat and flour prices, collection of data on shipping, processing and handling margins, evaluation of price gaps (for 13 products, including wheat). The website of Kazakh-Zerno[16] shows domestic market prices for wheat classes 3, 4 and 5, along with flour classes extra, 1 and 2 grades, concerning 14 regions. The prices are buying and selling prices (in KZT). The terms of delivery are EXW or CPT. The export prices apply to wheat classes 3, 4 and 5, along with flour classes extra, 1 and 2 (in USD) as at the nine most important border crossing points. Terms of delivery are DAP, FOB and CPT. On 9 October 2013 the website displayed 1 October 2013 prices. The website of KazAgroMarketing[17] presented only seven studies and analyses relating to the wheat sector but nearly all of them were posted years ago and have become outdated.

[16] www.kazakh-zerno.kz.
[17] www.kam.kz.

9

PROSPECTS FOR WHEAT **PRODUCTION AND EXPORTS IN KAZAKHSTAN**

9 Prospects for wheat production and exports in Kazakhstan

Many observers (e.g. Swinnen and Van Herck, 2011) see Central Asia, and especially Kazakhstan, as having the potential to strengthen world food security by expanding grain production and exports. In this section, we analyse the prospects of the wheat sector in Kazakhstan, based on three existing studies.

9.1 | Recent studies on the prospects for wheat production and exports

The most authoritative sources of information on the past and current status of agriculture in general, including wheat production, in Kazakhstan have been the various recent publications of the OECD and FAO that have been widely cited in the earlier chapters of this study. However, while they address, sometimes in detail, possible future developments concerning many of the factors that can have an impact on future prospects for wheat production in Kazakhstan (for example, WTO accession), they do not themselves provide any detailed assessment of likely future trends in wheat production and consumption in the country.

For this reason, other publications were sought that make credible attempts to map out the future developments in agriculture in Central Asia, in particular with respect to wheat production in Kazakhstan. Three such publications were found, which adopt contrasting approaches, and a 1,000-1,200 word summary of each appears below in the form of boxed text. The organisations responsible for the publications were the FAO Regional Office for Europe and Central Asia (Box 9.1), IAMO, Halle (Saale), Germany (Box 9.2) and the University of Nevada in association with Food and Agricultural Policy Research Institute (FAPRI), University of Missouri (Box 9.3). The FAO study embraces the Caucasus and Central Asian region, while the study by IAMO concentrates on the main grain producing regions in northern Kazakhstan. The FAPRI analysis focuses on global wheat projections, but also includes country-specific projections for Kazakhstan.

Box 9.1
European and Central Asian Agriculture towards 2030 and 2050 (Bruinsma, 2012).

This report was prepared at the request of the FAO Regional Office for Europe and Central Asia and was published in February 2012. It assesses the major expected developments in food and nutrition as well as in agricultural production, trade and resource use in Europe and Central Asia over the period to 2030 and 2050. Its primary purpose was to be a background paper for use at the FAO Regional Office. Within Europe and Central Asia, six sub-regions are identified, *European Union* (27 Member States), *Eastern Europe* (nine countries), *Other Europe* (Iceland, Norway, Switzerland and Israel), *Russia*, *Turkey*, and *Caucasus and Central Asia* (eight countries). The remainder of this summary concentrates mainly on the projections for the latter region, with

some reference to Russia, owing to its close economic links with Kazakhstan.

The report uses published data to forecast the most likely developments. The author points out two major uncertainties that can influence its forecasts: population projections and the development of the average energy price (and its influence on biofuel production).

Only data at the sub-regional level, and not at the level of individual countries, were available for use in the study. *Caucasus and Central Asia* (hereinafter CCA) is composed of Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. Thus the author notes that, for example, "[it] is therefore impossible to say anything about the cereal production and exports of Kazakhstan. Net cereal exports of Kazakhstan varied the last few years between 6 and 8 million tonnes but were at the level of the sub-region (Caucasus and Central Asia) almost completely offset by the constantly increasing net cereal imports of the other republics" (p. 28). Despite the limited insight offered by the report on the prospects for Kazakh agriculture directly, the expected developments for the Central Asian region as a whole are of direct relevance and are therefore summarised below.

The population of CCA is expected to increase from 75 million in 2005/2007 to 91 million in 2030 and 96 million in 2050. With a current population of 16.7 million, Kazakhstan makes up about 205 per cent of the sub-region's population. By contrast, the rural population is expected to increase from 41 million in 2005 to 45 million in 2030, but then decline to 26 million in 2050. Previously-unpublished data suggest that the agricultural labour force in the region will decline from 7.8 million in 2005/2007 to 6.0 million in 2030 and 3.8 million in 2050. Annual growth in GDP may be 5.1 per cent in the period 2005/2007-2030 and 2.6 per cent in the subsequent two decades.

Average per capita food consumption in CCA is projected to increase from 2,745 kcal/person/day in 2005/2007 to 2983 and 3,122 kcal/person/day in 2030 and 2050 respectively. The prevalence of chronic undernourishment could decline from almost six per cent of the population at present to less than one per cent by 2050, while obesity could increase from around nine per cent currently to 20 per cent of the population in 2050. Cereals still account for 54 per cent of the calorie supply in the region; cereal consumption is expected to decline and 'sizeable increases' in the consumption of meat, milk and vegetable oils are expected to occur.

Total agricultural production in CCA is expected to increase by 1.12 per cent annually to 2030 and by 0.74 per cent annually between 2030 and 2050 (with livestock production increases exceeding crop production increases in line with the expected shift in diets). Thus production in CCA to 2050 could increase by 50 per cent in response to increasing demand. Even so, although the highest in the entire Europe and Central Asia region, these projected growth rates for production are slightly lower than the anticipated growth rates in annual demand in the region (1.32 and 0.79 respectively). The balance would be met by imports, at least in part from Russia where total demand is projected to increase at a lower rate until 2030 and to decline thereafter.

By 2050 the Europe and Central Asia region as a whole could supply over half (42 million tonnes) of the expected global net additional exports of cereals to developing countries and its net trade in cereals could reach nearly 70 million tonnes. The Russia and the eastern European sub-region

(mainly Ukraine) would provide most of the additional exports: their combined cereal production could increase from 130 million tonnes in 2005/2007 to 190 million tonnes in 2050 by when exports would amount to almost one third of their cereal production. By contrast, the report notes that in the last few years the net cereal exports of Kazakhstan have been almost completely offset by the constantly-increasing net cereal imports of the other republics of CCA and in the projections the net cereal exports of CCA are expected to remain more or less unchanged.

Average meat consumption in CCA is relatively low (32 kg per person per year) but is expected to increase by 1.91 per cent per annum to 2030 and by 1.13 per cent per annum between then and 2050, while the equivalent increases for meat production are 1.80 and 1.05 per cent respectively. Substantial and increasing net imports (mainly poultry) are foreseen in CCA. Similarly, annual consumption of milk and milk products is low "with ample room to increase". The annual rate of increase in production is expected to be 1.17 per cent to 2030 and 0.70 per cent thereafter.

The report notes that annual per capita consumption of vegetable oils and sugar in CCA are still low at 9 kg and 18 kg respectively. The annual growth in raw sugar demand is expected to be 0.96 per cent to 2030 and 0.78 per cent to 2050, while annual production of sugar crops will increase dramatically, by 2.23 and 2.22 per cent over the two time periods.

The report cites research that estimates that in Europe and Central Asia there are still 210 million hectares of unused land that is suitable for farming, "most of it" in Russia and Central Asia. It observes, however, that much of this land is not readily available as it might be remote and lack infrastructure and therefore its use might not be economically viable. In fact, the total arable land in use in CCA is projected to decline by 0.15 percent per annum to 2030 and 0.17 per cent thereafter, although this land may be used more intensively.

Furthermore, CCA is experiencing and will continue to face severe water shortages with water withdrawal for irrigation accounting for over 48 per cent of all renewable water resources. Any value above 40 per cent is considered to be 'critical'. Almost 40 per cent of the arable area is equipped for irrigation, but this area (and the amount of water withdrawn for irrigation) is expected to remain unchanged to 2050.

Actual crop yields in CCA as a percentage of attainable yields are currently estimated at 28 per cent, and projected to increase to 34 per cent in 2050, both extremely low values. This does not necessarily denote potential for growth, for many possible reasons, some agro-ecological and some agro-economic. Fertiliser application rates in Central Asia (29 kg ha^{-1}) are very low and in CCA may increase by 1.7 per cent annually to 2030 and by 1.2 per cent annually from then until 2050.

Box 9.2

Farm restructuring and agricultural recovery in Kazakhstan's grain region: an update (Petrick *et al.*, 2011).

The purpose of this study was to take a 'fresh look' at agricultural development in Kazahkstan, in view of the fact that the country is among the world's ten largest producers and five largest exporters of wheat and that, together with Russia and Ukraine, it is considered as a 'future main player' in world grain supply. The study focuses on the NKGR, i.e. the three *oblasts* of Akmola, Kostanay and North Kazakhstan.

Much of the content of the study is historical and duplicates some of the content of the current report. After the introduction, section 2 gives an overview of overall agricultural development in the NKGR by presenting some key data on output and factor use. In section 3 the main steps of farm restructuring and agricultural policy after 1990 are summarised. Section 4 takes current statistical data on structural change to characterise and tentatively evaluate the different farming organisations in the NKGR today. Section 5 looks at the social implications of agricultural restructuring and section 6 concludes.

While noting that the NKGR is a 'success story' in terms of recent agricultural productivity increases (arising from cropland expansion, agricultural intensification and productivity increases, feeding through to more wheat exports) the study says relatively little about the prospects for the development of wheat production in Kazakhstan. However, it does identify a number of weaknesses in the present system and offers some policy recommendations on how to address these, together with some ideas on future research needs. By adopting these ideas, future wheat production in the NKGR can hopefully be further developed. A useful feature of the study is that a number of individual 'case studies' are featured as boxed text.

Following a review of the history of land market policy similar to the one in this report, the study notes that most farmland is still rented from the government at low prices and land sales remain rare. It concludes that more transparency and legislation that is firmer and more practical is needed to stimulate land rentals and to bring about medium-term efficiency gains. The study also concludes that dominance of KazAgroHolding as a source of finance for farmers has contributed to private lenders having lost interest in the otherwise growing agricultural sector. Many individual farmers, a distinctive sector in Kazakhstan farming with an average area of 650 hectares, would benefit from a more competitive and less centralised agricultural credit system.

The study includes a useful comparison of the performance of individual farms compared to agricultural enterprises in the NKGR in terms of indicators such as annual change in total land use, gross agricultural output per hectare and wheat yields per hectare. It starts by noting that the view was once widely held that the 'western' model of individual family farms represented the more efficient and equitable mode of production but that the relevance of this model for the post-socialist countries has more recently been called into question. The study concludes that in the NKGR the performances of both types of farms have been broadly comparable and that both have contributed to the agricultural recovery of the region. However, an ideological bias

against individual farming seems to prevail amongst government officials.

By contrast, little evidence is available about the practical significance, whether good or bad, of agro-holdings in the NKGR. They are estimated to control about 30 per cent of the farmland devoted to grain, and provide two thirds of the grain sold domestically and abroad. The study observes that their activities are generally not very transparent.

The study notes that, along with the recovery of the farm sector, economic conditions for the majority of households in the NKGR have improved considerably over the recent decade, but offers only a 'tentative insight' into the main drivers of income increases. Rural labour has become scarce, which implies increasing market power for workers and, although pensions have also increased, wage increases are likely to have been a main driver of poverty reduction. These may arise from either on-farm or off-farm (e.g. construction) employment.

Many farmers interviewed in connection with the study were concerned about future access to qualified labour and a recommendation is that the Kazakh government should ensure that future labour demands in terms of educated people of working age can be met. A fourth recommendation of the study is that a more focused and less distortionary approach to agricultural policy spending (much of which is hardly compatible with WTO standards) is necessary. It calls for systematic upgrading of the rural transport infrastructure as this is likely to have a more beneficial long-term impact than indiscriminate subsidy distribution.

The study identifies the following areas where further research is needed in order to understand the real drivers of the success of agriculture in the NKGR:

- Little systematic knowledge is available about actual practice and possible options in terms of labour supervision and the design of incentive-compatible employment contracts, including new technologies based on satellite imaging;
- In view of the stable rural population numbers and strongly rising incomes, it is an open question whether generating off-farm employment opportunities and/or depending heavily on (regional) migration are appropriate strategies for the NKGR. Deeper insights into the relevant cause and effect relationships are required;
- No farm-level data are available that would allow substantial comparisons in the performance of agricultural enterprises, individual farms and household economies. Thus, no definitive statements can be made about which type of organisation is better suited to meet the demands of modern food chains;
- There is clear evidence that many households produce a surplus to their subsistence needs that could supply the demands of urban consumers. The ways in which these household operations could and should be commercialised and what this means for other types of agricultural producers needs to be investigated further;
- More research is needed on the interactions between different types of agricultural producers. Such linkages could potentially be mutually beneficial. As well as fuel or feed, exchanges could involve knowledge, access to risk management tools, or storage and marketing logistics;
- There is little information about who has entered agricultural production in the NKGR and why. Relative political power and access to information and resources by different types of farm managers may well have implications for future structural change in agriculture.

Box 9.3
International Crops Baseline Briefing Book (Helmar, 2014).

This publication consists of a macroeconomic summary followed by an international crop summary and then separate sections on wheat, feed grains, oilseeds and products, and cotton. It presents forecast data as far as the 2023/2024 crop year.

The macroeconomic assumptions cover GDP growth (in general, global 'long-term sustainable growth' is expected after 2015), currencies, and population growth (which globally will continue to slow). For Kazakhstan, real GDP is predicted to grow at around 6 per cent per annum to 2018; thereafter the growth rate will slow each year to 4.3 per cent in 2023. The equivalent GDP deflator values are around 5 per cent and 4.4 per cent. There will be little change in the exchange rate of the KZT over this period, while Kazakhstan's population growth, which has been around 1.1 per cent per annum in recent years, will ease back to 0.7 per cent in 2023.

Globally, agricultural commodity prices are not expected to fall back to pre-2006 levels owing to high underlying costs, especially those for energy. Grain prices will decline from 2012/2013 peak levels and stabilise by the middle of the decade, although there will be regional differences. Wheat and barley prices are expected to decline more than 25 per cent from the recent peaks (ca. USD 330 per tonne in 2012/2013) to around USD 240 per tonne in 2014/2015 and USD 230 per tonne in 2023/2024 for US Gulf hard red wheat.

The increase in global cropped area that quickened in recent years is expected to slow; lower prices will provide less incentive to expand plantings although, particularly in South American soybean and grain producing countries there are still some regions that have available land for expansion. Area expansion will occur primarily in oilseeds and feed grains, crops that are largely used to feed livestock. Wheat and rice production for human consumption is not expected to increase significantly from now to 2023/2024. The global harvested area of wheat in 2012/2013 was 205.7 million tonnes and the predicted figure for 2023/2024 is 220.4 million tonnes.

Productivity of major grains will expand around one per cent per year, at or slightly above projected population growth rates. Thus, yield growth will be sufficient to meet global demand (currently around 1,000 million tonnes and expected to rise to 1,100 million tonnes). Overall per capita consumption of wheat is declining as wheat in the average diet is approaching saturation, especially in high-income countries where a growing number of societies are faced with obesity issues. For developing countries, wheat per capita consumption is increasing as incomes above subsistence levels allow the population to diversify diets beyond traditional staples. Global trade in wheat is expected to remain constant at around 125-130 million tonnes per annum to 2023/2024.

The separate section on wheat explores these predicted trends in more detail. Wheat prices have been declining in 2013/2014 as global grain markets begin to stabilise following production shortfalls in several major producing countries, including Australia, Canada, the EU, Russia and Ukraine, in the past two years. Continuing into 2014/2015, wheat prices are projected to decline further then stabilise for the rest of the baseline period (i.e. to 2023/2024). However, price levels will remain well above those experienced prior to 2007 in order for wheat to successfully compete for land against other crops.

Rising global excess demand will be met primarily through increased production in major exporting nations. The report states that the rise in wheat production in Russia, Ukraine, and Kazakhstan will push exports from these nations, making them important suppliers to regional and world markets. The data show that, apart from bigger areas in 2009/2010 and 2011/2012 (14.3 and 13.7 million hectares respectively), the area of wheat harvested each year in Kazakhstan has steadily increased from around 11.5 million hectares in the early 2000s to around 12.5 million hectares currently, and is expected to grow to 13.0 million hectares in 2023/2024 (Table 9.1).

	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/12	21/22	22/23	23/24
Area harv., (mill. ha)	12.5	12.5	12.7	12.7	12.8	12.8	12.8	12.9	12.9	12.9	13.0
Yield, (t ha^{-1})	1.24	1.13	1.14	1.15	1.16	1.18	1.19	1.20	1.21	1.23	1.24
Production, (1,000 t)	15,500	14,144	14,515	14,676	14,857	15,060	15,259	15,451	15,636	15,826	15,500
Utilisation, (1,000 t)	10,261	10,139	10,465	10,656	10,831	11,012	11,183	11,347	11,504	11,660	10,261
• Feed and residual	2,492	2,336	2,452	2,521	2,587	2,654	2,713	2,766	2,817	2,870	2,492
• Food, seed & industrial	4,816	4,840	4,920	4,981	5,041	5,101	5,160	5,216	5,268	5,318	4,816
Net exports, (1,000 t)	7,962	6,958	7,014	7,112	7,180	7,252	7,332	7,415	7,497	7,583	7,676

TABLE 9.1: ESTIMATED AREA OF WHEAT HARVESTED, PER HECTARE YIELDS, AND PRODUCTION, UTILISATION AND NET EXPORT QUANTITIES IN KAZAKHSTAN, 2013/2014 – 2023/2024 HARVEST YEARS.
Note: discrepancies between values can be ascribed to start of year and end of year stocks of ca. 3 million tonnes.

The supply of wheat in Kazakhstan (including start of year stocks) is expected to increase from around 18,000 thousand tonnes currently to 19,500 thousand tonnes in 2023/2024. Total utilisation (feed, food etc.) will also increase, from around 10,000 thousand tonnes at present to around 11,800 thousand tonnes. Consumption for food, seed and industrial is approximately double that of feed and residual. Apart from small fluctuations in year-end stocks, the balance is available for export.

Kazakhstan's wheat exports have fluctuated in recent years, with a low value of 4,855 thousand tonnes in 2010/2011 being followed by a very high value of 11,838 thousand tonnes in the following year. However, annual exports are expected to increase from the 'average' current level of around 7,000 thousand tonnes to nearly 7,700 thousand tonnes in 2023/2024 (Table 9.1). Thus, harvested area is expected to increase by around 4 per cent over this period whilst exports will increase by around ten per cent. Yields, which also fluctuated widely over the ten years from 2002/2003 (between 0.73 and 1.30 tonnes per hectare), are also expected to increase, from around 1.13 to 1.24 tonnes per hectare.

While not the predominant grain for animal production globally, wheat is vital for livestock feeding in some regions. The nations of the former Soviet Union traditionally fed large quantities of wheat as they had an advantage in production of that grain. Livestock production in Russia and Ukraine is showing signs of increasing again and the associated use of wheat for feed is expected to increase accompanying animal production. However, wheat feed use also tends to increase or decrease in a given year depending on wheat and competing feed grain (such as maize) production and prices. When producers enjoy large wheat crops, wheat feeding generally increases in those countries, especially if some of that wheat is of lower quality.

In conclusion, the report anticipates a broadly positive future for wheat production in Kazakhstan over the next ten years, both in terms of production area, harvested yields per hectare and exports of wheat, in a generally static world market.

Taken together, these three publications illustrate well the relevance of the current study.

The FAO study (Box 9.1) is an extremely useful assessment of the major expected developments in food and nutrition as well as in agricultural production in Eastern Europe and Central Asia but, as the author points out, from the available data it is "impossible to say anything about the cereal production and exports of Kazakhstan". Nonetheless it identifies some useful likely future trends for CCA, including a further population increase coupled with a decline in the rural population after 2030, together with a related decline in the agricultural workforce that would affect wheat production practices. GDP may increase by around 5 per cent per annum to 2030 and thereafter at around half that rate, and there will be an increase in food consumption coupled with a shift to the consumption of meat, milk and vegetables over cereals. The sectoral nature of agriculture would change accordingly. There may be a slight decline in the area under agriculture, perhaps coupled with intensification and higher crop yields, but water will continue to be a major limiting resource.

The IAMO study (Box 9.2), although concentrating solely on the main grain producing region of Kazakhstan, makes little attempt to quantify future trends in wheat production in the country. Its strength partly lies in identifying some of the key weaknesses that affect farming in the NKGR, not least a declining workforce and a lack of qualified labour (something that the FAO study implies could become a yet bigger problem), but also in identifying areas in which further research is needed if the kind of 'sustainable intensification' that will be needed to offset problems caused by factors such climate change and water shortages are to be achieved. In particular, it stresses the lack of farm-level data. As the IAMO study points out, this information is needed to help understand the "real drivers of success in the NKGR" and that it is dangerous to assume that the western-style family farming model is the most appropriate for Kazakhstan.

By contrast the FAPRI study (Box 9.3) provides detailed estimates for wheat production in Kazakhstan to 2024, and these provide a valuable comparison with those of the FAO study. It agrees that wheat yields per hectare may increase and harvested area may increase also. Again, increases in population and GDP in Kazakhstan are anticipated, together with a per capita decline in wheat consumption. It also agrees with the implication in the FAO study that Kazakhstan's wheat exports are expected to rise in the coming years, although it notes that in past years the volume of exports has fluctuated widely. A possible weakness of the study may simply be a consequence of the fact that details of the methodology used were not available. As well as the factors mentioned above, the modelling clearly takes into account factors such as the KZT exchange rate and the volume of global trade. However, it is not clear whether non-economic issues such as climate change and water scarcity are considered.

9.2 | Kazakhstan's potential to strengthen local, regional and global food security

Together with Russia and Ukraine, Kazakhstan is considered as a 'future main player' in world grain supply. Over the past years, Kazakhstan has indeed frequently featured in the top ten largest producers and top five largest exporters of wheat, although its exports of wheat grain and flour are mainly directed to other CIS countries and both production and export volumes have fluctuated considerably over the years.

The three studies agree on the potential for expanding wheat production in Europe and Central Asia and the important role the region will play in increasing the exports of cereals to developing countries in the future. Russia and Ukraine would provide most of the additional exports from the region. Exports from Kazakhstan have in the past years mainly been completely absorbed by net imports from other countries in the region, and this is likely

to remain the main destination for Kazakh wheat exports, even though it may increasingly add to exports outside the region as well.

The increase in wheat exports from the region is expected to come mainly from increases in yields, which are projected to increase by about 20 per cent by 2050 – even though the projected yield levels remain far below those attainable. Analysts disagree on whether the total arable land area in the region will increase. While there is still an estimated 210 million hectares of unused land suitable for farming in the region, much of it may be not readily available and its use may not be economically viable due to remoteness and lack of infrastructure. Others argue that Kazakhstan will increase the harvested area of wheat by about 4 per cent in the next decade. Given the projected increases in yields, and the potential decline in per capita consumption as GDP rises in Kazakhstan, the country's wheat exports are likely to increase.

Nevertheless, the studies highlight some challenges that are preconditions for further growth in wheat production and exports. A decline in the agricultural workforce, and especially the lack of qualified labour, could pose challenges for wheat production in the future. The wheat sector would also benefit from improved transparency in the land market and a more competitive and a less centralised agricultural credit system. And while the studies project an intensification of wheat production and higher crop yields, climate change and water shortage will remain limiting factors.

Overall, Kazakhstan has a great potential for expanding its wheat production and exports in the future. As such, it could play a non-negligible role in fulfilling local, but especially regional, food security. By compensating for the export fluctuations of other major players, it could have an important stabilising role on the world market for wheat and thereby contribute to global food security. Nevertheless, this positive view on the future of Kazakh wheat production is highly conditional on several factors. Projections on the role of climate change are uncertain, but may lead to considerable yield losses, although increased fertiliser use and sustainable practices could counter these effects. In addition, investments in infrastructure and machinery (e.g. by improved access to credit) will be essential to unlock the wheat potential of the country and to compensate for the potential consequences of climate change, water scarcity and soil degradation.

The general conclusion from the three studies, however, is summed up by the last of the three, namely that there is a broadly positive future for wheat production in Kazakhstan over the next ten years, and quite possibly in the following decades as well.

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LIST OF ABBREVIATIONS

AFP	Agriculture and Food Programme for 2003-2005
ARKS	Agency of the Republic of Kazakhstan on Statistics
CCA	Caucasus and Central Asia
CES	Common Economic Space
CIS	Commonwealth of Independent States
CP	Credit partnership
CPT	Carriage Paid to (named place of destination)
CU	Customs Union (of Belarus, Kazakhstan and Russia)
DAF	Delivered at frontier
DAP	Delivery at port
ECO	Economic Cooperation Organisation
EEC	Eurasian Economic Commission
ETS	Eurasia Trading System
EU	European Union
EUR	Euro (European Union)
EurAsEC	Eurasian Economic Community
EXW	Ex-works (named place of delivery)
FAO	Food and Agriculture Organization of the United Nations
FAPRI	Food and Agricultural Policy Research Institute
FCC	Food Contract Corporation
FDI	Foreign Direct Investment
FFSA	Fund for Financial Support of Agriculture
FOB	Free on board
GDP	Gross Domestic Product
GSSE	General Services Support Estimate
HACCP	Hazard Analysis and Critical Control Points
IAMO	Leibniz-Institut für Agrarentwicklung in Transformationsökonomien
IPM	Integrated pest management
ISO	International Standards Organization
JSC	Joint Stock Company
KTZ	Kazakhstan Temir Zholy (State Railway Company of Kazakhstan)
KZT	Kazakh tenge*
MFN	Most Favoured Nation (tariff)
MPS	Market price support
NKGR	North Kazakh Grain Region
OECD	Organisation for Economic Co-operation and Development
PSE	Producer Support Estimate
R&D	Research and development
RUK	Russia, Ukraine and Kazakhstan
SME	Small- and medium -sized enterprises
SPS	WTO Sanitary and Phytosanitary Agreement
TRQ	Tariff Rate Quotas
USAID	US Agency for International Development
USD	United States dollar
USDA	United States Department of Agriculture
VAT	Value added tax
WFP	World Food Programme
WTO	World Trade Organisation

* On 14 November 2017, the mid-market currency exchange rates were as follows[18]:

EUR 1	=	KZT 389
GBP 1	=	KZT 436
RUB 1	=	KZT 5.58
USD 1	=	KZT 332

[18] Source: www.xe.com.

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