DISCUSSION PAPER

Leibniz Institute of Agricultural Development in Transition Economies

The outcomes of 25 years of agricultural reforms in Kyrgyzstan

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Abstract

Kyrgyz agriculture experienced substantial reform during the 1990s and early 2000s. Subsequently, the pace of reform slowed and at present the government does not appear to have any clear strategy for further development in the sector. Summarizing the outcomes of these reforms, a certain freedom granted to farmers stands out as one of the main achievements and an important reason for the sector's efficiency. Peasant farms are effectively protected from attempts to administratively regulate crop structure or introduce any other types of market distortions. However, an insufficient level of investments is undermining long-term prospects for development in the sector. Supporting large professional players in the sector is one of the key policy priorities of the government. It is however necessary to provide space for these enterprises to emerge on their own. It is additionally important to ensure that any support policies in favor of such players also provide positive spillovers to the small farmers around them, and do not aim at replacing them mechanically. The list of incomplete policy reforms is very long, especially in the area of natural resource management and provision of other essential public goods. The state of pastures and irrigation systems is alarming and requires government support well above its current level. Understanding the key areas for government intervention and focusing interventions on public goods provision should be the key components of a future agricultural development strategy.

JEL: P41, P47, Q15, Q18

Keywords: Farm restructuring, agricultural productivity, irrigation, pasture reform, agricultural policy, Kyrgyzstan.

Резюме

Результаты 25 лет сельскохозяйственных реформ в Кыргызстане

Сельское хозяйство Кыргызстана пережило очень глубокие реформы в 1990-х и в начале 2000-х годов. После этого темпы реформ замедлились, и в настоящее время правительство не имеет утвержденной стратегии развития отрасли. Говоря об итогах реформ, их главным достижением можно выделить свободу фермеров, которая является важным источником производительности сектора. Крестьянские хозяйства имеют возможность самостоятельно принимать решения о структуре посевных площадей и организовать свое производство так, как они считают наиболее выгодным для себя. Однако низкий уровень инвестиций, малый размер хозяйств, недостаточный доступ к производственным ресурсам, к рынкам затрудняют долгосрочное развитие отрасли. Одним из приоритетов политики правительства должна стать поддержка крупных профессиональных игроков в этом секторе. Важно, чтобы такие предприятия появлялись/вырастали добровольно, а не в результате принудительного укрупнения. В этом случае их деятельность принесет также пользу и мелким фермерам. Программа реформ в сельском хозяйстве далека от завершения, особенно в области управления природными ресурсами и предоставления других важнейших государственных услуг (снабжение семенами, ветеринария и др.). Состояние пастбищ и ирригационных систем требует немедленной государственной поддержки; ее текущий уровень совершенно не достаточен. Сосредоточение государственных ресурсов на критически важных направлениях развития

инфраструктуры и оказания государственных услуг могло бы стать ключевым элементом будущей стратегии развития сельского хозяйства.

JEL: P41, P47, Q15, Q18

Ключевые слова: Реструктуризация сельского хозяйства, производительность сельского хозяйства, ирригация, реформа пастбищ, сельскохозяйственная политика, Кыргызстан.

ZUSAMMENFASSUNG

DIE ERGEBNISSE VON 25 JAHREN LANDWIRTSCHAFTLICHER REFORMEN IN KIRGISTAN

In den 1990er und frühen 2000er Jahren durchlebte die Landwirtschaft in Kirgistan eine Reihe erheblicher Reformen. Das Reformtempo wurde anschließend verringert und zurzeit scheint die Regierung über keine klaren Strategien zur Weiterentwicklung des Sektors zu verfügen. Eine gewisse Entscheidungsfreiheit der Bauern ergibt sich als eines der wichtigsten Ergebnisse der Reformen und wirkt als Treibkraft für die Produktivität des Sektors. Von administrativen Regelungen bezüglich der Struktur der Anbauflächen sowie von der Einführung jeglicher Art Marktbeeinflussung sind Kleinbauernbetriebe meistens nicht betroffen. Allerdings werden langfristige Perspektiven zur Entwicklung des Sektors durch unzureichende Investitionen verhindert. Die großen Agrarbetriebe zu unterstützen, ist eine Hauptpriorität der staatlichen Agrarpolitik. Diesen Betrieben sollte aber genügend Raum geboten werden, um ein eigenständiges Wachstum zu gewährleisten. Zudem ist es wichtig, dass solche Unterstützungsmaßnahmen auch eine positive Wirkung auf die Kleinbetriebe haben und nicht nur zu einer mechanischen Ersetzung führen. Besonders in den Bereichen Management der natürlichen Ressourcen und Bereitstellung öffentlicher Güter ist die Liste der unvollständigen politischen Reformen sehr lang. Der Zustand der Weiden und Bewässerungssysteme erregt Besorgnis und benötigt eine deutlich höhere staatliche Unterstützung als bisher. Die Identifikation von Schlüsselbereichen, für die eine staatliche Intervention nötig ist, sowie eine Schwerpunkverlagerung auf die Bereitstellung von öffentlichen Gütern sollten die Hauptkomponenten einer zukünftigen Strategie zur landwirtschaftlichen Entwicklung darstellen.

JEL: P41, P47, Q15, Q18

Schlüsselwörter: Landwirtschaftliche Umstrukturierung, landwirtschaftliche Produktivität, Bewässerung, Bodenreform, Agrarpolitik, Kirgistan.

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AAK	Association of Agro businessmen of KR
AVD	Accompanying Veterinary Documents
State Inspectorate	State Inspectorate for Veterinary and Phytosanitary Safety under the Government of the Kyrgyz Republic
CIS	Commonwealth of Independent States
CU	Customs Union
EAEU	Eurasian Economic Union
EEC	Eurasian Economic Commission
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
LRF	Land Redistribution Fund
KR	Kyrgyz Republic
KGS	Kyrgyzstan Som
MoAFIM	Ministry of Agriculture, Food Industry and Melioration of the Kyrgyz Republic
OIE	Office International des Epizooties (International Epizootic Bureau)
NSC	National Statistical Committee of the Kyrgyz Republic
SAEPF	State Agency of Environmental Protection and Forestry under the Government of Kyrgyz Republic
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
VAT	Value Added Tax
WUA	Water Users Association

1 INTRODUCTION[1]

Some 25 years ago Kyrgyzstan began implementing agrarian reforms. These reforms are believed to be among the most radical and comprehensive transformations of agriculture to be implemented in the countries of the former Soviet Union. The outcomes and effectiveness of these reforms should be assessed in order to identify their achievements as well as any existing development issues within the agricultural sector.

This study aims at analyzing the outcomes of the reforms in Kyrgyz agriculture over the period of 1991 to 2016. It is based on official statistics provided by the National Statistical Committee of the Kyrgyz Republic (NSC). The paper concentrates on agricultural production and does not cover non-agricultural activities of the rural population or social development issues in rural areas.

Section 2 of the paper provides a concise discussion of the history of agrarian reforms in Kyrgyzstan as well as current national agricultural policies. Section 3 summarizes available information on the dynamics and components of agricultural production, contemporary farm structure, agricultural land use patterns, agrifood trade, and productivity in agriculture. Section 4 discusses agricultural producers' access to natural resources and input markets. Section 5 provides a summary of findings and policy recommendations related to the development of the agricultural sector in Kyrgyzstan.

This study has been implemented within the framework of the project "Agricultural Restructuring, Water Scarcity and the Adaptation to Climate Change in Central Asia: A Five-Country Study (AGRIWANET)" coordinated by the Leibniz Institute of Agricultural Development in Transition Economies (IAMO) and supported by the German Federal Ministry of Education and Research (BMBF). The views and opinions expressed in this paper belong solely to its authors and do not represent the position of the University of Central Asia, IAMO, BMBF or any other project partners.

2 REFORMS IN KYRGYZ AGRICULTURE

2.1 History of reforms

Transformations in the agrarian sector began in the early 1990s as part of cardinal changes within the Soviet Union. The breakup of the USSR brought a need for the creation of new institutional arrangements regarding land, livestock, capital and labor. Approximately 500 collective farms made up the rural sector during the early 1990s.

The **first phase** of agricultural reform (1991-1994) is characterized by inconsistent measures towards reorganizing farms. Already in 1991, an attempt was made to make the transition from collective to private ownership and 2000 individual farmers received approximately 5 % of arable land. New legislation tried to establish the principles of land distribution.

In 1992, collective farms were reorganized in the form of joint-stock companies, agricultural cooperatives, and peasant farm associations, but despite these changes most of the rural

[1] This report was prepared by national partners within the framework of the project "Agricultural Restructuring, Water Scarcity and the Adaptation to Climate Change in Central Asia: A Five-Country Study (AGRIWANET)" (www.iamo.de/agriwanet), funded by the Federal Ministry of Education and Research (BMBF). The authors are grateful to Martin Petrick and Nodir Djanibekov (IAMO, Germany) for their valuable comments during the preparation of this report. Contributions by Hayley Moore and Ugiljan Turaeva (both IAMO, Germany) to preparation of the print version of the report are acknowledged.

population continued to remain in organizations resembling the socialist collective farms. One-third of collective farms were reorganized and up to 20 thousand (thous.) small farms were formed during this period. The rest of the sector remained in the old mode of work and management. The government continued to subsidize farms, but every year the level of support decreased due to the budget collapse and eventually agricultural prices were also deregulated. By the end of 1994, only 12 % of land was cultivated by individual farmers, although land ownership was unclear at that moment. Land shares and other assets were distributed on paper to farm members and others working in the rural area. Unlike other former Soviet republics, in Kyrgyzstan collective farm workers who wanted to be individual farmers had the possibility to claim land shares in separate locations and establish an individual peasant farm (SABATES and CHIDRESS, 2004). Agricultural output was falling, but slower than in other sectors. In 1995 the agricultural sector accounted for half of the national GDP.

The **second phase** of land reform began in 1994 with the new presidential decree. It established the procedures and methods for the final phase of the reform and restructuring program for collective farms. The reorganization covered 262 state farms and 190 collective farms (AKRAMOV and OMURALIEV, 2009). A distribution of the majority of transferable land shares targeted full individualization of farming, especially after private ownership of land was recognized in 1998. Livestock distribution started earlier and by 1995 already 68 % of livestock had been individualized. However, only 16 % of tractors and buildings were in private hands. Three-quarters of arable land was allocated for distribution among individual farmers (BLOCH et al., 1996). The rest of the area (25 %) was shifted to the Land Redistribution Fund (LRF) and left in state ownership for future distribution (LERMAN and SEDIK, 2009). The management of the land belonging to the LRF was transferred to local authorities who were allowed to rent it out to farmers through auctions, tenders or by direct allocation. However, in many areas with limited arable land, such as southern Kyrgyzstan, LRF land was also transferred to private owners, leaving these areas without land reserves.

At the same time, the state tried to reform the irrigation system. It decentralized the formerly centrally planned irrigation sector by involving farmers in the management of on-farm irrigation networks. It created a legal base for creating Water Users Associations (WUAs) and transferred on-farm irrigation infrastructure to WUA ownership (AKRAMOV and OMURALIEV, 2009). Inter-farm irrigation infrastructure remained state property.

The increase in land owned and managed by the private sector was accompanied by the rapid growth in the number of peasant, mostly one-household farms (from 20,000 in 1994 to 250,000 in 2001). Consequently, the average farm size decreased: from 15 ha in 1994-96 to 3 ha in 2002. The total arable land for individual use (peasant farms and household plots combined) stabilized at around 920,000 ha of land (irrigated and non-irrigated) with the remaining large agricultural enterprises and other users cultivating less than 400,000 ha.

The government continued its water reform in 2002. It implemented legislation providing the WUAs with the legal status of non-commercial organizations aimed at managing and maintaining irrigation systems in rural areas in the local farmers' interest. The WUAs were designated to collect water fees, allocate water equitably among their members and other water users within their service area, and operate and maintain on-farm irrigation infrastructures using fees collected from water users. However, anecdotal evidence suggests that the associations remained weak and faced serious challenges in collecting water fees from farmers. The introduction of irrigation water fees seems to have created opportunities for "elite capture" in some areas by allowing "elites" to gain better access to irrigation water (AKRAMOV and OMURALIEV, 2009).

The **third phase** of agrarian reforms beginning in 2004 emphasized the development of agricultural extension services and infrastructure (LERMAN and SEDIK, 2009). The government compiled a priority list for agricultural development reforms: development of cooperatives; development of peasant farms and agri-businesses; improvement of water and pasture management; and social development of rural areas. The Rural Advisory Service (RAS) – the extention service provider – received substantial support from donor organiations during the first decade of its existence (1998-2008). However, the RAS does not appear to be sustainable. In 2010, turnover from the RAS fell to its 2007 level with private sector and rural clients contributing just 3 % (WORLD BANK, 2011).

Pasture reform started in 2009 when pasture management was transferred to communities, creating 454 pasture user unions, one per Aiyl Okmotu (rural municipality council). The reform is still under way: registration and demarcation of pastures is in process, fee collection from pasture users is gradually increasing, while the capacity of the pasture unions to provide advisory services requires further support (WORLD BANK, 2011).

2.2 Current agricultural policy

As of 2016, the main policy document in the country is the National Strategy of Sustainable Development of the Kyrgyz Republic for 2013-2017 (NSSD) approved by the Decree of the President of the Kyrgyz Republic No. 11 from 21 January 2013. The NSSD sets the main directions for the development of the country in the medium term. Section 10.1 of the NSSD discusses the agro-industrial sector as one of the strategic sectors of the economy. Analyzing recent development trends in Kyrgyz agriculture and recognizing serious issues in the development of the sector – land degradation, disinvestment in irrigation and other public infrastructure, insufficient private investments and access to financial resources in the sector, dependence on imports for key food products and barriers for Kyrgyz agricultural exports, insufficient processsing of agricultural produce etc. – the NSSD sets four goals for the agro-industrial sector: (i) growth of output and production quality, provision for food security of the country; (ii) increase in efficiency and competitiveness of agriculture and the agro-processing industry; (iii) improvement in efficiency of use of government budget resources in the sector; and (iv) resolution of peasants' social issues. These goals are to be achieved through the implementation of policies concentrated around the following tasks:

1. Improvements in governance in the sector through optimization of governance structures, strengthening property rights, support of farm consolidation and enlargement, improved pasture management, and re-establishing seed and animal breeding farms.
2. Provision of better services for agriculture including rehabilitation of irrigation networks, development of veterinary and plant protection, better access to agricultural machinery, finance, improved seeds and genetic materials through the use of public-private partnership (PPP) approaches, provision of human resource and extension services, and rural infrastructure (roads, clean water, electricity) development.
3. Encouraging cooperation and concentration of production by creating proper legal environments, providing economic incentives for farms to cooperate and consolidate, PPP etc.
4. Creation of modern market infrastructure for the sector through establishing wholesale markets, information support, and training.
5. Increase in production and exports of agro-industrial sector through formation and development of clusters.

6. Land reclamation to be achieved through development of irrigation systems and amelioration works.
7. Development of agro-processing industry especially animal feed production, dairy and meat industry and canned fruits and vegetables. This is to be achieved through the creation of new enterprises supported by government investments and subsidized loans.
8. Improved management of land use, through improved government accounting and monitoring of land and water use and increased role of local governments and civil society organizations in preservation of agricultural land fertility.

These policies are intended to be further detailed by sector strategies and programs. In the past, there were a number of policy documents covering agriculture as a whole and its different sub-sectors (livestock farming, fishery, seed breeding etc.), however, as of September 2016 the only remaining non-outdated policy document is the Food Security and Nutrition Programme for 2015-2017 (approved by the Government Decree No. 618 dated 4 September 2015). All other policy documents either expired, or had never been officially adopted by the government.

Institutionally, two bodies implement government policies: (i) Ministry of Agriculture, Food Industry and Melioration of the Kyrgyz Republic (MoAFIM) and (ii) State Veterinary and Phytosanitary Inspectorate under the Government of the Kyrgyz Republic. The Ministry is in charge of policy development for the sector and delivery of all government services except those falling under the Inspectorate's area of responsibility. As can be gathered from its name, the Inspectorate provides all services related to the functions of veterinary and phytosanitary control in the country.

The above NSSD's policy statement and available information on actual government activities in the sector imply that key agricultural policies implemented by the government of the Kyrgyz Republic include:

- Support in provision of critically important public goods for agriculture (veterinary services, seed breeding etc.);
- Rehabilitation of infrastructure (e.g. irrigation, roads), mostly with support of donors;
- Improving access to markets including accession to the Eurasian Economic Union (EAEU) with a view to facilitate Kyrgyz farmers' access to the markets of Russia, Kazakhstan and other EAEU member countries, and rehabilitation of quality infrastructure (modernization of testing labs, harmonization of technical regulations and standards with the EAEU ones);
- Provision of cheaper credit to farmers and agribusinesses; this is being achieved through the government subsidy programmes for commerical bank loans to agricutural producers and processors;
- Favorable taxation regime for agricultural producers and some types of agribusinesses – these enterprises and individuals pay only land tax at very low rates and are exempt from any other taxes.

Government expenditures on agriculture are not very high. In 2015, these expenditures amounted to just 1.5 % of general government budget expenditures or 1.2 % of gross agricultural output (GAO) (Table A1 in the Appendix). These resources are very far from being sufficient to implement the broad policy agenda outlined above. As a result, the quality of government services in agriculture is below its necessary level.

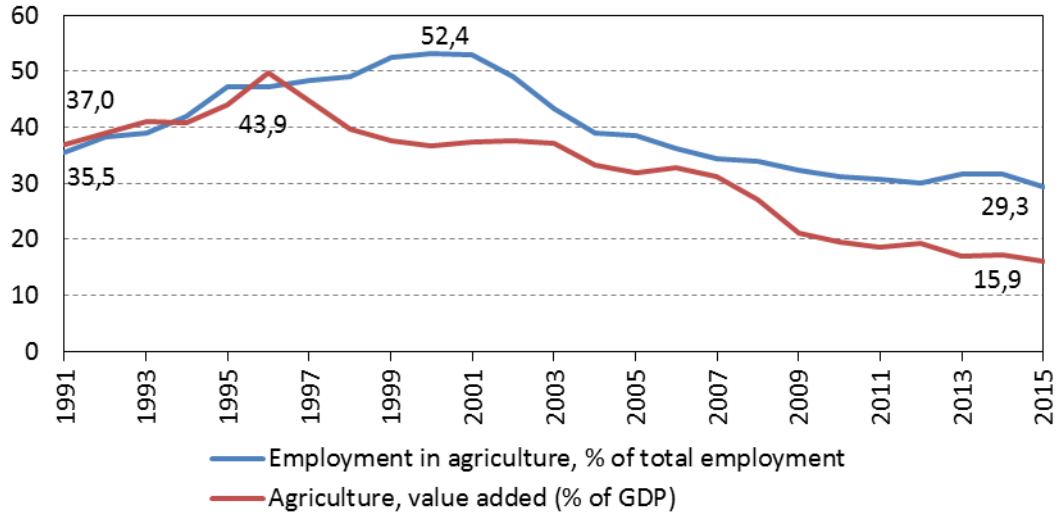
3 AGRICULTURAL PRODUCTION

3.1 Overview of the agricultural sector in Kyrgyzstan

Agriculture has always been a core sector of the economy of Kyrgyzstan. However, its role is gradually declining: the contribution of the sector to the GDP fell from 43.9 % in 1996 to just 15.9 % in 2015 (Figure 1), according to data from the National Statistical Committee of the Kyrgyz Republic (NSC). It is worth noting that the current agricultural data collection system in Kyrgyzstan is based not on reports made by farms and enterprises, but on assessments of uncertain quality completed by local authorities and compiled by the NSC. Therefore, these data and trends need to be treated with a fair amount of caution. Still, the trends seem to be mostly consistent with other sources of data (one-off surveys conducted by independent researchers, other types of statistical data etc.), so, in the authors' view, the NSC agricultural data is acceptable for use in analysis (with the exception of cases explicitly discussed below). Similarly, the share of agricuture in total employment in the country went down from its peak rate of 52.4 % in 2000 to 29.3 % in 2015. This drop in agricultural employment can be attributed to the migration of labor to the service sector and abroad.

There is significant regional variation in the role of agriculture in the economy. In the most agricultural oblast (province) in Kyrgyzstan, the Talas oblast, the share of agriculture in the Gross Regional Product (GRP) and in total employment was 50.7 % (2014) and 62.1 % (2015), respectively. On the other end of the scale, the share of agricuture in the GRP in the Issyk-Kul oblast was just 9.3 % (2014), while the share of total employment in the Chui oblast was 21.5 % (2015). The proportion of households involved in agriculture on the rayon (district) level is shown in Figure A2 in the Appendix.

Figure 1: Share of agriculture in GDP and total employment, %



Source: NSC.

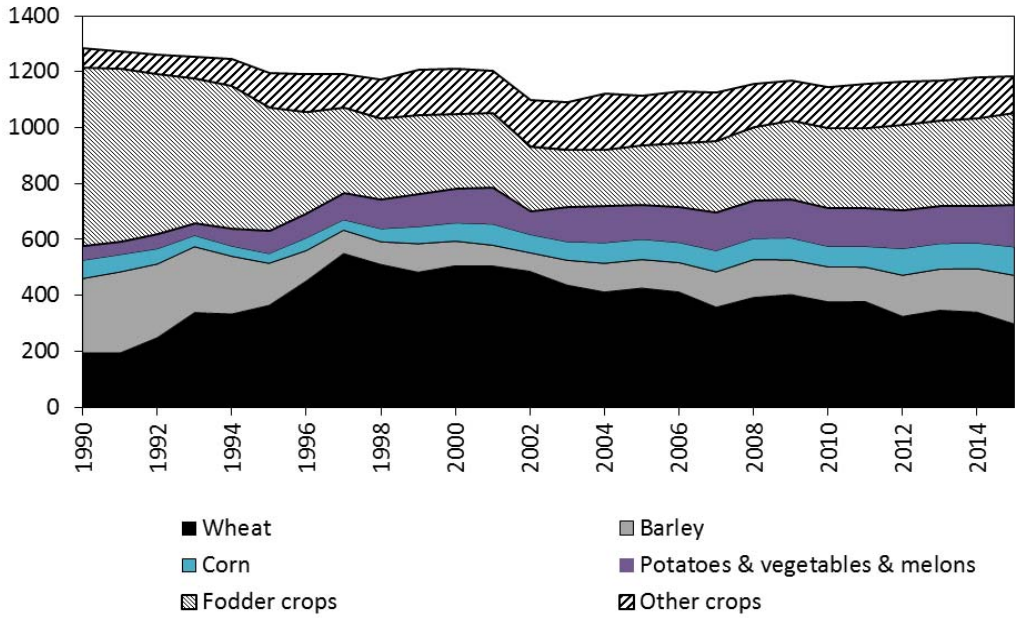
Gross output of agriculture in 2015 made 197,065.8 million Kyrgyz soms (USD 3.1 billion). For the period of 1991-2015, the gross value added in agriculture grew at an average annual rate of 2 %; from 2005-2015 this rate was 1.9 %. From the total output in 2015, the share of crop production accounted for 50.3 %, livestock – 47.5 %, fisheries and forestry – 0.2 %, and agricultural services – 2 %. For comparison, in 1991 the share of livestock was 58.9 % and in 2006 (the lowest point) it was 42 %; the respective shares of crop production in gross agricultral output were 38.2 % in 1991 and 56.4 % in 2006. This reflects the prevailing specialization of Kyrgyz agriculture in livestock breeding (especially sheep for wool) in Soviet times, its

re-orientation to subsistence crops in the period of active transformation of the economy and the agricultural sector, and the recent increasing market orientation towards agricultural production led by the meat and dairy livestock sector.

3.1.1 Crop production

Wheat is the main crop in the country. Its importance increased in the first half of the 1990s (Figure 2), the most difficult period in the process of transition, when food security concerns were prevailing in the minds of the farmers. As of 1998, the share of wheat in the total cultivated area was gradually declining as it was not economically attractive to grow wheat on irrigated land. The area under barley, corn (maize), and fodder crops (lucerne, sainfoin) – the crops used for animal feed – correlate with the numbers of livestock (see below). The area under these crops fell until the late 1990s and beginning of 2000s when it began to recover again. The increase in areas under potatoes, vegetables and legumes (mostly kidney beans) which are all export crops reflects the gradual change in crop patterns towards more market-oriented production. At the same time, the areas of such technical crops as cotton and tobacco which prevailed in pre-independence time reduced significantly.

Figure 2: Sown area, thous. ha



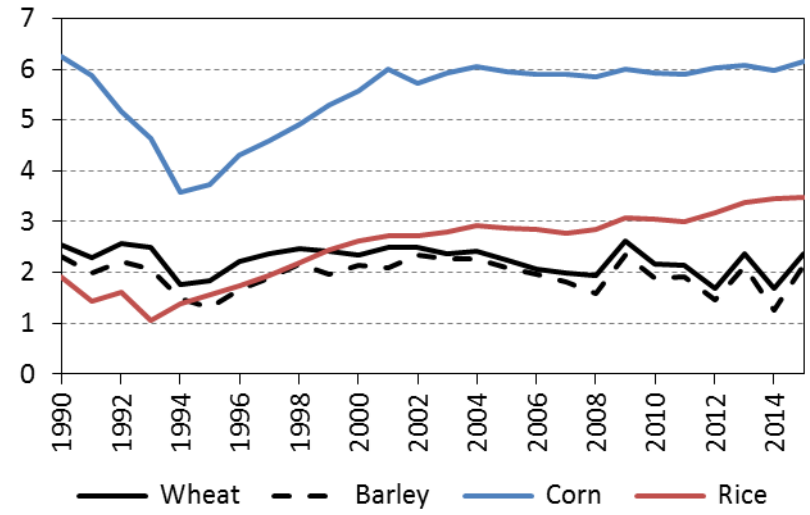
Source: NSC.

The key crop production areas include the fertile Chui, Fergana and Issyk-Kul valleys (Figures A3a and A3b in the Appendix) as well as some mountainous areas such as the Naryn and Talas oblasts.

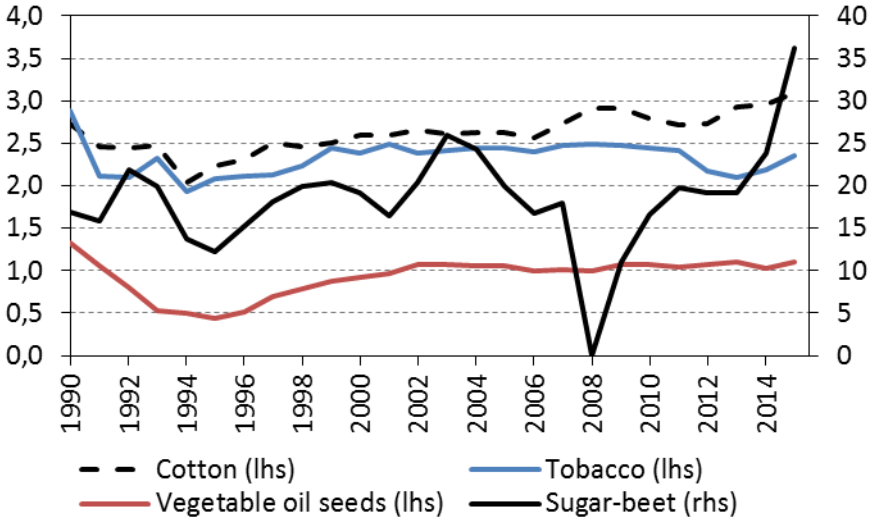
The yields of major agricultural crops experienced a decline in the first half of the 1990s (Figure 3). Then they more or less recovered to the 1990 level and either slowly improved (rice, cotton, vegetables, melons), or stagnated (wheat, barley, corn, potatoes, fruits). The sluggish dynamics of yields is related to major technological challenges faced by Kyrgyz agriculture: neglect of cultivation techniques by farmers, low use of quality seeds, fertilizers and agricultural chemicals etc.

Figure 3: Yields of major agricultural crops, t/ha

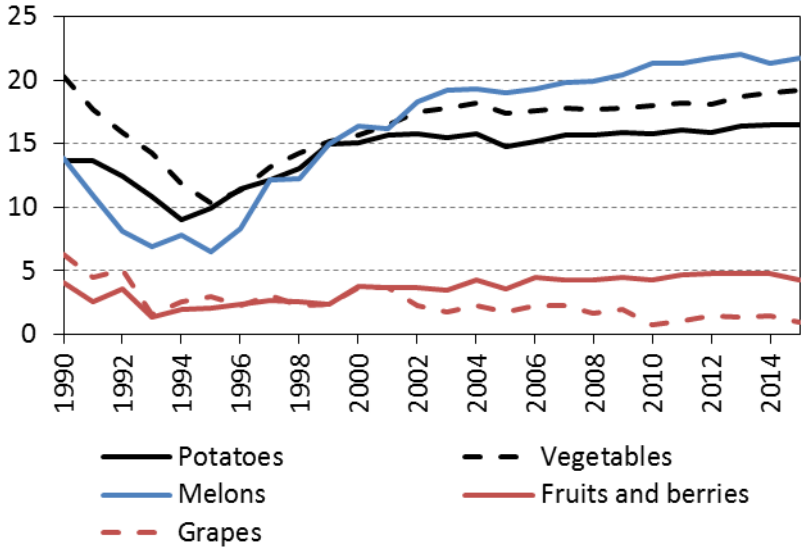
a) Cereals



b)Technical crops



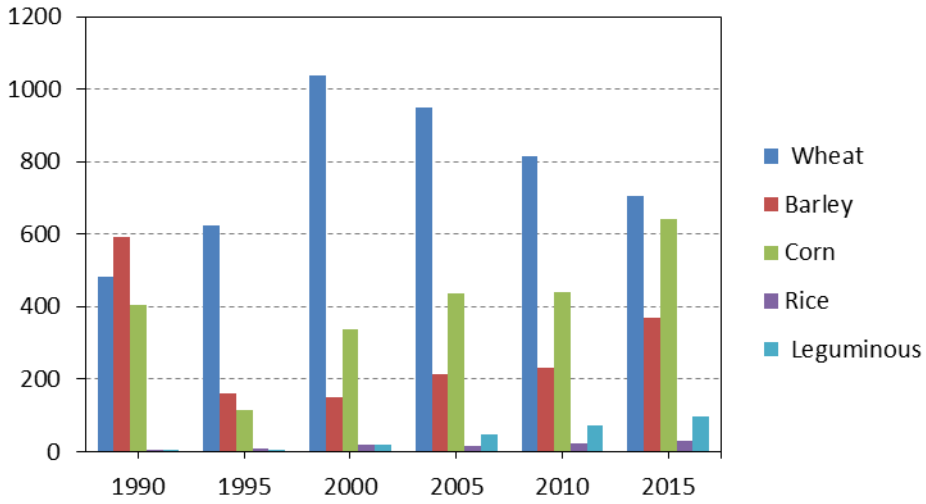
c) Other high-value crops



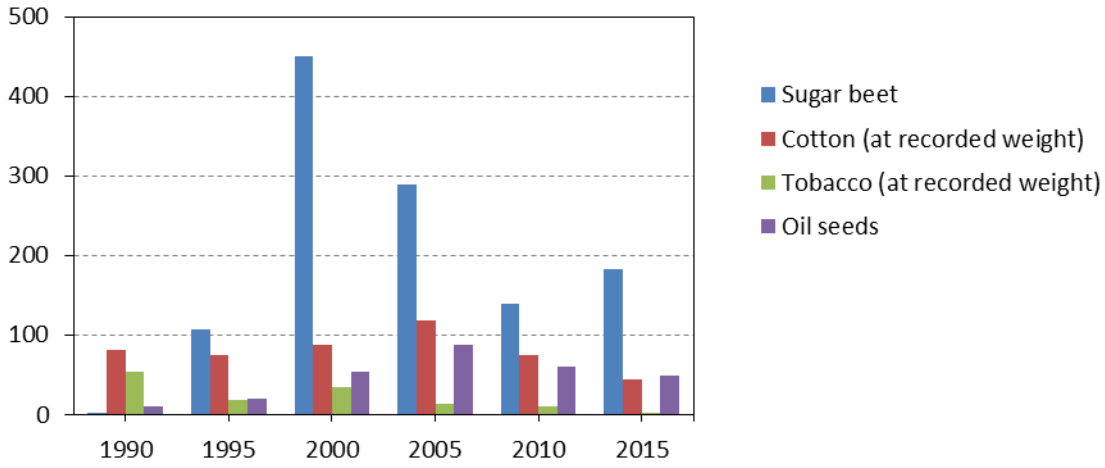
Source: NSC.

Figure 4: Crop production, thous. t

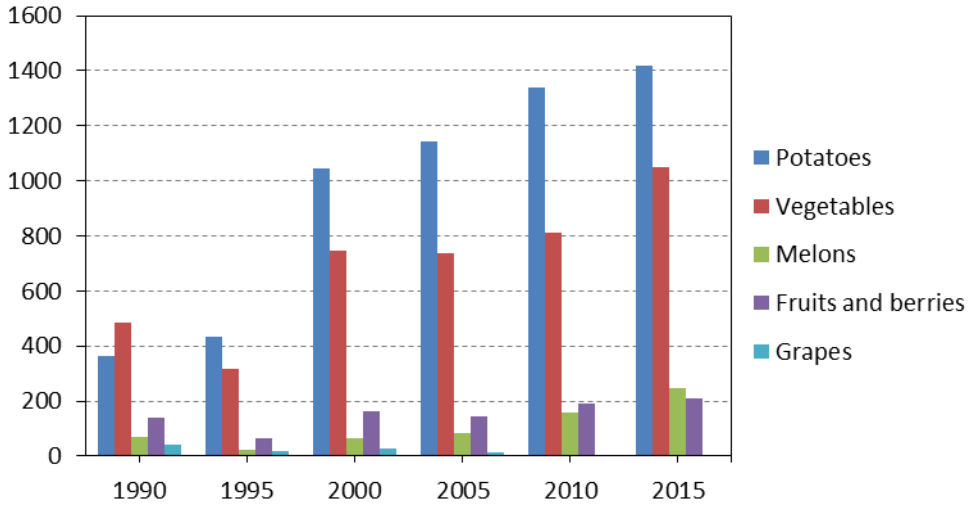
a) Grains and legumes



b) Technical crops



c) Other high-value crops



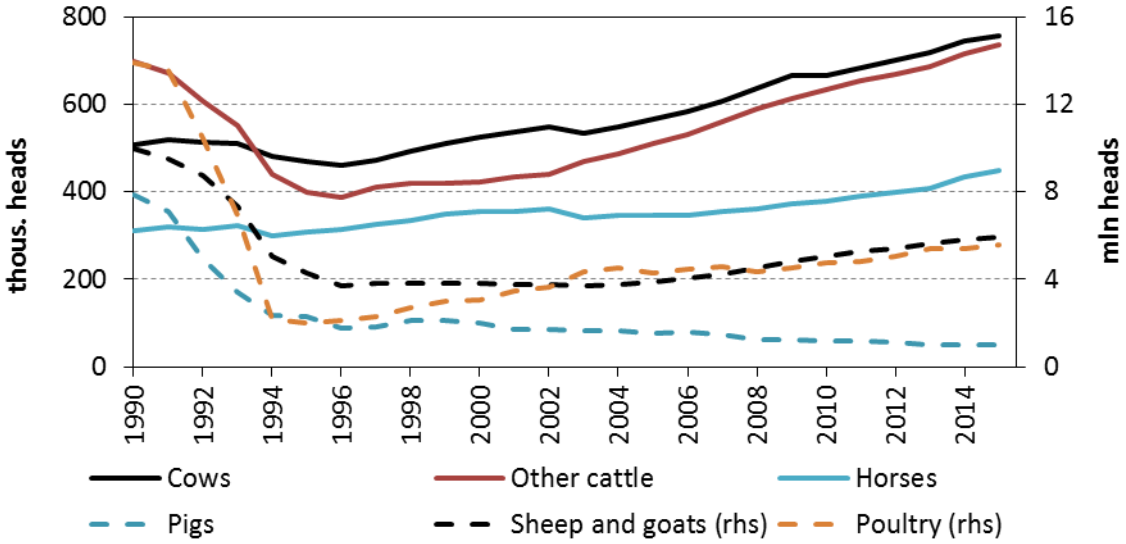
Source: NSC.

Crop production follows the changes in crop areas and yields (Figure 4). The production of wheat in 2015 decreased by some 30 % in comparison to its peak in 2000, but is still much higher than in 1990 when Kyrgyzstan relied on wheat supplies from other republics of the Soviet Union. These trends are consistent with the changes in the wheat areas discussed above and stagnating wheat yields. Production of other grains (barley, corn, rice) and legumes (kidney beans) continues to grow in line with increasing areas under these crops. Production of sugar beet demonstrated huge swings reflecting the dynamics of output prices and the changes in soil fertility in sugar beet growing areas (high after many years of production of other crops and low when sugar beet was sown for several years in a row). Cotton production in which the government of Kyrgyzstan has no stake (unlike neighboring Uzbekistan and Turkmenistan) has gradually become a secondary activity for most Kyrgyz farmers in cotton-growing areas. The production of potatoes, vegetables, melons and fruits continues to increase.

3.1.2 Livestock production

Cattle, sheep, goats, horses, and poultry are the main types of livestock bred in Kyrgyzstan; pigs were once quite common, but for the last 25 years their numbers have been declining (Figure 5). Livestock numbers fell in the first half of the 1990s, and then recovered to a different extent: the number of cattle and horses are now much higher than in 1990, while sheep, goats and poultry are still well below their 1990 level. The key factors affecting these trends are availability of forage and issues with pastures (see below).

Figure 5: Number of livestock, thous. head



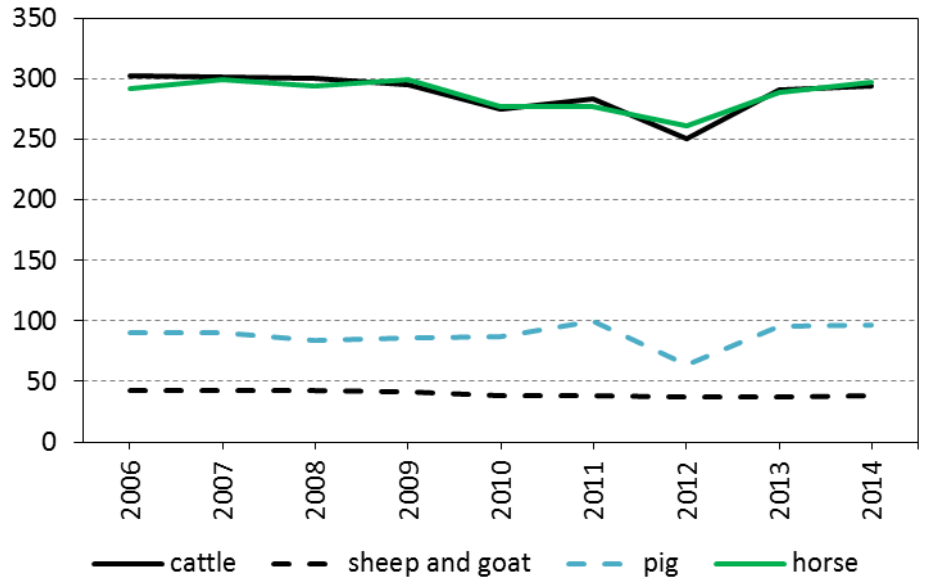
Source: NSC.

Livestock production is concentrated in the most populous Chui and Osh oblasts as well as in the Issyk-Kul, Jalal-Abad and Naryn oblasts where mountainous pastures are abundant (Figures A3c and A3d in Appendix).

The main livestock products in Kyrgyzstan include meat (50 % beef, 29 % sheep meat, 10 % horse meat, 11 % other meat), cow's milk, wool, and eggs. Livestock productivity indicators have been gradually degrading in recent years (Figures 6, 7). This has to do with the deterioration of the feed supply and animal breeds. The livestock breeding sector also faces serious challenges in terms of veterinary care (TILEKEYEV et al., 2016). The veterinary control system has seriously degraded in the last decades due to chronic underfinancing. Recently, the government

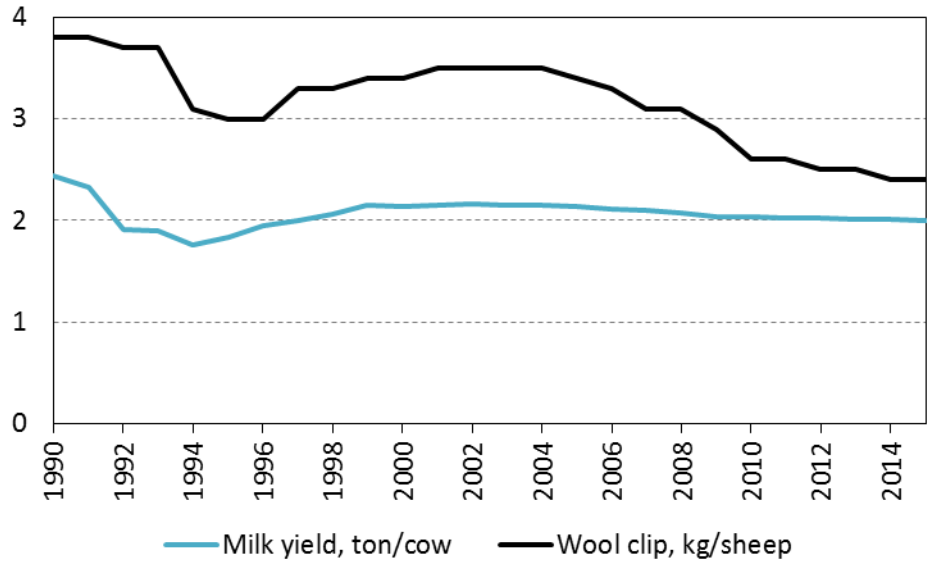
began to pay more attention to the veterinary system in order to improve the export capacity of the sector.

Figure 6: Average weight of animals sold for slaughter, kg/head



Source: NSC.

Figure 7: Milk and wool productivity

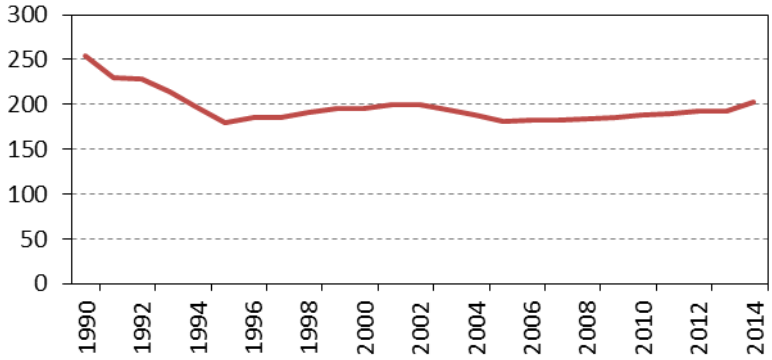


Source: NSC.

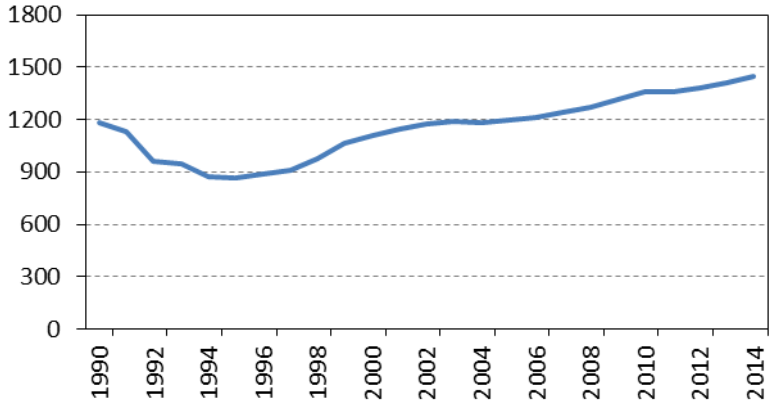
Production of meat (Figure 8a) has declined in comparison to the pre-independence period; however, over the last ten years it has gradually increased due to the growth in livestock numbers. Milk is the only livestock product of which production increased during the last 25 years (Figure 8b) – the significant growth of the number of cows more than compensated for the decline in the milk yield. The production of wool (Figure 8c) fell by more than three times during the last 25 years. This reflects the re-orientation of sheep breeding in Kyrgyzstan from production of wool (emphasized in Soviet times) to production of meat currently highly demanded on the domestic market.

Figure 8: Livestock production, thous. t

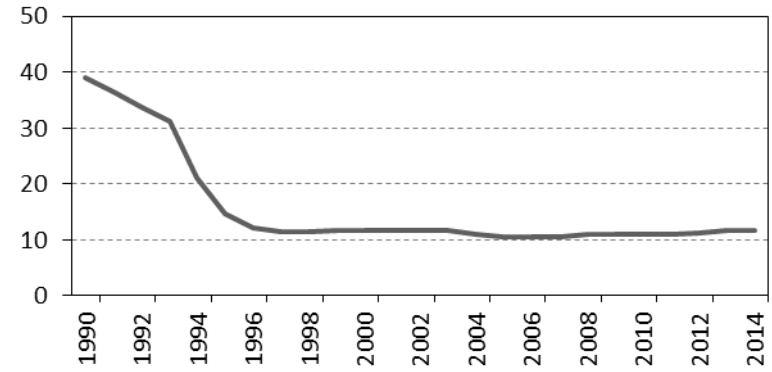
a) Meat



b) Milk



c) Wool



Source: NSC.

3.1.3 Contemporary farm structure

As mentioned in Section 2.1, the farm structure in Kyrgyzstan experienced a shift during the agrarian reforms from a few hundred large farms (typical farm size above 1,000 ha) to a few hundred thousand small peasant farms (typical farm size about 2 ha). As follows from Table 1, large state and collective farms now play a marginal role in Kyrgyz agriculture; small peasant farms and household plots dominate in the sector in all oblasts of the country.

Table 1: Farm structure

	Number of farms, thous.		Arable land area, % of total		GAO, % of total	
	2002	2015	2002	2015	1996	2015
State and collective farms	0.8	0.6	22.3	5.5	19.8	1.7
Peasant farms	251.5	400.8	67.7	87.2	26.0	60.2
Household plots	726.6	726.6	10.2	7.3	54.1	38.1

Source: NSC.

Note: Data for the number and land area of household plots and state and collective farms are available from 2002.

Similarly, livestock is also concentrated now in small entities with an even larger emphasis on households (Table 2). However, the growth in the livestock sector is driven by peasant farms which are more commercially oriented while households keep livestock mostly for subsistence purposes.

Table 2: Livestock production by farm type

	State and collective farms		Peasant farms		Households	
	1999	2014	1999	2014	1999	2014
	Livestock number, thous. heads					
Cattle	54.5	15.1	360.5	709.5	517.3	733.7
Sheep and goat	86.0	29.2	1570.8	3280.0	2,149.7	2519.8
Horses	14.8	4.3	154.9	244.8	180.1	184.0
Pigs	14.7	1.24	12.9	24.7	77.2	24.8
Poultry	178.8	959	778.2	1985.6	2,022.9	2475.5
	% of total					
Livestock sector output	2.6	1.7	30.9	50.2	66.5	48.1

Source: NSC.

3.2 International trade in agricultural goods

Trade in agricultural and food products plays an important role in the small open economy of Kyrgyzstan. Some sub-sectors of the Kyrgyz agricultural sector are export-oriented (vegetables, fruits, dairy products, tobacco, cotton); whereas many food and agricultural products either are not produced in Kyrgyzstan, or produced in insufficient quantities or quality due to climatic conditions or high production costs (wheat and wheat flour with high gluten content, beef, poultry and some other types of meat, fruits, various prepared foods, cigarettes and alcohol etc.). In general, since the late 2000s the country has experienced a major deficit in agrifood trade.

The export performance of the Kyrgyz agricultural sector over the last two decades has been mixed at best (Figure 9a). The total amount of agrifood exports fluctuated at around USD 200 million for many years. However, it should be taken into account that the purchasing capacity of the US dollar is gradually falling in Kyrgyzstan. Accounting for the dynamics of the exchange rate and inflation in the country, USD 1 in 2000 could buy as much goods on the Kyrgyz domestic market as USD 2.5 in 2015. This means that the "real" value of the Kyrgyz exports fell dramatically in the 2010s in comparison to the end of the 1990s and early 2000s. The share of agrifood exports in total exports remains in the range of 10-20 % since 2003.

The structure of exports (Figure 9b) has also changed with cotton and tobacco being replaced by vegetables (half of them kidney beans), fruits and dairy products. Key export markets for Kyrgyz agrifood produce are Kazakhstan, Russia, and Turkey (kidney beans).

Imports of agrifood products increased in nominal and real terms in each year except 2015 (Figure 9a). The increase in imports accompanied a general growth in the economy and improvement in living standards of the population which could afford more imported food products. The share of imports in total imports of goods was pretty stable for many years ranging from 13 % to 17 %. The product structure of imports was relatively stable, too, with prepared foods (juices, canned food, chocolates, sweets and so on), grain and flour occupying more than 50 % of total agrifood imports. The countries of origin of imports are more diverse than export destination countries; the main import sources are Kazakhstan, China, Russia, and Ukraine.

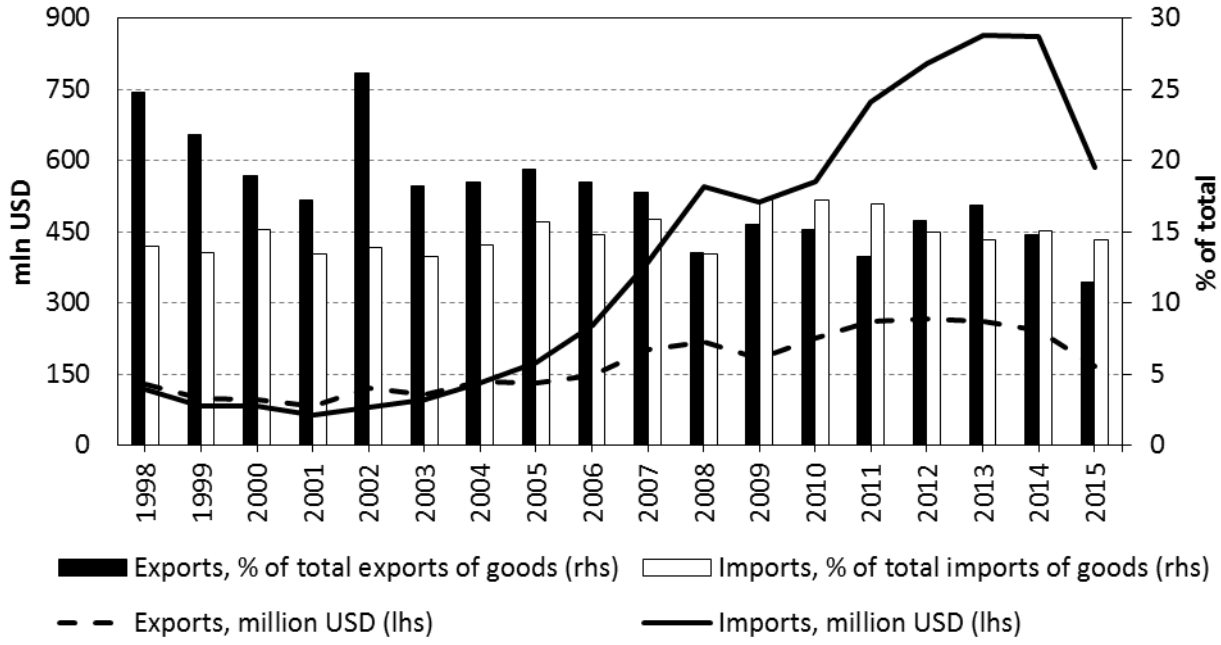
The Kyrgyz agrifood enterprises face significant challenges when exporting their produce. While external tariff barriers are either non-existent (on the markets of the former Soviet Union), or relatively low, the technical barriers to trade are big. This has mostly to do with structural issues inside the agricultural and food sector of Kyrgyzstan: insufficient development of veterinary and phytosanitary systems, difficulties with technical regulation conformity assessment of the produce intended for exports, small scale of the enterprises for which the fixed costs associated with exports are a significant burden, costly logistics related to asymmetry of trade flows, small scale of supplies, and underdeveloped transport infrastructure, and governance irregularrities during the entire export process.

Apart from the structural issues, Kyrgyz trade in agrifood products is sensitive to the dynamics of the exchange rate. The appreciation of the KGS against the Russian ruble by 24 % with the associated loss of competitiveness of the Kyrgyz products on the Russian market may be an explanation for the drop in agricultural exports in 2015. In contrast, the depreciation of the KGS against the USD, Chinese yuan and Euro is one of the factors behind the reduction in 2015 of agrifood imports.

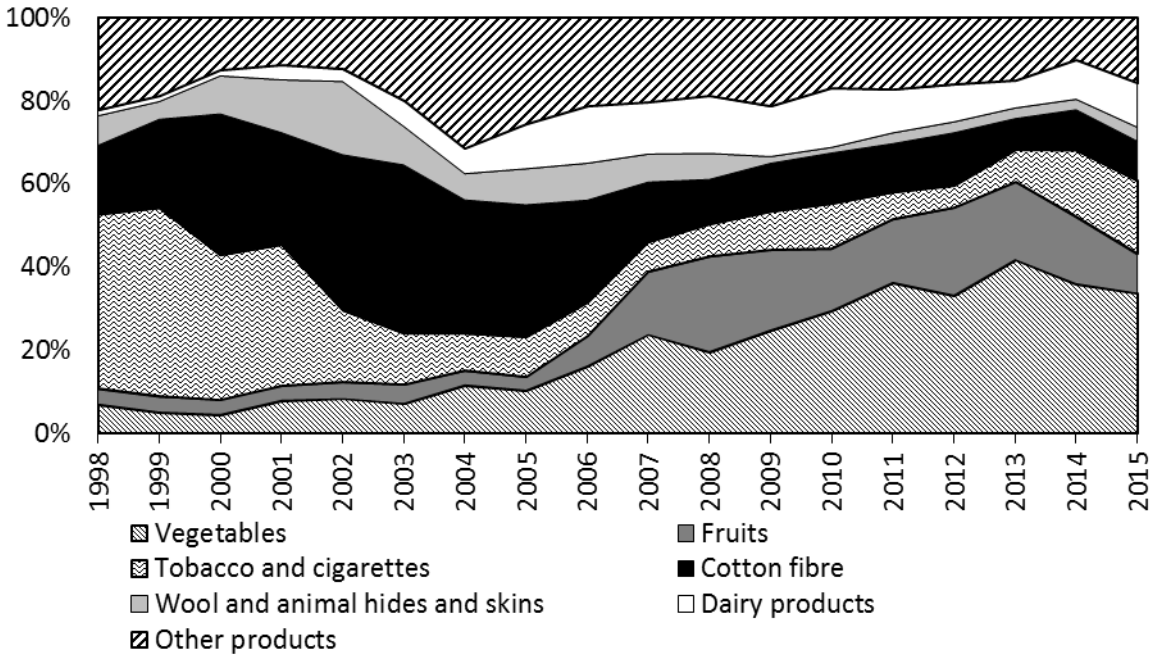
In 2015 Kyrgyzstan acceded to the Eurasian Economic Union (EAEU). At the end of 2016, it is still too early to discuss the actual effects of accession, but it is clear that this could have consequences on the agrifood trade of Kyrgyzstan in many ways. Some of the impact canals include the removal of customs and phytosanitary control on the Kyrgyz-Kazakh border, investments into testing labs for food products exported from Kyrgyzstan, substantial inflow of financial resources to the economy of Kyrgyzstan to support the process of accession, increase in external tariff for imported goods etc. (MOGILEVSKII, 2016).

Figure 9: Foreign trade in agrifood products

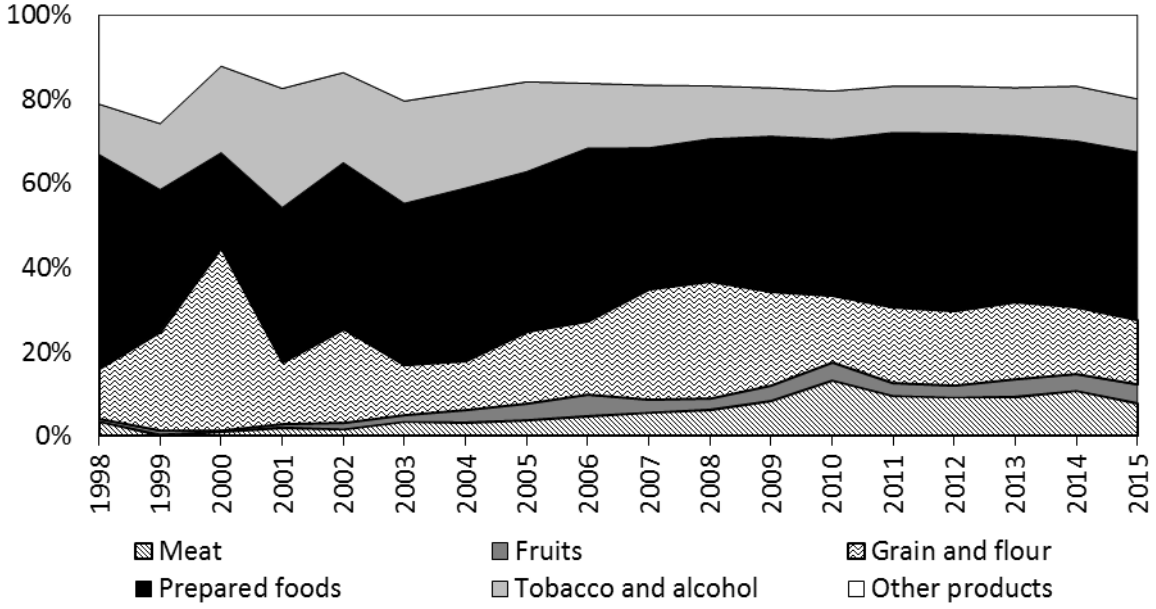
a) Dynamics of agrifood exports and imports



b) Evolution of the structure of agrifood exports by product



c) Evolution of the structure of agrifood imports by product

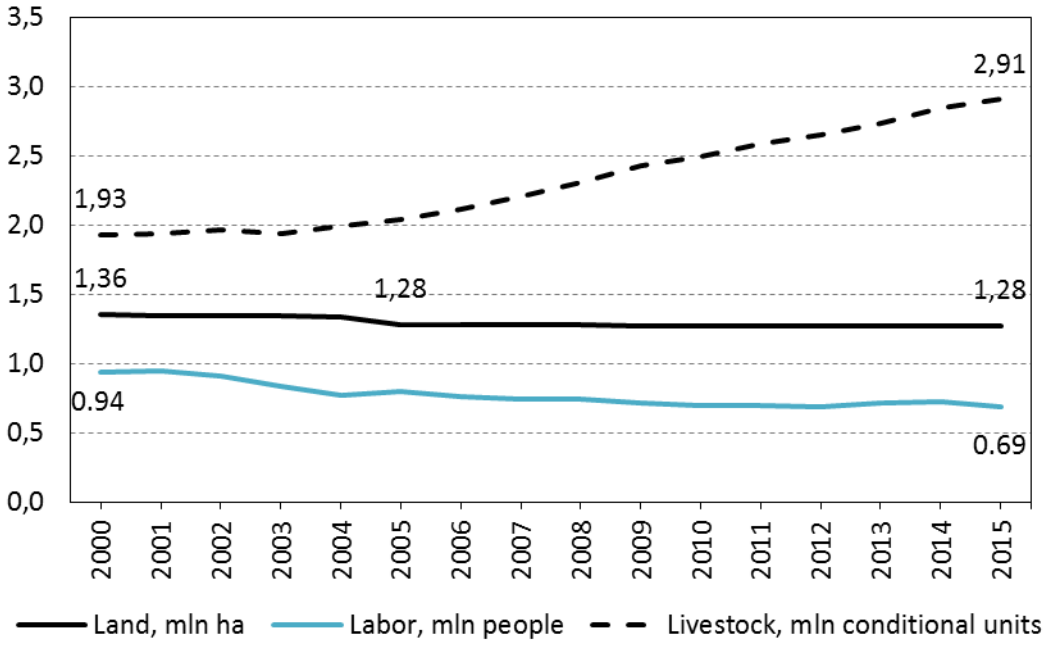


Sources: NSC, STATE CUSTOMS SERVICE OF THE KYRGYZ REPUBLIC.

3.3 Productivity in agriculture

From the beginning of the 2000s, the growth of agricultural output was accompanied by multidirectional dynamics of production factors (Figure 10). From 2000-2015, agricultural employment was almost uninterruptedly declining, while agricultural land area was fluctuating around the same level, and livestock numbers were increasing. In other words, farms were shedding excessive labor while using more or less the same land area and increasingly investing in livestock. Excessive labor was a feature of agriculture in Kyrgyzstan since the pre-independence period when labor migration from rural to urban areas was administratively restricted. In the 1990s, the administrative barriers were removed, but at that time the country and the entire region were going through a transition shock, so the situation in urban areas was as (and, in some cases, even more) difficult as in rural areas. This retained and even increased employment rates in agriculture for a while. However, with the stabilization of the economic situation and some adaptation of the population to the new economic reality the process of labor outflow from agriculture began. The outflow intensified with the beginning of the oil boom in Russia and Kazakhstan in the early 2000s; many agricultural workers went from Kyrgyzstan to these countries as labor migrants. General economic recovery and remittances from the labor migrants allowed for some savings in the rural households; part of these savings was used to increase livestock herds as the most convenient and simple way for rural people to invest.

Figure 10: Dynamics of production factors in agriculture 2000-2015



Sources: NSC, own calculations.

The dynamics of production factors resulted in different trends in agricultural productivity indicators (Figure 11a). Due to the growth of the GAO and the reduction of the number of agricultural workers, labor productivity almost doubled between 2000 and 2015; the average annual growth rate for this period of time was 4.3 %. Land productivity increased by 50 % in 2015 in comparison to 2000; this implies an annualized growth rate of 2.6 %. Livestock productivity (measured as a ratio of livestock output to the number of livestock conditional units), however, fell for the same period of time by some 20 % or by 1.2 % per annum, on average. The livestock conditional units were calculated using the following conversion coefficients: 1 cow or horse = 1 unit, cattle other than cows = 0.7 unit, sheep/goat = 0.2 unit. Apparently, investments into livestock were growing faster than the livestock sector output.

The growth in labor and land productivity in the last 15 years could be attributed to farmers accumulating better knowledge of farm management relative to their situation, understanding accessible markets, and utilizing available resources including labor, the ability to optimize crop structure and the general performance of a farm. Important to note here is that this takes place with minimum government interventions in the sector. This, of course, means under-provision of public goods, but at the same time a lack or low level of any distorting signals from the government which heavily affected the sector in the pre-independence times and continues to affect agriculture in some neighboring countries.

In general, labor productivity values in Kyrgyzstan are relatively low. According to the WDI, in 2013 in Kyrgyzstan the agricultural value added per worker was USD 1,230 (2010 prices). Comparable values were USD 1,883 for lower middle income countries (the income category Kyrgyzstan belongs to according to the World Bank's classification), USD 1,895 for Azerbaijan, USD 4,102 for Kazakhstan, USD 7,733 for low and middle income countries of Europe and Central Asia, USD 12,543 for the Russian Federation, and USD 35,732 for high income countries.

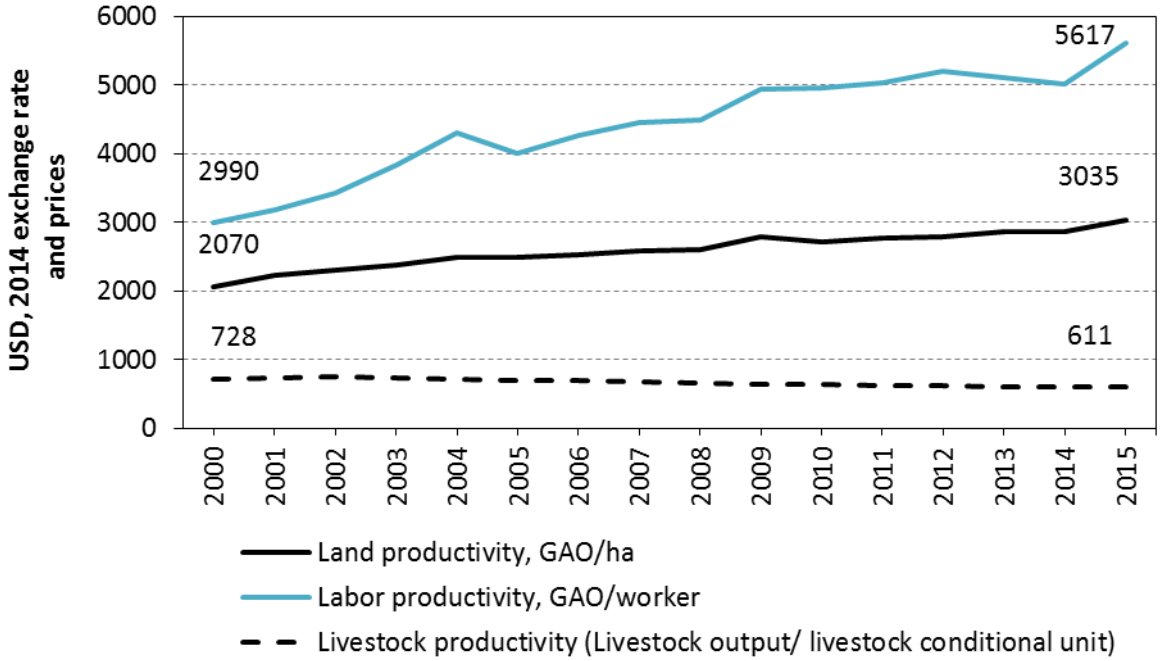
Comparison of productivity indicators for different types of farms (Figure 11b) indicates that land productivity is much higher on small farms (peasant farms and household plots), while labor and livestock productivity is significantly higher in larger state and collective farms.

This result seems to be consistent with the theory of declining marginal productivity of factors – more abundant factors (labor and livestock on small farms, land on large farms) are less productive than relatively scarce factors of production. One could notice that while large farms do have higher labor productivity than small ones, the productivity gap (some 40 %) between these two farm types is not very big, i.e. large farms also under-perform in compareson to any international benchmark.

One of the most important reasons behind the low agricultural productivity is the level of investments in agriculture (Table 3). According to official statistics, these investments are below or about 1 % of the GAO or total investments into fixed capital. In reality, these investments are higher as the statistics do not take into account investments in livestock and, presumably, other investments made by peasant farms and households which do not report on their investment activities. Available information allows for a very rough estimation of livestock investments. Using official NSC data for 2015 on increases in the number of key agricultural animals (34.1 thousand cattle, 100.5 thousand sheep and goats, and 16.6 thousand horses) and applying average prices per head based on information from the MoAFIM[2] (KGS 45,000 per cattle, KGS 6,500 per sheep and goat, and KGS 60,000 per horse) it can be estimated that investments in livestock are at around KGS 3,184 mln or USD 49.4 mln, which is 2.5 times higher than the NSC's estimate of all other investments in the sector in 2015. But even accounting for this adjustment for livestock, total investments into fixed capital in Kyrgyz agriculture are very low. The depletion of fixed assets inherited from the Soviet period (agricultural machinery, on-farm irrigation systems, buildings etc.), provides enough evidence to talk about general disinvestments in the sector.

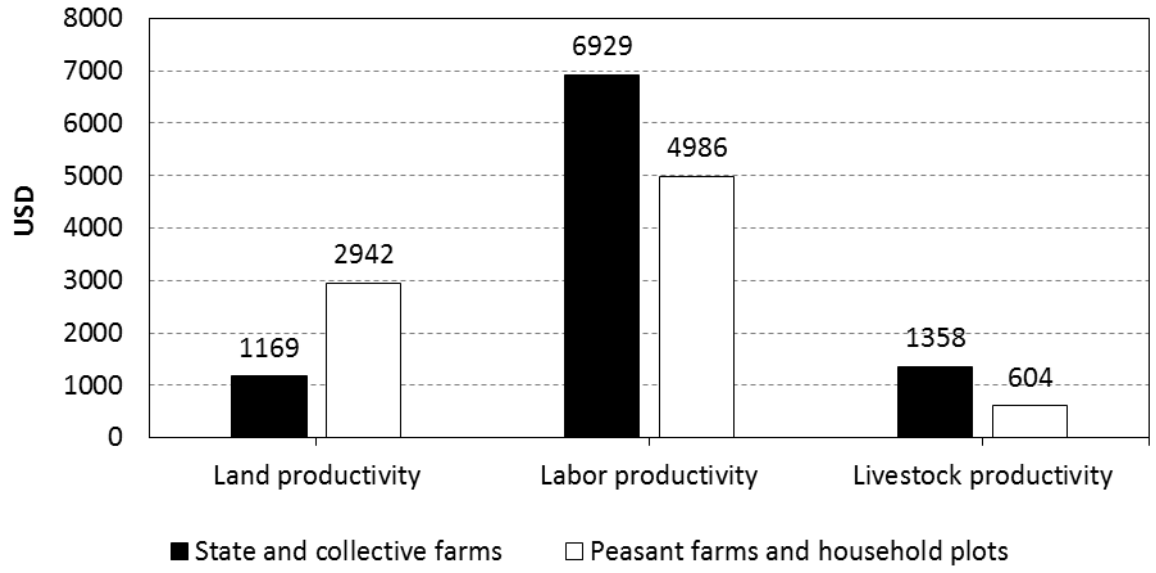
Figure 11: Agricultural productivity indicators

a) Dynamics



[2] http://www.turmush.kg/ru/news:89254.

b)By farm type, 2014



Sources: NSC, own calculations.

Another major source of insufficient productivity is the very basic technological level of contemporary agricultural production in the country. The loss of animal breeds, use of self-produced seeds, lack of proper crop rotation and any other agronomic techniques, low levels of utilization of fertilizers etc. limit potential growth of productivity. Insufficient management of key natural resources for agriculture (irrigation systems, pastures etc.) is one more important explanation for the sector's under-performance.

Table 3: Investments into fixed capital in agriculture

	2011	2012	2013	2014	2015
Mln KGS	789.9	1 006.4	1 239.1	816.4	1 283.2
Mln USD at market exchange rate	17.1	21.4	25.6	15.2	19.9
% of GAO	0.5	0.6	0.7	0.4	0.7
% of total investments into fixed capital	1.5	1.3	1.3	0.7	0.8

Sources: NSC, own calculations.

The majority of farmers do not have any professional education in farm management, agronomy or livestock breeding. According to the NSC, in 2014 only 17.1 % of all people employed in agriculture had some (not necessarily agricultural) professional education. Many of them have little to no traditional farming knowledge applicable to the current situation. Until becoming independent farmers in the 1990s, most of them were "partial" agricultural workers on large Soviet farms; they were not required or encouraged to learn the details of agricultural technologies and management – this was the business of selected professionals. Lack of professional skills and exposure to the best international experience is one of the factors behind the farmers' reliance on the most basic agricultural technologies and practices. Insufficient social capital is another factor preventing farmers from joining more advanced forms of agricultural organization such as service cooperatives. Repeated government campaigns in favor of the creation of cooperatives of any kind (but with an emphasis on production ones) failed due to insufficient mutual trust and lack of self-organization skills among farmers. Still, according the FAO/REU survey in 2012, there is some evidence of informal cooperation

among farmers in Kyrgyzstan in such areas as joint use of agricultural machinery and transport vehicles, sales of farm production, purchase of inputs, and joint processing (LERMAN, 2013).

The small size of the majority of farms seems to be simultaneously a blessing and a curse for Kyrgyz agriculture. On the one hand, these farms are managed in the direct interest of the absolute majority of rural households who are their owners. This is a major reason for the efficiency of the sector and the registered growth in productivity. It would not be an exaggeration to say that self-reliance of farmers is a major source of extreme poverty reduction and basic food security (there was not one episode of hunger in the recent history of Kyrgyzstan) despite the harsh conditions of transition in the 1990s and the political turmoil which hit the country in the beginning of the 21st century. According to the NSC, the extreme (food) poverty level fell from 23.3 % of the total population in 2002 to 1.2 % in 2014-2015. On the other hand, these farms cannot enjoy economies of scale and are extremely vulnerable to external shocks (e.g. bad weather or price fluctuations). This vulnerability is greatly felt by farmers and incentivizes them to choose risk-averse farming strategies (choice of basic technologies which reduce the farms' dependence on external supplies, crop structure with prevailing share of subsistence crops etc.). These small farms do not have enough savings and ability to mobilize technical expertise for significant investments and they do not have enough creditworthiness to borrow for investment purposes (other than investments in livestock). This seems to be one of the key explanations for the low investment level in agriculture.

While low-productivity, small scale, semi-subsistence farms dominate the agricultural sector, there are also instances of improved efficiency and productivity based on more sound market grounds. The switch in the Talas oblast from subsistence crops to the production of export-oriented beans resulted in a dramatic reduction of poverty in this oblast: from 40.0 % of total population of the oblast in 2006 to 21.5 % in 2015, compared to the national poverty level change from 39.9 % in 2006 (same as in Talas) to 32.1 % in 2015. The development of commercial dairy farming and processing in the Chui and Issyk-Kul valleys targeted towards the Bishkek and southern Kazakhstan markets is another well-known fact. Recently, one can observe the dynamic development of the cattle and sheep fattening business which has become a major source of meat supplies for urban areas in Kyrgyzstan. Another example of the same kind is the increased use of greenhouses which improved supplies of vegetables for Bishkek and exports. Ongoing construction of new logistical and processing centers in the Chui, Issyk-Kul and Osh oblasts of Kyrgyzstan plans to improve the capacity to store, sort, package and export Kyrgyz vegetables and fruits.

4 ACCESS TO RESOURCES AND INPUTS

4.1 Land use

Agricultural land in Kyrgyzstan includes arable land, pastures, perennial plants, hayfields, and virgin lands. Pastures account for the largest share of agricultural land – 9,031.7 thousand ha out of 10,625.2 thousand ha of the total agricultural land in 2015 (or 85 %), while arable land accounts for 12.1 %. The total size of agricutural land fell by some 1 % in 2009 due to the reclassification of some pastures into forested areas (SAEPF, 2012). Otherwise, the agricutural land size and structure practically have not changed for the last 25 years.

Pastures are mostly located in mountainous areas of the country, especially in the Naryn, Jalal-Abad, Issyk-Kul, and Osh oblasts. Aarable land is concentrated in valleys, of which the Chui valley is the largest. Other important arable areas are located in the Osh, Jalal-Abad and Issyk-Kul oblasts.

According to official data, 80 % of arable land in Kyrgyzstan is irrigated. The share of irrigated land in total arable land is approximately the same in all parts of the country as can be deduced by comparing the oblast shares. The extent of irrigation is somewhat higher in the mountainous Naryn and Talas oblasts where lack of irrigation practically precludes land from being arable.

Land degradation in Kyrgyzstan is caused by natural and human factors. Degradation type depends upon the location:

- mountainous areas – rock falls, landslides, pasture and forest degradation;
- foothills – water and wind erosion, mudslides, irrigational erosion and loss of reach soil layer;
- valleys – salinization, swamping and irrigational erosion.

In recent years, inappropriate land use practices have become a major factor of land degradation. Contemporary farmers lack knowledge of traditional agricultural techniques and do not have modern agricultural equipment which could avoid or reduce the harm caused to the land and its fertility (SAEPF, 2009). The degradation of agricultural land is treated in the NSSD as a significant threat to sustainable national development.

Partially due to land degradation, in 2014 some 7 % of total arable land was not used (90,000 ha out of total 1,281,000 ha); this indicates some improvement – in 2010, the share of unused arable land was 8.7 %. Key reasons for the land disuse are economical (very dry, remote, stony plots – 80 % of unused arable land) and environmental (salinization, waterlogging, dysfunctional irrigation systems, natural disasters – 20 % of unused arable land).

The main reasons for the unsatisfactory irrigation of arable lands are lack of natural drainage, absence or poor maintenance of drainage systems, huge water losses in the process of irrigation, and inappropriate irrigation regimes resulting in the rise of ground water. Considering climate conditions, it is recommended to introduce drip irrigation systems, as well as create new and rehabilitate existing drainage systems (SAEPF, 2009). In 2006, according to the ameliorative cadaster, 85 % of irrigated land was in good condition, 6 % in fair condition, and 9 % in poor condition. Poor condition is related to the high level of ground water (37 %), salinization (52 %), and a combination of both (11 %). Crop yield losses on moderately salinized soil are 13-17 %, somewhat salinized – 32-37 % and on strongly salinized – 60-64 % of the yield level on land with no salinization. On average, harvest losses are estimated to be at 27 % due to salinized soil and at 38 % due to high level of ground water.

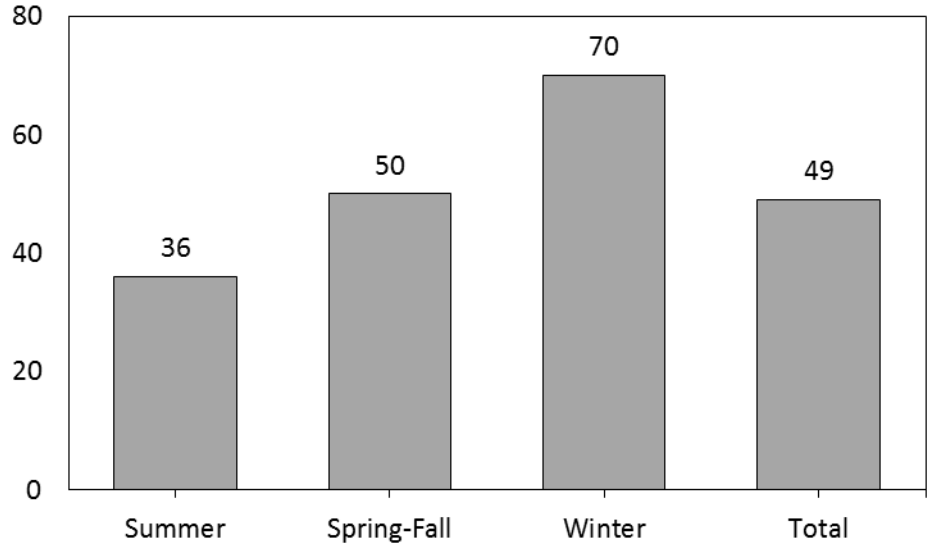
Unlike most arable land and on-farm irrigation systems owned by farmers and their associations, all pastures in Kyrgyzstan belong to the government. Pastures in Kyrgyzstan are divided into three major categories: winter (23 % of total pasture area and 12 % of total pasture feedstock), spring-fall (32 % and 31 %), and summer (45 % and 57 %) pastures (THE GOVERNMENT OF THE KYRGYZ REPUBLIC, 2014). Winter pastures are usually close to villages and located in areas of light snowfall where livestock can be easily housed, at least at night. Usually livestock sheds are located at these sites as are small houses for shepherds. Intended for use in winter only, due to their proximity to villages, these pastures are used in many places for all seasons and, consequently, are heavily overgrazed. Summer pastures are usually situated at middle elevations (2,500+ m above sea level) and in the high mountain valleys and gorges, typically located at significant distances from the settlements. They are characterized by high productivity and used in summer from one to four months; however, because of their remoteness, these are costly to access for livestock herds. Excessively used in Soviet times, most summer pastures are now rather under-utilized. In some cases, this was beneficial for the

pastures' productivity, but in many other cases the insufficient use resulted in degradation through the uncontrolled spread of plant species uneatable for livestock. Spring-fall pastures are usually located in the foothills at altitudes below 2,500 m above sea level. Grazing starts there in early spring when forage growth begins and again in fall after the harvest has been taken from the fields. These pastures are extremely important because they serve as the first natural feeding source after winter, and they are used for inseminating, shearing and dipping sheep (WORLD BANK, 2005).

Pasture availability and access differ significantly between different parts of the country. The largest summer pasturelands are located in sparsely populated areas of the Naryn, Jalal-Abad, Osh and Issyk-Kul oblasts. Winter pastures prevail in the densely populated Chui and Fergana valleys; this contributes to these pastures' overgrazing.

The over-utilization of winter pastures and under-utilization of summer pastures lead to their degradation. According to available data (Figure 12), 49 % of all pasturelands have degraded, and winter pasture degradation is at 70 %. According to the findings of a geobotanical survey of pastures conducted by specialists of the Kyrgyzgiprozem institute, more than 1.2 million hectares of pastures are shrubby, 1.3 million hectares are covered with poisonous rough-stemmed and badly eaten herbs, nearly 1.4 million hectares are covered with rocks, over 0.8 million hectares are both shrubby and rocky, and 0.4 million hectares are classified as hard-to-reach pastures (with a slope of more than 45°, heavy shrubs, and remote from highways) that are not currently used. A massive infestation is observed in spring-fall and summer pastures, over 0.2 million hectares of which are prone to soil erosion. Clearly, the modern model of pasture management is not sustainable (Draft Livestock Sector Development Concept of the Kyrgyz Republic for 2014-2023).

Figure 12: Pasture degradation, % of total pasture area



Source: Pasture Farming Development Program of the Kyrgyz Republic for 2012-2015.

4.2 Irrigation systems and water availability

Glaciers cover 4 % of the total area of Kyrgyzstan. Current deposits of clean water in glaciers account for 650 km^3; this amount is steadily decreasing over time. Other water resources of Kyrgyzstan accumulated in reservoirs and Issyk-Kul lake stay at 1,745 km3 (however, Issyk-Kul lake water cannot be used for agricultural purposes as it is salty). The total annual water run-off fluctuates within the range of 44 to 50 km^3 including return flow (MoAFIM). Other

sources of water are rivers and underground waters; the distribution of water resources and water withdrawal is shown in Table 4. The largest river in Kyrgyzstan is the Naryn, one of the origins of the Syrdarya river; its flow accounts for 58 % of the total flow of rivers in the country. Kyrgyzstan is an upstream country and 70 % of water originating in Kyrgyzstan (and 95.5 % of the Naryn's flow) goes further to neighboring countries – China, Kazakhstan, Tajikistan, and Uzbekistan.

Almost all water in Kyrgyzstan is used for agriculture (95 %) (National Institute for Strategic Studies). Irrigation systems in Kyrgyzstan include 1,030 irrigation canals and drainage systems (MoAFIM, 2013). Most irrigation systems were built in the 1950-1980s and are slowly renewed. Due to shortage of investments, water users have to exploit obsolete systems with high risk of accident. As a consequence of obsolete systems, there are a lot of cases of breakage and damage of canals and irrigation structures. The lack of proper maintenance results in a decrease of canal capacity by 15-25 % and a decrease in the productivity of pump stations and electrified holes by 20 %.

Table 4: Water resources in Kyrgyzstan by basin

	Syrdarya	Amudarya	Chu	Talas and Kurkureu	Ili	Tarim	Issyk-Kul
			Average long run flow, km^3 per year				
km^3	24.7	1.9	5.0	1.7	0.4	6.2	4.7
% of total	58	4	11	4	1	13	10
			Water withdrawal inside the country, km^3 per average year				
km^3	3.8	0.03	3.85	0.78	0	0	
% of total	45	0.3	45.5	9.2	0	0	

Source: MoAFIM.

Engineering irrigation systems serve 40 % of arable land, semi-engineering – 34 % and non-engineering – 26 %. The total length of inter-farm irrigation systems is 25.3 thous. km; only 40 % is lined. As for on-farm systems, only 25 % of it is lined. This leads to water absorption into soil and to higher water losses. Inter-farm drainage systems are 645.5 km long of which 26 % is in poor condition, the internal drainage system length is 4892.7 km of which 40.5 % has degraded (Table 5). The Issyk Kul oblast has the most degraded drainage system, while the Chui oblast suffers the least.

Table 5: Technical conditions of the drainage system, 2005

Oblast	Drainage, km			Internal drainage, km		
	Total	Poor	%	Total	Poor	%
Batken	22.8	12.1	53	268.2	88.3	33
Jalal Abad				254.6	73.7	29
Issyk Kul	23.9	16.5	69	206.3	169.9	82
Naryn				120.2	69.8	58
Osh	19.2	12.1	63	354.7	242.1	68
Talas	4			270.4	134.5	50
Chui	575.6	125.1	22	3 418.3	1 201.1	35
Total	**645.5**	**165.8**	**26**	**4 892.7**	**1 979.4**	**40.5**

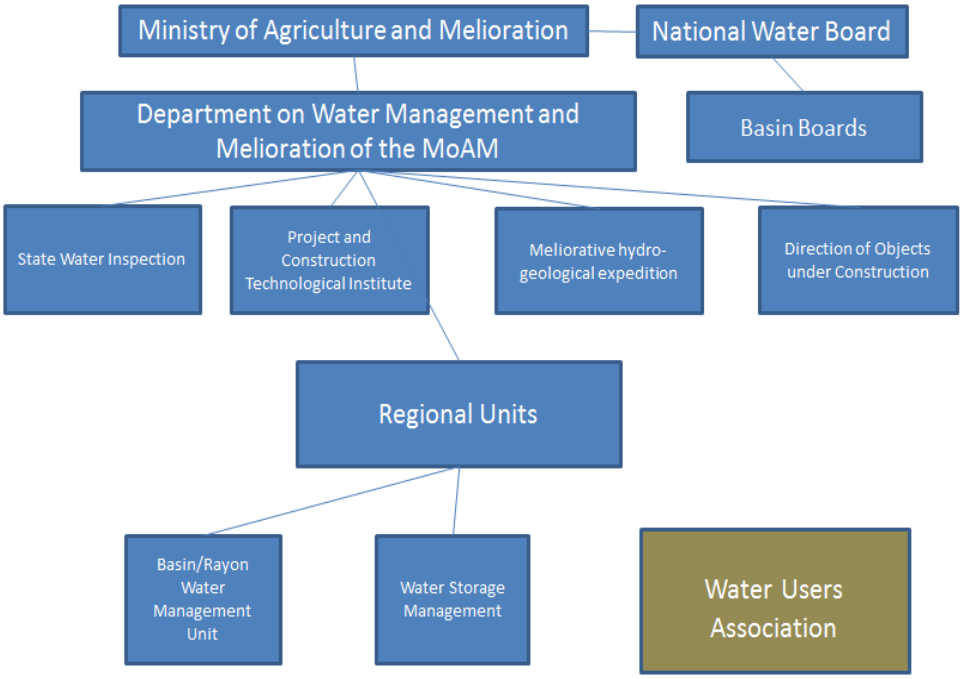
Source: AQUASTAT, 2012.

The poor state of irrigation and drainage systems as well as outdated methods of irrigation cause significant water losses. Up to 27 % of water withdrawn from its source is not reaching fields. Degradation of systems can be explained not only by the lack of investments into irrigation infrastructure, but also by the lack of qualified personnel, backup equipment and transportation for alternative supplies of drinking water. This also causes conflicts between upstream and downstream water users as no one wants to cover water losses.

In the long-term, water availability depends on climate change trends. According to the available evidence and estimates, the predicted temperature increase on the territory of Kyrgyzstan will cause the melting of glaciers and, by 2050, may result in a decrease in water supply in the country and increase in water demand for crop production (THE GOVERNMENT OF THE KYRGYZ REPUBLIC, 2016). This requires measures on climate change adaptation and mitigation. Kyrgyzstan ratified the United Nations Framework Convention on Climate Change in 2000 and joined the Kyoto protocol in 2003 which has been replaced by the 2015 Paris agreement. The government approved sectoral programs on climate change adaptation and mitigation in healthcare, emergency situations, forestry and biodiversity; the agricultural sector adaptation program for 2016-2020 exists in draft form but has not yet been approved.[3]

The institutional set-up for water use in Kyrgyzstan consists of 2 parts: 1) governmental regulatory bodies; and 2) non-governmental regulation systems represented by Water User Associations. The organizational structure is presented in Figure 13.

Figure 13: Organizational structure of water use management in Kyrgyzstan



Source: Water Code of Kyrgyzstan.

The government created the National Water Board to coordinate all water management institutions, create legislation in water use and management, and control water administration. The board consists of the heads of ministries and other administrative units which are responsible for water use policies and led by the Prime Minister. The National Board creates Basin Boards which include regional representatives of water administrations, NGOs and Water

[3] These documents are available in Russian at http://climatechange.kg/ky-rgy-zstan-i-izmenenie-klimata/otraslevye-programmy-po-adaptatsii/.

User Associations. The head of the Basin Board simultaneously heads the Basin Management Unit.

The MoAFIM is the central executive institution for the realization of state policy on agriculture, land and water resources, irrigation and melioration. The Department of Water Management and Melioration is a part of MoAFIM which is responsible for the management, monitoring and regulation of the use of water resources, irrigation and melioration infrastructure. Also, the Department serves as a Secretariat of the National Water Board. The Department is responsible for the executive and coordination functions in the implementation of the government water policy. There are also several units under the supervision of the Department – state water inspection (control and inspection of water use), ameliorative hydro-geological expedition (supervision, monitoring, exploitation and maintenance of ameliorative and drainage systems), design and construction technological institute (dealing with control and metrological systems), and directorate in charge of objects under construction.

The key feature of the Kyrgyz irrigation regulatory system is the existence of Water Users Associations (WUAs) which are independent non-commercial organizations in charge of the utilization and maintenance of irrigation systems at farm level. As of 2016, there are 481 WUAs registered in the Kyrgyz Republic. WUA activities and status are regulated by the Law "On Water User Associations" #38 dated 15 March 2002.

The water distribution system in Kyrgyzstan is considered to be quite advanced in terms of the extent of reform. Still, there are many issues in this sector which include: staff capacity; unclear legislation and insufficient delineation of responsibilities between the government bodies, WUAs and water users; unfair distribution of water; low fee collection rate; insufficient government financing; and corruption.

4.3 Access to agricultural inputs

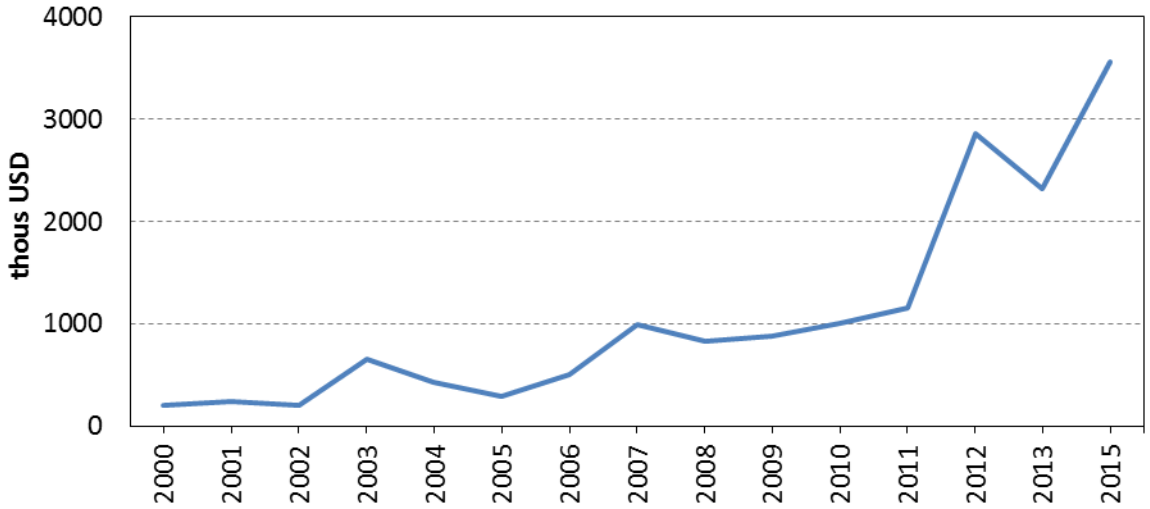
Access to quality and affordable inputs (seeds, fertilizers and chemicals, credit etc.) is key for achieving any improvements in the productivity of the agricultural sector in Kyrgyzstan. This is one of the areas where government interventions are particularly relevant and important.

Seeds: Kyrgyzstan has inherited a quite developed seed breeding and control system. These are governed by the State Seed Inspectorate which is in charge of seed testing and regulating the sector and the State Center for Plant Breed Testing and Genetic Resources for Plants under the MoAFIM. The main legal document regulating seed production, certification, and marketing is the Law "On Seeds" #38 from June 19, 1997. As of 2014, there were 107 state and cooperative seed farms mostly producing seeds of cereals, cotton, potatoes, corn, sugar beet, fodder crops and oil seeds. There is only one seed farm for kidney beans – the main export crop of the country. Domestic professional production of seeds covers only a fraction of total demand of the sector – in 2013, seed farms were reported to produce just 10 % of the necessary quantity of wheat seeds, 28 % of cotton seeds, 2 % of potatoes, 31 % of lucerne, and 8 % of sainfoin. This is partially due to the insufficient production capacity of the seed farms, but also because of the farmers' lack of trust in these seeds' quality and unwillingness to pay a higher price for them. Official imports of seeds are minimal (Figure 14); only vegetable and sugar beet seeds are imported in significant quantities (about 20 % of demand for sugar beet) (Data for imports of seeds of cereals are available only for 2015). Still, imports are growing as Figure 14a suggests.

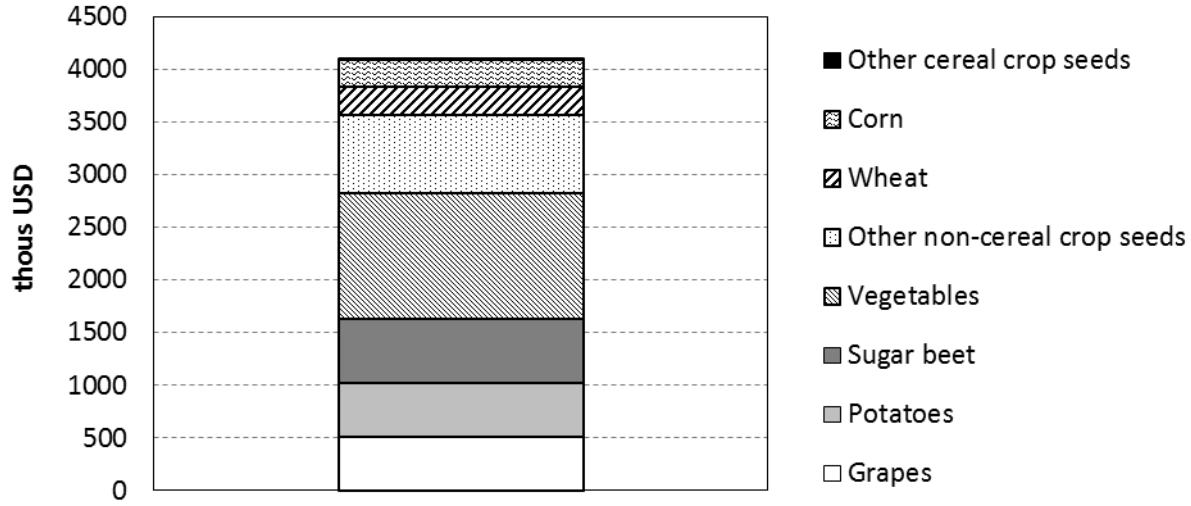
The gap between the total demand for seeds and its domestic production and imports is filled in by the seeds produced by farmers themselves or by unofficially imported seeds (HELVETAS, 2013). These seeds are, of course, of lower or uncontrolled quality. This is one of the important reasons behind the low crop yield values reported above.

Figure 14: Imports of seeds to Kyrgyzstan

a) All crops (without cerials)



b) All crops (including cereals), 2015

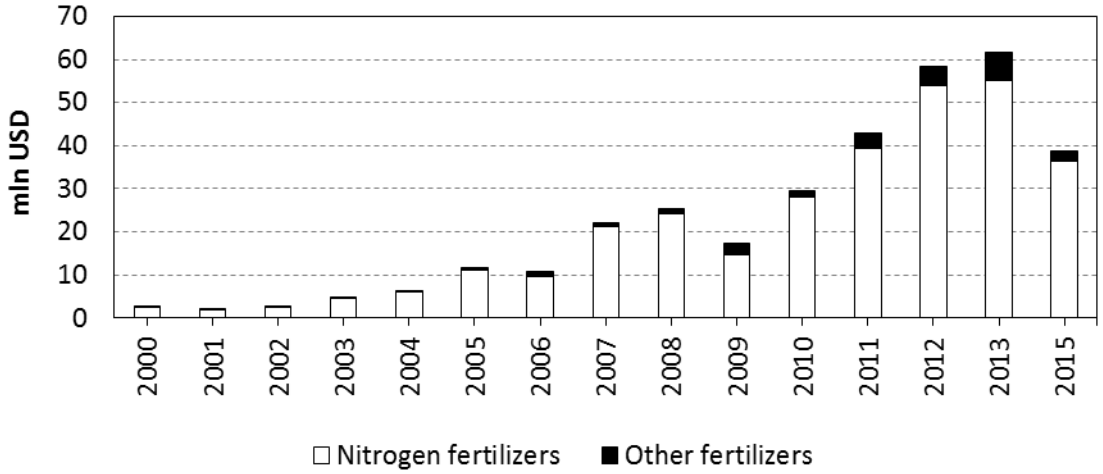


Source: UN COMTRADE.

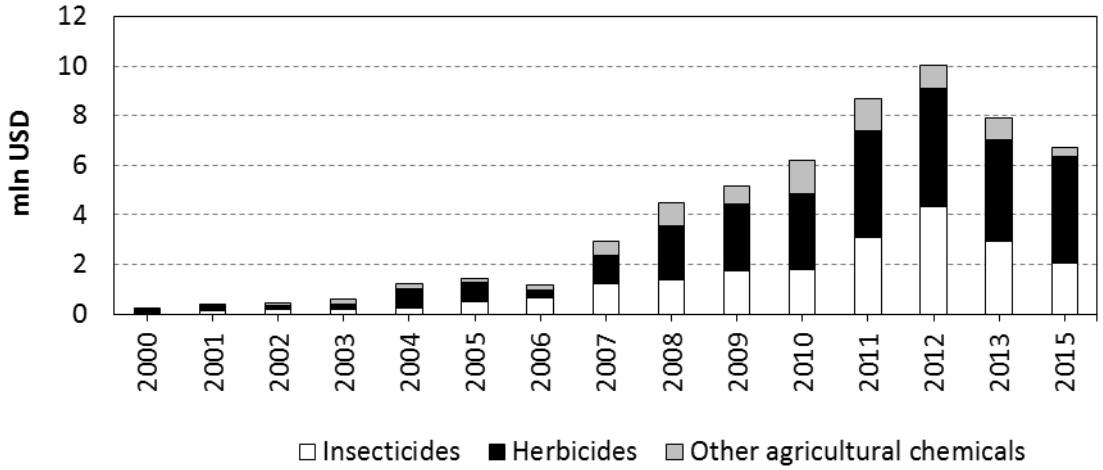
Fertilizers and chemicals for plant protection: There is no domestic production of mineral fertilizers and agricultural chemicals (pesticides, fungicides, insecticides etc.), so the country's agriculture fully depends on imports (Figures 15a and 15b). Only nitrogenous fertilizers are imported in significant quantities, mostly from Uzbekistan, Russia and Kazakhstan. Reportedly, there are also unofficial imports of fertilizers and agro-chemicals from China and elsewhere as well as some re-exports to Kazakhstan and other places.

Figure 15: Imports of fertilizers and agrilcutural chemicals to Kyrgyzstan

a) Fertilizers



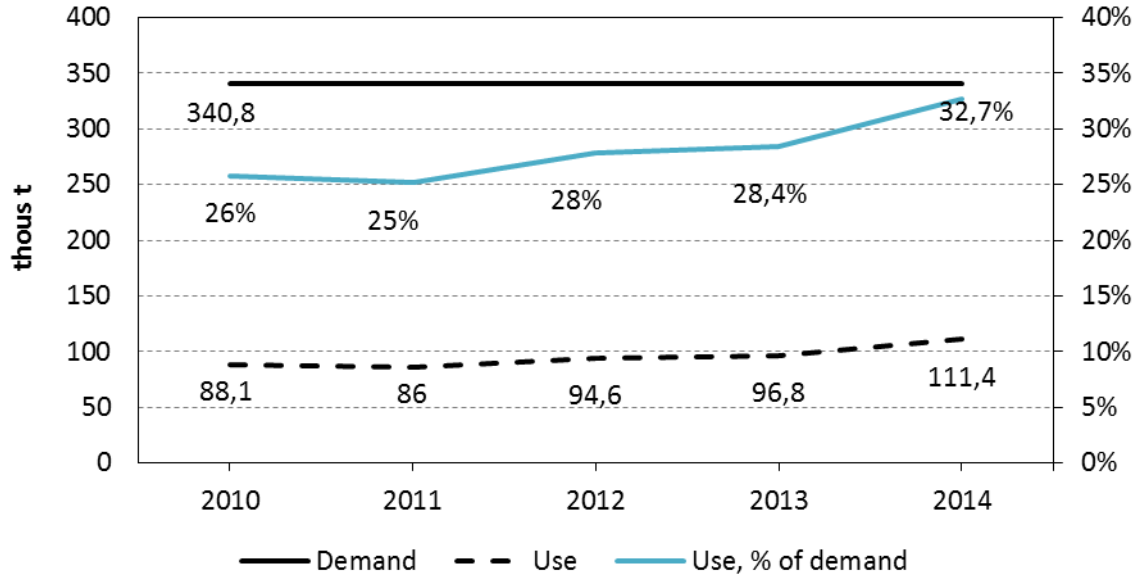
b) Agricultural chemicals



Source: UN COMTRADE.

In general, it is estimated that these imports cover only about 30 % of the total demand of Kyrgyz agriculture for mineral fertilizers (Figure 16). Still, the supply of fertilizers is gradually improving – between 2010 and 2014 the unsatisfied demand for fertilizers fell by 7 %. While the formal legal framework for testing the chemicals for safety is fully in place, in practice traders manage to avoid the regulations, and many chemicals circulating on the domestic market of Kyrgyzstan are of unproven quality.

Figure 16: Demand for and use of mineral fertilizers in Kyrgyzstan in 2010-2014, 1000t

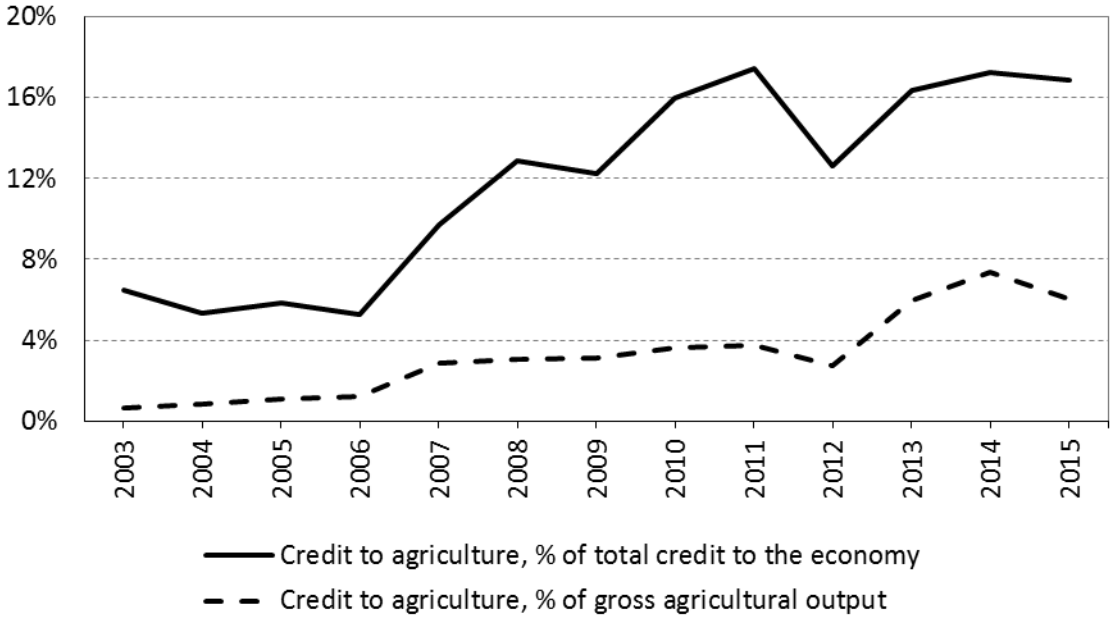


Source: MoAFIM.

Machinery and equipment: Most of the agricultural machinery used in the sector has been in use for decades; only 50-60 % of farmers' needs are covered by these machines. The renewal of equipment is done only sporadically when foreign government (e.g. Japan or China) grants are provided or when some farmers accumulate enough resources to buy a new tractor or other machine. It is estimated that the workload for 1 tractor is 400 ha/year which is 3.5 times higher than the normal load (MoAFIM, 2012). The composition of available equipment has not been fully adjusted to the needs of small farms prevailing in contemporary Kyrgyz agriculture – there is an acute lack of small machinery. The unsatisfactory supply of machinery in agriculture is, of course, another factor adversely affecting the sector's performance.

Credit: Financial resources for agricultural producers in Kyrgyzstan are mostly provided by commercial banks, micro-financial organizations and credit unions. Credit resources for agriculture as well as for other sectors of the economy are rather short-term (usually, not more than one to two years) and expensive (typical annual interest rate exceeds 20 %). Still, supply of credit to the sector is growing (Figure 17); the share of the sector in total credit to the non-financial sector of the economy has grown by more than 10 % between 2006 and 2015. The ratio of the credit to agriculture to the GAO increased from negligible values in the early 2000s to 7.3 % in 2014.

Figure 17: Credit to agriculture



Sources: NSC, NBKR.

It is worth noting that while this value is the highest it has been in the recent history of Kyrgyzstan, it is a very modest value if compared internationally. For example, according to the FAOSTAT data, in 2014 banking credit to the agricultural sector in Kazakhstan and in the Philippines was at 19 % and 31 % of the GAO, respectively. This is a reflection of general growth in both the agricultural and financial sectors, but, most likely, this is also a product of the recent governmental efforts to provide cheaper loans to agricultural producers. This is done through a series of government programs "Affordable credits to farmers" (2011 and 2012), where credits were disbursed directly from the government budget, and "Financing of Agriculture I-IV" (2013-2016), where loans are provided by commercial banks and the government subsidizes the interest rates more than halving them for farmer-recipients. These subsidized loans account for about a quarter of total credit to the sector. Most of these resources (80-90 %) went to livestock farming. This is consistent with the registered increase in livestock numbers in recent years.

5 Conclusions

Kyrgyz agriculture experienced substantial reform during the 1990s and early 2000s. Subsequently, the pace of reform slowed and at present the government does not appear to have any clear strategy for further development in the sector. Summarizing the outcomes of these reforms, a certain freedom granted to farmers stands out as one of the main achievements and an important reason for the sector's efficiency. Peasant farms are effectively protected from attempts to administratively regulate crop structure or introduce any other types of market distortions should the government or other major player in the sector make any effort of this kind.

Over the last 25 years the agricultural sector has accumulated a number of structural issues in its development. These include the prevalence of small-scale semi-subsistence farms lacking any clear prospects for efficiency improvement, disinvestment in the sector, insufficient technological level of production, issues with farmers' access to input and output markets, land and especially pasture degradation, under-provision of key public goods for agriculture

(irrigation, veterinary services, seeds etc.), and an insufficient level of human and social capital in the sector. These issues resulted in a modest agricultural output growth rate and low, by international standards, productivity of the sector.

One of the key issues undermining the long-term prospects of development in the sector is the insufficient level of investments in agriculture. Lack of resources for long-term investments is however only one side of the coin. Another side is the insufficient number of stakeholders able to implement investment projects beyond simple marginal increase in livestock herd size. Encouragement and facilitation of the emergence of large professional players in the sector is one of the key policy priorities of the government. The right methods of supporting the formation of these large enterprises are yet to be found. It seems important to provide room for the organic and voluntary emergence of these enterprises, be they service or production cooperatives or private commercial enterprises. It is also important to ensure that any support policies in favor of such players also provide positive spillovers to the small farmers around them, and do not aim at replacing them mechanically.

The list of incomplete policy reforms is very long, especially in the area of natural resource management and provision of other essential public goods. The state of pastures and irrigation systems is alarming and requires government support well above its current level. The ongoing upgrade of quality infrastructure (labs, standards etc.) implemented by the government towards improving food safety and facilitating the access of Kyrgyz farmers and agribusinesses to export markets is a very important endeavor which also requires substantial resources. Understanding the key areas for government interventions, and focusing these intervenetions on public goods to be effectively provided by the government as well as the allocation of the appropriate resources for their provision seem to be key components of the government's agricultural development strategy.

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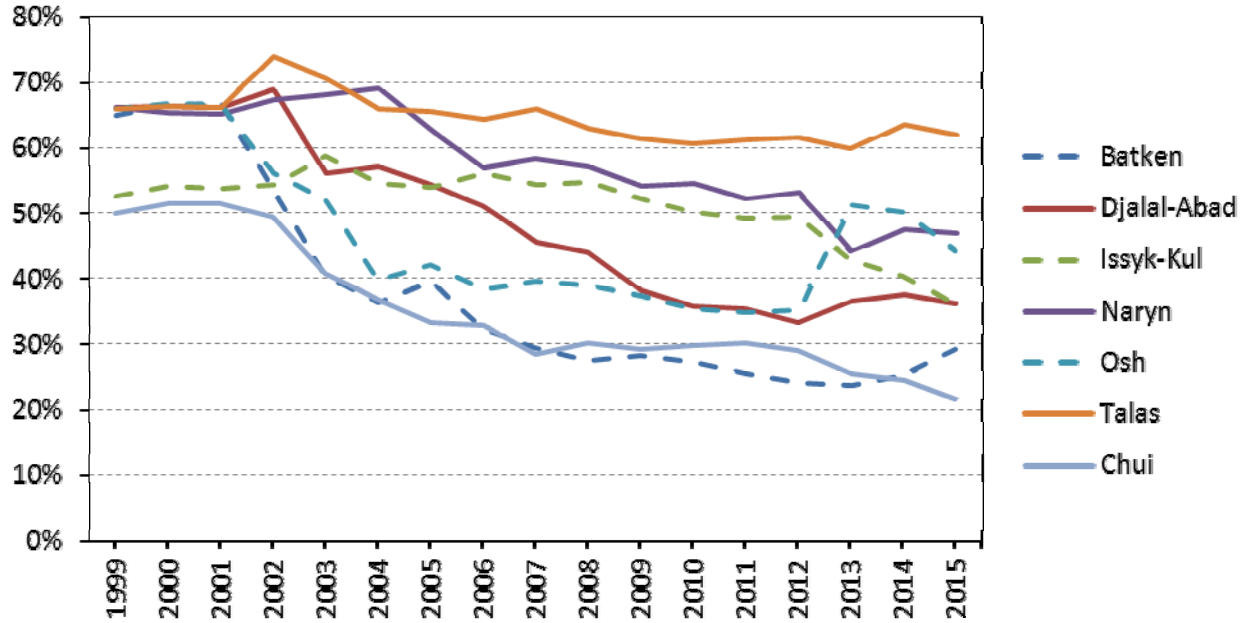
APPENDIX

Table A1: Government expenditures on agriculture in 2015

	Value
Ministry of Agriculture, Amelioration and Food Industry of the KR, mln KGS	1,502
State Veterinary and Phytosanitary Inspectorate under the Government of the KR, mln KGS	400
"Financing agriculture" programme of subsidized loans for farmers and agribusinesses, mln KGS	457
Total	
mln KGS	2,360
mln USD	36.6
% of GAO	1.2
% of general government budget expenditure	1.5
For reference:	
GAO, mln KGS	197,066
General government budget expenditure, mln KGS	161,131
Exchange rate, period average, KGS/USD	64.46

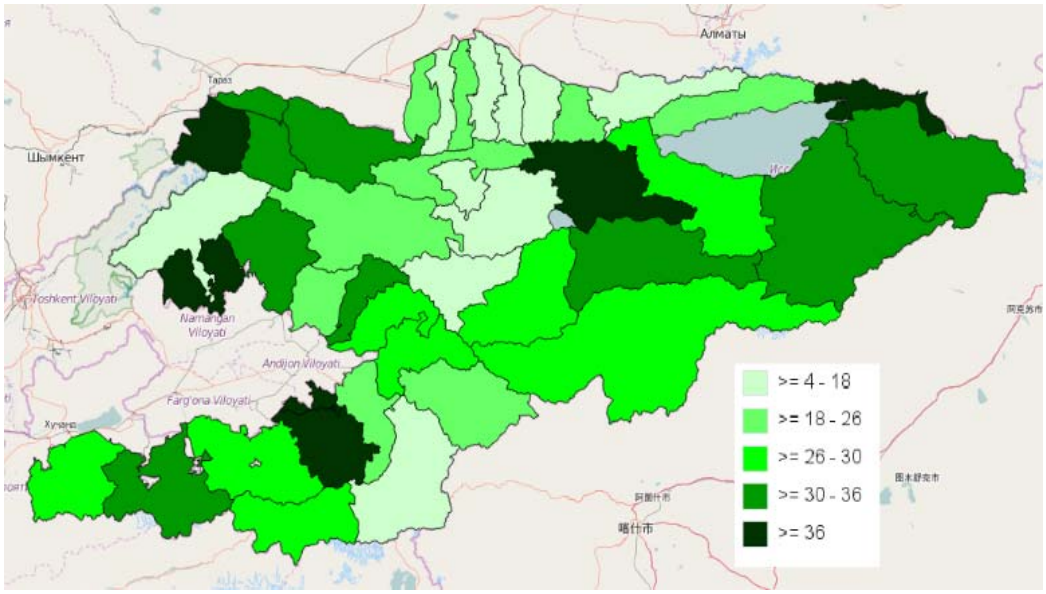
Sources: MINISTRY OF FINANCE OF THE KR, NSC, NATIONAL BANK OF THE KR, own calculations.

Figure A1: Share of people employed in agriculture by oblast



Source: NSC.

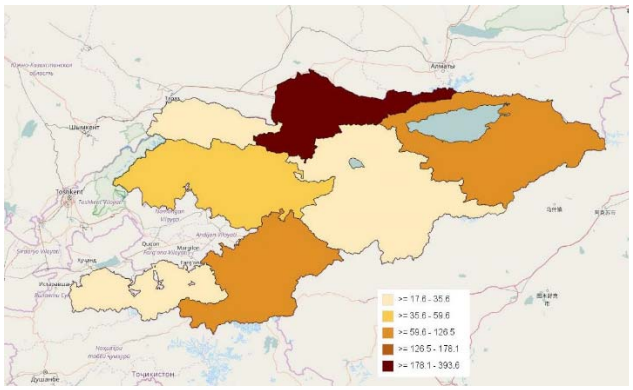
Figure A2: Proportion of households involved in agriculture, %



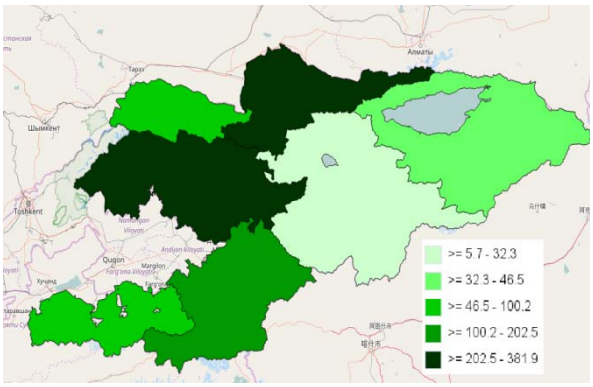
Source: www.kyrgyzstanspatial.org.

Figure A3: Agricultural production in the KR, 2014, thous. t

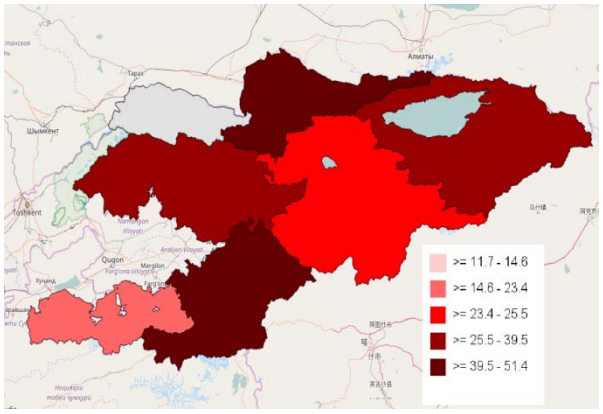
a) Wheat



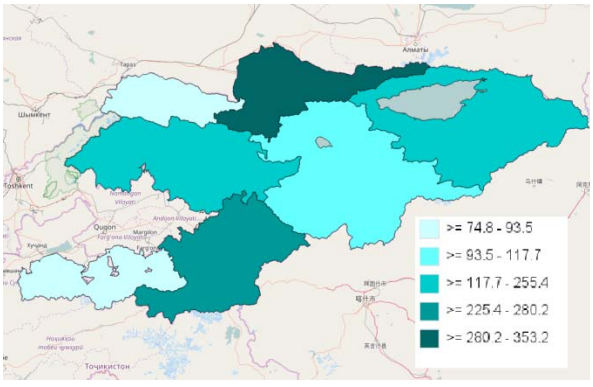
b) Vegetables



c) Meat



d) Milk



Source: www.kyrgyzstanspatial.org.

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