COUNTRY PROFILES

Under the study on

Review of Trends, Challenges, and Opportunities for Agricultural Development in the Central Asia Regional Economic Cooperation Member Countries

June 2019

The CAREC Institute and the International Food Policy Research Institute (IFPRI) are finalizing a joint study on review of trends, challenges, and opportunities for agricultural development in the CAREC member countries.

This document presents country profiles included in the study. It provides information about land and water resources, macroeconomic trends, agricultural share in the overall economy, production and cropping calendars, food security, food intake and malnutrition, agricultural trends, constraints and potentials.

While agricultural systems of the CAREC countries are too diverse to suggest a one-size-fits-all strategy, some common threads appear when discussing avenues for further growth, namely:

1) Policymakers should target improving the capacity of small farmers throughout the region. Smallholder farming is a crucial employer of the CAREC region's large rural population. Understandably, smallholders demonstrate low capacity to get SPS and other certification to access new markets and integrate into value chains, compounded with the issue of product traceability, difficulties to achieve mechanization and improve logistics, and absence of a working public-private partnership (PPP) mechanism to make impact on a large scale. A primary and immediate need is to set in place systems that allow farmers access to modern technology, inputs, and knowledge.
2) Investments in public goods, such as irrigation and road infrastructure can provide the type of support that would aid household farmers and farm businesses of all types. Investing in public infrastructure must also focus on improving governance of these institutions which manage irrigation resources, road networks, and border points.
3) Improvements in agricultural infrastructure, development of storage and logistics facilities. Many countries in CAREC lack capacity to extend the shelf-life of horticultural goods that would allow them to be marketed at a maximum economic gain. The accompanying institutional and regulatory frameworks are also essential. Improving veterinary, SPS inspections and certification services would help increase trade in meat and animal products.
4) To unleash the growth potential of their economies, countries in the region will have to identify constraints and apply improvements to all aspects of their respective agricultural sectors, with an eye at changing nature of agricultural trade, competing trade interests, characteristics of market integration, e-commerce, issues of diversification and specialization, and how the Belt and Road Initiative (BRI) can change the dynamic.
5) Water becomes a key constraint in agricultural production, including PRC.
6) Identify and act on missed opportunities to learn from one another how to handle land ownership, productivity issues, etc.
7) How agricultural development and food security can become nutrition driven, necessity for nutrition strategies, a need to place more value money on good environment, and how to bring nutrition into the BRI to conform to PRC's two-mountain theory to take effective measures in ecology and transform the ecological advantage into the economic and development advantage.

The research underlines that there is a need to augment governments' research capacity, continue research, and develop a comprehensive policy framework to replace the piecemeal policy advice and action to achieve tangible results.

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AFGHANISTAN

With a total population of 37 million (of which 27 million or 73 percent live in rural areas), Afghanistan is a mountainous, landlocked country that is bordered by Pakistan in the south and east; Iran in the west; Turkmenistan, Uzbekistan, and Tajikistan in the north; and the Peoples' Republic of China (PRC) in the far northeast. The agriculture sector contributes a significant proportion of the national income, but the sector faces numerous challenges because of limited natural resource endowment, particularly water. Alongside political turmoil, the environmental condition in Afghanistan has imposed major disturbances in its economic growth and has left it vulnerable to various economic shocks. This condition underscores the need for policy interventions that could spur sustainable development in Afghanistan's agriculture and natural resource sector.

Land Resources

As of 2016, roughly 58 percent (38 million ha) of Afghanistan's land is utilized for agriculture. Out of the total agricultural area, around 20 percent (7.7 million ha) is arable, 79 percent (30 million ha) is classified as permanent meadows and pastures, and 0.4 percent (181,000 ha) is categorized for permanent or plantation crops. Figure 1 presents this information graphically. Crops produced in Afghanistan cover arable lands and lands classified as plantation crops. By major crop group, cereals occupy 87.2 percent of cropped areas, followed by horticulture (7.1%), fiber (0.9%), oilseeds (0.2%), and other crops (3.2%) as shown in Figure 2. This information was derived from FAOSTAT.

Figure 1. Agricultural land types, 2016 (FAOSTAT)

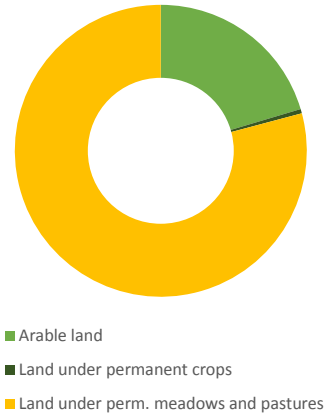
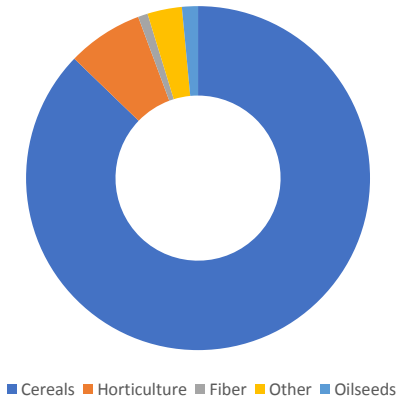


Figure 2. Share of cultivated land by crop type, 2014 (FAOSTAT)



Water Resources

Afghanistan has an annual internal water supply of around 47 billion cubic meters, of which around 38 billion m^3 is classified as internally-produced surface water and 11 billion m^3 comes from internally-produced groundwater, with an overlap of 1 billion m^3. The country's inland water resources originate from three major river basins: (1) Amu Darya Basin, (2) Kabul/Indus Basin, and (3) Helmand Water Basin. Of Afghanistan's 7.9 million hectares of arable land, 3.2 million (roughly 41%) is equipped for irrigation. Agriculture is the largest user of water resources, accounting for more than 95 percent.

Agriculture and the Economy

Macroeconomic Trends

A significant portion of Afghanistan's economy is derived from its agricultural sector. However, agriculture's share in national output has exhibited a decreasing trend in recent years. In 2017, agriculture accounted for 24.8 percent value added of total GDP, compared to 28.8 percent in 2010, and 43.7 percent in 2002 as seen in Figure 3. Currently, the services sector is the largest contributor in terms of value-added to national GDP. In 2016, total value-added agricultural output was approximately $4.7 billion, compared to the national GDP of $20.2 billion. Afghanistan's per capita GDP was recorded at $584 that year.

Figure 3. Share of GDP by sector, 2002-2017 (Asian Development Bank)

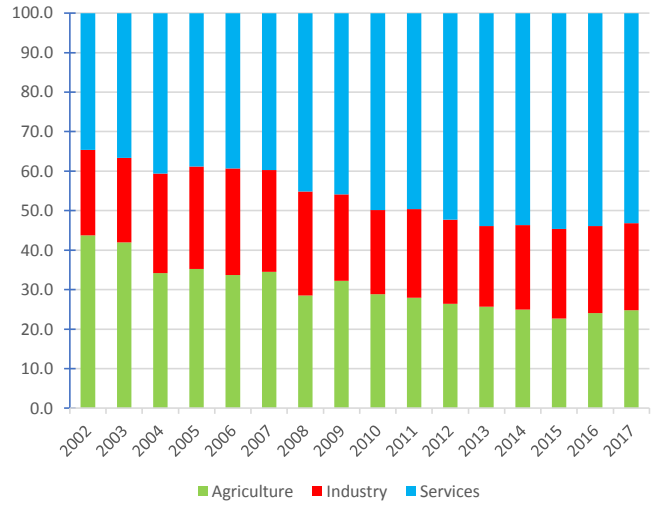


Figure 4 on the next page illustrates the growth of total GDP and agricultural GDP, demonstrating the slower growth of the latter when compared to other sectors of the economy.

Figure 4. Growth of GDP and Agricultural GDP in local currency (millions), 2002-2017 (FAOSTAT)

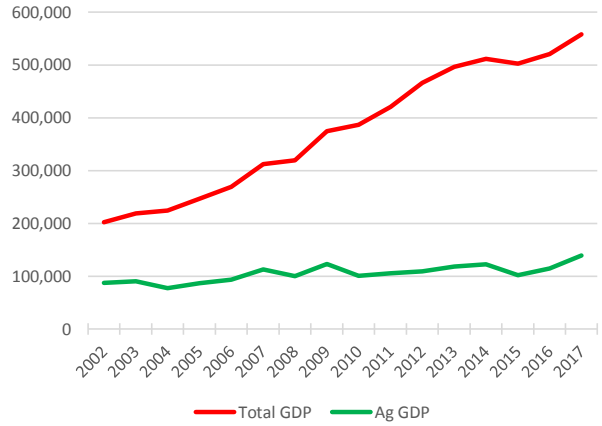
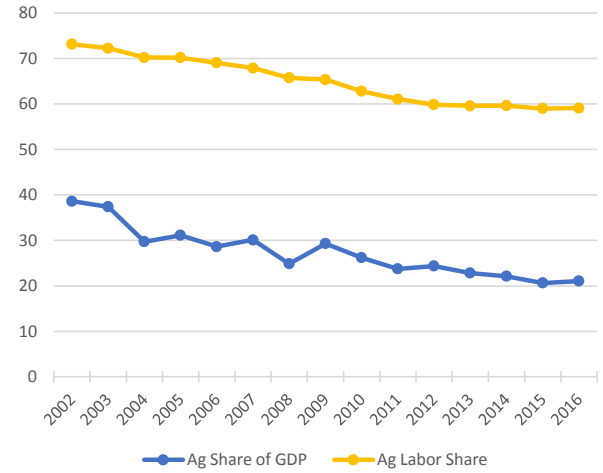


Figure 5 provides a comparison of agriculture's share of the national GDP and its share of the employed labor force. The existing data suggests a large relative decrease in agricultural labor compared to other sectors since the early 2000s, from 73.1 percent in 2002 to 59.1 percent in 2016. It also shows that agriculture's share in both GDP and labor force has been decreasing in recent decades. This information was sourced from the World Bank.

Figure 5. Agriculture's share of national GDP and share of employed labor force, 2002-2016



Agricultural Production

Wheat is the most commonly consumed cereal and occupies most of the cultivated land. Wheat alone accounted for 70 percent of lands allocated to crops. Apart from wheat, the livestock sector has grown in importance in Afghanistan and overtook crop sector in terms of value addition to agriculture. The livestock sector accounted for 56 percent of value addition. The horticulture sector is small by comparison to wheat and livestock but is also growing in importance. Some of the most commonly grown horticultural products in Afghanistan are vegetables, grapes, watermelons, apples, and melons. Fertilizer usage in Afghanistan was measured at approximately 94,000 tons in 2016, with 78,000 tons imported.

Cropping Calendar

Figure 6 is a graphical representation of the typical crop calendar for the most commonly grown crops on irrigated land in Afghanistan. Sugarcane, grapes, and fruits are grown throughout the entire year on irrigated land. Rice, maize, vegetables, sunflower, sesame, pulses, and sugar beets are typically grown in the spring-autumn cropping season. Barley, wheat, and potatoes are typically grown during the secondary autumn-spring cropping season. Irrigation is practiced during the entire year, but especially for the main cropping season. This information was sourced from Afghanistan's Central Statistics Organization through FAO.

Figure 6. Crop calendars, irrigated land (FAO)

Agricultural Trade

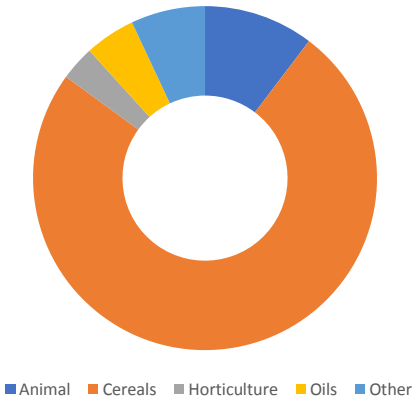
Afghanistan imported $2.2 billion worth of agricultural goods in 2016, compared to $436 million in agricultural exports. Afghanistan's top agricultural export commodities that year in order of their value were raisins ($56 million), grapes ($40 million), dried figs ($34 million), anise/badian/fennel/coriander seeds ($27 million), apples ($26 million), and tomatoes ($22 million). Wheat flour was the Afghanistan's key agricultural import with total imports valued at $561 million. It was followed by palm oil ($194 million), rice ($173 million), sugar ($123 million), tea ($90 million), and sunflower oil ($87 million).

Food Security

Food Intake

Total daily kilocalories per capita was estimated at 2087 kcal in 2013, with 1369 kcal coming from wheat products alone. Figure 7 displays the proportion of daily calorie intake contributed by each major food group. Cereals accounted for 75 percent of daily calorie consumption in Afghanistan during this time. Calories from animal sources comprised 10 percent and fruits and vegetables accounted for 3 percent. Daily protein consumption per capita was estimated at 58.2 grams. Average dietary energy supply adequacy was estimated to be 95 percent in 2015-2017, representing a decrease from the 2007-2012 period.

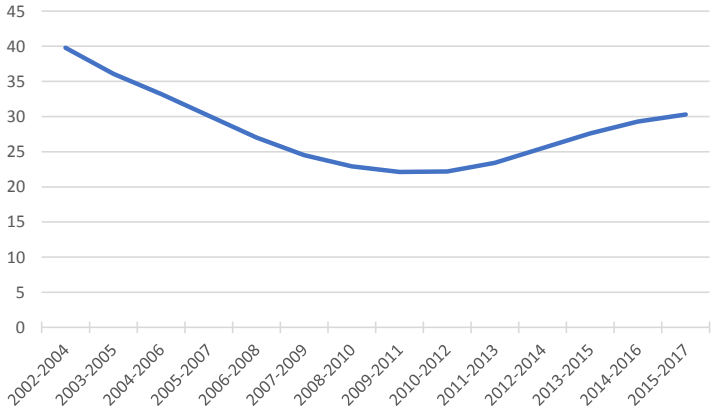
Figure 7. Share of daily kcal per capita by food group, 2013 (FAOSTAT)



Malnutrition

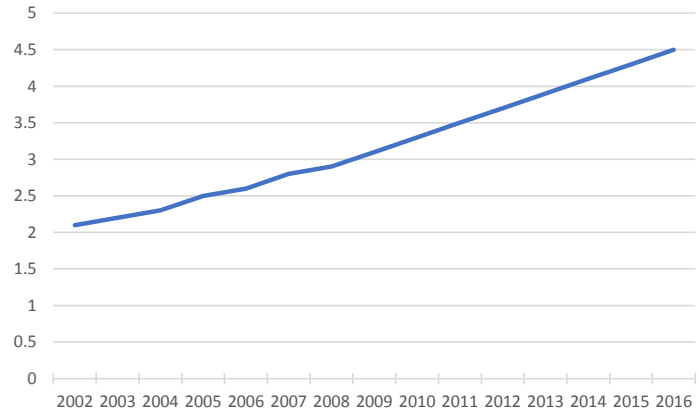
Figure 8 shows the medium-term trend of undernourishment in Afghanistan. The prevalence of undernourishment expresses the probability that a randomly-selected individual from the country consumes an inadequate number of calories to cover his/her energy requirement, according to FAO. For the period of 2015-2017, this figure was 30.3 percent, representing an increase from the early 2010s when undernourishment levels reached as low as 22.1 percent in 2009-2011. However, the situation has improved from the early and mid-2000s, when these figures reached over 40 percent of the population.

Figure 8. Percentage of population undernourished, three-year average, 2002-2017 (FAOSTAT)



Obesity is an increasing problem in developing countries, including in the CAREC region. However, anthropometric data shows that this is minor problem in Afghanistan. Obesity has been steadily increasing, from 2.1 percent in 2002 to 4.5 percent in 2016. While the prevalence of obesity is low compared to other CAREC countries, it demonstrates the same gradual upward long-term trend as seen in the others.

Figure 9. Prevalence of adult obesity, 2002-2016 (FAOSTAT)



Conclusions

Constraints

The principal constraints to achieving maximum productivity in agricultural production include: (1) a lack of investment in agricultural machinery, (2) deficiency of available water resources, (3) limited coverage of the agricultural export market and heavy reliance on imported agricultural products, (4) inadequacy and inefficiency of agricultural infrastructure, and (5) poor research and development investment. Addressing these issues could result in remarkable improvements in agricultural productivity. Afghanistan continues to also deal with ongoing political instability that affects certain areas of the country, including agricultural zones.

Potential for Agricultural Development

A lack of major water resources is a major contributor to the low productivity of farms. Therefore, irrigation for agricultural lands are an important point of development that could help spur economic growth in the agricultural sector in the future. Furthermore, land tenure rights must be properly implemented. Afghanistan needs to lay the groundwork for identifying and implementing targeted policy strategies that involve active stakeholder participation to ensure that the enabling conditions for efficient agricultural production are put in place.

AZERBAIJAN

With a population of 10 million (of which 4.5 million or 45 percent live in rural areas), Azerbaijan is situated at the crossroads of Southwest Asia and Southeastern Europe. It is bounded in the north by Russia, in the east by the Caspian Sea, in the south by Iran, in the west by Armenia, and in the northwest by Georgia. A former Soviet state, Azerbaijan has grown rapidly over the past two decades due to its aggressive government policies. An influx of foreign investment in energy and industry has greatly helped the economy develop. However, as Azerbaijan's industrial sector has developed rapidly, agriculture has failed to keep pace and remains vulnerable to various environmental, political, and economic shocks. Policy interventions promoting sustainable development in the agricultural sector could address these lingering concerns.

Land Resources

As of 2016, roughly 56 percent (4.8 million ha) of Azerbaijan's land is utilized for agriculture. Out of the total agricultural area, around 42 percent (2.0 million ha) is arable, 53 percent (2.5 million ha) is classified as permanent meadows and pastures, and 5 percent (241,000 ha) is categorized for permanent or plantation crops. Figure 1 presents this information graphically. Crops produced in Azerbaijan cover arable lands and lands classified as plantation crops. By major crop group, cereals occupy 72.1 percent of cropped areas, followed by horticulture (14.8%), oilseeds (3.5%), fiber crops (1.7%), and other crops (7.9%) as shown in Figure 2. This information was derived from FAOSTAT.

Figure 10. Agricultural land types, 2016 (FAOSTAT)

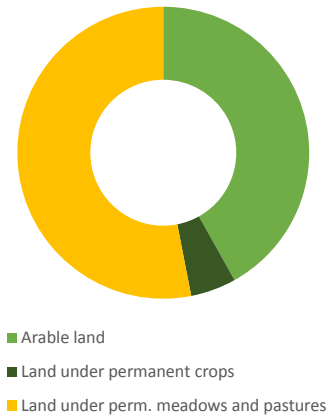
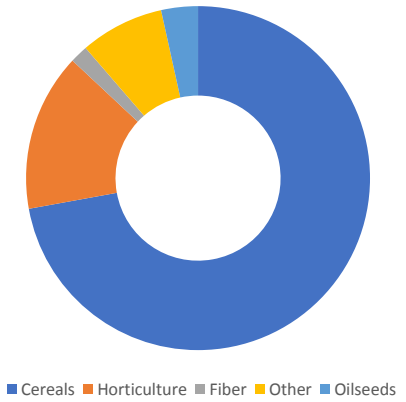


Figure 11. Share of cultivated land by crop type, 2014 (FAOSTAT)



Water Resources

Azerbaijan has an annual internal water supply of around 8.1 billion cubic meters, of which around 6.0 billion m^3 is classified as internally-produced surface water and 6.5 billion m^3 comes from internally-produced groundwater, with an overlap of 4.4 billion m^3. The country's inland water resources originate from four major river basins, two of which are shared with other countries. The largest of the basins is the one in which the Kura and Araks rivers collect and shared with Turkey. The Samur River basin in the country's northeastern region is located along the border with Russia. Of Azerbaijan's 3.2 million hectares of potentially irrigable land, only 1.4 million hectares (roughly 45%) are currently equipped for irrigation. Agriculture accounted for 73 percent of total water withdrawal in 2017.

Agriculture and the Economy

Macroeconomic Trends

A relatively small portion of Azerbaijan's economy is derived from its agricultural sector. Agriculture's already small share in national output has exhibited a decreasing trend in recent years. In 2017, agriculture accounted for 6.1 percent value added of total GDP, compared to 7.2 percent in 2007, and 15.2 percent in 2002 as seen in Figure 3. Currently, the industrial sector is the largest contributor in terms of value-added to national GDP. In 2016, total value-added agricultural output was approximately $2.1 billion, compared to the national GDP of $37.8 billion. Azerbaijan's per capita GDP was recorded at $3,892 that year.

Figure 12. Share of GDP by sector, 2002-2017 (Asian Development Bank)

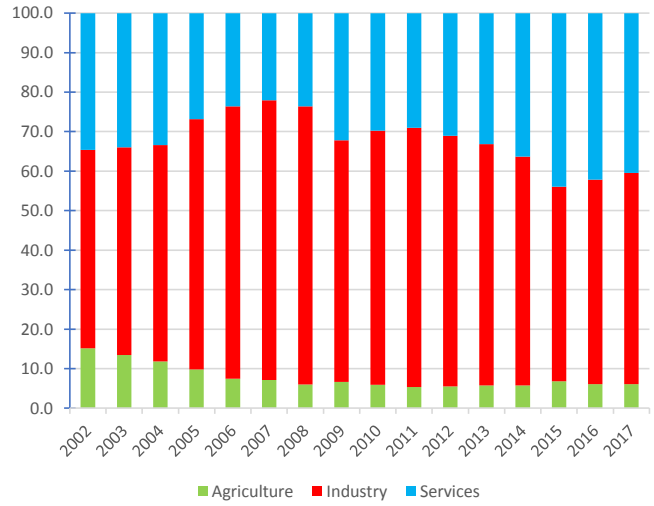


Figure 4 on the next page illustrates the growth of total GDP and agricultural GDP, demonstrating the sluggish growth of the latter when compared to other sectors of the economy. Azerbaijan is an energy-exporting country and is vulnerable to commodity price fluctuations.

Figure 13. Growth of GDP and Agricultural GDP in local currency (millions), 2002-2017 (FAOSTAT)

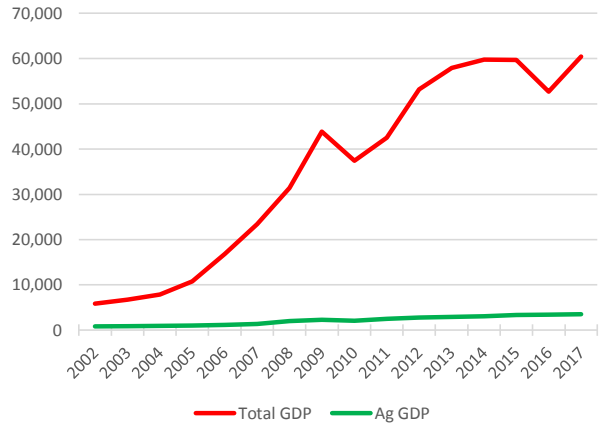
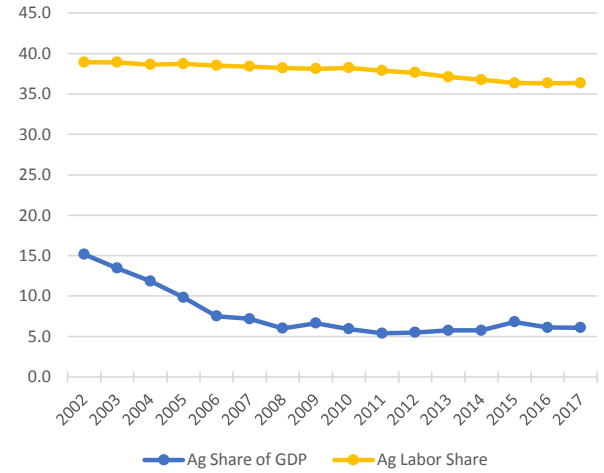


Figure 5 provides a comparison of agriculture's share of the national GDP and its share of the employed labor force. The existing data suggests a small but steady decrease in agricultural labor compared to other sectors since the early 2000s, from 38.9 percent in 2002 to 36.4 percent in 2016. It also shows that agriculture's share in GDP has fallen more rapidly than its share in labor and demonstrates the wide gap in the two figures. This information was sourced from the Asian Development Bank.

Figure 14. Agriculture's share of national GDP and share of employed labor force, 2002-2017 (Asian Development Bank)



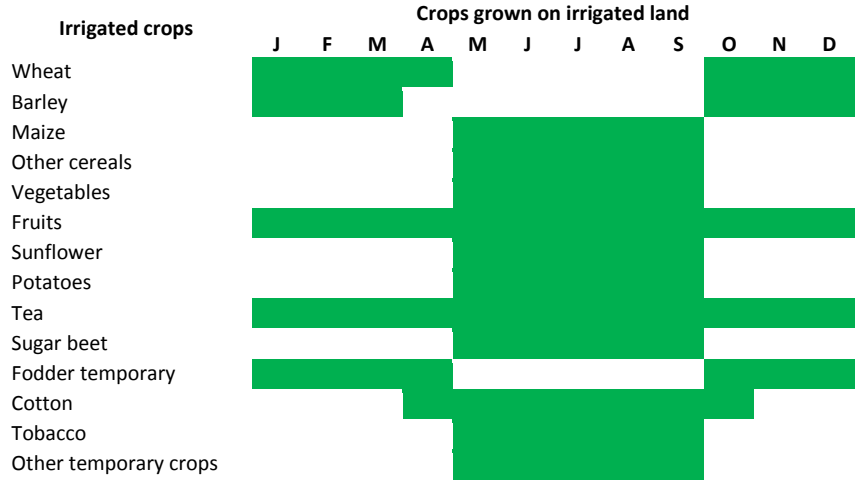
Agricultural Production

Approximately 57 percent of total agricultural production comes from the crop sector, compared to 43 percent for livestock. In terms of value, milk from dairy cows was the single most valuable commodity produced in Azerbaijan in 2016, totaling around $598 million. Other important commodities included cattle meat ($554 million), sheep meat ($353 million), wheat ($311 million), potatoes ($223 million), and tomatoes ($176 million). In terms of quantity, wheat was the most commonly produced crop, with a total volume of 1.8 million tons. Other important products by volume included barley (929,000 tons), potatoes (902,000 tons), tomatoes (503,000 tons), and watermelons (348,000 tons). Around 28,000 tons of fertilizers were used in Azerbaijan in 2016 and a further 46,000 tons were imported into the country that year.

Cropping Calendar

Figure 6 is a graphical representation of the typical crop calendar for the most commonly grown crops on irrigated land in Azerbaijan. Fruits and tea are grown throughout the entire year on irrigated land. Maize, cereals (excluding wheat and barley), vegetables, sunflowers, potatoes, sugar beets, and tobacco are typically grown in the spring-autumn cropping season. Barley, wheat, and fodder are typically grown during the secondary autumn-spring cropping season. The main irrigated areas consist of wheat, vegetables, fruit, and cotton. This information was sourced from Azerbaijan's State Statistical Committee through FAO.

Figure 15. Crop calendars, irrigated land (FAO)



Agricultural Trade

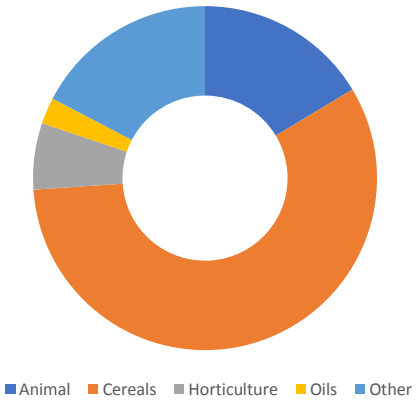
Azerbaijan imported $1.2 billion worth of agricultural goods in 2016, compared to $417 million in agricultural exports. Azerbaijan's top agricultural export commodities that year in order of their value were hazelnuts ($84 million), tomatoes ($82 million), persimmons ($59 million), apples ($21 million), cherries ($21 million), and sugar ($16 million). Wheat flour was the Azerbaijan's key agricultural import with total imports valued at $225 million. It was followed by rice ($79 million), tea ($54 million), processed foods ($53 million), sunflower oil ($50 million), and butter ($49 million).

Food Security

Food Intake

Total daily kilocalories per capita was estimated at 3118 kcal in 2013. Figure 7 displays the proportion of daily calorie intake contributed by each major food group. Cereals accounted for 58 percent of daily calorie consumption in Azerbaijan during this time. Calories from animal sources comprised 16 percent and fruits and vegetables accounted for 6 percent. Daily protein consumption per capita was estimated at 93.2 grams. Average dietary energy supply adequacy was estimated to be 130 percent in 2015-2017, representing a sharp increase since the early 2000s.

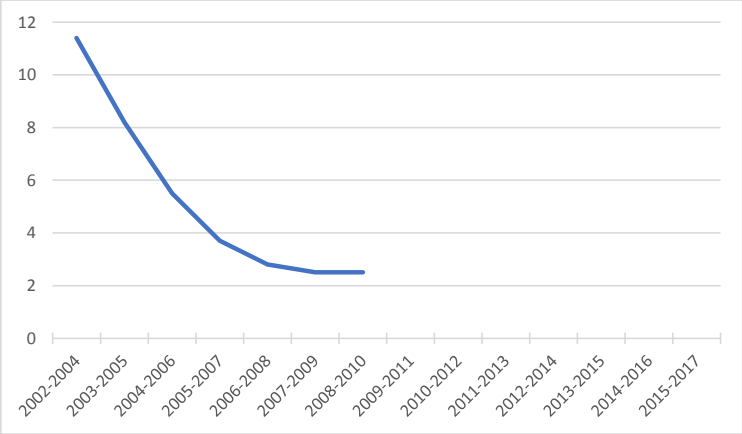
Figure 16. Share of daily kcal per capita by food group, 2013 (FAOSTAT)



Malnutrition

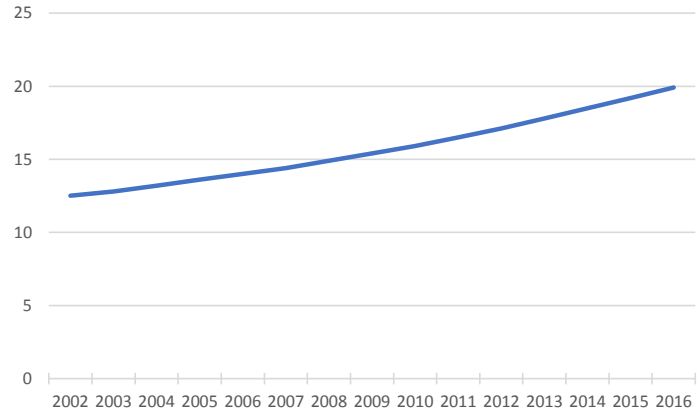
Figure 8 shows the medium-term trend of undernourishment in Azerbaijan. The prevalence of undernourishment expresses the probability that a randomly-selected individual from the country consumes an inadequate number of calories to cover his/her energy requirement, according to FAO. For the period of 2015-2017, this figure was less than 2.5 percent, representing a steady trend since the late 2000s. This is a drastic decrease from levels seen during the first decade of independence, when more than 10 percent of the population experienced undernourishment.

Figure 17. Percentage of population undernourished, three-year average, 2002-2017 (FAOSTAT)



Obesity is an increasing problem in developing countries, including in the CAREC region. Anthropometric data shows that this has become a significant problem in Azerbaijan. Obesity has been steadily increasing, from 12.5 percent in 2002 to 19.9 percent in 2016. The prevalence of obesity is high compared to other CAREC countries and demonstrates the same upward long-term trend as seen in the others.

Figure 18. Prevalence of adult obesity, 2002-2016 (FAOSTAT)



Conclusions

Constraints

Azerbaijan remains vulnerable to a number of problems that inhibit the country from maximizing the potential of the agricultural sector. The country is hindered by a poor and underdeveloped irrigation infrastructure. Progress in terms of modernizing existing infrastructure has been slow. Farm technology in the form of machinery and new seed varieties are lacking in the agricultural sector and funding for agricultural research and development is below UN recommendations. Farmers often lack the necessary training and education in improved farm techniques. Extension services need to be expanded. Moreover, the country is highly vulnerable to climate change effects, especially with the growing problem of flooding and droughts in the region. Sluggish agricultural productivity has resulted in stagnant growth, especially compared to other sectors of the economy.

Potential for Agricultural Development

Agriculture has taken a backseat to industrial development in national development programs. The sharp growth in the country's energy industry diverted attention away from agriculture, as the government focused on more productive sectors of the economy. However, with the understanding that oil resources are becoming depleted, Azerbaijan must adapt its economy to a sustainable future. The country has a large dependency on cereals, but the country is more well suited to horticultural products. By introducing modern farm techniques and mechanization, Azerbaijan can improve productivity and establish a food-secure economy.

PEOPLE'S REPUBLIC OF CHINA

With a total population of 1.4 billion (of which 563 million or 40 percent live in rural areas), China has about 21 percent of the world population, with about 6 percent of the world's freshwater and 9 percent the world's farmlands. Given its large land area, China's territory covers a wide range of different landscapes and climatic zones. Western China features mostly mountainous terrain and arid regions, highlighted by the Himalayan mountain ranges and the Taklamakan Desert. The vast Gobi Desert is situated in north-central China and straddles the Chinese border with Mongolia. China's central region is hilly and marks the western boundaries of a massive productive agricultural region spanning over several major river deltas in the country's southeast and east. Chinese agriculture has developed alongside a major economic boom that started in the late 20th century, which raised the living standards for a significant portion of the population. China is among the world's leading producers of many major commodities, but Chinese agriculture faces limited resources in the face of growing demand by an increasingly affluent consumer base.

Land Resources

As of 2016, roughly 55.18 percent (527.73 million ha) of China's land is utilized for agriculture. Out of the total agricultural area, around 22.53 percent (118.9 million ha) is arable, 74.43% (392.83 million ha) is classified as permanent meadows and pastures, and only 16,000 ha is categorized for permanent crops Figure 19. Crops produced by China cover arable lands and those classified for plantation crops. By major crop group, cereals occupy 54.0 percent of cropped areas, followed by horticulture (21.8%), oilseeds (14.6%), fiber crops (2.5%), and other crops (7.1%) as shown in Figure 20. This information was derived from FAOSTAT.

Figure 19. Agricultural land types, 2016 (FAOSTAT)

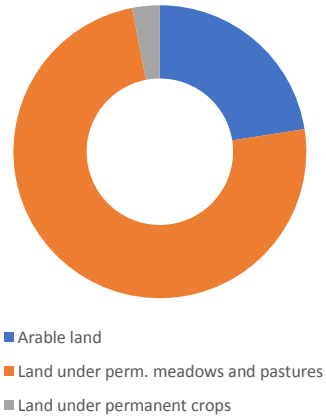
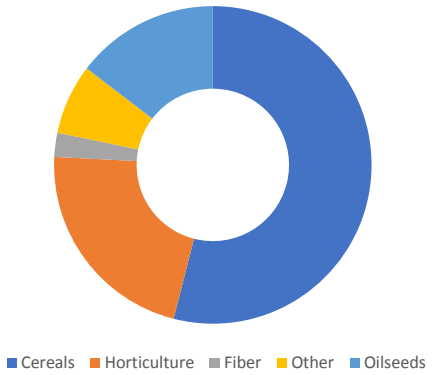


Figure 20. Share of cultivated land by crop type, 2014 (FAOSTAT)



Water Resources

Given its large population, China is one of the most water stressed countries in the world. China has an annual internal water supply of around 2.8 trillion cubic meters, of which around 2.7 trillion m^3 is classified as internally-produced surface water and 829 billion m^3 comes from internally-produced groundwater, with an overlap of 728 billion m^3. China's territory can be divided into nine main river basin groups. In the north there are the Song-Liao or Heilong (Amur)-Songhua, the Huai, the Huang (Yellow), the Hai-Luan and the interior or endorheic river basin groups. The total average annual internal renewable surface water resources (ISRWR) in these five river basin groups makes up around 20 percent of the country's IRSWR. In the south there are the Chang (Yangtze), the Zhu (Pearl), the southwest and the southeast river basin groups. The total average annual ISRWR in these four river basin groups account for around 80 percent of the country's IRSWR. Thus, there are much more water resources in the south than the north. China has good performance on land irrigation, with 69.9 million hectares (roughly 99.8%) of China's 70 million hectares of potentially irrigable land currently equipped for irrigation. In 2017, agriculture accounted for 62 percent of total water use, followed by industry (21 percent), municipal consumption (14 percent), and ecological protection (3 percent).

Agriculture and the Economy

Macroeconomic trends

A relatively small portion of China's economy is derived from its agricultural sector. Agriculture's already small share in national output has exhibited a decreasing trend in recent years. In 2017, agriculture accounted for 7.9 percent value added of total GDP, compared to 10.3 percent in 2007, and 13.3 percent in 2002 as seen in Figure 21. Currently, the service sector is the largest contributor in terms of value-added to national GDP. In 2017, total value-added agricultural output was approximately $968 billion, compared to the national GDP of $12,237 billion. China's per capita GDP was recorded at $7,993 that year.

Figure 21. Share of GDP by sector, 2004-2017 (Asian Development Bank)

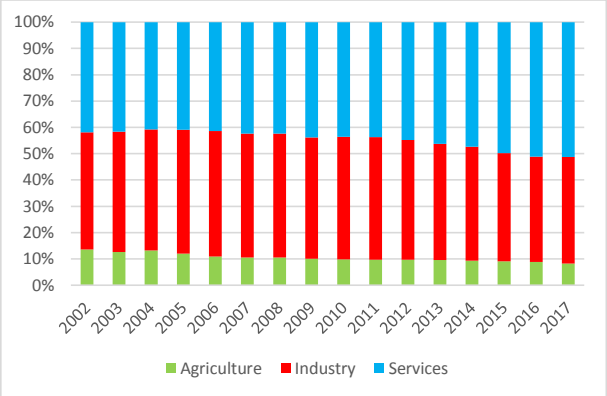


Figure 22 illustrates the growth of total GDP and agricultural GDP, demonstrating the sluggish growth of the latter when compared to other sectors of the economy.

Figure 22. Growth of GDP and Agricultural GDP in local currency (millions), 2002-2015 (FAOSTAT)

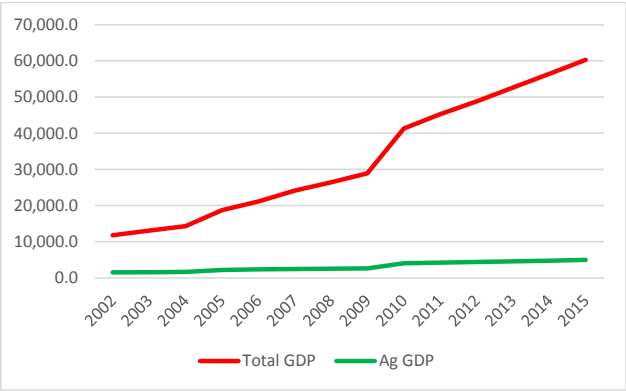
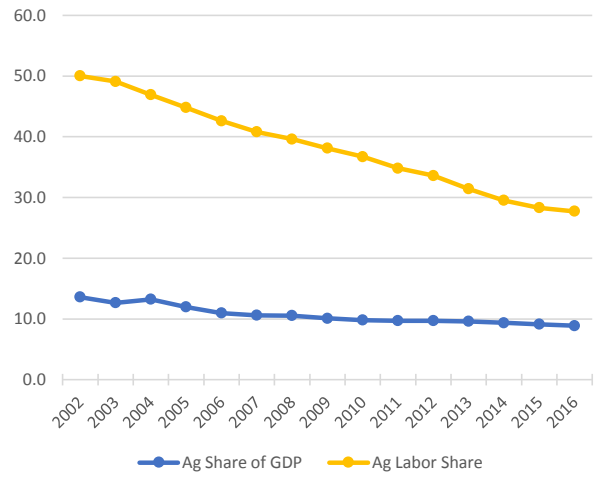


Figure 23 provides a comparison of agriculture's share of the national GDP and its share of the employed labor force. The existing data suggest a relatively rapid decrease in agricultural labor compared to other sectors since the early 2000s, from 50 percent in 2002 to 27.7 percent in 2016. It also shows that a wide gap persists between agriculture's share of national GDP and total labor despite the rapid decrease of the latter. This information was sourced from the World Bank.

Figure 23. Agriculture's share of national GDP and share of employed labor force, 2002-2016 (FAOSTAT)



Agricultural production

Approximately 69.8 percent of total agricultural production comes from the crop sector, compared to 30.2 percent for livestock. In terms of value, pork was the single most valuable commodity produced in China in 2016, totaling around $331 billion. Other important commodities included rice ($117 billion), maize ($61 billion), fresh vegetables ($54 billion), and wheat ($51 billion). In terms of quantity, vegetables were the most commonly produced item, with a total volume of 508 million tons. Other important products by weight included maize/maize products (219 million tons), milled rice (136 million tons), sugar cane (128 million tons), and wheat/wheat products (122 million tons). Around 59 million tons of fertilizers were used in China in 2017 and a further 600,000 tons were imported into the country that year.

Cropping Calendar

Figure 24 in the next page is a graphical representation of the typical crop calendar for the most commonly grown irrigated crops in China. Fruits, citrus, and sugarcane are grown throughout the entire year. Maize, cereals (excluding wheat and barley), some vegetables, soybeans, groundnuts, oil crops, sunflowers, sesame, potatoes, sugar beets, and cotton are typically grown in the spring-autumn cropping season. Barley, wheat, rapeseed, and some vegetables are typically grown during the secondary autumn-spring cropping season. The main irrigated areas consist of wheat, vegetables, fruit, and cotton. This information was sourced from China's State Statistical Committee through FAO.

Figure 24. Crop calendars, irrigated land (FAO)

Agricultural Trade

China imported $100 billion worth of agricultural goods in 2016, compared to $47 billion in agricultural exports. China's top agricultural export commodities that year in order of their value were crude agricultural materials ($5.2 billion), processed foods ($4.6 billion), garlic ($2.6 billion), preserved vegetables ($2.0 billion), and processed fruits ($1.9 billion). Soybeans were China's key agricultural import with total imports valued at $34 billion. It was followed by beef ($4.5 billion), processed foods ($4.5 billion), wine ($4.2 billion), and baby food ($3.1 billion).

Commented [PA(1]: I had to re-do this paragraph because I got very different results from looking at the FAOSTAT data.

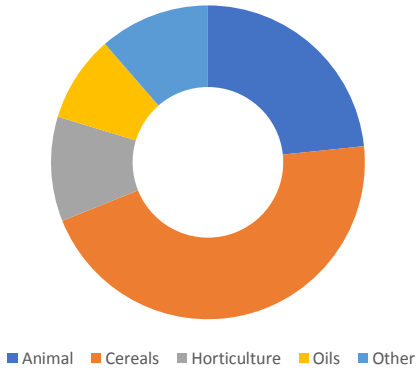
Food Security

Food Intake

Total daily kilocalories per capita was estimated at 3108 kcal in 2013. Figure 7 displays the proportion of daily calorie intake contributed by each major food group. Cereals accounted for 45.6 percent of daily calorie consumption in China during this time. Calories from animal sources comprised 23.4 percent and fruits and vegetables accounted for 10.8 percent. Daily protein

consumption per capita was estimated at 98.04 grams. Average dietary energy supply adequacy was estimated to be 131 percent in 2015-2017, representing a sharp increase since the early 2000s.

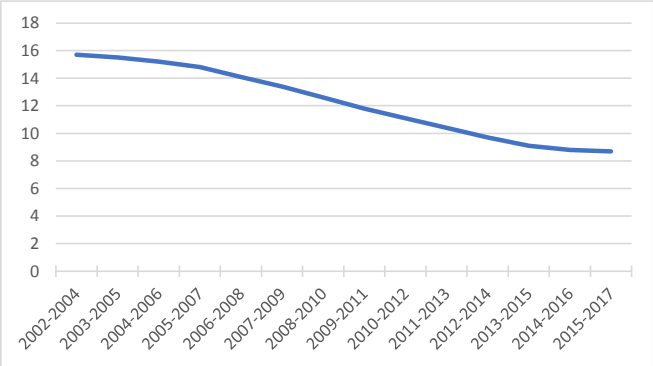
Figure 25. Share of daily kcal per capita by food group, 2013 (FAOSTAT)



Malnutrition

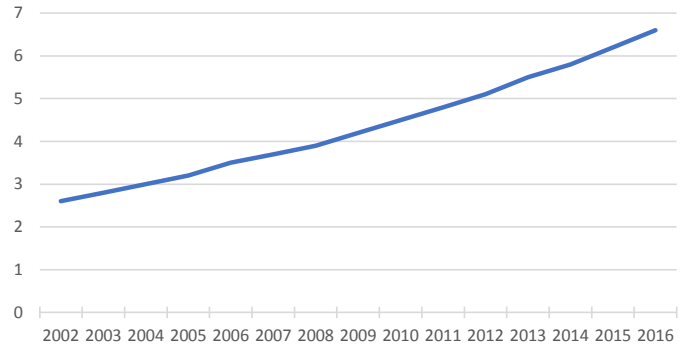
Figure 8 shows the medium-term trend of undernourishment in China. The prevalence of undernourishment expresses the probability that a randomly-selected individual from the country consumes an inadequate number of calories to cover his/her energy requirement, according to FAO. For the period of 2015-2017, this figure was less than 8.7 percent, representing a steady decrease since the late 2000s.

Figure 26. Percentage of population undernourished, three-year average, 2002-2017 (FAOSTAT)



Obesity is an increasing problem in developing countries, including in the CAREC region. Anthropometric data shows that this is a growing problem in China. Obesity has been rapidly increasing, from 2.6 percent in 2002 to 6.6 percent in 2016 (Figure 27). The prevalence of obesity is low compared to other CAREC countries but demonstrates the same upward long-term trend as seen in the others.

Figure 27. Prevalence of adult obesity, 2002-2016 (FAOSTAT)



Conclusions

Constraints

Chinese agriculture is constrained by its land and water resources, which also face pressure in terms of environmental problems. China's past agricultural development did not prioritize the sustainable use of natural resources. The long-term trend of urbanization has reduced the agricultural labor force, alongside a concurrent rise in labor costs. Therefore, finding new sources of agricultural productivity is key to growing the sector. China's reliance on exports for certain product categories, especially oilseeds, leaves it vulnerable to external shocks and changes in policy. Food safety and the development of agricultural value chains require attention and may have positive ramifications throughout the sector.

Potential for Agricultural Development

Increasing agricultural productivity and sustainability will allow China to overcome its constraints. Balancing a drive for agricultural development with a need to practice better stewardship of its resources and environment, China will have to carefully employ policies that will also be able to address growing demands for agricultural products. Research and the introduction of new technologies may be one partial solution for accomplishing this, and policymakers must seek ways to leverage the country's indigenous technical expertise for use in agriculture. Moreover, China must disseminate this knowledge to its farmers. The agricultural sector may have access to opportunities afforded by the growing wealth of domestic consumers and closer links to Central Asia, the Middle East, and Europe via the Belt and Road Initiative. Increasing the competitiveness of Chinese agriculture, therefore, should be a priority.

GEORGIA

With a total population of 3.9 million (of which 1.6 million or 41 percent live in rural areas), Georgia is located at the crossroads of West Asia and Eastern Europe. It is bounded on the north by Russia, on the west by the Black Sea, on the south by Turkey and Armenia, and on the southeast by Azerbaijan. Georgia has seen rapid economic growth despite global economic slowdowns and conflict with Russia in the late 2000s. Manufacturing, transport, and financial services have helped contribute to the recent growth. However, despite positive overall growth, agriculture has remained sluggish. Without proper development, it will become vulnerable to various environmental, political, and economic shocks.

Land Resources

As of 2016, roughly 34 percent (2.4 million ha) of Georgia's land is utilized for agriculture. Out of the total agricultural area, around 14 percent (344,000 ha) is arable, 81 percent (1.9 million ha) is classified as permanent meadows and pastures, and 5 percent (110,000 ha) is categorized for permanent or plantation crops. Figure 1 presents this information graphically. Crops produced in Georgia cover arable lands and lands classified as plantation crops. By major crop group, cereals occupy 50.2 percent of cropped areas, followed by horticulture (36.0%), oilseeds (0.8%), and other crops (13.0%) as shown in Figure 2. This information was derived from FAOSTAT.

Figure 28. Agricultural land types, 2016 (FAOSTAT)

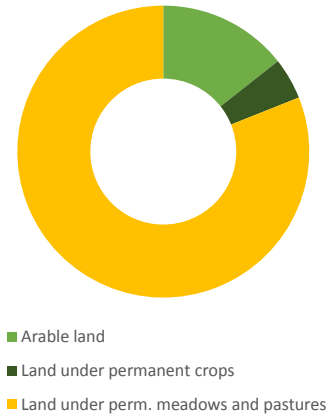
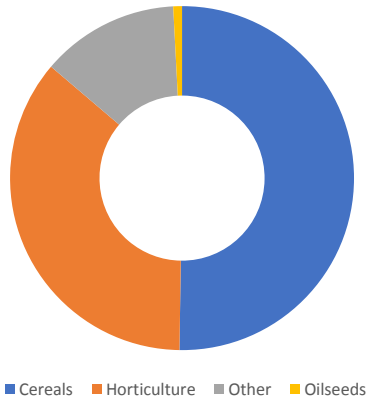


Figure 29. Share of cultivated land by crop type, 2014 (FAOSTAT)



Water Resources

Georgia has an annual internal water supply of 58 billion cubic meters, of which around 57 billion m^3 is classified as internally-produced surface water and 17 billion m^3 comes from internally-produced groundwater, with an overlap of 16 billion m^3. The country's inland water resources originate from over 25,000 rivers measuring nearly 55,000 kilometers. These rivers are connected to the Black Sea and Caspian Sea basins. Of Georgia's 725,000 hectares of potentially irrigable land, only 433,000 hectares (roughly 60%) are currently equipped for irrigation. According to data from Ministry of Environment and Natural Resources Protection of Georgia, agriculture has accounted for somewhere between 50-60 percent of total water use during the period from 2010 to 2017.

Agriculture and the Economy

Macroeconomic Trends

A relatively small portion of Georgia's economy is derived from its agricultural sector. Agriculture's already small share in national output has remained steady, following a drop in the mid-2000s. In 2017, agriculture accounted for 8.2 percent value added of total GDP, compared to 8.4 percent in 2010, and 20.6 percent in 2002 as seen in Figure 3. Currently, the services sector is the largest contributor in terms of value-added to national GDP. In 2016, total value-added agricultural output was approximately $1.1 billion, compared to the national GDP of $14.3 billion. Georgia's per capita GDP was recorded at $3,651 that year.

Figure 30. Share of GDP by sector, 2002-2017 (Asian Development Bank)

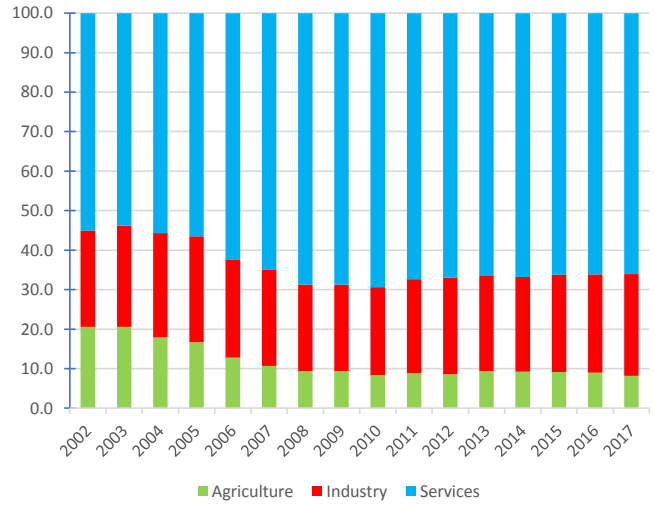


Figure 4 on the next page illustrates the growth of total GDP and agricultural GDP, demonstrating the virtually no growth of the latter especially when compared to other sectors of the economy.

Figure 31. Growth of GDP and Agricultural GDP in local currency (millions), 2002-2017 (FAOSTAT)

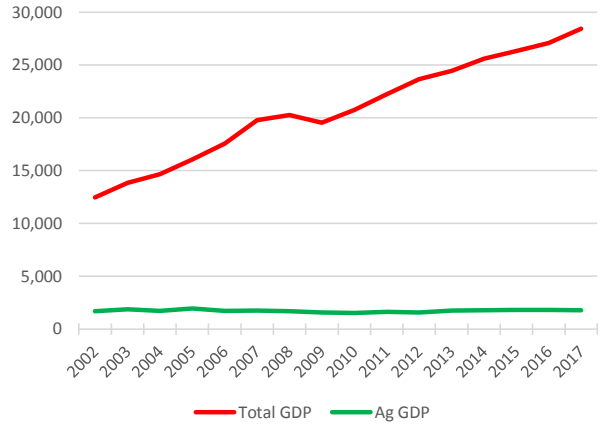
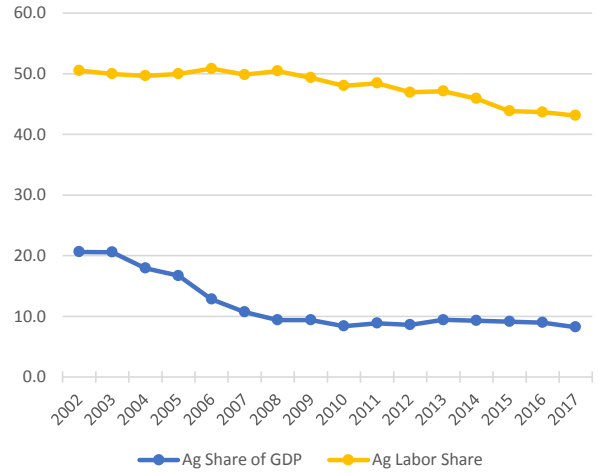


Figure 5 provides a comparison of agriculture's share of the national GDP and its share of the employed labor force. The existing data suggests a small but steady decrease in agricultural labor compared to other sectors since the early 2000s, from 50.5 percent in 2002 to 43.1 percent in 2016. It also shows that agriculture's share in GDP has fallen more rapidly than its share in labor, though remaining steady since 2010, and demonstrates the wide gap in the two figures. This information was sourced from the Asian Development Bank.

Figure 32. Agriculture's share of national GDP and share of employed labor force, 2002-2017 (FAOSTAT)



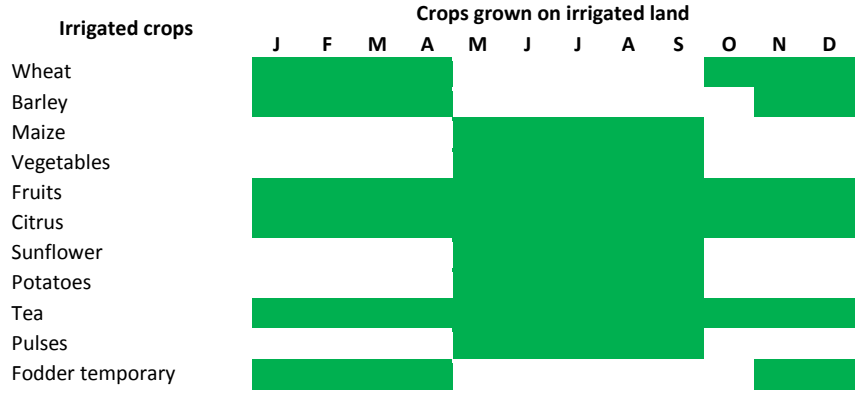
Agricultural Production

Approximately 45 percent of total agricultural production comes from the crop sector, compared to 55 percent for livestock. In terms of value, meat from cattle was the single most valuable commodity produced in Georgia in 2016, totaling around $208 million. Other important commodities included cow milk ($179 million), grapes ($62 million), hazelnuts ($55 million), maize ($53 million), and eggs ($53 million). In terms of quantity, potatoes were the most commonly produced crop, with a total volume of 249,000 tons. Other important products by weight included maize (244,000 tons), grapes (159,000 tons), wheat (127,000 tons), and apples (65,000 tons). Around 59,000 tons of fertilizers were used in Georgia in 2016 and a further 18,000 tons were imported into the country that year.

Cropping Calendar

Figure 6 is a graphical representation of the typical crop calendar for the most commonly grown crops on irrigated land in Georgia. Fruits, citrus, and tea are grown throughout the entire year on irrigated land. Maize, vegetables, sunflowers, potatoes, and pulses are typically grown in the spring-autumn cropping season. Barley, wheat, and fodder are typically grown during the secondary autumn-spring cropping season. The main irrigated areas consist of fruits (including citrus), fodder, and cereals. Crops are typically irrigated during the spring-autumn main cropping season. This information was sourced from Georgia's Ministry of Environment and Natural Resources Protection through FAO.

Figure 33. Crop calendars, irrigated land (FAO)



Agricultural Trade

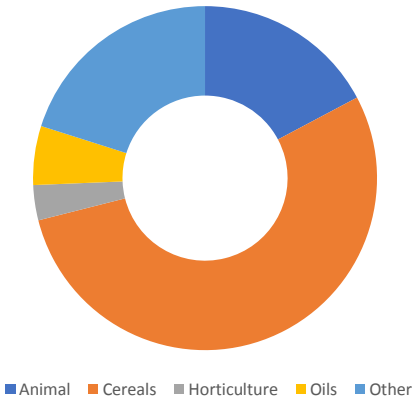
Georgia imported $1.0 billion worth of agricultural goods in 2016, compared to $660 million in agricultural exports. Georgia's top agricultural export commodities that year in order of their value were hazelnuts ($173 million), wines ($113 million), distilled alcoholic beverages ($92 million), bottled water ($80 million), non-alcoholic beverages ($12 million), and soybeans ($11 million). Wheat was the Georgia's key agricultural import with total imports valued at $101 million. It was followed by processed foods ($55 million), chicken meat ($57 million), chocolate products ($51 million), sugar ($41 million), and sunflower oil ($40 million).

Food Security

Food Intake

Total daily kilocalories per capita was estimated at 2905 kcal in 2013. Figure 7 displays the proportion of daily calorie intake contributed by each major food group. Cereals accounted for 54 percent of daily calorie consumption in Georgia during this time. Calories from animal sources comprised 17 percent and fruits and vegetables accounted for 3 percent. Daily protein consumption per capita was estimated at 80.5 grams. Average dietary energy supply adequacy was estimated to be 115 percent in 2015-2017, representing a steady long-term trend.

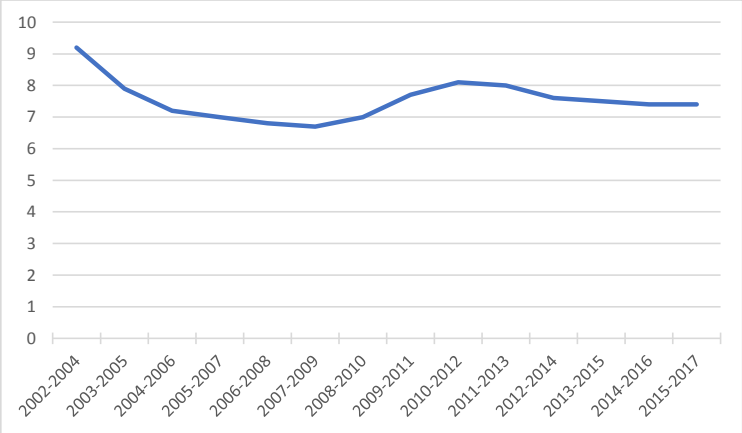
Figure 34. Share of daily kcal per capita by food group, 2013 (FAOSTAT)



Malnutrition

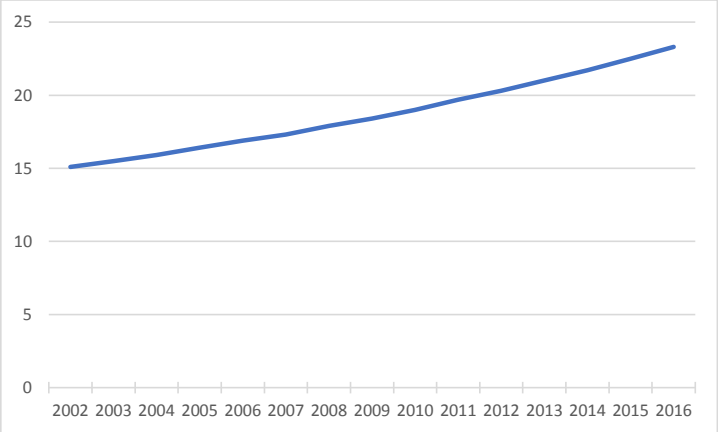
Figure 8 shows the medium-term trend of undernourishment in Georgia. The prevalence of undernourishment expresses the probability that a randomly-selected individual from the country consumes an inadequate number of calories to cover his/her energy requirement, according to FAO. For the period of 2015-2017, this figure was around 7.4 percent, representing a steady trend since the early 2010s. This is somewhat of a decrease from levels seen during the first decade of independence, but an increase since the late 2000s, demonstrating that pockets of malnutrition persist in the country.

Figure 35. Percentage of population undernourished, three-year average, 2002-2017 (FAOSTAT)



Obesity is an increasing problem in developing countries, including in the CAREC region. Anthropometric data shows that this has become a significant problem in Georgia. Obesity has been rapidly increasing, from 15.1 percent in 2002 to 23.3 percent in 2016. The prevalence of obesity is high compared to other CAREC countries and demonstrates the same upward long-term trend as seen in the others.

Figure 36. Prevalence of adult obesity, 2002-2016 (FAOSTAT)



Conclusions

Constraints

Georgia remains vulnerable to a number of problems that inhibit the country from maximizing the potential of the agricultural sector. Local water resources are mainly sourced from rainfall and snow while external water resources are vulnerable to border disputes with neighboring countries, making the agricultural sector vulnerable to disruption in water flow. This may be more pronounced in coming years as the effects of climate change become more apparent. Irrigation facilities need to be developed and improved as a countermeasure. The country's agrarian reforms have allowed free markets to flourish, but land is highly fragmented. Farmers often lack technical knowledge and the entrepreneurial skills needed to create profitable enterprises. Extension services need to be developed in order to overcome this constraint.

Potential for Agricultural Development

Progress in terms of undernourishment has stalled since the late 2000s, making the development of staple food items imperative. This will not only provide a more sustainable food supply and ease food insecurity, but also lessen trade deficits as wheat is a large expenditure in terms of imports. The stability of the agricultural sector is of paramount importance and will require improvements and support to infrastructure including roads, storage facilities, machinery, and value chains.

KAZAKHSTAN

With a total population of 18.6 million (half of which live in rural areas), Kazakhstan is an upper middle-income country and the largest economy in the Central Asia and Caucasus region. It is the world's largest landlocked country with an area of about 272 million hectares and shares borders with Russia, China, Kyrgyz Republic, Uzbekistan, and Turkmenistan. Kazakhstan is an energy-rich country that primarily exports natural resources to global markets. Kazakhstan's policymakers have sought to diversify the economy to achieve greater sustainability, especially as fluctuations in global commodity markets have buffeted the economy over the past decade. Agriculture had been relatively overlooked as the government focused on more productive sectors during the early 21st century. However, agriculture can play an important role in developing a sustainable and diverse economy, as Kazakhstan possesses substantial natural endowments and a growing means to invest in the sector.

Land Resources

As of 2016, roughly 80 percent (217 million ha) of Kazakhstan's land is utilized for agriculture. Out of the total agricultural area, around 14 percent (29 million ha) is arable, 87 percent (187 million ha) is classified as permanent meadows and pastures, and 0.06 percent (132,000 ha) is categorized for permanent or plantation crops. Figure 1 presents this information graphically. Crops produced in Kazakhstan cover arable lands and lands classified as plantation crops. By major crop group, cereals occupy 83.1 percent of cropped areas, followed by oilseeds (12.0%), horticulture (1.7%), fiber crops (1.5%) and other crops (1.8%) as shown in Figure 2. This information was derived from FAOSTAT.

Figure 37. Agricultural land types, 2016 (FAOSTAT)

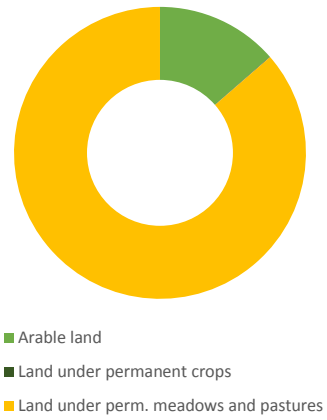
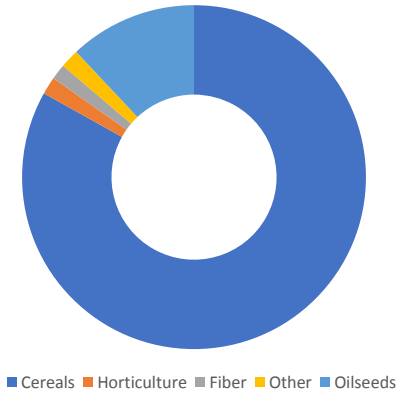


Figure 38. Share of cultivated land by crop type, 2014 (FAOSTAT)



Water Resources

Kazakhstan has an annual internal water supply of around 64 billion cubic meters, of which around 57 billion m^3 is classified as internally-produced surface water and 34 billion m^3 comes from internally-produced groundwater, with an overlap of 26 billion m^3. The country's inland water resources originate from eight major water basins, namely: the Syr Darya, Balkhash-Alako, Chu-Talas-Assa, Irytsh River, Ishim River, Nura-Sarysu, Tobol-Torgai, and Ural-Caspian Sea. Of Kazakhstan's 3.8 million hectares of potentially irrigable land, only 2.1 million hectares (roughly 55%) are currently equipped for irrigation. Agriculture accounted for 67 percent, whereas industry for about 26 percent, of total water withdrawal in 2017.

Agriculture and the Economy

Macroeconomic Trends

A relatively small portion of Kazakhstan's economy is derived from its agricultural sector. Agriculture's already small share in national output has remained steady, following a drop in the early to mid-2000s. In 2017, agriculture accounted for 4.7 percent value added of total GDP, compared to 6.2 percent in 2009, and 8.5 percent in 2002 as seen in Figure 3. Currently, the services sector is the largest contributor in terms of value-added to national GDP and is continuing to grow. In 2016, total value-added agricultural output was approximately $6.2 billion, compared to the national GDP of $135.0 billion. Kazakhstan's per capita GDP was recorded at $7,505 that year.

Figure 39. Share of GDP by sector, 2002-2017 (Asian Development Bank)

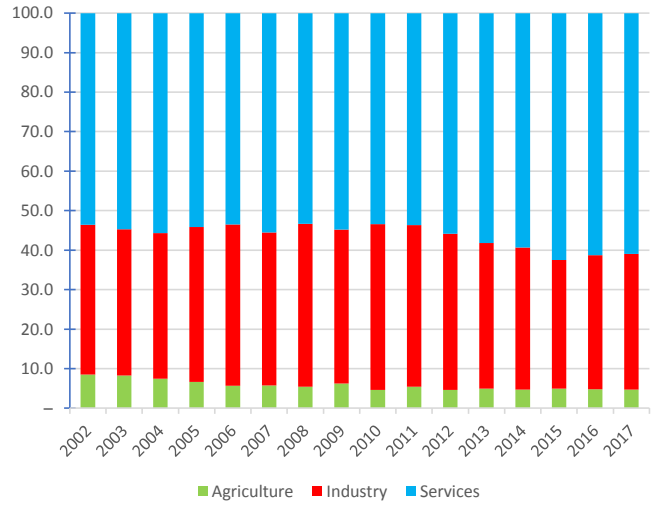


Figure 4 on the next page illustrates the growth of total GDP and agricultural GDP, demonstrating the much slower rate of growth of the latter compared to other sectors of the economy.

Figure 40. Growth of GDP and Agricultural GDP in local currency (millions), 2002-2017 (FAOSTAT)

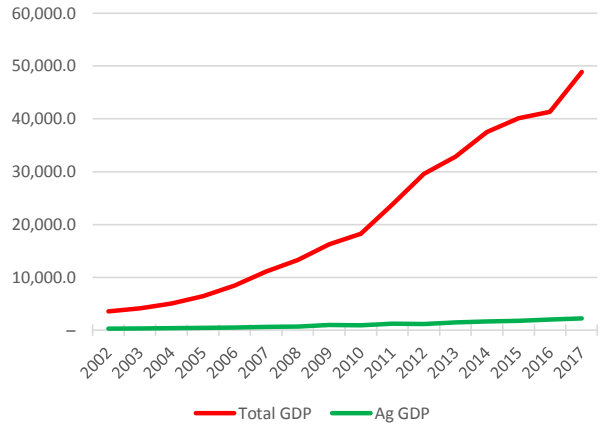
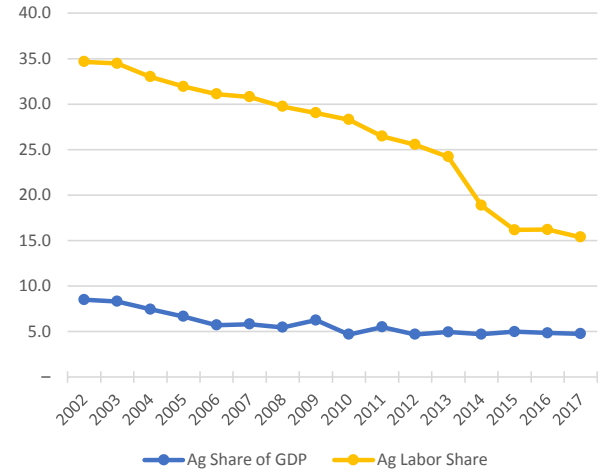


Figure 5 provides a comparison of agriculture's share of the national GDP and its share of the employed labor force. The figures suggest an accelerating decrease in agricultural labor compared to other sectors since the mid-2010s, from 24.2 percent in 2013 to 15.4 percent in 2017. While there is still a significant gap between agriculture's share of labor and output, it appears that the two figures have been converging in the past five years. This information was sourced from the Asian Development Bank.

Figure 41. Agriculture's share of national GDP and share of employed labor force, 2002-2017 (FAOSTAT)



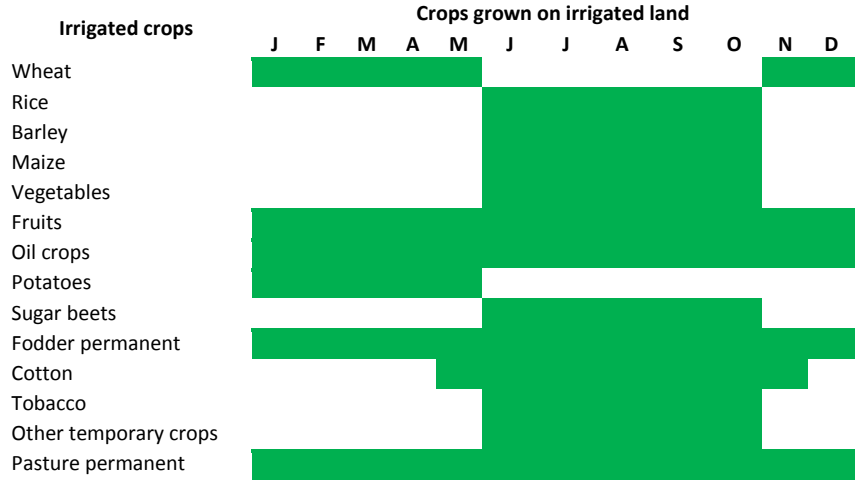
Agricultural Production

Approximately 56 percent of total agricultural production comes from the crop sector, compared to 44 percent for livestock. In terms of value, cattle meat was the single most valuable commodity produced in Kazakhstan in 2016, totaling around $2.1 billion. Other important commodities included wheat ($1.6 billion), cow milk ($1.3 million), sheep meat ($865 million), potatoes ($482 million), and tomatoes ($450 million). In terms of quantity, wheat was the most commonly produced crop, with a total volume of 15 million tons. Other important products by weight included potatoes (3.5 million tons), barley (3.2 million tons), watermelons (1.2 million tons), and melons (898,000 tons). Around 127,000 tons of fertilizers were used in Kazakhstan in 2017 and a further 128,000 tons were imported into the country that year.

Cropping Calendar

Figure 6 is a graphical representation of the typical crop calendar for the most commonly grown irrigated crops in Kazakhstan. Fruits, oil crops, and fodder are grown on irrigated land throughout the entire year. Rice, barley, maize, vegetables, sugar beets, cotton, and tobacco are typically grown in the spring-autumn cropping season. Wheat is typically grown on irrigated land during the secondary autumn-spring cropping season. The main irrigated areas consist of wheat, vegetables, pastures, and cotton. Crops are typically irrigated during the spring-autumn main cropping season. This information was sourced from FAO.

Figure 42. Crop calendars, irrigated land (FAO)



Agricultural Trade

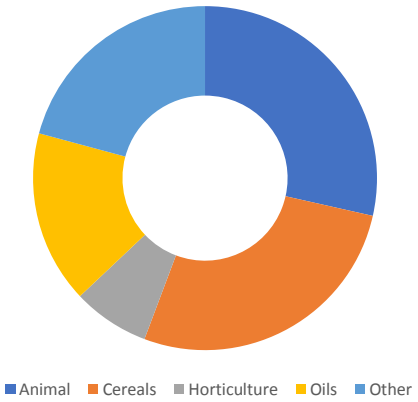
Kazakhstan imported $3.0 billion worth of agricultural goods in 2016, compared to $2.1 billion in agricultural exports. Kazakhstan's top agricultural export commodities that year in order of their value were wheat ($685 million), wheat flour ($505 million), barley ($109 million), linseed ($91 million), cotton lint ($72 million), and sunflower seeds ($55 million). Processed foods were Kazakhstan's key agricultural import with total imports valued at $197 million. It was followed by chocolate products ($151 million), raw sugar ($146 million), chicken meat ($130 million), sunflower oil ($93 million), and pastries ($88 million).

Food Security

Food Intake

Total daily kilocalories per capita was estimated at 3264 kcal in 2013. Figure 7 displays the proportion of daily calorie intake contributed by each major food group. Cereals accounted for 27 percent of daily calorie consumption in Kazakhstan during this time. Calories from animal sources comprised 29 percent and fruits and vegetables accounted for 7 percent. Daily protein consumption per capita was estimated at 96.4 grams. Average dietary energy supply adequacy was estimated to be 138 percent in 2015-2017, representing a steady long-term increase.

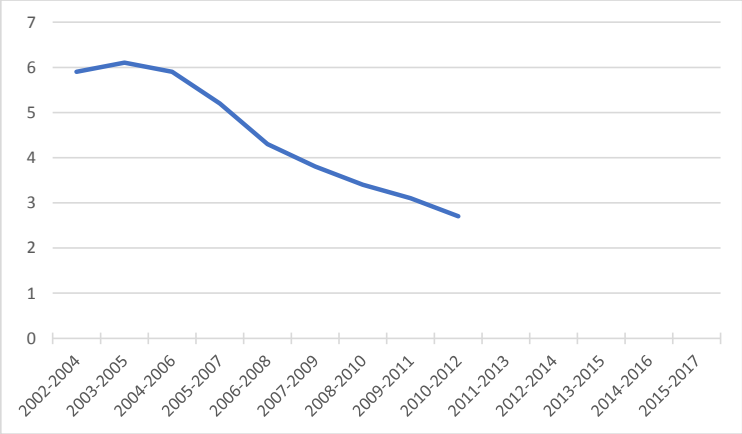
Figure 43. Share of daily kcal per capita by food group, 2013 (FAOSTAT)



Malnutrition

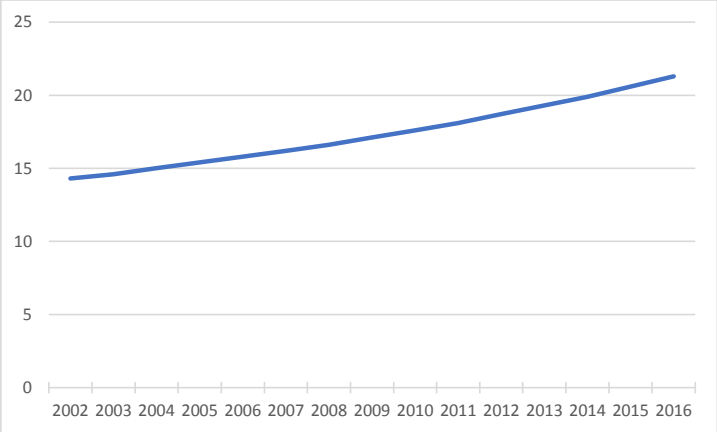
Figure 8 shows the medium-term trend of undernourishment in Kazakhstan. The prevalence of undernourishment expresses the probability that a randomly-selected individual from the country consumes an inadequate number of calories to cover his/her energy requirement, according to FAO. For the period of 2015-2017, this figure was less than 2.5 percent, representing a steady trend since the early 2010s. This is a significant decrease from levels seen in the early 2000s, when the prevalence of undernourishment was over 6 percent.

Figure 44. Percentage of population undernourished, three-year average, 2002-2017 (FAOSTAT)



Obesity is an increasing problem in developing countries, including in the CAREC region. Anthropometric data shows that this has become a significant problem in Kazakhstan. Obesity has been rapidly increasing, from 14.3 percent in 2002 to 21.3 percent in 2016. The prevalence of obesity is high compared to other CAREC countries and demonstrates the same upward long-term trend as seen in the others.

Figure 45. Prevalence of adult obesity, 2002-2016 (FAOSTAT)



Conclusions

Constraints

Kazakhstan's agriculture sector has considerable potential but faces challenges. Despite being one of the world's major producers of wheat, Kazakhstan has inadequate transport systems and infrastructure that link production areas to major markets. For years, Kazakhstan was served by a single sea port at Aktau on the Caspian Sea, though the recent construction of a new port at Kuryk and the expansion of the Aktau port has increased capacity. The country's agriculture sector needs investment in technical knowhow and machinery. Climate change threatens the future of the sector, adding to the existing problems of land degradation through overgrazing and poor water management. Famers need increased access to financial resources that will help them purchase high-quality inputs and develop their land. Kazakhstan's agricultural productivity has demonstrated improvement in recent years, which can help agriculture close the gap on other productive sectors of the economy.

Potential for Agricultural Development

Developing existing water resources can help Kazakhstan maximize its efficiency and promote farm productivity. Kazakhstan has developed the economic resources to invest in agriculture and policymakers must view the sector as a growth opportunity. As the country attempts to diversify its economy and reduce its exposure to global commodity price fluctuations, revitalizing national agriculture is one pathway to that goal. The country has become an important supplier of wheat to the region and increased connectivity through transport infrastructure may unlock additional benefits.

KYRGYZSTAN

With a total population of 6.2 million (of which 4 million or 64 percent live in rural areas), Kyrgyz Republic is a landlocked country bordered by Kazakhstan to the north, Uzbekistan to the west, Tajikistan to the southwest, and China to the east. It is covered by mountainous terrain and limited natural resources that pose a challenge to its agricultural development. Kyrgyzstan has suffered from episodes of political instability in past and has lagged behind other countries in the region in terms of economic growth. It continues to be vulnerable to various environmental, political, and economic shocks, and is in need of policy interventions that can spur sustainable development in agriculture.

Land Resources

As of 2016, roughly 53 percent (10.5 million ha) of Kyrgyz Republic's land is utilized for agriculture. Out of the total agricultural area, around 12 percent (1.3 million ha) is arable, 87 percent (9.2 million ha) is classified as permanent meadows and pastures, and 0.7 percent (76,000 ha) is categorized for permanent or plantation crops. Figure 1 presents this information graphically. Crops produced in Kyrgyz Republic cover arable lands and lands classified as plantation crops. By major crop group, cereals occupy 63.3 percent of cropped areas, followed by horticulture (12.0%), oilseeds (7.1%), roots and tubers (8.4%), pulses (5.6%), fiber crops (2.5%) and other crops (1.1%) as shown in Figure 2. This information was derived from FAOSTAT.

Figure 46. Agricultural land types, 2016 (FAOSTAT)

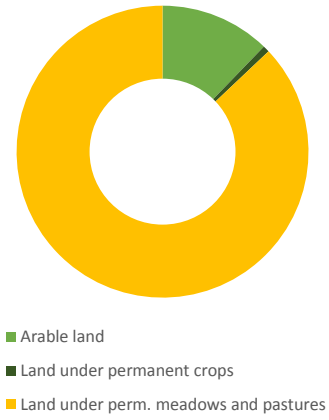
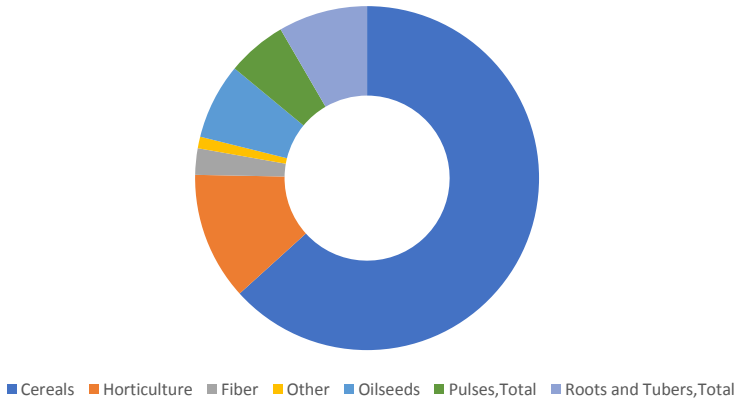


Figure 47. Share of cultivated land by crop type, 2014 (FAOSTAT)



Water Resources

Kyrgyz Republic is the only country in Central Asia whose water resources are almost completely formed on its own territory, and it has considerable water and hydropower resources. The country has an annual internal water supply of around 49 billion cubic meters, of which around 46 billion m^3 is classified as internally-produced surface water and 14 billion m^3 comes from internally-produced groundwater, with an overlap of 11 billion m^3. The country's inland water resources originate from six major river basins, namely: (1) Issyk-Kul, (2) Chu/Talas/Assa, (3) the southeastern river basin, (4) Amu Darya, (5) Syr Darya, and (6) Chatkal. Of Kyrgyz Republic's 2.2 million hectares of potentially irrigable land, only 1.0 million hectares (roughly 46%) are currently equipped for irrigation. According to the Department of Water Resources and Land Improvement under the Ministry of Agriculture, irrigated agriculture accounted for 90 percent of total water use in 2017.

Agriculture and the Economy

Macroeconomic Trends

A significant but shrinking portion of Kyrgyz Republic's economy is derived from its agricultural sector. Agriculture's share in national output has fallen over the past two decades, falling most sharply in the latter half of the 2000s. In 2017, agriculture accounted for 13.8 percent value added of total GDP, compared to 20.3 percent in 2009, and 37.3 percent in 2002 as seen in Figure 3. Currently, the services sector is the largest contributor in terms of value-added to national GDP. In 2016, total value-added agricultural output was approximately $867 million, compared to the national GDP of $6.6 billion. Kyrgyz Republic's per capita GDP was recorded at $1,100 that year.

Figure 48. Share of GDP by sector, 2002-2017 (Asian Development Bank)

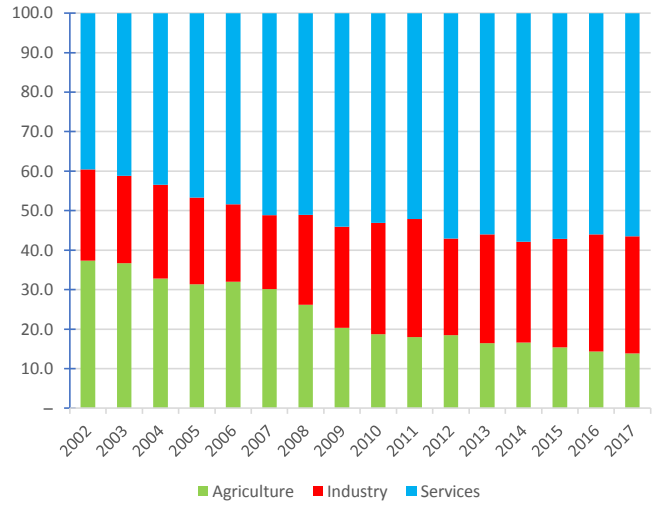


Figure 4 on the next page illustrates the growth of total GDP and agricultural GDP, demonstrating the much slower rate of growth of the latter compared to other sectors of the economy.

Figure 49. Growth of GDP and Agricultural GDP in local currency (millions), 2002-2017 (FAOSTAT)

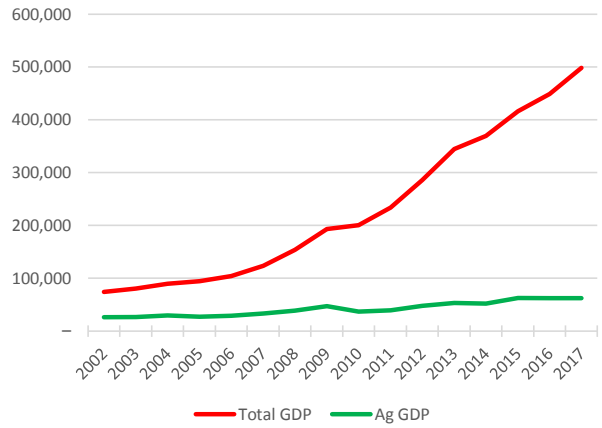
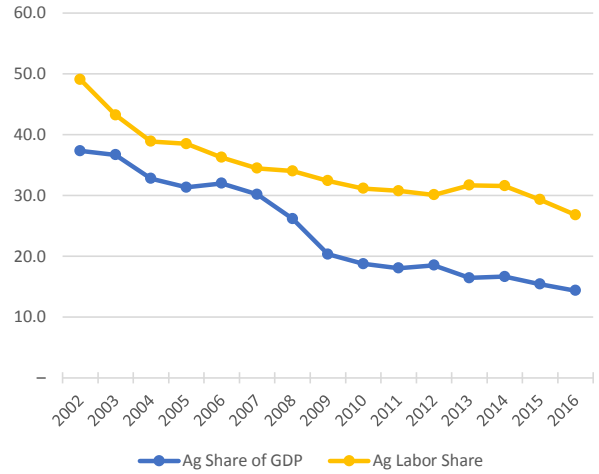


Figure 5 provides a comparison of agriculture's share of the national GDP and its share of the employed labor force. The figures suggest a proportional decrease in agricultural labor compared to other sectors since the early 2000s: from 49.1 percent in 2002 to 26.8 percent in 2016. While there is still a significant gap between agriculture's share of labor and output, it appears that the two figures have been falling in tandem in recent years, suggesting agricultural labor is being absorbed by other sectors. This information was sourced from the Asian Development Bank.

Figure 50. Agriculture's share of national GDP and share of employed labor force, 2002-2017 (FAOSTAT)



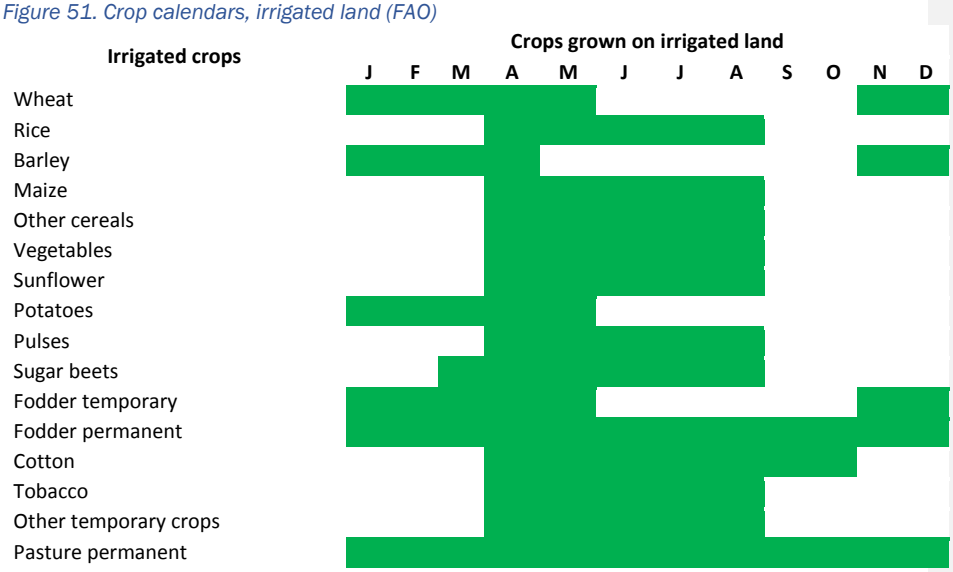
Agricultural Production

Approximately 45 percent of total agricultural production comes from the crop sector, compared to 55 percent for livestock. In terms of value, cattle meat was the single most valuable commodity produced in Kyrgyz Republic in 2016, totaling around $785 million. Other important commodities included sheep meat ($502 million), cow milk ($418 million), potatoes ($224 million), maize ($114 million), and wheat ($112 million). In terms of quantity, potatoes were the most commonly produced crop, with a total volume of 1.4 million tons. Other important products by volume included sugar beets (705,000 tons), wheat (662,000 tons), maize (649,000 tons), and barley (415,000 tons). Around 40,000 tons of fertilizers were used in Kyrgyz Republic in 2017 and a further 29,000 tons were imported into the country that year.

Cropping Calendar

Figure 6 is a graphical representation of the typical crop calendar for the most commonly grown irrigated crops in Kyrgyz Republic. Fodder is grown on irrigated land throughout the entire year. Rice, maize, cereals, vegetables, sunflowers, pulses, cotton, and tobacco are typically grown on irrigated land during the spring-autumn cropping season. Wheat and barley are typically grown on irrigated land during the secondary autumn-spring cropping season. The main irrigated areas consist of wheat and fodder. Crops are typically irrigated during the spring-autumn main cropping season. This information was sourced from FAO.

Figure 51. Crop calendars, irrigated land (FAO)



Agricultural Trade

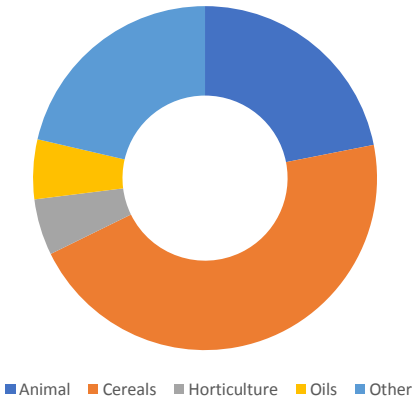
Kyrgyz Republic imported $456 million worth of agricultural goods in 2016, compared to $168 million in agricultural exports. Kyrgyz Republic's top agricultural export commodities that year in order of their value were beans ($55 million), cotton lint ($19 million), dried fruits ($14 million), butter ($7.6 million), cheese ($5.0 million), and cow milk ($3.5 million). Chocolate products were Kyrgyz Republic's key food imports with total imports valued at $42 million. It was followed by sunflower oil ($37 million), wheat ($32 million), sugar ($25 million), processed foods ($25 million), and baby food ($18 million).

Food Security

Food Intake

Total daily kilocalories per capita was estimated at 2817 kcal in 2013. Figure 7 displays the proportion of daily calorie intake contributed by each major food group. Cereals accounted for 46 percent of daily calorie consumption in Kyrgyz Republic during this time. Calories from animal sources comprised 22 percent and fruits and vegetables accounted for 5 percent. Daily protein consumption per capita was estimated at 85.2 grams. Average dietary energy supply adequacy was estimated to be 120 percent in 2015-2017, representing a gradual long-term increase.

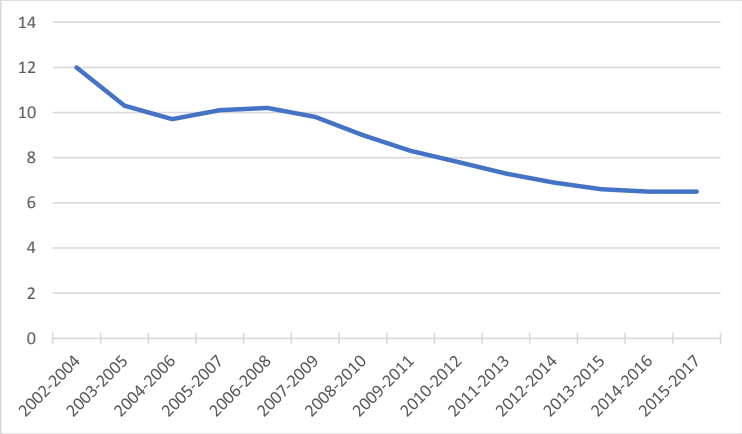
Figure 52. Share of daily kcal per capita by food group, 2013 (FAOSTAT)



Malnutrition

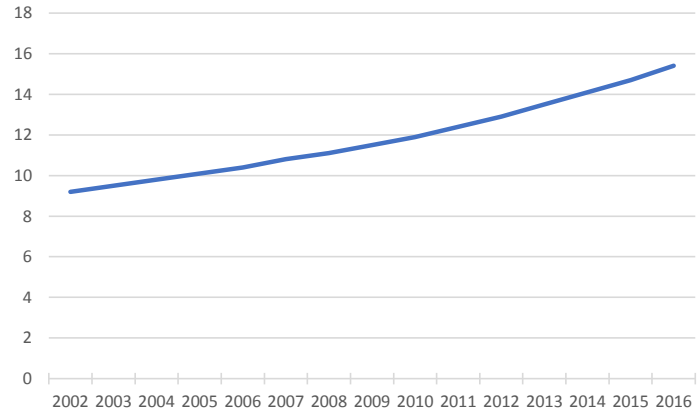
Figure 8 shows the medium-term trend of undernourishment in Kyrgyz Republic. The prevalence of undernourishment expresses the probability that a randomly-selected individual from the country consumes an inadequate number of calories to cover his/her energy requirement, according to FAO. For the period of 2015-2017, this figure was 6.5 percent, representing a steady decrease since the early 2010s. This is a significant decrease from levels seen in the early 2000s, when the prevalence of undernourishment was over 12 percent.

Figure 53. Percentage of population undernourished, three-year average, 2002-2017 (FAOSTAT)



Obesity is an increasing problem in developing countries, including in the CAREC region. Anthropometric data shows that this has become a significant problem in Kyrgyz Republic. Obesity has been rapidly increasing, from 9.2 percent in 2002 to 15.4 percent in 2016. The prevalence of obesity is moderately high compared to other CAREC countries and demonstrates the same upward long-term trend as seen in the others.

Figure 54. Prevalence of adult obesity, 2002-2016 (FAOSTAT)



Conclusions

Constraints

Kyrgyz Republic's agriculture sector has considerable potential but faces challenges. Although Kyrgyzstan implemented land reforms relatively quickly and has managed to create one of the most liberalized political systems in the region, its agricultural sector has lagged in terms of productivity. Land fragmentation without the development of necessary support services and improvements in governance is a considerable hurdle for agricultural growth. Farmers, many of whom had not received proper training on modern techniques, require extension services and technology transfers in order to make use of the country's potential. Though the country has abundant water resources, it faces challenges in terms of land availability, land degradation, and infrastructure.

Potential for Agricultural Development

Kyrgyzstan's agriculture requires considerable investment, especially in support services and infrastructure in order to help its largely smallholder-oriented farming to make productivity gains. With its entry into the Eurasian Economic Union, Kyrgyzstan has theoretical access to a large market. However, without congruent improvements in regulatory services, transportation, and processing facilities, it will struggle to take advantage of this opportunity.

MONGOLIA

With a total population of 3.2 million (of which 860,000 or 27 percent live in rural areas), Mongolia is a landlocked country in East Asia, located between China to the south and Russia to the north. Agriculture, minerals, natural resources, and services sectors have been major contributors to the country's growth. However, there exits some constraints in agricultural development, it is vulnerable to harsh weather and nature disaster, trade partners policies, economic shock, and therefore, the government support for the sustainable development and policy instrument for agriculture and natural resource sector would be critical important to this sector.

Land Resources

As of 2016, roughly 71.5 percent (111.1 million ha) of Mongolia's land is utilized for agriculture. Out of the total agricultural area, around 0.4 percent (567,200 ha) is arable, 99.5 percent (110.5 million ha) is classified as permanent meadows and pastures, and only 5,000 ha are categorized for permanent crops. Figure 1 presents this information graphically. Crops produced in Mongolia cover arable lands and lands classified as plantation crops. By major crop group, cereals occupy 90.8 percent of cropped areas, followed by horticulture (3.3%), oilseeds (1.1%) and other crops (4.8%) as shown in Figure 2. This information was derived from FAOSTAT.

Figure 55. Agricultural land types, 2016 (FAOSTAT)

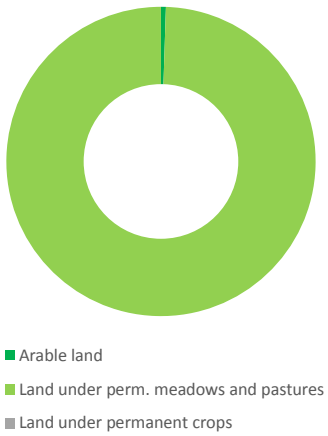
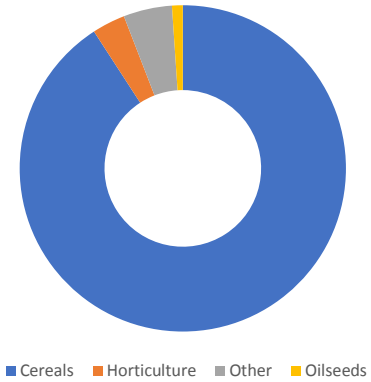


Figure 56. Share of cultivated land by crop type, 2014 (FAOSTAT)



Water Resources

Mongolia has an annual internal water supply of around 35 billion cubic meters, of which around 33 billion m^3 is classified as internally-produced surface water and 6.1 billion m^3 comes from internally-produced groundwater, with an overlap of 4 billion m^3. Mongolia is situated on three international river basins including the Arctic Ocean Basin, the Pacific Ocean Basin, and the Central Asian Internal Drainage Basin. There are totally about 4,113 rivers in Mongolia, with a total length of 67,000 km. Of Mongolia's 518,000 hectares of potentially irrigable land, only 84,000 hectares (roughly 14%) are currently equipped for irrigation. Currently, agriculture is the largest water user in the country, with irrigation making up 30 percent and livestock 23.5 percent of the total water use. Mining accounts for 12.7 percent of the water use but is expected to become a significant water user in the coming years.

Agriculture and the Economy

Macroeconomic Trends

A relatively small portion of Mongolia's economy is derived from its agricultural sector. Agriculture's already small share in national output has exhibited a decreasing trend in recent years. In 2017, agriculture accounted for 10.6 percent value added of total GDP, compared to 20.5 percent in 2007, and 21.5 percent in 2002 as seen in Figure 3. Currently, the service sector is the largest contributor in terms of value-added to national GDP. In 2017, total value-added agricultural output was approximately $10.6 billion, compared to the national GDP of $111.6 billion. Mongolia's per capita GDP was recorded at $3,686.5 that year.

Figure 57. Share of GDP by sector, 2002-2017 (Asian Development Bank)

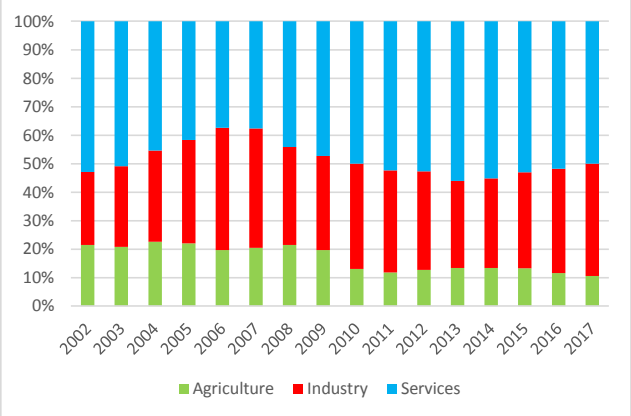


Figure 4 on the next page illustrates the growth of total GDP and agricultural GDP, demonstrating the sluggish growth of the latter when compared to other sectors of the economy.

Figure 58. Growth of GDP and Agricultural GDP in local currency (millions), 2002-2017 (FAOSTAT)

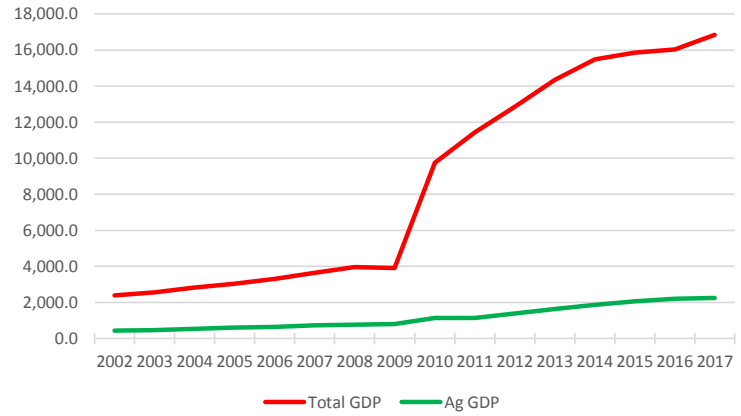
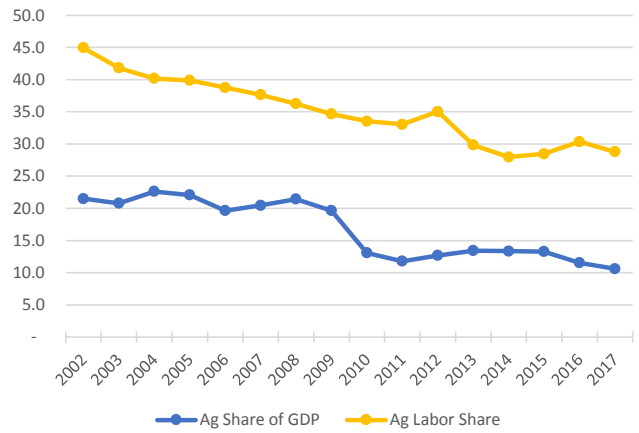


Figure 5 provides a comparison of agriculture's share of the national GDP and its share of the employed labor force. The existing data suggests a continual and steady decrease in agricultural labor compared to other sectors since the early 2000s, from 44.9 percent in 2002 to 28.8 percent in 2017. It also shows that agriculture's share in GDP has fallen roughly in tandem its share in labor, though a wide gap persists between the two figures. This information was sourced from the World Bank.

Figure 59. Agriculture's share of national GDP and share of employed labor force, 2002-2017 (FAOSTAT)



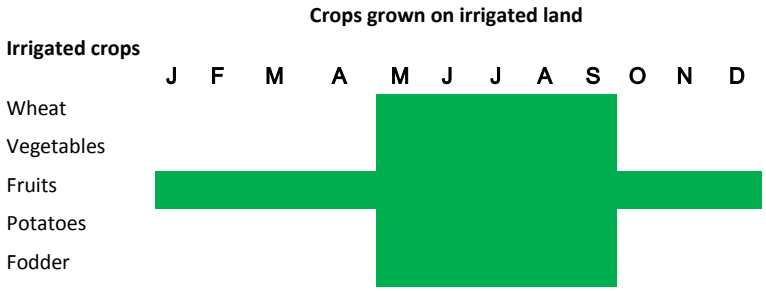
Agricultural Production

Approximately 74.8 percent of total agricultural production comes from livestock, compared to 25.2 percent for the crop sector. In terms of value, meat from sheep was the single most valuable commodity produced in Mongolia in 2016, totaling around $381 million. Other important commodities included beef ($303 million), cow milk ($220 million), goat milk ($101 million), and wheat ($92 million). In terms of quantity, milk (excluding butter) was the most commonly produced item, with a total volume of 510,000 tons. Other important products by weight included wheat/wheat products (368,000 tons), potatoes/potato products (192,000 tons), mutton and goat meat (157,000 tons), and vegetables (93,000 tons). Around 22,670 tons of fertilizers were used in Mongolia in 2016 and none of the fertilizer were produced domestically.

Cropping Calendar

Figure 6 is a graphical representation of the typical crop calendar for the most commonly grown irrigated crops in Mongolia. Fruits are grown throughout the entire year. Wheat, vegetables, potatoes, and fodder are typically grown in the spring-autumn cropping season. The main irrigated areas consist of wheat, vegetables, and fruit. This information was sourced from FAO.

Figure 60. Crop calendars, irrigated land (FAO)



Agricultural Trade

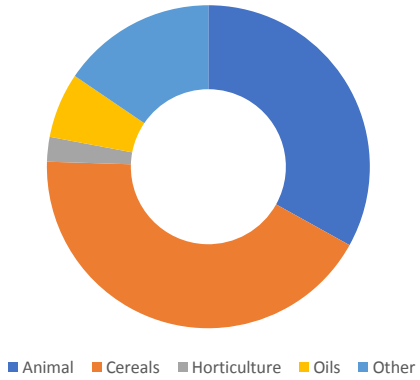
Mongolia imported $505 million worth of agricultural goods in 2016, compared to $368 million in agricultural exports. Mongolia's top agricultural export commodities that year in order of their value were fine hair ($212 million), nuts ($33 million), rapeseed ($16 million), wool ($16 million), crude materials ($15 million), and horse meat ($14 million). Processed food was Mongolia's key agricultural import with total imports valued at $57 million. It was followed by chocolate products ($39 million), wheat ($33 million), raw sugar ($26 million), and confectioners' sugar ($24 million).

Food Security

Food Intake

Total daily kilocalories per capita was estimated at 2510 kcal in 2013. Figure 7 displays the proportion of daily calorie intake contributed by each major food group. Cereals accounted for 42.4 percent of daily calorie consumption in Mongolia during this time. Calories from animal sources comprised 33.1 percent and fruits and vegetables accounted for 2.5 percent. Daily protein consumption per capita was estimated at 80.8 grams. Average dietary energy supply adequacy was estimated to be 106 percent in 2015-2017, representing a sharp increase since the early 2000s.

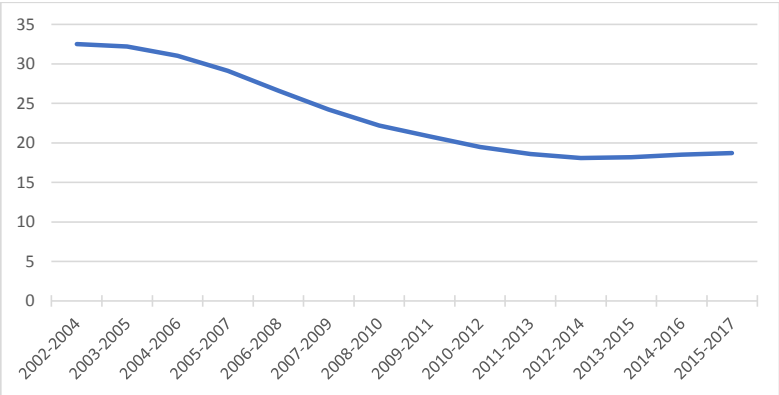
Figure 61. Share of daily kcal per capita by food group, 2013



Malnutrition

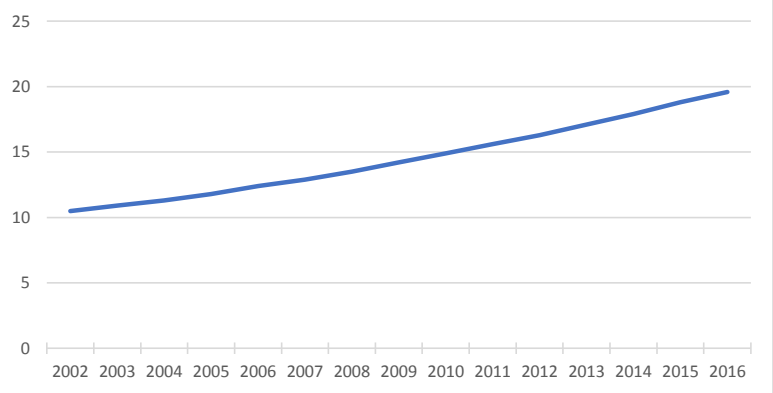
Figure 8 shows the medium-term trend of undernourishment in Mongolia. The prevalence of undernourishment expresses the probability that a randomly-selected individual from the country consumes an inadequate number of calories to cover his/her energy requirement, according to FAO. For the period of 2015-2017, this figure was around 18.7 percent, representing steady levels since the early 2010s. This is a drastic decrease from levels seen during the early 2000s, when more than 30 percent of the population experienced undernourishment.

Figure 62. Percentage of population undernourished, three-year average, 2002-2017



Obesity is an increasing problem in developing countries, including in the CAREC region. Anthropometric data shows that this has become a significant problem in Mongolia. Obesity has been steadily increasing, from 10.5 percent in 2002 to 19.6 percent in 2016 (Figure 63). The prevalence of obesity is moderately high compared to other CAREC countries and demonstrates the same upward long-term trend as seen in the others.

Figure 63. Prevalence of adult obesity, 2002-2016



Conclusions

Constraints

Though Mongolia contains a large land area, much of it is not well-suited for agricultural production. Arable land accounts for less than 0.5 percent of its agricultural land and pasture land has been declining. Mongolia's extreme climate poses additional risks for agricultural producers and natural resources were heavily exploited during the transition to a market-based economy. Moreover, Mongolia's farmers generally lack technical knowledge and access to market information to create profitable farms or enterprises. Addressing these issues and improving domestic infrastructure can create opportunities for Mongolian agriculture and help expand the range and variety of its trade activities.

Potential for Agricultural Development

Sustainable development of Mongolia's agricultural sector can help address some of the constraints and counteract the negative impacts of previous practices. Developing Mongolia's agricultural value chains can help modernize the country's important livestock sector and provide additional opportunities for exports, especially as neighboring countries become more prosperous and demand more animal-based food products. Value chain development not only relates to physical infrastructure such as transportation and storage but the regulatory and certification regimes that will allow Mongolian exports to access new markets. Further investments in machinery and irrigation can also help Mongolia maximize its scarce land resources.

PAKISTAN

With a total population of about 204 million (of which 122 million or 60 percent live in rural areas), Pakistan is a lower-middle income country with a large agricultural sector that is bordered by Afghanistan to the northwest, Iran to the west, India to the east and China to the northeast. It contains vast natural resources and a large population but is vulnerable to various environmental, political, and economic shocks. Pakistan has suffered from episodes of political instability and natural disasters that hindered agriculture in certain regions. Despite these challenges, Pakistan is among the world's leading agricultural producers in a number of food items.

Land Resources

As of 2016, roughly 42 percent (37 million ha) of Pakistan's land is utilized for agriculture. Out of the total agricultural area, around 84 percent (31 million ha) is arable, 14 percent (5.0 million ha) is classified as permanent meadows and pastures, and 2.1 percent (804,000 ha) is categorized for permanent or plantation crops. Figure 1 presents this information graphically. Crops produced in Pakistan cover arable lands and lands classified as plantation crops. By major crop group, cereals occupy 53.5 percent of cropped areas, followed by fiber crops (22.7%), oilseeds (13.6%), horticulture (4.6%), and other crops (5.7%) as shown in Figure 2. This information was derived from FAOSTAT.

Figure 64. Agricultural land types, 2016 (FAOSTAT)

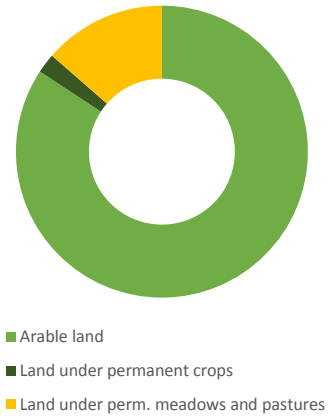
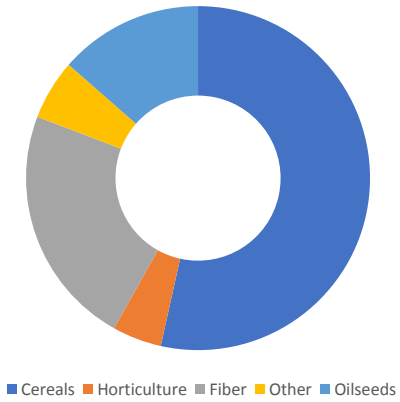


Figure 65. Share of cultivated land by crop type, 2014 (FAOSTAT)



Water Resources

Pakistan has an annual internal water supply of around 55 billion cubic meters, of which around 47 billion m^3 is classified as internally-produced surface water and 55 billion m^3 comes from internally-produced groundwater, with an overlap of 47 billion m^3. Surface and groundwater are primarily replenished through rainfall and runoff from the Indus River Basin that spans across 80 percent of Pakistan's arable land and irrigates roughly 52 percent of its agricultural area. Of Pakistan's 21.3 million hectares of potentially irrigable land, around 20 million hectares (roughly 94%) are currently equipped for irrigation. Agriculture accounted for 94 percent of total water withdrawal in 2008, although more recent data was not available.

Agriculture and the Economy

Macroeconomic Trends

A significant portion of Pakistan's economy is derived from its agricultural sector. Agriculture's share in national output has remained over the past two decades, though it has been greatly reduced in the longer term. In 2017, agriculture accounted for 24.4 percent value added of total GDP. Currently, the services sector is the largest contributor in terms of value-added to national GDP. In 2016, total value-added agricultural output was approximately $67 billion, compared to the national GDP of $283 billion. Pakistan's per capita GDP was recorded at $1,462 that year.

Figure 66. Share of GDP by sector, 2002-2017 (Asian Development Bank)

Figure 4 on the next page illustrates the growth of total GDP and agricultural GDP, demonstrating the much slower rate of growth of the latter compared to other sectors of the economy.

Figure 67. Growth of GDP and Agricultural GDP in local currency (millions), 2002-2017 (FAOSTAT)

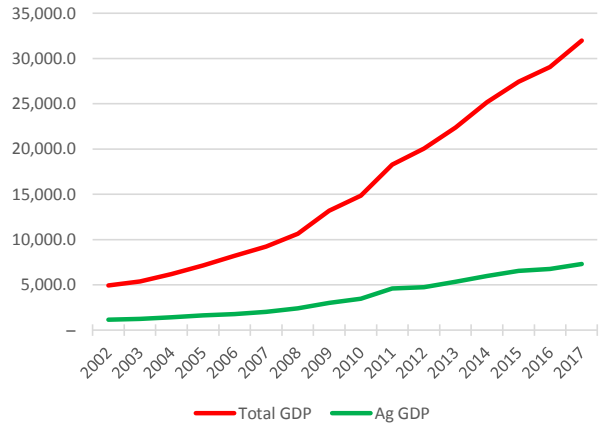
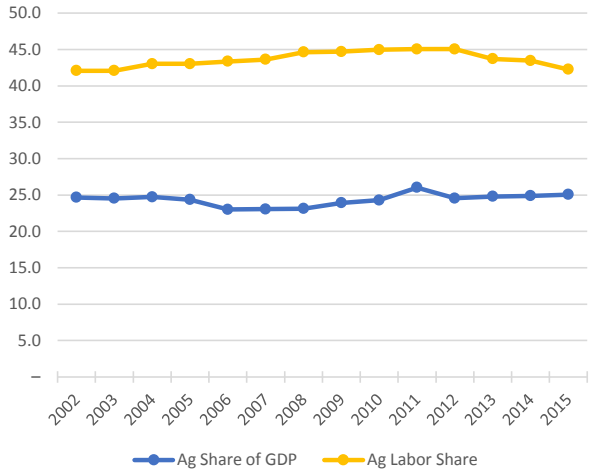


Figure 5 provides a comparison of agriculture's share of the national GDP and its share of the employed labor force. The figures suggest little structural transformation among major economic sectors over this period. While there is still a significant gap between agriculture's share of labor and output, it appears that the two figures have remained steady. This information was sourced from the Asian Development Bank.

Figure 68. Agriculture's share of national GDP and share of employed labor force, 2002-2015 (FAOSTAT)



Agricultural Production

Approximately 46 percent of total agricultural production comes from the crop sector, compared to 54 percent for livestock. In terms of value, buffalo meat was the single most valuable commodity produced in Pakistan in 2016, totaling around $9.8 billion. Other important commodities included buffalo milk ($9.4 billion), wheat ($7.4 billion), cattle meat ($5.5 billion), cotton ($3.3 billion), and chicken meat ($3.2 billion). In terms of quantity, sugarcane was the most commonly produced crop, with a total volume of 65 million tons. Other important products by volume included wheat (26 million tons), rice (10.2 million tons), maize (6.1 million tons), and cotton (5.3 million tons). Around 4.5 million tons of fertilizers were used in Pakistan in 2016 and a further 913,000 tons were imported into the country that year.

Cropping Calendar

Figure 6 is a graphical representation of the typical crop calendar for the most commonly grown irrigated crops in Pakistan. Fruits (including citrus), bananas, and sugarcane are grown on irrigated land throughout the entire year. Rice, maize, millet, sorghum, vegetables, sunflowers, sesame, groundnuts, potatoes, pulses, cotton, and tobacco are typically grown on irrigated land during the spring-autumn cropping season. Wheat, barley, rapeseed, and fodder are typically grown on irrigated land during the secondary autumn-spring cropping season. The main irrigated areas consist of cereals, cotton, and fodder. This information was sourced from FAO.

Figure 69. Crop calendars, irrigated land (FAO)

Agricultural Trade

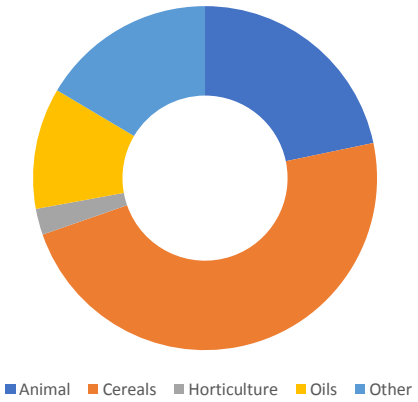
Pakistan imported $7.1 billion worth of agricultural goods in 2016, compared to $3.7 billion in agricultural exports. Pakistan's top agricultural export commodities that year in order of their value were rice ($1.7 billion), wheat flour ($173 million), tangerines/mandarins ($158 million), beef ($155 million), sugar ($123 million), and dates ($103 million). Palm oil was Pakistan's key food imports with total imports valued at $1.7 billion. It was followed by cotton lint ($581 million), tea ($490 million), rapeseed ($464 million), soybeans ($383 million), and coffee ($329 million).

Food Security

Food Intake

Total daily kilocalories per capita was estimated at 2440 kcal in 2013. Figure 7 displays the proportion of daily calorie intake contributed by each major food group. Cereals accounted for 48 percent of daily calorie consumption in Pakistan during this time. Calories from animal sources comprised 22 percent and fruits and vegetables accounted for 2 percent. Daily protein consumption per capita was estimated at 65.5 grams. Average dietary energy supply adequacy was estimated to be 108 percent in 2015-2017, representing a steady long term trend.

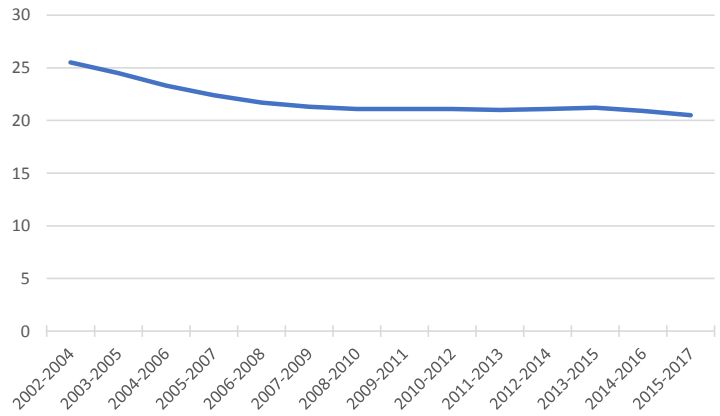
Figure 70. Share of daily kcal per capita by food group, 2013 (FAOSTAT)



Malnutrition

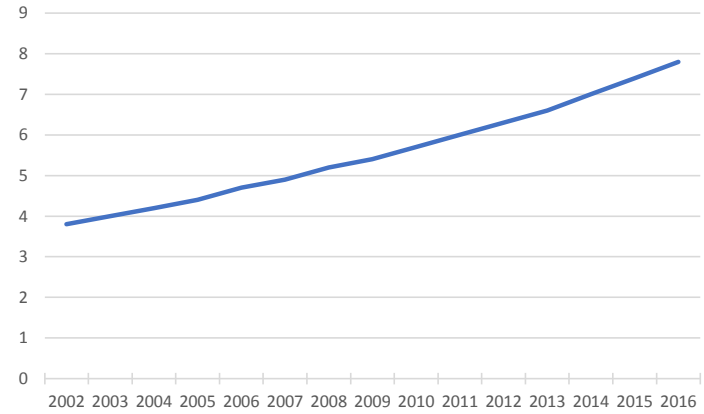
Figure 8 shows the medium-term trend of undernourishment in Pakistan. The prevalence of undernourishment expresses the probability that a randomly-selected individual from the country consumes an inadequate number of calories to cover his/her energy requirement, according to FAO. For the period of 2015-2017, this figure was 20.5 percent, representing a steady but gradual decrease since the early 2000. The data suggest that undernourishment is a lingering problem in Pakistan.

Figure 71. Percentage of population undernourished, three-year average, 2002-2017 (FAOSTAT)



Obesity is an increasing problem in developing countries, including in the CAREC region. Anthropometric data shows that this is a minor but growing problem in Pakistan. Obesity has been steadily increasing, from 3.8 percent in 2002 to 7.8 percent in 2016. The prevalence of obesity is low compared to other CAREC countries but demonstrates the same upward long-term trend as seen in the others.

Figure 72. Prevalence of adult obesity, 2002-2016 (FAOSTAT)



Conclusions

Constraints

Pakistan's vast natural resource endowments allow it to produce a wide variety of agricultural products and participate actively in the export market. It is among the leading producers of several niche horticultural products and staple foods such as rice and wheat. However, agricultural productivity is relatively low compared to global competitors with similar agroclimatic conditions. Agricultural households are constrained by their access to land, as policymakers have struggled to overcome staunch political opposition to implement reforms. Meanwhile, the government continues to intervene in certain aspects of agricultural marketing. Moreover, Pakistan has suffered from weather-related and other natural disasters, which could be exacerbated as the effects of climate change become more apparent. Investment in infrastructure, wider access to agricultural credit, land reform, and an emphasis on resilience will help Pakistan achieve higher productivity agriculture.

Potential for Agricultural Development

Pakistan's policymakers are focused on enhancing crop productivity through research into resilient crop varieties, efficient use of water and improved irrigation, promotion of high value export crops, better distribution of credit, better post-harvest and marketing mechanisms, and improved access to inputs. However, constraints to Pakistan's agricultural sector are confounded by problems in public policy and governance. Pakistan must lay the groundwork for identifying and implementing targeted policy strategies that involve active stakeholder participation.

TAJIKISTAN

Tajikistan is a landlocked country located in Central Asia with a total population of about 9.3 million (of which 6.7 million or 70 percent live in rural areas). It is bordered by Afghanistan to the south, Uzbekistan to the west, Kyrgyzstan to the north and China to the east. Around 93 percent of the country is covered by mountainous terrain that poses specific challenges to agriculture. Its limited agricultural areas are wedged into irrigated valleys between high mountain ranges. Its topography and terrain hinder access to lucrative markets, though improved recent relations with Uzbekistan has improved connectivity somewhat. Limited economic diversity and a heavy reliance on overseas remittances place Tajikistan in a vulnerable position to various environmental, political, and economic shocks.

Land Resources

As of 2016, roughly 33 percent (4.7 million ha) of Tajikistan's land is utilized for agriculture. Out of the total agricultural area, around 15 percent (1.3 million ha) is arable, 82 percent (3.9 million ha) is classified as permanent meadows and pastures, and 3 percent (133,000 ha) is categorized for permanent or plantation crops. Figure 1 presents this information graphically. Crops produced in Tajikistan cover arable lands and lands classified as plantation crops. By major crop group, cereals occupy 39.0 percent of cropped areas, followed by horticulture (19.1%), oilseeds (18.7%), fiber crops (17.6%) and other crops (5.8%) as shown in Figure 2. This information was derived from FAOSTAT.

Figure 73. Agricultural land types, 2016 (FAOSTAT)

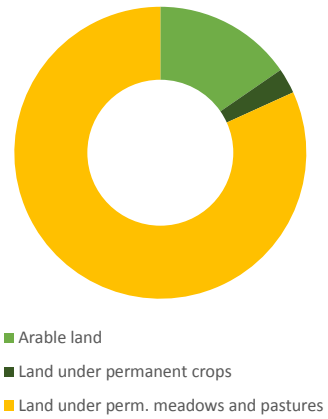
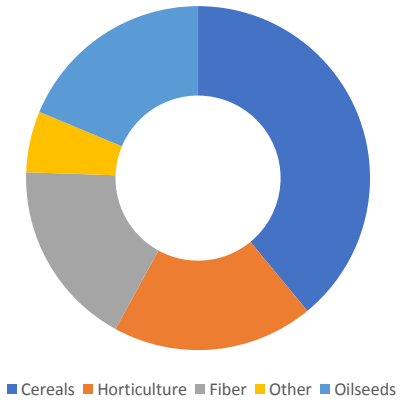


Figure 74. Share of cultivated land by crop type, 2014 (FAOSTAT)



Water Resources

Tajikistan has an annual internal water supply of around 63 billion cubic meters, of which around 60 billion m^3 is classified as internally-produced surface water and 6 billion m^3 comes from internally-produced groundwater, with an overlap of 3 billion m^3. The country's inland water resources originate from rainfall and runoff from four major basins, namely: (1) Kafernigan, (2) Pyanj, (3) Syr Darya, and (4) Vakhsh. Of Tajikistan's 1.6 million hectares of potentially irrigable land, only 742,100 hectares (roughly 47%) are equipped for irrigation. The main users of water in Tajikistan are irrigated agriculture, which has accounted for about 85 to 90 percent of the total volume of water used in recent years, followed by municipality and industry.

Agriculture and the Economy

Macroeconomic Trends

A significant portion of Tajikistan's economy is derived from its agricultural sector. Agriculture's share in national output has remained steady over the past two decades, falling most sharply in the latter half of the 2000s. In 2017, agriculture accounted for 23.6 percent value added of total GDP, compared to 20.6 percent in 2009, and 24.6 percent in 2002 as seen in Figure 3. Currently, the services sector is the largest contributor in terms of value-added to national GDP. In 2016, total value-added agricultural output was approximately $1.4 billion, compared to the national GDP of $7.0 billion. Tajikistan's per capita GDP was recorded at $796 that year.

Figure 75. Share of GDP by sector, 2002-2017 (Asian Development Bank)

Figure 4 on the next page illustrates the growth of total GDP and agricultural GDP, demonstrating the much slower rate of growth of the latter compared to other sectors of the economy.

Figure 76. Growth of GDP and Agricultural GDP in local currency (millions), 2002-2017 (FAOSTAT)

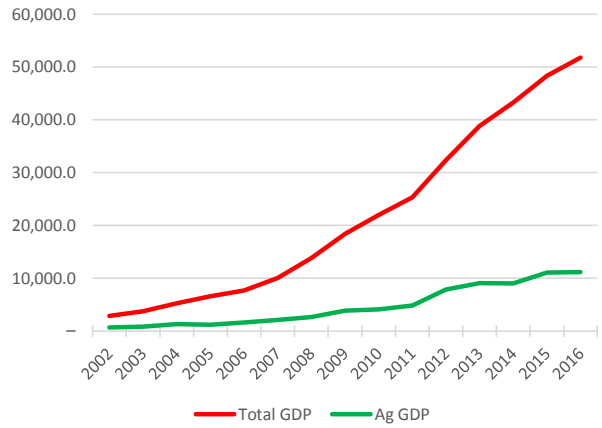
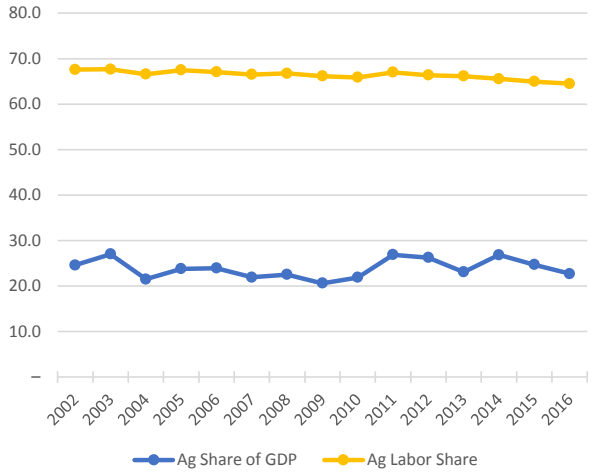


Figure 5 provides a comparison of agriculture's share of the national GDP and its share of the employed labor force. The figures suggest a slight decrease in agricultural labor compared to other sectors since the early 2000s: from 67.6 percent in 2002 to 64.5 percent in 2016. There is still a significant gap between agriculture's share of labor and output, which has largely remained steady. This information was sourced from the Asian Development Bank.

Figure 77. Agriculture's share of national GDP and share of employed labor force, 2002-2017 (FAOSTAT)



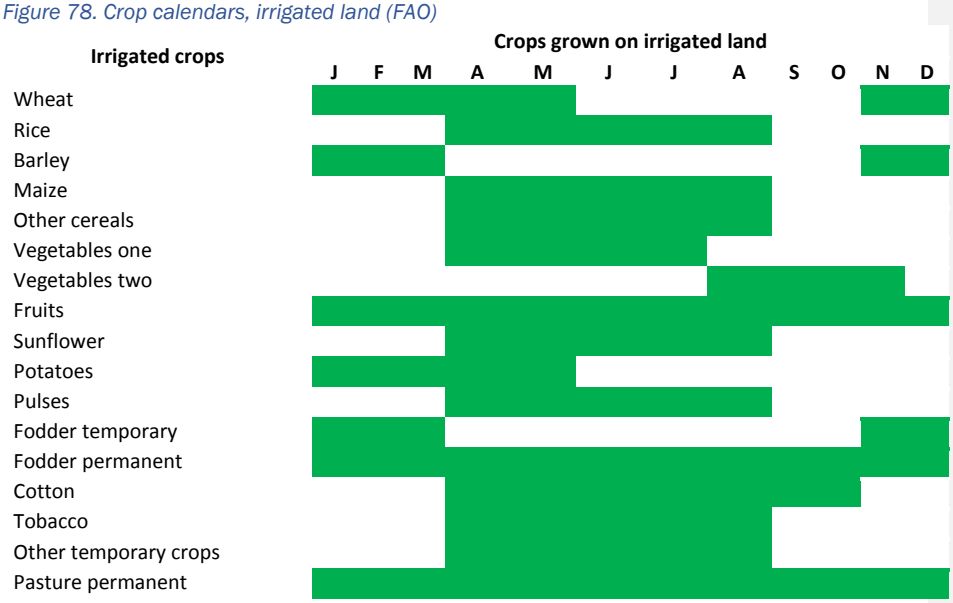
Agricultural Production

Approximately 79 percent of total agricultural production comes from the crop sector, compared to 21 percent for livestock. In terms of value, potatoes were the single most valuable commodity produced in Tajikistan in 2016, totaling around $182 million. Other important commodities included cow milk ($169 million), wheat ($162 million), apples ($146 million), onions ($124 million), and cottonseed ($120 million). In terms of quantity, wheat the most commonly produced crop, with a total volume of 917,000 tons. Other important products by volume included potatoes (898,000 tons), watermelons (594,000 tons), onions (557,000 tons), and tomatoes (362,000 tons). Around 59,000 tons of fertilizers were used in Tajikistan in 2017 and a further 11,000 tons were imported into the country that year.

Cropping Calendar

Figure 6 is a graphical representation of the typical crop calendar for the most commonly grown irrigated crops in Tajikistan. Fruits and fodder are grown on irrigated land throughout the entire year. Rice, maize, cereals, vegetables, sunflowers, pulses, cotton, and tobacco are typically grown on irrigated land during the spring-autumn cropping season. Wheat, barley, and fodder are typically grown on irrigated land during the secondary autumn-spring cropping season. The main irrigated areas consist of cotton and cereals. Crops are typically irrigated during the spring-autumn main cropping season. This information was sourced from FAO.

Figure 78. Crop calendars, irrigated land (FAO)



Agricultural Trade

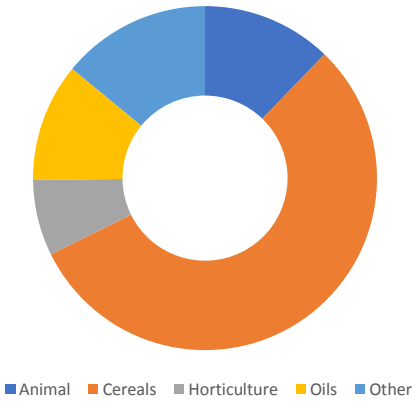
Tajikistan imported $630 million worth of agricultural goods in 2016, compared to $100 million in agricultural exports. Tajikistan's top agricultural export commodities that year in order of their value were cotton lint ($60 million), onions ($9.1 million), tomatoes ($7.3 million), dried apricots ($4.9 million), other dried fruits ($4.1 million), and rice ($2.8 million). Wheat was Tajikistan's key food import with total imports valued at $185 million. It was followed by sugar ($111 million), sunflower oil ($29 million), wheat flour ($27 million), cottonseed oil ($25 million), and chocolate products ($24 million).

Food Security

Food Intake

Total daily kilocalories per capita was estimated at 2201 kcal in 2013. Figure 7 displays the proportion of daily calorie intake contributed by each major food group. Cereals accounted for 55 percent of daily calorie consumption in Tajikistan during this time. Calories from animal sources comprised 12 percent and fruits and vegetables accounted for 7 percent. Daily protein consumption per capita was estimated at 63.4 grams. Average dietary energy supply adequacy was estimated to be 97 percent in 2015-2017. Though it still falls short of complete adequacy, this figure represents a long-term increase from a low of 86 percent in the early 2000s.

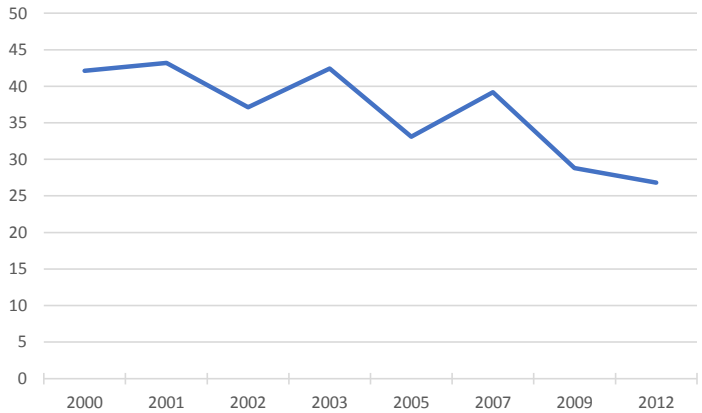
Figure 79. Share of daily kcal per capita by food group (FAOSTAT)



Malnutrition

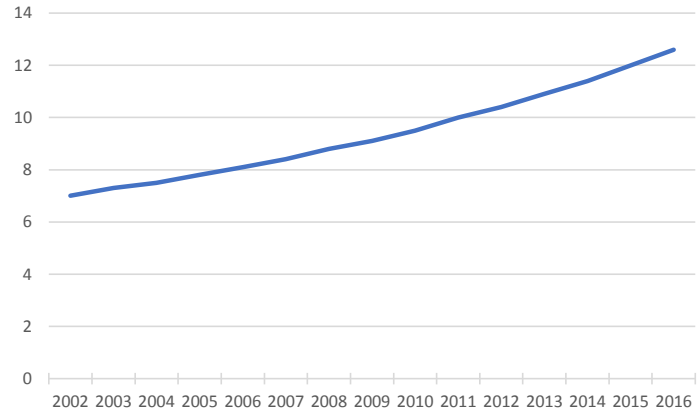
Figure 8 shows the medium-term trend of undernourishment in Tajikistan by looking at the percentage of children under five years of age who are stunted. The prevalence of stunting expresses the probability that a randomly-selected child from the country falls under 2 standard deviations from the mean in terms of height, according to FAO. For the 2012 this figure was 26.8 percent, representing a steady decrease since the early 2000s. This is a significant decrease from levels seen in the early 2000s, when the prevalence of child stunting was over 40 percent.

Figure 80. Percentage of children under 5 years of age who are stunted, 2000-2012 (FAOSTAT)



Obesity is an increasing problem in developing countries, including in the CAREC region. Anthropometric data shows that this has grown from a minor to a significant problem in Tajikistan. Obesity has been rapidly increasing, from 7.0 percent in 2002 to 12.6 percent in 2016. The prevalence of obesity is moderate compared to other CAREC countries and demonstrates the same upward long-term trend as seen in the others.

Figure 81. Prevalence of adult obesity, 2002-2016 (FAOSTAT)



Conclusions

Constraints

Although Tajikistan possesses vast water resources, it has very limited arable land and poor hydrocarbon resources. The government has long sought to harness Tajikistan's powerful hydroelectric potential to alleviate its energy shortages and create earnings from electricity exports. In the 2010s, Tajikistan has largely abandoned policies aimed at staple food self-sufficiency and moved to areas such as horticulture where its agroclimatic conditions provide it with a comparative advantage. The growing role of horticulture in Tajikistan's agriculture must balance against persisting demands for wheat sufficiency and the growing of cotton, which still provides a large share of national export earnings. Tajikistan faces many of the same challenges as other small countries in the region in terms of land fragmentation and a dearth of support services to sustain productivity in such an environment. With limited internal agricultural capacity, Tajikistan requires better connectivity and trade with neighboring countries, which has been a chronic problem in the past. Increasing investment in transport infrastructure and better relations with Uzbekistan and Kyrgyzstan have remedied the situation somewhat in recent years.

Potential for Agricultural Development

Tajikistan's agriculture requires considerable investment, especially in support services and infrastructure in order to help its largely smallholder-oriented farming to make productivity gains. Data suggest that Tajikistan is starting to shift production to higher-value crops such as fruits, vegetables, and nuts, where it appears to have comparative advantages. For these products to become a reliable and lucrative source of export earnings, Tajikistan's horticultural sector requires substantial support in terms of infrastructure and regulatory services that the country is currently lacking. Improved access to technical knowledge and a focus on resilient agriculture will also be important as the country begins to face the effects of climate change.

TURKMENISTAN

Turkmenistan is a country in Central Asia that is bordered in the north by Kazakhstan and Uzbekistan, in the southeast by Afghanistan, in the southwest by Iran, and the west by the Caspian Sea. With a total population of about 5.9 million (of which 3 million or 51 percent live in rural areas), Turkmenistan had one of the fastest growing economies in the world in the early 2010s but has since weathered slumps in commodity prices that blunted growth. It is abundant in natural gas, oil, and other petrochemicals, which have helped fuel the economy. However, it sits on mostly desert territory and Turkmenistan's agriculture has not grown in tandem with its energy sector. Reliable data on Turkmenistan is difficult to access, often precluding an accurate assessment of its largely unreformed agricultural sector.

Land Resources

As of 2016, roughly 69 percent (34 million ha) of Turkmenistan's land is utilized for agriculture. Out of the total agricultural area, around 6 percent (1.9 million ha) is arable, 94 percent (32 million ha) is classified as permanent meadows and pastures, and 0.2 percent (60,000 ha) is categorized for permanent or plantation crops. Figure 1 presents this information graphically. Crops produced in Turkmenistan cover arable lands and lands classified as plantation crops. By major crop group, cereals occupy 53.9 percent of cropped areas, followed by fiber crops and oilseeds (each 21.0%), horticulture (3.2%), and other crops (0.9%) as shown in Figure 2. This information was derived from FAOSTAT.

Figure 82. Agricultural land types, 2016 (FAOSTAT)

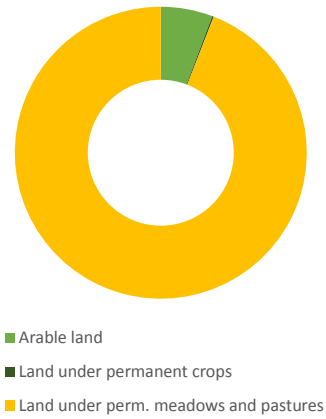
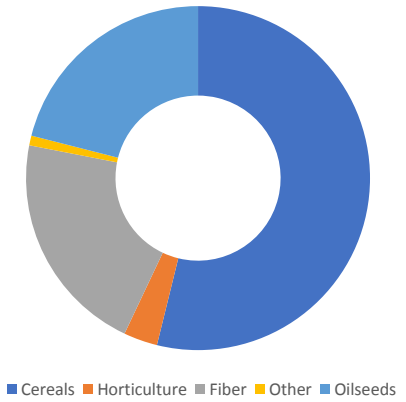


Figure 83. Share of cultivated land by crop type, 2014 (FAOSTAT)



Water Resources

Turkmenistan has an annual internal water supply of around 1.4 billion cubic meters, of which around 1 billion m^3 is classified as internally-produced surface water and 405 million m^3 comes from internally-produced groundwater, with no overlap. The country's inland water originates mainly from the Amu Darya basin, whose resources are artificially extended by the Karakum Canal. Of Turkmenistan's 2.3 million hectares of potentially irrigable land, 2.0 million hectares (roughly 85%) are currently equipped for irrigation. Turkmenistan is one of the largest users of water, not only in Central Asia, but in the whole world, consuming 6 million liters per inhabitant per year. Agriculture accounted for 94 percent of total water withdrawal in 2014.

Agriculture and the Economy

Macroeconomic Trends

A relatively small portion of Turkmenistan's economy is derived from its agricultural sector. Agriculture's already small share in national output has decreased in recent decades. In 2015, agriculture accounted for 9.3 percent value added of total GDP, compared to 12.3 percent in 2009, and 22.0 percent in 2002 as seen in Figure 3. Currently, the industrial sector is the largest contributor in terms of value-added to national GDP. In 2016, total value-added agricultural output was approximately $4.7 billion, compared to the national GDP of $36.2 billion. Turkmenistan's per capita GDP was recorded at $6,389 that year.

Figure 84. Share of GDP by sector, 2002-2017 (Asian Development Bank)

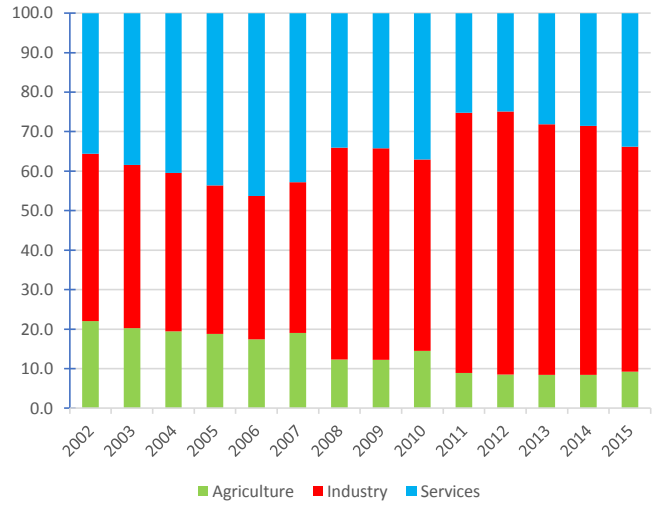


Figure 4 on the next page illustrates the growth of total GDP and agricultural GDP, demonstrating the near stagnant level of the latter compared to other sectors of the economy.

Figure 85. Growth of GDP and Agricultural GDP in local currency (millions), 2002-2014 (FAOSTAT)

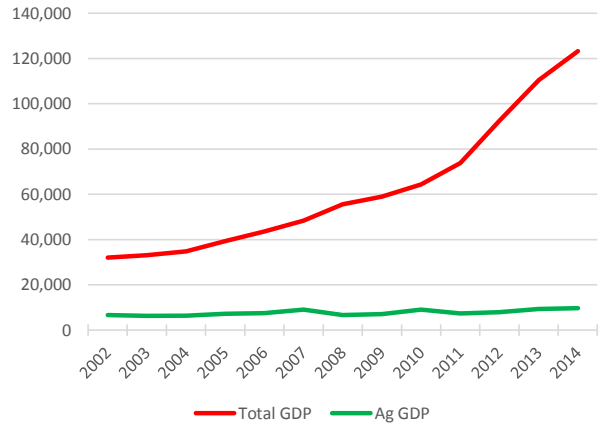
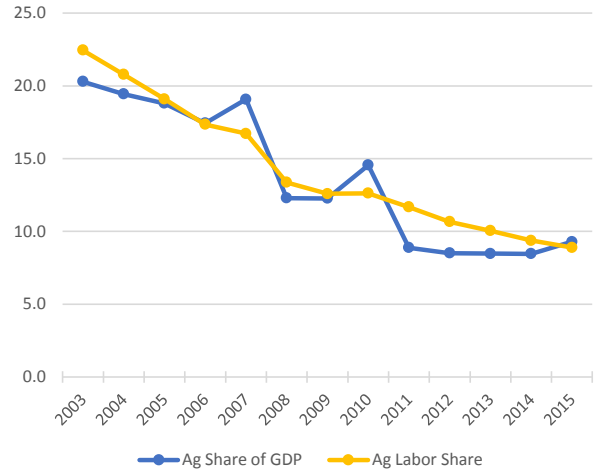


Figure 5 provides a comparison of agriculture's share of the national GDP and its share of the employed labor force. The figures indicate a sharp decrease both agricultural labor and output relative to other sectors. While both figures stood at around 20-22 percent in the early 2000s, they have since decreased to around 9 percent for each by 2015. This information was sourced from the Asian Development Bank.

Figure 86. Agriculture's share of national GDP and share of employed labor force, 2003-2015 (FAOSTAT)



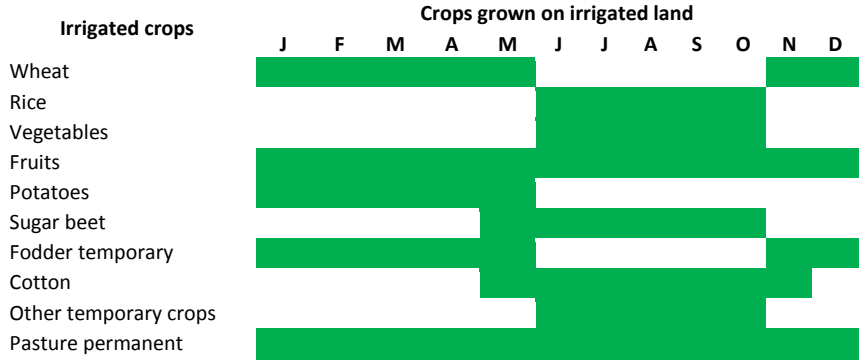
Agricultural Production

Approximately 53 percent of total agricultural production comes from the crop sector, compared to 47 percent for livestock. In terms of value, cattle meat was the single most valuable commodity produced in Turkmenistan in 2016, totaling around $820 million. Other important commodities included cotton ($598 million), cow milk ($527 million), wheat ($445 million), sheep meat ($261 million), potatoes ($112 million), and rice ($87 million). In terms of quantity, wheat was the most commonly produced crop, with a total volume of 1.6 million tons. Other important products by weight included cotton (430,000 tons), tomatoes (426,000 tons), potatoes (306,000 tons), and grapes (288,000 tons).

Cropping Calendar

Figure 6 is a graphical representation of the typical crop calendar for the most commonly grown irrigated crops in Turkmenistan. Fruits are grown on irrigated land throughout the entire year. Rice, vegetables, sugar beets, and cotton are typically grown in the spring-autumn cropping season. Wheat and fodder are typically grown on irrigated land during the secondary autumn-spring cropping season. The main irrigated areas consist of cereals and cotton. Crops are typically irrigated during the spring-autumn main cropping season. This information was sourced from FAO.

Figure 87. Crop calendars, irrigated land (FAO)



Agricultural Trade

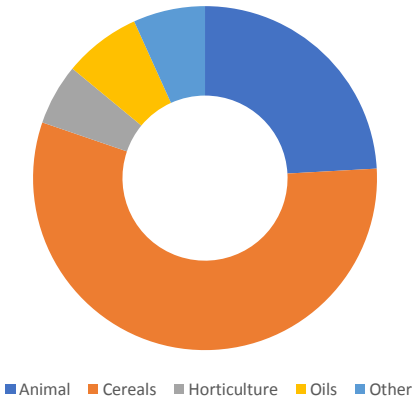
Turkmenistan imported $447 million worth of agricultural goods in 2016, compared to $280 million in agricultural exports. Turkmenistan's top agricultural export commodities that year in order of their value were cotton ($226 million), cottonseed ($22 million), crude materials ($17 million), hides ($6.1 million), cotton waste ($5.2 million), wool ($2.0 million), and tomatoes ($1.1 million). Wheat Turkmenistan's key agricultural import with total imports valued at $104 million. It was followed by processed foods ($25 million), sunflower oil ($22 million), chocolate products ($20 million), wheat flour ($17 million), and rice ($17 million).

Food Security

Food Intake

Total daily kilocalories per capita was estimated at 2840 kcal in 2013. Figure 7 displays the proportion of daily calorie intake contributed by each major food group. Cereals accounted for 56 percent of daily calorie consumption in Turkmenistan during this time. Calories from animal sources comprised 24 percent and fruits and vegetables accounted for 6 percent. Daily protein consumption per capita was estimated at 90.4 grams. Average dietary energy supply adequacy was estimated to be 121 percent in 2015-2017, representing a steady long-term trend.

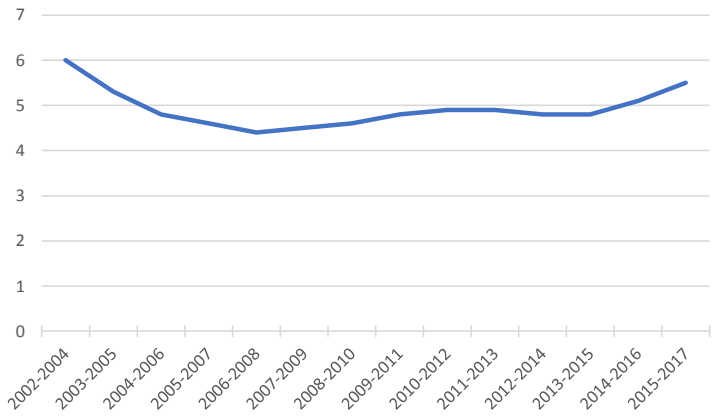
Figure 88. Share of daily kcal per capita by food group, 2013 (FAOSTAT)



Malnutrition

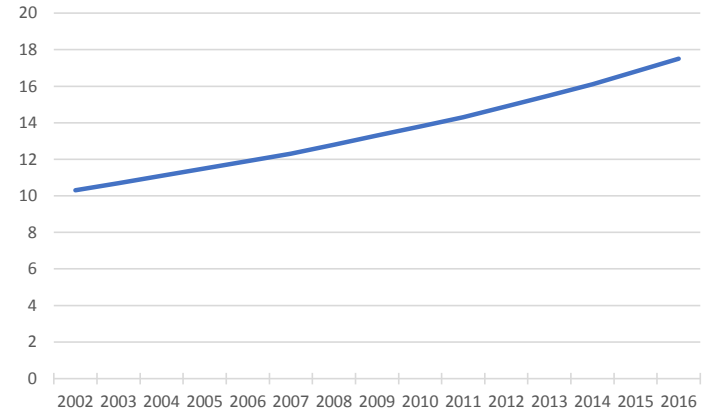
Figure 8 shows the medium-term trend of undernourishment in Turkmenistan. The prevalence of undernourishment expresses the probability that a randomly-selected individual from the country consumes an inadequate number of calories to cover his/her energy requirement, according to FAO. For the period of 2015-2017, this figure was 5.5 percent, representing a slight increase since the early 2010s. The figure suggests that although the problem of undernourishment is relatively small in Turkmenistan, it persists despite gains in other indicators.

Figure 89. Percentage of population undernourished, three-year average, 2002-2017 (FAOSTAT)



Obesity is an increasing problem in developing countries, including in the CAREC region. Anthropometric data shows that this has become a significant problem in Turkmenistan. Obesity has been rapidly increasing, from 10.3 percent in 2002 to 17.5 percent in 2016. The prevalence of obesity is moderately high compared to other CAREC countries and demonstrates the same upward long-term trend as seen in the others.

Figure 90. Prevalence of adult obesity, 2002-2016 (FAOSTAT)



Conclusions

Constraints

Turkmenistan is highly dependent on irrigation due to its largely arid climate, which will make extremely susceptible to climate change effects. Turkmenistan's agriculture sector is still under heavy state control and intervention in the country's most important crops (wheat, cotton, rice, and sugar) calls into question the sector's efficiency. Moreover, farmers are obliged to sell to the state often under non-market prices. Although Turkmenistan is a major exporter of energy, its agricultural products (with the exception of cotton) are rarely seen overseas. The lack of reliable data creates obstacles for better research and policymaking.

Potential for Agricultural Development

Investment in irrigation is an urgent need for Turkmenistan because of the country's lack of internal water resources. Although agriculture is heavily controlled by the state, there are some minor subsectors, especially in horticulture where farmers have more freedom in terms of marketing. Unlike other Central Asian countries, leaseholder farming in which tenant farmers lease from the state is widely practiced under procurement agreements. It is worth considering whether reforming this aspect of Turkmenistan's agriculture can lead to productivity gains, along with agricultural diversification and pro-market policies in general.

UZBEKISTAN

With more than 33 million inhabitants (half of which live in rural areas), Uzbekistan is the largest country in Central Asia in terms of population and shares borders Kazakhstan and the Aral Sea to the north, Turkmenistan to the south, Tajikistan to the southeast, and the Kyrgyz Republic to the northeast. Uzbekistan is a middle-income country and one of the fastest growing economies in the Eastern Europe and Central Asia region. Uzbekistan is endowed with considerable land and energy resources and has taken steps in recent years to develop its agricultural sector alongside broader liberalization of the economy.

Land Resources

As of 2016, roughly 60 percent (27 million ha) of Uzbekistan's land is utilized for agriculture. Out of the total agricultural area, around 16 percent (4.4 million ha) is arable, 82 percent (22 million ha) is classified as permanent meadows and pastures, and 1.3 percent (370,000 ha) is categorized for permanent or plantation crops. Figure 1 presents this information graphically. Crops produced in Uzbekistan cover arable lands and lands classified as plantation crops. By major crop group, cereals occupy 32.6 percent of cropped areas, followed by oilseeds (27.3%), fiber crops (26.0%), horticulture (11.9%) and other crops (2.3%) as shown in Figure 2. This information was derived from FAOSTAT.

Figure 91. Agricultural land types, 2016 (FAOSTAT)

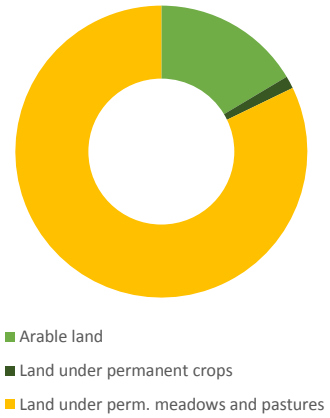
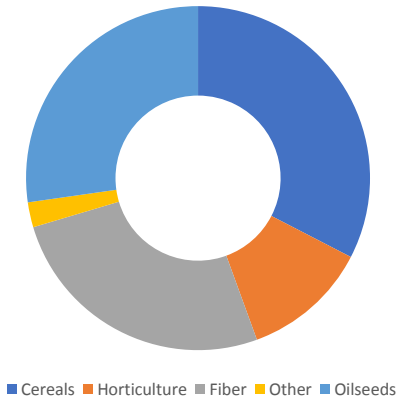


Figure 92. Share of cultivated land by crop type, 2014 (FAOSTAT)



Water Resources

Uzbekistan has an annual internal water supply of around 16 billion cubic meters, of which around 9.5 billion m^3 is classified as internally-produced surface water and 8.8 billion m^3 comes from internally-produced groundwater, with an overlap of 2 billion m^3. The country's inland water resources originate from rainfall and run-off from four rivers forming the Aral Sea basin: (1) Amu Darya, (2) Syr Darya, (3) Kashka Darya, and (4) Zarafshan. Of Uzbekistan's 4.9 million hectares of potentially irrigable land, 4.2 million hectares (roughly 85%) are currently equipped for irrigation. According to figures from the Ministry of Water Resources, as of 2017, Uzbekistan consumes an average of 51 billion cubic meters of water annually, with agriculture accounting for 90 percent of total water use.

Agriculture and the Economy

Macroeconomic Trends

A relatively small portion of Uzbekistan's economy is derived from its agricultural sector. Agriculture's already small share in national output has remained steady, following a drop in the early to mid-2000s. In 2017, agriculture accounted for 19.7 percent value added of total GDP, compared to 20.6 percent in 2009, and 34.5 percent in 2002 as seen in Figure 3. Currently, the services sector is the largest contributor in terms of value-added to national GDP and is continuing to grow. In 2016, total value-added agricultural output was approximately $11.4 billion, compared to the national GDP of $66.5 billion. Uzbekistan's per capita GDP was recorded at $2,116 that year.

Figure 93. Share of GDP by sector, 2002-2017 (Asian Development Bank)

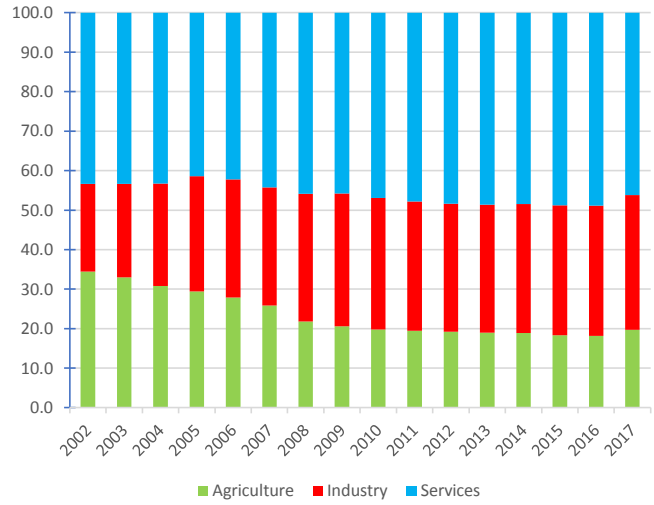


Figure 4 on the next page illustrates the growth of total GDP and agricultural GDP, demonstrating the much slower rate of growth of the latter compared to other sectors of the economy.

Figure 94. Growth of GDP and Agricultural GDP in local currency (millions), 2002-2017 (FAOSTAT)

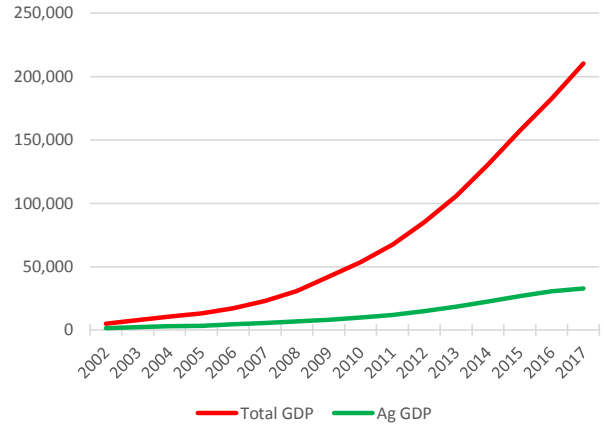
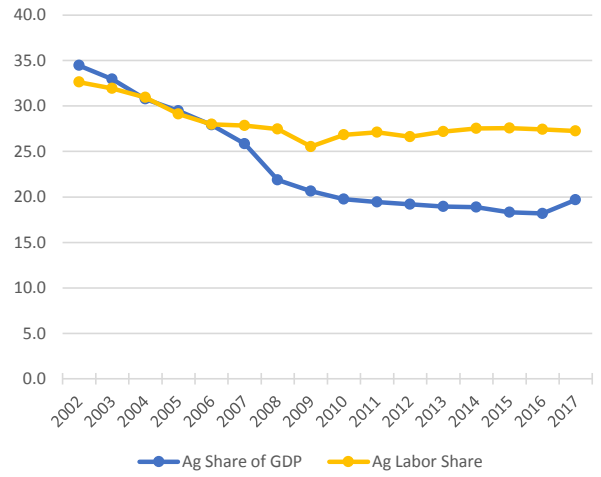


Figure 5 provides a comparison of agriculture's share of the national GDP and its share of the employed labor force. The figures suggest that agriculture's share of output has fallen more rapidly than its share of labor, from 34.5 and 32.6 percent, respectively, in 2002 to 19.7 and 27.3 percent in 2017. This gap suggests that agricultural labor has not been absorbed at a proportional rate by other sectors, even as relative agricultural output has fallen as a share of total GDP. This information was sourced from the Asian Development Bank.

Figure 95. Agriculture's share of national GDP and share of employed labor force, 2002-2017 (FAOSTAT)



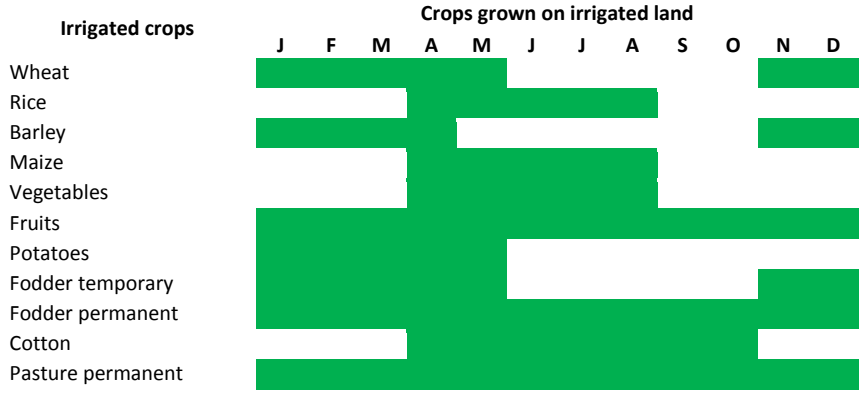
Agricultural Production

In terms of quantity, wheat was the most commonly produced crop, with a total volume of 6.9 million tons. Other important products by volume included cotton (3.2 million tons), potatoes (2.7 million tons), tomatoes (2.5 million tons), carrots/turnips (2.1 million tons), watermelons (1.9 million tons), vegetables (1.8 million tons), grapes (1.6 million tons), onions (1.1 million tons), and apples (1.0 million tons). Around 823,000 tons of fertilizers were used in Uzbekistan in 2017 and 1.1 million tons were produced by the country that year.

Cropping Calendar

Figure 6 is a graphical representation of the typical crop calendar for the most commonly grown irrigated crops in Uzbekistan. Fruits and fodder are grown on irrigated land throughout the entire year. Rice, maize, vegetables, and cotton are typically grown in the spring-autumn cropping season. Wheat and barley are typically grown on irrigated land during the secondary autumn-spring cropping season. The main irrigated areas consist of cotton and wheat. Crops are typically irrigated during the spring-autumn main cropping season. This information was sourced from FAO.

Figure 96. Crop calendars, irrigated land (FAO)



Agricultural Trade

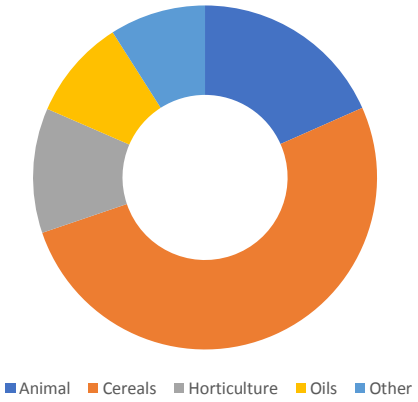
Uzbekistan imported $1.3 billion worth of agricultural goods in 2016, compared to $757 million in agricultural exports. Uzbekistan's top agricultural export commodities that year in order of their value were cotton ($177 million), raisins ($67 million), grapes ($62 million), cherries ($46 million), persimmons ($32 million), and beans ($29 million). Wheat was Uzbekistan's key agricultural import with total imports valued at $234 million. It was followed by sugar ($180 million), wheat flour ($144 million), sunflower oil ($123 million), soybeans ($47 million), and tea ($44 million).

Food Security

Food Intake

Total daily kilocalories per capita was estimated at 2760 kcal in 2013. Figure 7 displays the proportion of daily calorie intake contributed by each major food group. Cereals accounted for 51 percent of daily calorie consumption in Uzbekistan during this time. Calories from animal sources comprised 18 percent and fruits and vegetables accounted for 12 percent. Daily protein consumption per capita was estimated at 83.4 grams. Average dietary energy supply adequacy was estimated to be 115 percent in 2015-2017, representing a steady long-term increase.

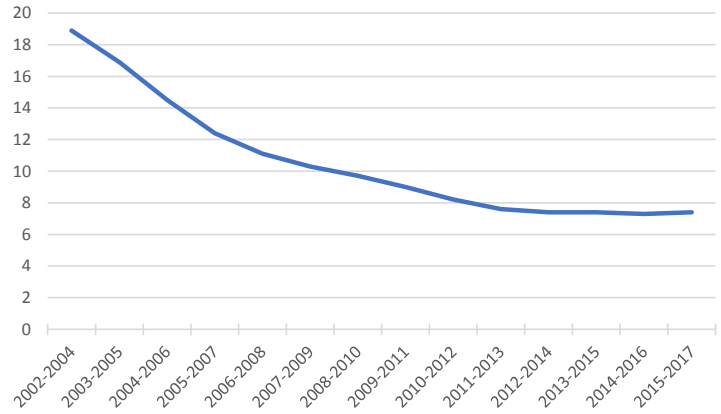
Figure 97. Share of daily kcal per capita by food group, 2013 (FAOSTAT)



Malnutrition

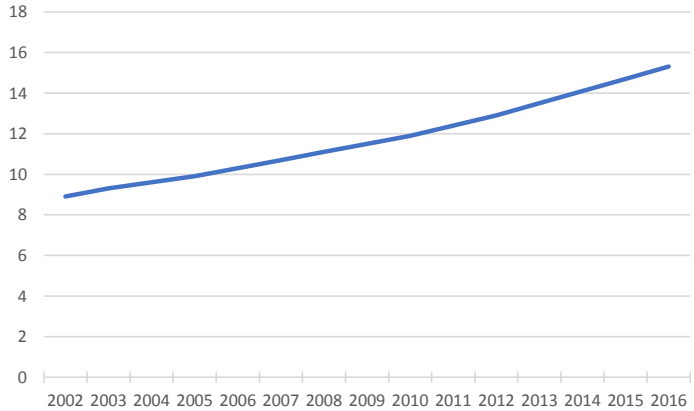
Figure 8 shows the medium-term trend of undernourishment in Uzbekistan. The prevalence of undernourishment expresses the probability that a randomly-selected individual from the country consumes an inadequate number of calories to cover his/her energy requirement, according to FAO. For the period of 2015-2017, this figure was 7.4, representing a steady trend since the early 2010s after a rapid decrease during the 2000s. However, the fall in undernourishment has appeared to stall in recent years, suggesting that the problem continues to persist in certain areas.

Figure 98. Percentage of population undernourished, three-year average, 2002-2017 (FAOSTAT)



Obesity is an increasing problem in developing countries, including in the CAREC region. Anthropometric data shows that this is becoming a significant problem in Uzbekistan. Obesity has been rapidly increasing, from 8.9 percent in 2002 to 15.3 percent in 2016. The prevalence of obesity is moderately high compared to other CAREC countries and demonstrates the same upward long-term trend as seen in the others.

Figure 99. Prevalence of adult obesity, 2002-2016 (FAOSTAT)



Conclusions

Constraints

Uzbekistan's agriculture sector has considerable potential but faces challenges. While Uzbekistan is among the world's top exporters of a handful of horticultural products, it requires additional investment into logistics and infrastructure to take advantage of its favorable agroclimatic conditions. Irrigation infrastructure requires modernization, with waterlogging and salinity providing associated challenges. Because Uzbekistan's agriculture is highly dependent on irrigation, climate change in source regions mostly located outside of national territory will have serious implications in the future. Problems such as climate change require international cooperation and tcurrent leadership of Uzbekistan has already done much to repair ties with its neighbors, boosting the country's connectivity and trade relations.

Potential for Agricultural Development

Like neighboring countries such as Kyrgyzstan and Tajikistan, Uzbekistan has transitioned away from staple food self-sufficiency as a primary food security strategy toward growing agricultural diversification. Increased investment in the horticulture sector can help promote Uzbekistan's export sector, which has already achieved a market presence for certain items overseas. Improving storage facilities and transport options would help extend the range of perishable items and stronger regulatory controls will help the country gain access to more lucrative markets. While the country's internal transportation networks are adequate, fully unlocking Uzbekistan's potential will require improved international connections that have been facilitated by closer ties with its neighbors.