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Prospects of and barriers to (further) agricultural development in Uzbekistan

Abstract

Almost 30 years after gaining independence from the Soviet Union, the government of Uzbekistan has initiated significant structural reforms, including agricultural reform, which are expected to result in a transition to the free-market system and an acceleration of development, among others. The change in development direction is accompanied by great interest from global and international organisations supporting developing countries (e.g. the World Bank, European Investment Bank, European Bank of Reconstruction and Development, Japan International Cooperation Agency and Islamic Development Bank, etc.). This study discusses the causes of implementing these reforms in Uzbekistan much later than in the countries of Central Europe and the former Soviet republics and the pitfalls faced by the agricultural reforms undertaken in the past five years.

Keywords: agricultural development, Uzbekistan, post-socialist model of agricultural sector, reforms

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1. Agriculture in the economy of Uzbekistan

Agriculture is considered one of the most important sectors of Uzbekistan's economy. It is also the driving force behind the development of rural areas, which are now inhabited by over half of all the country's inhabitants.

At the time of the systemic change, 39% of all Uzbekistan's professionally active inhabitants worked in agriculture, and in the following years, this employment statistic increased (in 1994, 44% of workers were employed in this sector). Currently, the statistic stands at 26.8% (Cramon-Taudabel, S. Hasanov 2021). This is especially important considering the fact that till date Uzbekistan's economic growth has been a jobless one: economic changes have not been accompanied by job creation and, as a result, no increase in labour efficiency has been observed, which has further resulted in a high level of unemployment and poverty. In 2018, 11.4% of the country's population lived below the poverty line. This also explains why the government wanted to conduct policy in such a way as to ensure the food security of all the country's inhabitants, especially in the first years of independence.

In 2020, agriculture accounted for 28.2% of Uzbekistan's GDP (similar to the share of industry: 28.5%). At the same time, however, gross value added per employee grew slower in agriculture than in the entire economy (2.9% and 4.8%, respectively). This means that the productivity growth in the sector is lower than in other sectors of the economy (Cramon-Taudabel, S. Hasanov 2021).

Nevertheless, agriculture is one of the sectors most regulated by the state. The current structure of agriculture is an effect of state policy that exercised persistent involvement in agricultural decision making (Djabenikov et al, 2015).

There are three types of farms in Uzbekistan: *dekhan* farms (traditional semi-subsistence household plots), commercial (individual) farms and *shirkat* farms (cooperative, large scale collective farms and former state farms that evolved into different forms. Nowadays, they are, in most cases, either production clusters or export-oriented processing companies). *Dekhan* farms and commercial farms form a symbiotic relationship (Djanibekov et al, 2015), as the latter suffer from a shortage of labour and the former still have insufficient land (even though the total area of these plots have increased by 7% lately) and capital to support the families, so family

members have to look for agricultural or non-agricultural jobs outside of the household and often find such on commercial farms.

Table 1. Main characteristics of the different types of farms in Uzbekistan

	Dekhan farm	Peasant farm	*Shirkat* farm/ agricultural enterprise
Definition	A partially commercial farm based on a household plot (up to 0.2 ha)	An independent commercial farm organized as a legal body (15 ha on average)	A large-scale corporate farm based on membership shares with private ownership of assets
Labour	Family members	Mainly family members, with some hired help	Members and hired workers
Land allocation	Arable land in the village	Prime *shirkat* land acquired in return for membership shares; also reserve land, unutilised *shirkat* land, land of unprofitable *shirkat*s and land in partially irrigated areas	Prime agricultural land around villages
Land tenure	Lifetime inheritable possession	Long-term lease (10–50 years)	Permanent possession for agricultural purposes
Owners	Agricultural enterprise workers, rural employees and pensioners	Any adult person with sufficient qualifications or experience, typically former agricultural enterprise worker	Member-shareholders
Production specialisation	Vegetables and livestock	Any crop or livestock	Mainly scale crops (wheat and cotton)

Source: Lerman 2008, p. 5.

2. Post-Soviet agriculture model before 2016

As in all other Soviet republics, agriculture in Uzbekistan was organised in a dual system of large-scale collective and state farms and subsidiary household plots (quasi-private individual farming, cultivating about 3% of arable land). The collective and state farms specialised in cotton production, as mechanical picking was required (in 1990, 57% of cotton was picked by machines), which corresponded with Soviet ideology for the industrialisation of agriculture. The 1989 reforms (resulting from economic changes introduced by Gorbachev) aimed to encourage large-scale farms to be more efficient and to raise the size of household plots. The peasant farm began to emerge in 1991 as the members of large-scale farms were given the option of exiting with their share of land to establish an independent private farm. Due to these regulations, the number of registered peasant farms rose from 2000 in 1990 to 50000 in 2001.

One might see the resemblance between these processes and those that took place in former Soviet Union (FSU) republics or Central and Eastern European countries. Still, the output of these changes (the productivity and output) in different transition countries are quite different. The main (and universal) factors of these differences are 'the choice of reform policies, initial conditions, disruption of exchange relationships, regional tensions and conflict and statistical problems [overestimated numbers on productivity and output before 1989]' (Macours, Swinnen 2002:1). If the changes in Uzbekistan were to be compared to those in any other FSU country, Belarus would be a good fit. This is because Belarus spent a similar number of years on central planning as Uzbekistan (71 and 72 years, respectively), has a similar agricultural structure (5% of the land in Uzbekistan makes up individual farms, 7% in Belarus), had a similar pace of implementing first reforms (after five years of reforms, 13% of the land in Uzbekistan made up individual farms, 16% in Belarus) and had similar results from these reforms (little progress).

Like all Central Asian republics, Ukraine, Belarus, Moldova and Russia, Uzbekistan's government chose distribution in shares as a major procedure of de-collectivisation. The share of employment in agriculture in Uzbekistan is similar to that of some Central Asian states (e.g. Kyrgyzstan,

Turkmenistan, Tajikistan)[1], Azerbaijan in the Caucasus or Moldova in European FSU (which also had a similar structure of agriculture before reforms but made much faster progress in reforming agriculture). Another aspect that makes these countries similar is that after five years of reforms, all of them observed significant loss of gross agricultural output and a decline in agricultural productivity. The only countries that did not suffer such losses where those in the Visegrád Group (Hungary, Slovakia and

[1] In 1990, in all Central Asian countries, agriculture had strategic characteristics: a significant part of the population was employed in this sector, and rural areas occupied a significant area of the countries, but their share in the GDP differed. The same characteristics can be identified as the differentiating factors between these countries: in 1990, 22.6% of people were employed in agriculture in Kazakhstan, 32.6% in Kyrgyzstan, 39.2% in Uzbekistan, 41.8% in Turkmenistan, and as many as 43% of all workers in Tajikistan. After 30 years, employment in agriculture has decreased in all these countries (the ranking of the countries in this respect has not changed).

The contribution of agriculture to GDP was significantly lower in Uzbekistan (the lowest agricultural contribution to GDP in these countries), lower in Tajikistan and Kyrgyzstan than in Turkmenistan and, especially, Kazakhstan. In 2018, the role of agriculture in building GDP changed: the share of agriculture in PKD fell, especially in Kazakhstan (according to the World Bank, it was supposed to be 4.2% – previously, it had been 29.5%), but a downward trend can also be seen in Kyrgyzstan and Turkmenistan. In 1990, these countries differed in their agricultural structure: in all of them, the number of individual farms was marginal, but in Kazakhstan, all land was nationalised; in Turkmenistan, 98% of land was in the hands of the state; and in the remaining countries, 4–5% of land were individual farms. These countries differ in their productivity, which is so low that they cannot compete with high-income economies and the rising economies of Asia.

Some of these differences are related to the characteristics of the countries' geographical locations: Uzbekistan has the resources to grow cotton, fruit and vegetables, and Kazakhstan has the resources to grow cereals (in both countries, these resources were neglected in the initial years of reforms – Uzbekistan focused on growing cereals despite the lack of conditions for such and Kazakhstan reduced wheat cultivation). Traditionally, wheat is grown in all these countries (in Tajikistan, Kazakhstan and Uzbekistan, wheat cultivation takes up over half of the arable land). The largest exporter of wheat and cereal products among these countries is Kazakhstan, and the recipients of these products are mostly other Central Asian countries. Uzbekistan cultivates cotton (it is one of the world's leading cotton producers) and is developing fruit and vegetable crops significantly and at a faster rate than other countries in the region.

Uzbekistan and Kazakhstan are the main exporters of food and agricultural products in the region. The recipients are primarily other countries in the region and secondarily the Russian Federation. Only Kazakhstan exports more agricultural products to these countries than it imports from them.

the Czech Republic), where productivity increased significantly, but this was mainly due to the outflow of agricultural workers. All these countries suffered from the decline of gross agricultural output (in CEEC, as terms-of-trade effects, and in Central Asia, mostly due to the interrupted resource exchange between republics).

More specific causes of the failures Uzbekistan's first reforms can also be recognised. Spoor (2018) identified three of them as economic nationalism, hidden and open resource-based conflicts and a city-centric model of growth. The geographical and historical conditions that were the source of the barriers mentioned by Spoor (2018) as well as political conditions for economic change are also causes of the failure of Uzbekistan's first reforms.

For centuries, Uzbekistan and the neighbouring countries have been an important element of the transport chain connecting China to the Middle East and Europe (China aspires to return to that tradition by initiating the 'one belt – one road' project). The entire region of Central Asia was created at the crossroads of civilisations, which also had consequences in the form of multi-ethnicity. The region's incorporation into the Soviet Union strengthened the belief in economic security but also put the demons of national interests to sleep. The Soviet economy was planned as a single unit, and goods and services moved inside this unit with inward-oriented trade (exported resources such as cotton were complemented by the exploitation of energy and mineral resources)[2].

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[2] Cotton cultivation was already present in Central Asia in the 6th century BC. The inhabitants of those areas were farmers and used advanced methods of cultivation and irrigation. The 'golden era' in the history of Central Asia spanned the 14th and 15th centuries, when cotton and silk production rapidly developed.

From the beginning of the 19th century, Tsarist Russia began competing with Great Britain in the race to colonise Central Asia. Among the areas these powers were interested in were the Emirates of Bukhara (a state founded by Uzbeks) and the Khanate of Khiva. At that time, cereals (wheat, barley and sorghum) and, less often, rice (only in well-watered areas) were grown in Central Asia. Cotton, vegetables and fruit (especially melons, peaches and grapes) were also important crops. Agricultural techniques and tools were very primitive and crop rotation was not practiced. Cattle (especially sheep) were grazed by desert nomads. Tsarist Russia also developed cotton cultivation in these areas, along with leather dressing, wool washing and silk spinning. Some plans to expand crops, especially cotton, failed due to the lack of a modern irrigation network. Rapid changes took place only after 1921. The USSR sought economic autarky, including in the matter of supplying

After the collapse of the Soviet Union, Uzbekistan was meant to have the advantages of being the main exporter of cotton and gold, which could be sold at global prices, and the only country in the region that had managed to develop air transport. However, Uzbekistan faced many obstacles in the use of these unique resources, especially the agricultural ones.

One obstacle was the very slow pace of agricultural sector changes due to the collectivisation of agriculture taking place – as in all Central Asian countries – long before the WWII individual farming traditions were non-existent. Therefore, the de-collectivisation process was also very slow. The production output was smaller than expected; therefore, the export of cotton dropped. In the first 10 years of Uzbekistan's independence, the level of mechanisation of production did not change (e.g. the number of tractors did not change) because state support for large farms was limited.

The chosen methods of increasing productivity had disastrous consequences for the country's natural resources. Attempts were made to increase production by using more fertilizers (their consumption doubled between the fifth and 10th years of the reforms), but the country's irrigation systems were weak. Many of the irrigation systems crucial for agricultural production in this part of the world were neglected or poorly managed. Canals and drainage ditches were not cleaned, and any damage was repaired provisionally (although in Uzbekistan, they were kept in better condition than in other countries in the region). Lack of access to water led to its salinisation, which in turn resulted in even greater water use; plants growing on saline-watered soil need better irrigation, and the use of water for production also increases as farmers try to wash salt from the soil. The most illustrative example of the destruction these processes have led to is the drying up of the Aral Sea.

As mentioned earlier, an important element of politics at that time was food security. In Uzbekistan, this meant that the state controlled the production of cotton but also forced the production of wheat (without preceding these changes with analyses of which country parts it should be grown in) (Babu, Sengupta 2006). Implementation of these assumptions led to an only illusory introduction of a free market. Collective farms

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the population of the entire Soviet country with clothes. After 1924, the USSR authorities ordered Uzbekistan to specialise in cotton production (Piechucki-Włosek 2020).

were first turned into corporate farms mostly by land lease or bidding on official tenders. Still, the production activities remained linked to the state production targets, especially as far as cotton and wheat were concerned. Uzbekistan's first president turned out to be an autocratic leader and decided to introduce strong Soviet-style market regulations, establishing production quotas (not only of cotton but also of grain production; these were to ensure food security for the country), product prices (food should be available for Uzbeks, and the profit from cotton exports should predictably contribute to the country's budget) and export supervision, among other things.

Geographical and climatic conditions turned out to be important for the possibility of introducing changes as well. Uzbekistan is a double landlocked country: not only does it not have access to the sea and maritime transport, but it is also surrounded by countries that also do not have such access. Most of the country is covered by highlands, lowlands and deserts. The summers are hot and dry, and the winters are cold or frosty with precipitation. The soils are mostly infertile and shallow. The entire country is a drainless area; the only relatively large reservoir is the drying Aral Sea. Retention reservoirs play an important role in the country because a significant part of the country's rivers flow through deserts, where they disappear (especially in the summer). Access to water and the method of distributing the water of cross-border rivers cause tensions between ethnic groups but also between Uzbekistan and the neighbouring countries (more or less open). Claims regarding the use of water appeared with the collapse of the Soviet Union and, consequently, the disappearance of raw material barter between the republics. These claims have also become an element strengthening economic nationalism, which is incompatible with the multiculturalism that exists here (Spoor 2018).

It is also worth stressing (after Spoor, 2018) that the country's development was unbalanced. Although cotton production and its export created an opportunity to finance development, the funds obtained in this way were invested in the development of cities, and rural development was neglected for a long time. This resulted in an increasingly conspicuous gap in the standard of living in the countryside and in the city. Statistics confirm that it is in rural areas that multidimensional social exclusion can be observed: only 4% of city inhabitants suffer from poverty, while as many as 55% of rural area inhabitants suffer from poverty (Spoor 2018). Such an unbalance pushes rural inhabitants to relocate (men more often

than women) and causes the migration of low-qualified workers to cities and the ruralisation of urban poverty.

Table 2. Stages of reforming the agricultural sector in Uzbekistan

Years	Events – More important stages
1991–1993	Creation of the legal basis for denationalisation and privatisation in the agricultural sector as well as a class of entrepreneurs and agricultural producers. Active social policy and protection of vulnerable segments of the rural population
1995–1998	Creation of a legal basis for reducing ineffective budget subsidies, implementing a tax policy favourable to food producers and changing the pricing policy to lead to an increase in retail prices of food products to the level of global prices. Development of farm and enterprise development programs to ensure food supply for the population.
1999–2007	Adoption of the concept of the development of farms and *dekhans*, improvement of the system of leasehold relations and measures to deepen economic reforms in horticulture and viticulture.
2008–2016	Taking several decisions regarding food security related not only to the increase in food production but also to the development of a strategy for the rational use of food resources.
2017–2020	Actions related to the reconstruction of irrigation systems and the improvement of water resources management.
2019	Approval of the Agriculture Development Strategy of the Republic of Uzbekistan for 2020–2030, the aim of which is to radically improve the state's agricultural policy and increase the competitiveness of the agri-food sector.

Source: Own study based on Sultanov B., Amirov L, Askarova M., Rakhmankulova B., Tosheva M. (2021) Agriculture of the Republic of Uzbekistan after the peak of the pandemic. E3S Web of Conferences 244, 03024

Obviously, the latest reform is not the first attempt to react to the above-mentioned problems. After its independence, Uzbekistan decided to gradually abandon the cotton monoculture, diversify agriculture and assure food supply for its inhabitants. In the first place, apart from implementing

denationalisation and privatisation, it was necessary to locate these solutions in the legal system. Next, activities aimed to increase production efficiency, and in the following years, an ecological turn (resource management) was introduced. Now, a comprehensive sector development strategy is being introduced (see Table 2).

3. Assessment of Uzbekistan Agriculture Development Strategy for 2020–2030

Almost three decades after gaining independence from the Soviet Union, Uzbekistan prepared its first market-oriented agrarian reform, which is to be part of the country's modernisation strategy and increase the sector's competitiveness.

In 2019, the Strategy for the Development of Uzbekistan's Agriculture for 2020–2030 (hereinafter the Agricultural Strategy) was developed and approved by presidential decree. It defines the actions necessary for the dynamic development of the sector in the next 10 years. The main goal of the strategy is to transform the sector, promote the accelerated implementation of advanced technologies, intensify production and make Uzbekistan one of the leaders in the implementation of effective and innovative solutions in the agricultural sector.

The Agricultural Strategy provides for the gradual withdrawal of state control over the production, sale and processing of cotton and wheat and promotes the diversification of all agricultural production. In addition, the strategy aims to help farmers and entrepreneurs in accessing knowledge, training and information resources necessary to make production decisions.

The Agricultural Strategy identifies nine strategic priorities for the development of Uzbekistan's agriculture:

- Ensuring food security;
- Creating a favourable climate for the development of agribusiness;
- Reducing the role of the state and increasing the investment attractiveness of the sector;
- Ensuring rational use of natural resources and environmental protection;
- Developing modern public administration systems;
- Diversifying government expenditure supporting the development of the sector;

- Developing the system of agricultural sciences, education, knowledge and counselling;
- Rural development;
- Preparing a system of statistics and market information.

The Agricultural Strategy envisions the development and introduction of new state support instruments. It particularly aims to stimulate the intensification of production and increase the financing of programs improving soil fertility as well as modernisation and the construction of modern water-saving systems. Another important aspect of the strategy is the activities aimed at limiting water losses, land reclamation and supporting the development of science and consulting. The strategy also aims to develop the digitisation of the agrifood system, which will enable the collection, comparison and dissemination of statistical data and market information.

Taking into account the implementation of the assumptions of the Agricultural Strategy as well as the changes in budget expenditures assigned to the agricultural sector in recent years, the positive direction of changes in the support of agricultural producers in Uzbekistan can be seen. Nevertheless, it is also necessary to point out certain **threats** that may affect the implementation of the actions included in the strategy.

Since 2021, support for vegetable producers has been implemented based on subsidies to interest on working capital loans. Previously, only cotton and wheat producers used this form of support (capital interest subsidies). However, it should be noted that due to the use of the so-called administrative prices (which are much lower than market prices), these producers generate lower income from the sale of their products.

The measures taken to diversify the agricultural sector and protect land with lower production potential resulted in no direct payments being paid to farmers cultivating cotton on poor soils in 2019.

Over the next five years, there will likely be more public support for livestock production on larger farms in the form of subsidies for the production and import of livestock. From mid-2021, production subsidies were applied to registered cattle, poultry and fish breeders (based on rates per kg of meat, milk or eggs). It is estimated that in the years 2021–2025, subsidies for livestock production will amount to an average of USD 43 million per year, and subsidies for the import of farm animals will amount to an average of USD 10 million per year. The aim of this support

will be to shift more meat production to larger and more commercial farms that have their own feed base and can afford improved farming practices, animal nutrition, animal health protection and sustainable manure treatment and disposal. Subsidising livestock production is an attempt to respond to the continued increase in the prices of meat and milk. It aims to stimulate import substitution and reduce the domestic prices of livestock products.

This is a new approach for Uzbekistan, which, as worldwide experience shows, will nevertheless not achieve its goal of lowering the prices of animal products. In the short term, this may stimulate an increase in agricultural production and lead to a short-term reduction in meat prices. However, in the midterm, production subsidies increase production costs and reduce the productivity of agricultural producers.[3] Moreover, even if the production of meat from subsidised farms in Uzbekistan increases significantly, domestic prices will not necessarily fall. The new price level will depend on changes in the share of production in domestic consumption, consumer income and the prices of imported meat. Although the importance of large farms has increased in recent years, they still account for a small share of Uzbekistan's livestock production. Therefore, it will take time for a larger supply from these farms to affect total meat and milk production and average meat and milk prices.

In 2019, several programs (funds) were launched to increase expenditure on the modernisation of fixed assets in agricultural holdings. Support was directed to the modernisation of drip irrigation equipment in the cultivation of cotton as well as to investments in the wine and horticulture sectors. These additional funds and grants were available for the first time to small farms (*dekhans*) that had not previously received such support.

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[3] An example in this respect can be the support for the poultry sector in Kazakhstan. For many years, poultry producers received production subsidies that helped to change the country from a net importer of poultry meat and eggs to a net exporter of these products. In 2019, the surcharges were terminated due to the achievement of the subsidy target of reducing import dependency. However, after the subsidies were discontinued, many poultry plants went bankrupt as they were no longer able to compete without subsidies. The pandemic increased fear of food insecurity in Kazakhstan, which resulted in the reintroduction of poultry subsidies in 2020.

As mentioned above, support for small farms has been implemented for several years, in the forms of direct support through payments and loan subsidies as well as indirect support through participation in the creation of agricultural cooperatives or partnerships and production associations.

In early 2020, the President of Uzbekistan announced plans to abolish compulsory state procurement for cotton and wheat in 2020–2023, which could potentially redistribute part of the agricultural land and completely eliminate the use of forced labour in cotton harvesting.

In February 2021, the President of Uzbekistan signed a decree on the establishment of the Agricultural Knowledge and Innovation System (AKIS) for the agricultural sector, along with a road map for 2021–2025. The main AKIS centre was opened in Tashkent, and the opening of regional AKIS centres is planned for the near future. These centres are to contribute primarily to the transfer of agricultural knowledge, market information and innovative projects for agricultural producers or other interested entities in the agricultural sector.

Also, those measures and shifts of budgetary expenditures that are to serve a more sustainable development of agriculture, environmental and climate protection and counteract social exclusion should be assessed positively.

The implementation of the Agricultural Strategy is to be facilitated by measures aimed at improving the business environment and the quality of human capital in rural areas and supporting labour productivity and rapid implementation of innovations in agriculture. The strategy suggests an increase in the number of people employed not only in agriculture (1%) but also in related industries such as the food (5%) and textiles (3%) industries by 2030. Agricultural labour productivity is projected to increase to USD 6,500 per farm worker per year by 2030.

Finally, certain threats and risks result mainly from poor coordination and planning of budget expenditures between various ministries.

The processes related to the reduction of tax burdens are also too slow, and there is no adequate coordination of investment implementation under various international programs.

Also, the progress in reducing electricity costs, modernising irrigation infrastructure and more targeted and tailored support for small farmers is poor.

4. Possible modification of support for agriculture in Uzbekistan

4.1. Key barriers to agricultural development and further reforms of Uzbekistan's agricultural policy

Like other Central Asian countries, Uzbekistan's government is struggling to find a post-socialist model for the domestic agricultural sector. Past debates have often focused on desired farm sizes, with the extremes of industrialised collective farms coexisting with household plots.

Previous attempts to liberalise the market and diversify production in individual agricultural holdings in Uzbekistan did not bring about any visible results. Farmers still lack financial support and connections with distribution channels. In addition, farmers' lack of experience in the field of alternative agricultural technologies hinders the further expansion of crops other than cotton or wheat.[4]

Global experience shows the need for a flexible agricultural policy, especially in an Asian environment with limited land area, high population density and rapid urbanisation, which is driving emigration from rural areas.[5] Rather than focusing on a specific type or size of farm holding, it should be ensured that farmers receive the right market signals and can respond to them with a broad set of public services at their disposal.

In Uzbekistan's agricultural sector, medium-sized farms currently coexist with small households. While the production of cotton and wheat is dominant on farms, high-value crops and livestock are concentrated in family households, where land productivity is much higher. While the former face strong government regulation, the latter do not have access to value chains and essential services and, as a result, often prefer better, off-farm employment options. Policy makers should be aware that farmers are not a homogeneous group and commerce-oriented farmers have different support needs than family households.

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[4] Petrick, M., Djanibekov, N. (2016): Obstacles to crop diversification and cotton harvest mechanisation: Farm survey evidence from two contrasting districts in Uzbekistan. IAMO Discussion Paper No. 153, Halle (Saale). http://purl.umn.edu/234226

[5] Otsuka, K., Liu, Y., Yamauchi, F. (2016): The future of small farms in Asia. Development Policy Review 34, 441–461.

Uncertainty in land tenure regulation and the absence of a formal land rent market remain major challenges in the mid- to long term. The lack of a functioning financial sector and the limited availability of financial products adapted to the requirements of farmers and exporters are probably among the most important factors limiting the development of the country's agricultural sector.

Government support should complement the market by providing basic public services, such as water and transport infrastructure, know-how and regulations that facilitate domestic and international trade.

Bolder reforms are needed to increase productivity and make the agricultural sector more competitive. It is necessary to start with reforming the state management of the agricultural sector, liberalise the land market and create a new support system for agricultural producers. At the same time, it is important to always consider the social consequences of agriculture reforms.

The commencement of Agricultural Strategy's implementation improved the effectiveness of public expenditure on agriculture. However, the pace of implementing changes is slower than planned, especially in areas such as the abolition of agricultural price regulation, coordination between institutions in the planning and implementation of the agricultural budget, limiting the use of electricity for irrigation and increasing the scale of support for small farmers.

4.2. Diagnosis of the most important problems of Uzbekistan's agriculture and proposed solutions to them

Based on the above analysis of the processes introduced to date in the agricultural sector, seven groups of problems can be distinguished, and each requires different solutions:

1) Ineffective sector management model–farmers lack the ability to make their own decisions (poor coordination and effectiveness of public institutions responsible for central planning and state regulation of agricultural products prices, excessive dependence of the livestock sector on subsidies).
2) Poor access to means of production (both seeds and new plant seedlings, agricultural machinery and stable ownership of land).

3) Poor access to financial resources that would enable the development of production (shortage of investment capital, poor support for small farms, lack of support in terms of insurance and difficulty accessing credit).
4) Structural dysfunctions (dominance of cotton and wheat monoculture, lack of well-organised value chains).
5) Slow development of agriculture due to poor access to advisory services or information and low level of research funding.
6) Infrastructural deficiencies–obsolete and expensive water infrastructure and poor logistics infrastructure.
7) Failure to account for the social consequences of reforms (poor rural development and high unemployment in rural areas).

According to this study's results, the following are possible solutions to the above-mentioned problems:

1) Ineffective sector management model
   a. The effectiveness of agricultural public expenditure is limited due to the fragmentation of the agricultural public institutions financing the agriculture sector. Therefore, **budget planning should be centralised in one institution, the tasks of which would also include supervision over the spending of funds on individual activities. It is worth considering the creation of an agricultural policy analytical unit at the Ministry of Agriculture, which would support the ministry in strategic planning, program evaluation, monitoring the situation on agricultural markets and current activities.**
   b. Free and competitive markets that provide farmers with the best market prices for their produce must be created. The abolition of agricultural product price regulation is one of the priority tasks of agricultural policy. In the short term, implementing this would require the abolition of state wheat prices, the purchase of wheat for strategic reserves only at market prices and ensuring minimum cotton prices close to the estimated export parity prices. In the midterm, it would require a reform of the cluster organisation of the cotton market to allow cotton pricing to be based on the market situation and competition between clusters and the abolition of all agricultural price controls.

c. Departure from the practice of central planning in the production of cotton and wheat and elimination of production quotas and government procurement so that farmers can receive undisturbed market signals.
d. Support for animal husbandry, which emphasises subsidies for the production and import of livestock, should be made more effective. Achieving the sustainable development of livestock farming requires reducing dependence on production subsidies in favour of matching subsidies for investment in fixed assets (modernisation of livestock farms). It is also advisable to refrain from any significant increase in support for the importation of new breeds of animals. The costs saved would be better invested in programs such as animal nutrition, AKIS, veterinary services, artificial insemination and local animal husbandry.

2) Poor access to means of production
   a. It is necessary to liberalise the land market by introducing the institution of private ownership of agricultural land and begin implementing the privatisation of land. This will enable farm restructuring in line with market needs. The first step in this direction should be the legalisation of land leases, the lifting of the threat of land takeover by public authorities and the formalisation of lease agreements. Land tenure rights for land users should be strengthened by providing for the resale of land tenure, sublet and mortgage rights. In addition, part of the land should be redistributed to a wider group of users and market-based land taxation rules should be introduced, taking into account the real value of the plots. Actions should also be taken to reduce transaction costs in access to land.
   b. There is a need for the gradual deregulation and development of free and competitive markets for the means of production for agricultural producers. Farmers need support in the form of seeds or seedlings of new plant species and means of production (such as fertilisers or pesticides). Government support for the domestic production of agricultural machinery and tools may be an accessible alternative to expensive imports.
3) Poor access to financial resources that would enable the development of production

a. Facilitating farmers' access to credit for the purchase of means of production, machinery and restoration of soil fertility is necessary. The banking system should provide long-term loans that are adapted to the financial capacity of farmers.
b. Encouraging capital investments in agriculture and attracting foreign investors.
c. Covering small farms with state support is a good change that should be continued and strengthened. In the coming years, it will be important to maintain the combination of support instruments for small farmers (such as earmarked funds, subsidised loans, training and encouraging cooperation and association). An assessment of small farm needs should be carried out to design the necessary support services. Programs for the integration of small farmers into modern agrifood value chains should be introduced.
d. In the face of increasing climate change, it is necessary to develop **a long-term strategy for the development of a competitive agricultural insurance market in Uzbekistan and to introduce public subsidies for crop and animal insurance.**

4) Structural dysfunctions
   a. Further efforts to diversify crops are needed. However, it is important that crop diversification is about incentives and not about introducing new obligations.
5) Slow development of agriculture
   a. Efforts to improve the organisation of the value chain need to be stepped up. Support for the creation of links between farmers, cooperatives and exporters (producer and exporters' organisations) should be introduced.
   b. It is necessary to **increase investment in agricultural research, development of new technologies, digitisation and stimulation of innovations that will result in increased productivity, improvement of product quality and the sustainability of agricultural production.** Further development of the network of research laboratories and certification organisations is needed (phytosanitary, veterinary and ecological control), for example, **a good working AKIS.**

c. It is also important to redirect a part of public expenditure to **the expansion of the network of agricultural advisory centres and ensuring the effective provision of advisory services**, especially in the field of water saving, improvement of soil fertility, organic production, integrated pest management and other modern agricultural practices.
d. Access to market and commercial information should also be improved.

6) Infrastructural deficiencies
   a. Irrigation expenditure accounts for a very large proportion of total public expenditure on agriculture. Therefore, reducing the burden on public expenditure with the costs of maintaining irrigation infrastructure should be a priority of the entire agricultural policy. The modernisation of irrigation should be invested in to reduce the high electricity bills underpinning irrigation subsidies. It is necessary to introduce the paid use of water, considering the costs of its delivery to consumers, and a pilot of measuring installations to prepare the irrigation system for quantitative payments. Public-private partnership mechanisms in the management of irrigation systems should be created. It is also in the national interest to provide government support for innovative water-saving technologies. Short-term reforms should focus on a rational allocation of funds for repair and maintenance, supporting farmers in implementing drip irrigation, implementing projects to reduce the consumption of electricity in irrigation and increasing investment in building human capital for irrigation management.
   b. An appropriate logistics infrastructure should be created. Transport should be developed and wholesale markets and logistics centres should be created
7) Failure to account for the social consequences of reforms
   a. Farmers should be encouraged to produce public goods by providing them with public funds (analogous to the funds of the second pillar of the CAP). It is worth considering supporting activities such as agri-environmental packages, the development of direct sales, the diversification of farm activities towards non-agricultural activities or the development of agritourism.

b. Creating non-agricultural jobs in rural areas should begin with an analysis of the needs of the rural population. To activate local communities, it is worth introducing programs modelled on the proven EU initiative Leader and Community Lead Local Development.

How Uzbekistan's ever-growing rural population will secure their income is one of the fundamental questions the government should answer. This requires action outside the agricultural sector too, as increasing labour productivity in agriculture will not be possible without the release of a significant number of workers from this sector. A thorough modernisation of the agricultural sector will also depend on comprehensive reforms to revitalise the country's entire economy.

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