Netherlands Enterprise Agency

Market study on plant propagation material Uzbekistan

Commissioned by: Netherlands Enterprise Agency (RVO) & Embassy of the Kingdom of the Netherlands in Moscow, Russia

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MARKET STUDY
UZBEKISTAN

ON SEEDS AND SEEDLINGS

PREPARED FOR NETHERLANDS ENTERPRISE AGENCY
CR MANAGEMENT CONSULTANCY - JANUARY 2020

Market study on seeds and seedlings in Uzbekistan

January 2020

Commissioned by:

Netherlands Enterprise Agency (RVO) &

Embassy of the Kingdom of the Netherlands in Moscow, Russia

Conducted by:

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Content

Tomato plants at a young plant nursery in Tashkent region

Introduction

Uzbekistan is reforming its economic and agricultural policies and is prioritising the development of the horticultural subsector. The country is well-known for its delicious fruits and vegetables and its entrepreneurship and has huge potential to become a key player in the production and export of horticultural produce as well as value-added food products. The Uzbek government has developed a new agricultural strategy 2020–2030 that is aimed at reforming the horticultural subsector (i.e. potato, vegetable and fruit) into a modern, export-oriented sector. The international (financial) organisations (i.e. WB[1], ADB[2],EU[3]) are developing programs and allocating budgets to support the agro food sector reforms in Uzbekistan. The Ministry of Agriculture of Uzbekistan recognises the importance of high value plant propagation material for the development of efficient and competitive horticulture in Uzbekistan.

In August 2018 a high-level Uzbek delegation headed by Deputy Minister of Agriculture Mr. Saidkamol Khodjaev and three representatives of the World Bank offices in Tashkent and Almaty visited the Netherlands in the framework of an Agro Strategic Mission. During the mission, a cooperation protocol was signed at the Ministry of Agriculture in The Hague between the Uzbek and Dutch ministries of agriculture. The Netherlands and Uzbekistan agreed to identify areas of mutual interest in Uzbekistan's agricultural development, for exploring further cooperation, in particular in the horticultural sector.

Figure 1: Signing of a cooperation protocol between the Uzbek and Dutch Ministries of Agriculture. Source; RVO.

The Netherlands has a lot to offer on high value seed potatoes, vegetable seeds, young plants and fruit trees, besides modern and innovative technology and last but not the least knowledge transfer and practical training. It was decided to conduct further market research on the plant propagation sector to identify the needs of both public and private sectors in Uzbekistan and match these needs with the required Dutch expertise.

The Team for International Organizations at the Netherlands Enterprise Agency (RVO/TIO), headed by Mrs. drs. W.E.C. Plomp, commissioned this research in close cooperation with the Netherlands Agricultural Counsellor of the Embassy in Moscow (MOS-LBR), Mr. M. Brouwer.

The study was conducted through a combination of desk research and field research in Uzbekistan. It started with a general inception mission in early June, organised by the Agricultural Counsellor of the Netherlands Embassy in Moscow, and was followed up by an institutional mission in early July, a fruit mission in September and a concluding mission in November 2019. The final report was written in December 2019.

[1] World Bank
[2] Asian Development Bank
[3] European Union

CR Management Consultancy was commissioned to conduct the research and supported by Dutch experts, one for potato and one for fruit crops. The core team was supported by local experts from the company Agrohouse.

We would like to thank Mr. Meeuwes Brouwer and Mrs. Commerijn Plomp for their support and guidance and contacts, and all the individual contributors, from famers to ministers, whom we interviewed during this study.

We hope that this subsector research will contribute to the competitiveness of the Uzbek economy and promote the development of the Uzbek potato, vegetable and fruit sector, as well as bilateral trade and knowledge transfer between the Netherlands and Uzbekistan.

Research objective

The outcome of this research is on the one hand a starting point for a better market entry for Uzbek and Dutch private companies in Uzbekistan, and on the other identification of measures recommended to be taken by the Uzbek authorities in order to remove possible obstacles and create a transparent business environment in the seeds and plant propagation sector. In the longer term, this research will contribute to the competitiveness of the Uzbek economy, and promote development of Uzbek potato, vegetable and fruit starting material and propagation sector.

Our market research aims to:

i. Describe the structure, latest developments, trends and organisation of the propagation sector in the three horticultural subsectors: vegetables[4], fruits and potato;
ii. Describe the governmental institutional structure, procedures, policies and legal framework and the sector's governmental strategy;
iii. Map the institutional organisations, their projects and priorities and to identify opportunities for cooperation;
iv. Develop a SWOT and TOWS[5] matrix for the three subsectors;
v. Recommend bilateral subsector cooperation, both business to business and knowledge transfer.

The findings of this report will be disseminated to the Dutch plant propagation business community and the Dutch institutional sector. A summary of the major findings and recommendations will be presented to the Uzbek Minister of Agriculture.

[4] Vegetables include also melons and watermelons
[5] TOWS matrix is a chart where Strengths and Weaknesses intersect with the Opportunities and Threats

Report setup

This report starts with an executive summary and is followed by two more in-depth sections.

Part one of this report starts with a brief introduction about Uzbekistan and describes the horticultural landscape, the three subsectors, the institutional structure and support policies and regulations. This is followed by an overview of the international institutions and their specific projects to support the horticultural sector.

In part two the SWOT/TOWS analysis leads to specific recommendation per sub sector and lists projects for bilateral cooperation between the Netherlands and Uzbekistan[6].

Abbreviations

ADB	Asian Development Bank
ALC	Agro-Logistic Centres
EU	European Union
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoU	Government of Uzbekistan
HGDA	Horticulture and Greenhouse Development Agency
IFC	International Finance Corporation
IFAD	International Fund for Agricultural Development
ISTA	International Seed Testing Association
Min AG	Ministry of Agriculture
PBR	Plant Breeders Rights
UPOV	International Union for the Protection of New Varieties of Plants
US	United States
USAID	United States Agency for International Development
UZS	Uzbekistan SUM
VAT	Value Added Tax
WB	World Bank
WTO	World Trade Organisation

[6] Part two is officially handed over to the Uzbek Ministry of Agriculture by the Netherlands Enterprise Agency and Netherlands Agricultural Counsellor of the Embassy in Moscow during an official visit early March 2020.

Executive summary

Uzbekistan is moving from an inward-oriented economic model towards a more open, integrated and export-driven economy[7]. Cotton has been Uzbekistan's major export good and an important source of hard currency since the early 1990s, resulting in the government's heavy involvement in cotton production, marketing and export.

Food security concerns as well as the environmental and social problems associated with cotton production have spurred the relative shift in the cropping structure in the country—first towards wheat, and now towards horticulture[8].

The Uzbekistan government is slowly moving away from weekly decrees to a more structured approach. With the support of the EU, World Bank, FAO and Asian Development Bank, "The Strategy for Agriculture Development of Uzbekistan in 2020-2030'', was created by the Ministry of Agriculture and adopted in October 2019.

The strategy is aimed at developing an export-oriented horticultural value chain, improving the current output in terms of both quality and quantity and ensuring the efficient use of natural resources such as water. The government believes in an integrated supply chain approach with large clusters, similar to the cotton and textile clusters, to realise the country's short-term targets.

Due to natural endowments, Uzbekistan has a comparative advantage in horticulture. Horticulture is an important part of agricultural production, even though the sub-sector accounts for only about 16% of the total arable lands[9]. With the growing population, opportunities to export to new and existing markets and its contribution to the GDP, the horticultural cropping area will further increase, primarily through the displacement of land used to grow cotton and wheat. The government has set a goal of converting over 200 thousand hectares into horticulture production, thereby moving away from cotton and wheat, by 2030.

Obtaining water, however, is one of the major challenges. Uzbekistan depends on neighbouring countries for its water supply. The country is water-stressed and vulnerable to climate change, particularly in the agricultural sector. Currently, the horticultural output per hectare is low, post-harvest losses are considerable and there is a knowledge gap deterring progress in the ambitious speed expected by the government.

International donor organisations and the EU have been supporting the market-oriented reforms in Uzbekistan since 2016. The WB had total $4 billion in committed loans[10] as well as 23 projects end of December 2019, the agricultural portfolio of the World Bank in Uzbekistan will be $1.5 billion, after the approval of the Agriculture Modernization Project in March 2020. Other donors such as the ADB committed loans over $1.1 billion including projects to support to Agro-Logistic Centres, new orchards and irrigation projects.

The objective of this research was to identify possible obstacles to creating a transparent business environment in the seeds and plant propagation sector. The Dutch Ministry's aim is to support the development of the horticulture sector with the close cooperation with their counter parts in Uzbekistan.

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[7] EBRD
[8] World Bank
[9] 47% grains and 37% cotton
[10] https://www.worldbank.org/en/country/uzbekistan

The research was conducted between June and December 2019, during which time we visited Uzbekistan four times and held interviews at Ministries, governmental agencies, farmers, international donor organisations and Dutch and Uzbek businesses. The research was focussed on three sub-sectors; vegetables, potatoes and fruit.

In all the three sub-sectors similar opportunities were found related to added value growth, export potential, yield and quality improvement potential. The threats and weaknesses, however, are significant: water scarcity; lack of local disease-free high yielding seeds/plants; insufficient business environments, and legislation, absence of private sector development and knowledge gaps. We analysed the SWOT and built strategy scenarios for each sub-sector: an opportunistic scenario, a more defensive scenario, a scenario to mitigate the weaknesses and one to work around the threats.

The ambitious reform agenda for Uzbekistan's agricultural sector is well recognized by the multilateral banks, which could provide an entry point for the Netherlands for targeted co-operation and knowledge sharing in the sector. This report aims to identify fields of mutual interest. Based on the analyses, a set of potential bilateral projects has been identified and could be the starting point for long-term cooperation between both the countries.

PART 1

Uzbekistan at a glance

Uzbekistan is one of the largest Central Asian states, with a population of more than 33 million people. It is the most populous country in Central Asia. Population dynamics, including growth rates, age structure and migration, strongly influence the country's social and economic development strategies. The country's population is predominantly young, with 55% being under 30 years (see figure 2).

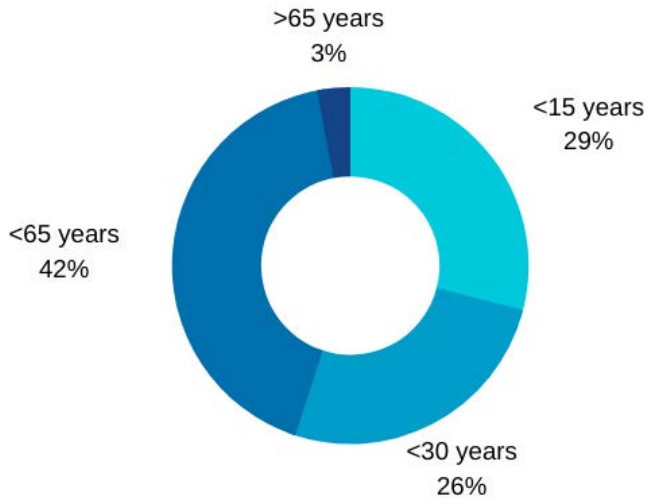

Figure 2: Population distribution by age (2018). Source; https://stat.uz/.

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Uzbekistan's economy is expected to continue to grow by 5.8% in 2019 and 6.0% in 2020, according to the ADB. Inflation rates remain high, at around 15%. Agriculture plays an important role in Uzbekistan's economy and could become a major driver for further economic growth, according to the WB. Agriculture accounts for about 30% of the value-added percentage of the GDP[11] (NL; 1.68%). Turkey had a similar agricultural GDP level at the beginning of the 80s, today they are at 6%[12] . Agriculture is also a major jobs provider, and for one-third of the working population it is the main source of income. To improve the country's food security, the GoU has increased wheat production and supported poultry and animal farming over the past few years, decreasing cotton production and favouring the development of new orchards and greenhouses for vegetable production. The government has been promoting export-oriented horticulture and increasing the economic output of the horticultural subsector.

The Republic of Uzbekistan declared Independence on September 1, 1991. Tashkent is the capital of Uzbekistan and there are 12 regions and the autonomous Republic of Karakalpakstan. Each region consists of several districts

[11] Gross Domestic Product
[12] www.theglobaleconomy.com , World Bank (2019)

Figure 3: Regions of Uzbekistan and the republic of Karakalpakstan.

Population growth rate is high in Uzbekistan, with a fertility rate of 2.3 per woman compared to 1.6 in the Netherlands. The population is expected to continue to grow to around 38 million over the next two decades. Unemployment is high, over 9% on average, with over 15% of unemployed individuals being young people under 30 years old. Among those aged 15–25 it exceeds 17.1%, whereas the level of female unemployment is 13.0%[13].

Uzbekistan	
President: Shavkat Mirziyoyev	**Population, persons**: 32.955.400 (2018)
Prime Minister: Abdulla Nigmatovich Aripov	**Area, sq km:** 425.000
Capital City: Tashkent (Toshkent)	**GDP per capita, US$:** 1.532 (2018)
Languages: Uzbek (official) 74.3%, Russian 14.2%, Tajik 4.4%, other 7.1% note: in the Karakalpakstan Republic, both the Karakalpak language and Uzbek have official status	**GDP, billion current US$:** 50.5 (2018)
	GINI index: No data
	Ease of Doing Business rank: 76

Figure 4: Key data Uzbekistan. Source; World Atlas.

With a territory of 447,400 square kilometres (over 10 times the size of the Netherlands), the country shares borders with Kazakhstan and the Aral Sea to the north and west, Turkmenistan and Afghanistan to the south and Tajikistan and Kyrgyzstan to the east. The country is rich in natural resources like gas, gold, coal, copper, oil, silver and uranium. The Uzbek Language is the only official state language.

[13] www.stat.uz (2019)

Russian is still an important language for interethnic communication, including much day-to-day technical, scientific, governmental and business use. English is less common as language in Uzbekistan.

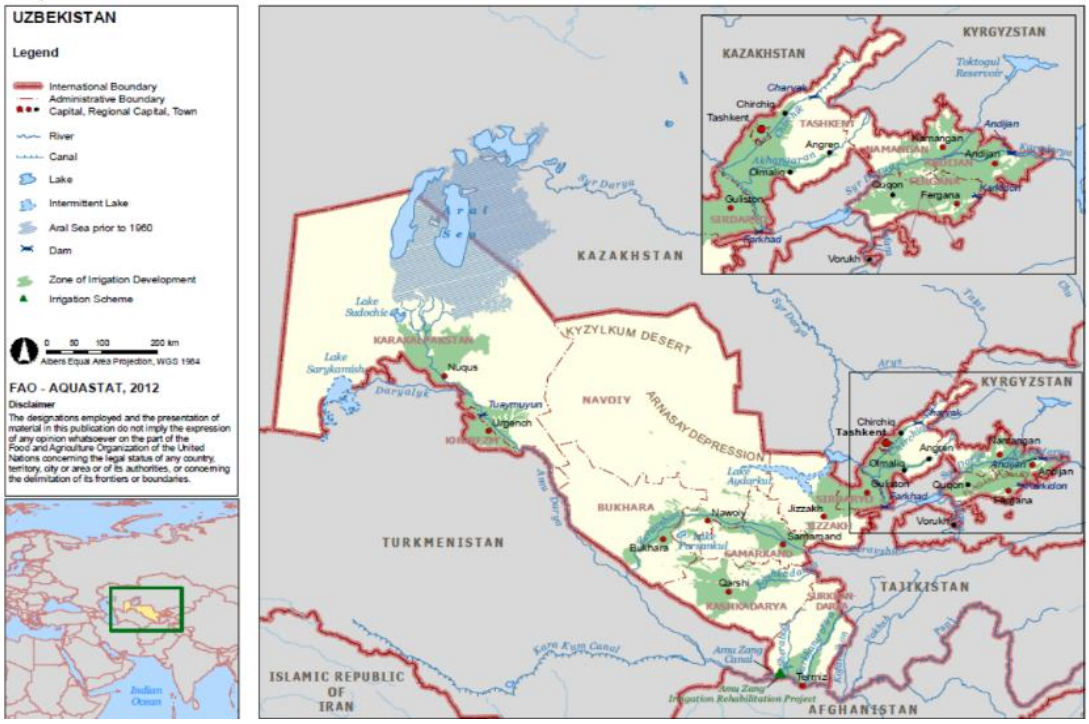

Figure 5: Map of Uzbekistan. Source; FAO 2012.

Climate, water and land use

Uzbekistan has a harsh, dry continental climate with large daily and seasonal changes in temperature and regional differences (see figure 6). It depends on its neighbouring countries for its surface water supply. The main sources of water are the Amu Darya and the Syr Darya rivers which flow into the Aral Sea. Most of both rivers' water flow is taken for agriculture irrigation, cotton mainly, causing the Aral Sea to dry up to a fraction of its original size.

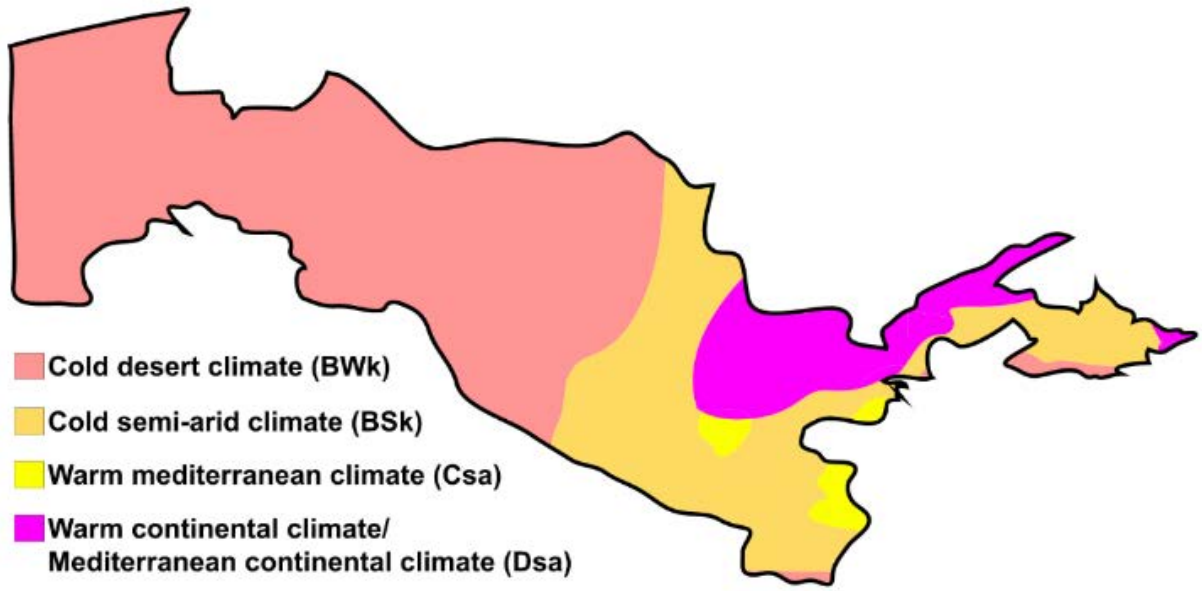

Figure 6: Climate classification Uzbekistan. Source; https://commons.wikimedia.org/.

Annual rainfall is below 300 mm in most locations. Agricultural output is almost fully dependent on irrigation and accounts for over 90% of Uzbekistan's total water use withdrawal.

It is estimated that only 60% reaches the fields, with the irrigation systems being outdated and many devoid of concrete coating. Furrow irrigation is widely used, and despite government efforts drip irrigation systems are only used in 2–3% of the fields. According to a USAID study[14], agricultural productivity is at risk due to climate change and the lack of enough irrigation water and could lead to food insecurity.

[14] www.climatelinks.org/sites/default/files/asset/document/Uzbekistan_CRP_Final.pdf

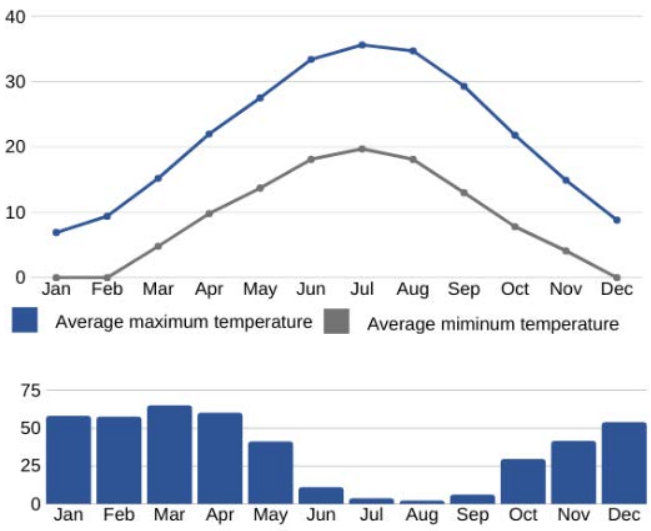

Figure 7: Average maximum and minimum temperature, and rainfall in Tashkent. Source; https://www.weather-atlas.com/

Figure 8: Potato field with furrow irrigation.

Total agricultural land occupies 25.2 million hectares. This includes 23.4 million hectares that can be considered poor or low-productive pastureland, and 4.3 million hectares of irrigated land. One of the major issues in agriculture in Uzbekistan is salinization due to poor irrigation practices. The Republic of Karakalpakstan, Bukhara, Jizzakh, Navoi, Syrdarya and Khorezm suffer most from high soil salinity levels.

Climate stressors and climate risks agriculture	
Stressors	**Risks**
	Decreased assess to water for irrigation
Increased Temperatures	Increased demand for irrigation water
Changes in precipitation patterns	Reduced crop yields and productivity
	Lower livestock breeding productivity
Increased drought	Increased food insecurity
	Increased pest and disease outbreaks for livestock and agriculture

Figure 9: Climate Stressors and Climate risks: Agriculture. Source; USAID (2017).

Cotton and wheat are the two main crops grown on more than 80% of the irrigated land. The recent shift towards wheat production appears to have reduced the total consumption of water for irrigation.

Agricultural and horticultural structure

Uzbek agriculture has gone through different restructuring stages since the collapse of the Soviet Union. State farms were first split and decollectivized into individual farms and consolidated again into farms of between 40 to 60 ha. The Government created a dual system, where small, so-called Dekhan[15] farmers producing livestock and horticulture products coexisted with larger individual farms producing cotton and wheat. In 2016, the government started to convert land under cotton and wheat to higher value crops such as fruits and vegetables grown in greenhouses[16]. In January 2019 a new restructuring was announced[17], aiming to double the size of cotton and wheat farms to 100 ha to improve economies of scale. Food production today in Uzbekistan is structured around individual farms[18] and Dekhan farms.

	Dekhan farms	Independent commercial farms	Agricultural enterprises
Definition	A partially commercial farm based on a household plot	An independent commericial farm organised as a legal body	A large-scale corporate farm based on membership shares with private ownership of assets
Labour	Family members	Mainly family labour, with some hired help	Members, hired workers
Land tenure	Lifetime inheritable possession	Long-term lease (10-50 years)	Permanent possession for agricultural purposes
Owners	Workers of agricultural enterprises, rural employees, pensioners	Any adult person with sufficient agricultural qualifications or experience; typically former worker of agricultural enterprise	Members-shareholders
Specialisation	Vegetables, livestock	Any crop or livestock	Mainly scale crops such as wheat and cotton

Figure 10: Characteristics of farm types of Uzbekistan. Source; Lerman, 2008.

Individual farms or independent commercial farms are operating on leased land; these farms are registered as legal entities and grow mainly wheat and cotton based on the state programs, on 10 ha surface or more. The agricultural authority and the local government allocate the fields, select the farmers from among applicants, define the crop types, impose production levels, finance the farming, sell seeds and fertilisers and buy and market all the products.

The selection of farmers is based on demonstrated managerial and farming skills. The maximum lease term is 50 years. Individual farmers often have a garden where vegetables are planted, too. The Individual farmers seldom invest in their land, as fields may be reallocated or used for other purposes.

[15] Dekhan farmer = Dekhan farm is a small-scale family farm engaged in the production and sale of agricultural products based on the individual labour of family members on a land plot provided to the head of the family for inherited lifetime possession. http://www.agro.uz/ru/documents/413/4225/

[16] http://documents.worldbank.org/curated/en/686761549308557243/pdf/134322-WP-P162303-PUBLIC-Report-Farm-Restructuring-in-Uzbekistan-eng.pdf

[17] The Resolution of the Cabinet of Ministers No. 14 of January 11, 2019.

[18] Individual farm is an independent business entity with the rights of a legal entity and engaged in agricultural commodity production using land plots granted to it on long-term lease. http://www.agro.uz/ru/documents/413/4232/

This group of farmers may partly disappear over time, and the cotton farmers will be incorporated into the bigger clusters (see below), or farmers might transition to horticulture[19] .

The Dekhan farmers are by far the largest group. Dekhan farms are family-based farms operating on household plots of 0.35 ha (irrigated) to 0.5 ha (rainfed). The small plots of land are inheritable and include buildings. According to the official statistics (see figure 11), the Dekhan farmers produced in 2018, 88.4% of the total volume of potatoes, 74.3% of vegetables, 60.8% melons and 62.6% of fruits and berries.

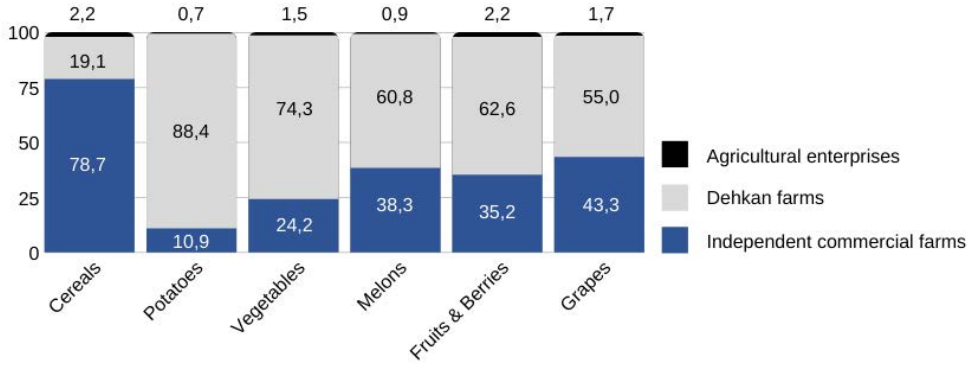

Figure 11: Crop production by farmers type in 2018. Source; https://stat.uz/.

Dekhan farmers do not receive inputs or financial assistance from the state, and they are free to choose what to grow. Their participation and creation of products oriented for export is however minimal today. The smallholder families face significant challenges and have limited access to fertile land and irrigation water. Their productivity is low due to lack of cropping knowledge, lack of input supplies such as fertilisers and good starting material. There are around 4.7 million Dekhan farmers for whom horticulture is an important source of income.

The clusters approach

Clusters are vertically integrated supply chains and have been formed since 2018 mainly in the cotton and textile industry. There are around 75 clusters operational today in Uzbekistan. Most clusters grow cotton, process the cotton into textile and export most of the products. Many clusters have a variety of activities and besides cotton they also grow wheat and have vineyards and greenhouses. The government recently announced creation of new clusters for greenhouses and fruits (see figure 12) providing favourable conditions, such as loans to stimulate the profitable development of these new horticultural clusters. The agricultural land allocated today to agricultural clusters makes up 67% in the cotton and textile industry, livestock farming—8%, and horticulture—7.5%.

[19] Source interviews

Figure 12: Measures identified for organization of fruit and vegetable clusters. Source; https://statuz

In summary, Uzbekistan's agriculture and food production landscape today consists of a small number of clusters (75), Agricultural enterprises (27.000), Farmers (92.000) and large number of Dekhan farmers (4.9 M).

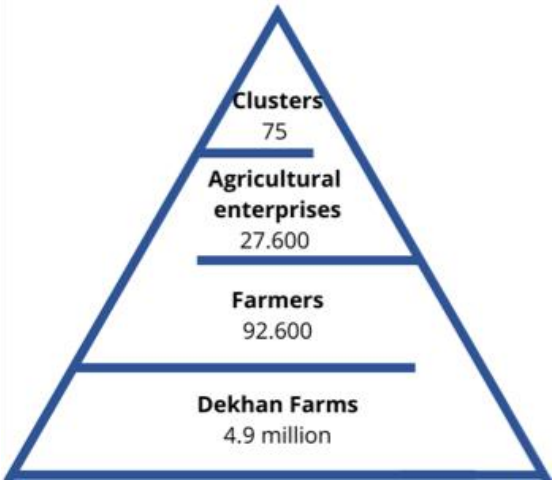

Figure 13: Structure of agriculture.

Landownership

After independence of the country, state land ownership was integrated exclusively into the constitution of Uzbekistan. Afterwards, this was repeated in the 1998 Land Code[20]. Land for agriculture is given by the state to its future users. However, no rights of transfer are given to the owner of the land. Land can be held by family members during their lifetime, yet inheritable possession of the land cannot be presented like a gift, be sold or changed.

The state ownership allows the state to control and plan the performance and production standards of the larger farms and clusters. The government decides which land is reallocated to the planned

[20] Land code of the Republic of Uzbekistan http://www.agro.uz/ru/documents/413/4234/

cotton and wheat production. The transformation of cotton into higher value horticulture crops is also centrally manged; not all land, however, will be suitable for this transition. The HGDA[21] was established in spring 2019 to organise this transition. They plan to allocate horticultural crops to specific regions and decide on what to grow in each field in line with the old centralised traditions.

Horticultural production per region

Official statistics display a statistical tendency which is based on the central-economy targets given to the regions by the government. The official output in tons of major crops per region in figure 14, however, gives an indication about what is grown in the different regions of the country.

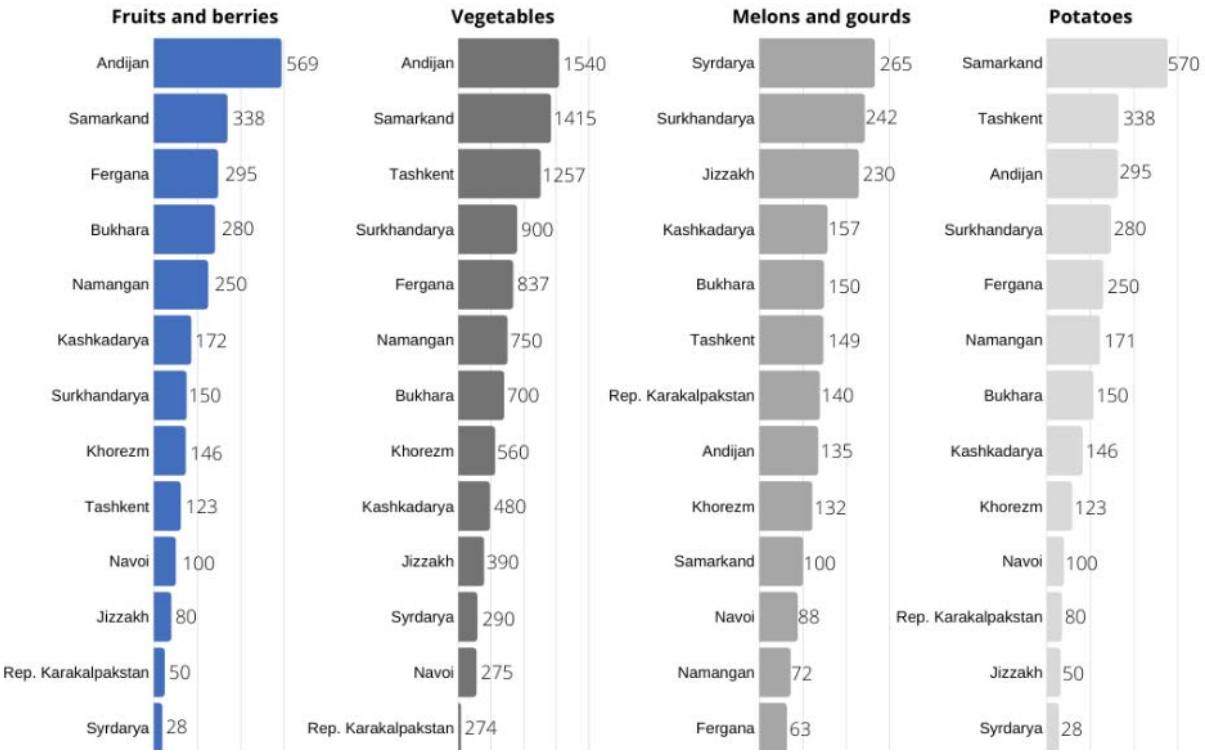

Figure 14: Fruits and Berries, Vegetable, Melon and Potato production per region in 1000 tons, 2018. Source; https://stat.uz

[21] http://www.agro.uz/ru/about/organizations/agentstvo-po-restrukturizatsii-selskokhozyaystvennykh-predpriyatiy/

International trade

The volume of Uzbekistan's foreign trade turnover grew by 27.3% year-on-year to $33.8 billion in 2018, wherein exports contributed $14.3 billion and imports $19.5 billion[22].The trade deficit had grown from $1.5 billion in 2017 to $5.3 billion by the end of 2018, due to an increased demand for imported goods. Local businesses, for instance, are taking advantage of new opportunities created by recent currency exchange and trade liberalisation reforms to cover their unsatisfied import needs. The major trade partners are China, Russian Federation, Kazakhstan, Turkey and South Korea.

	Export in 1000 tons	Import in 1000 tons	Foreign trade turnover Share 2018, %	Growth compared to 2017, %
China	2869	3558	19	135
Russian Federation	2193	3537	16,9	121
Kazakhstan	1458	1565	8,9	147
Turkey	932	1235	6,4	140
Republic of Korea	92	2047	6,3	154
Germany	47	725	2,3	125
Japan	13	687	2,1	421
Afghanistan	600	2	1,8	97
Kyrgyzstan	328	133	1,4	190
Ukraine	103	327	1,3	148

Figure 15: Top 10 foreign trade partners Uzbekistan in 2018 compared to 2017, in million $.

The value of Uzbek Agri-food exports has become much more diverse over time. In 2000, the main agriculture export product was raw cotton, generating 42% of total export revenue ($1.05 billion). In 2017 cotton and textile products accounted for 15% ($1,2 billion), while vegetables and (dried) fruits export contributed 7% ($633 million).

In July 2017, horticultural export was liberalised and no longer state controlled via "Uzagroexport". This has increased the export volumes from $633 million in 2017 to $851 million in 2018[23]. This is an impressive growth rate of almost 35%. This result is partly due to the allocation of more land to horticulture sector and for some part the effect of direct economic gain for the farmers.

[22] https://stat.uz/uploads/doklad/2018/yanvar-dekabr/en/13.pdf
[23] HS code 07 edible vegetables & HS code 08 edible fruits, source https://www.trademap.org

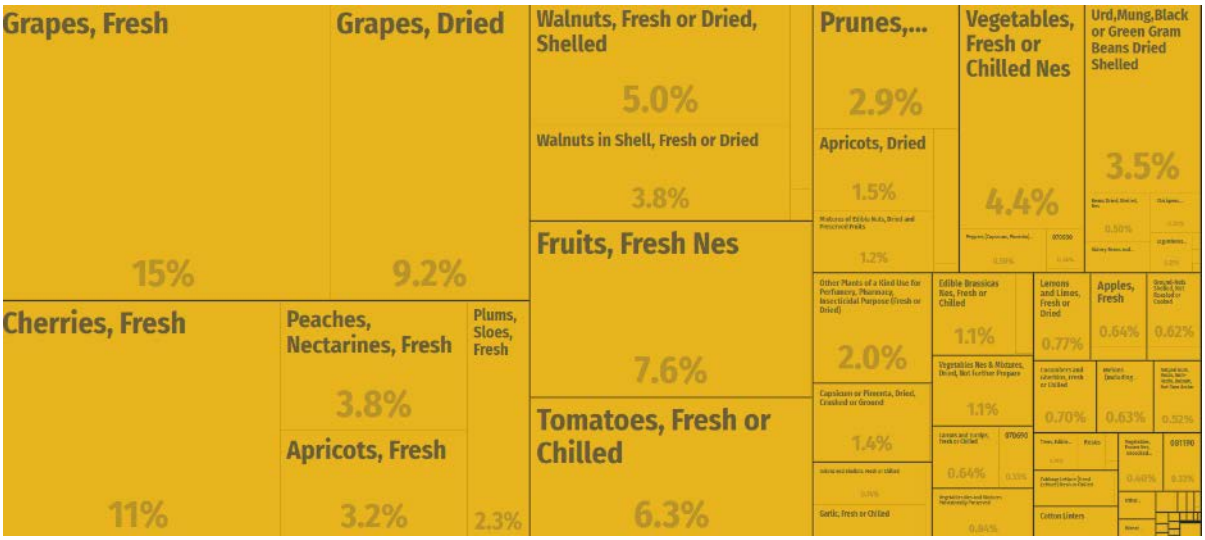

Figure 16: Fruit and vegetable export shares per type in 2017.

Major export destinations of horticultural produce

Russia is by far the most important end destination for horticultural products. Trade statistics show, however, that more than 50 percent of Uzbek exports of vegetables are destined for Kazakhstan, and only 23 percent for Russia. Lower import tariffs are supporting the export to Kazakhstan and re-export to Russia. Kazakhstan has a Customs Union with Russia and Belarus, which stimulates re-export from Kazakhstan. Recently, Kazakhstan introduced administrative measures to prevent the re-export of goods imported at lower tariff rates to Russia and several other countries within the Customs Union.

Trade agreements and trade barriers

Uzbekistan is not a member of the WTO. Uzbekistan first applied to join the WTO in 1994, however, since 2005 the negotiations have been at a standstill, until this spring. The GoU restarted the discussion this summer with the WTO, and the WTO Secretariat has submitted documents covering various aspects of the foreign trade regime, including information on the application of the WTO Agreements on customs valuation, technical barriers to trade, sanitary and phytosanitary measures, trade aspects of intellectual property rights as well as a plan of measures to adapt national legislation to WTO agreements[24].

In 2004, Uzbekistan and Russia signed a Strategic Framework Agreement that also includes free trade and investment concessions. Uzbekistan's membership in the CIS Free Trade Zone was formalised in 2014. In June 2017, the government launched a "green corridor", the goal of which is to provide simplified procedures for customs and phytosanitary clearance for fruits and vegetables that are supplied to Russia.

Uzbekistan benefits from the EU's Generalised System of Preferences[25], which grants developing countries non-reciprocal access to the European market.

An important step towards opening trade was taken by the GoU in 2017, when a presidential decree abolished the requirement to convert foreign currency export earnings into Uzbek Sums for all types of businesses. At the same time, the central bank abolished its "crawling peg" regime vis-à-vis the US dollar, allowing the exchange rate of the Uzbek Sum to float. This change in the exchange rate policy

[24] http://tashkenttimes.uz/national/4179-uzbekistan-s-wto-accession-process-officially-launched
[25] https://ec.europa.eu/trade/policy/countries-and-regions/development/generalised-scheme-of-preferences/index_en.htm

resulted in the national currency losing half of its value in one day. In August 2019 the central bank devalued[26] the Sum, setting the exchange rate at 8000–8150 UZS. At the end of 2019 the official exchange rate was 9.512 UZS to the US Dollar.

In late autumn of 2019 currency restrictions were imposed on agricultural machinery and fertilisers, which caused confusion among the importers of these products. The central bank quickly announced that all commercial banks could sell foreign currency to business entities for the import of goods (services) in a regular mode without any restrictions. Public procurement, however, will be under stricter examination in terms of conformity to prices and local availability of similar goods[27]. In practice, importers need to "plan" their payments in foreign currency carefully[28]. Exporters of goods are advised to ask for prepayment or letters of credit.

Figure 17: The Central Bank of Uzbekistan

[26] http://tashkenttimes.uz/finances/1390-uzbekistan-devalues-soum-announces-more-flexible-exchange-rate-policy
[27] https://uzdaily.uz/en/post/52130
[28] Source interviews

The Government of Uzbekistan

The Government has initiated a few significant reforms to reduce the state's presence in the economy and strengthen the business environment. Driven by this ambitious and fast-moving reform programme, Uzbekistan is moving from an inward-oriented economic model towards a more open, integrated and export driven economy.

Different ministries are involved with agriculture and horticulture, the Ministry of Irrigation receives 80% of the budgets today for managing the cotton and wheat cultivation and the irrigation infrastructure. It is expected that budgets will gradually be transferred to the Min AG to support the transition from cotton to horticulture.

Government spending on agriculture is high; in 2018, government spending on agriculture in Uzbekistan amounted to 1.8% of GDP. In 2018, Kazakhstan spent 0.8% of its GDP on agriculture, and Vietnam only 0.5%[29]. Despite this high level of government spending, agriculture in Uzbekistan is not very efficient, yields are low and land use suboptimal.

Figure 18: Measures are identified for further development of horticulture and increasing the export. Source; https://stat.uz/

[29] https://www.theglobaleconomy.com

New agricultural strategy 2020-2030

The Ministry of Agriculture, developed a new agriculture food strategy 2020–2030 in close consultation with international partners including WB, FAO, EU and ADB.

This strategy was approved[30] and published[31] in October 2019 and provides roadmaps and key indicators (see annex 1) along with the overall objective "*to develop a competitive, market and export-oriented agri-food sector that will increase farm incomes, create new jobs, enhance food security and ensure the sustainable use of natural resources."*

Through the implementation of a long-term, ambitious reform process, Uzbekistan seeks to develop a competitive, export-oriented agriculture sector – an agri-processing industry that will produce competitive food products corresponding to international safety and quality standards. Investments and modernisation in the processing industry should support the production of high value products and diversify the export portfolio.

The strategy for the development of agriculture by the Republic of Uzbekistan has nine key focus areas for 2020–2030:

i. Ensuring food security of the population;
ii. Creating a favourable agribusiness climate and value chains;
iii. Reducing the role of the state and increasing investment attractiveness;
iv. Rational use of natural resources and environmental protection;
v. Development of modern public administration systems;
vi. Phased diversification of government spending to support the sector;
vii. Development of science, education, systems of information and advisory services in agriculture;
viii. Rural development;
ix. Creating a transparent system of industry statistics.

In the strategy document, important bottlenecks and solutions are described. The major bottlenecks and solutions, that could have an impact on the development of the starting material sector and the evaluation of future Dutch bilateral expertise support in the horticultural sector of Uzbekistan are discussed.

Creating a favourable agribusiness climate and value chains

According to the strategy document, there is a shortage of laboratories, wholesale markets and agro-logistic centres that meet international standards. Customs and border points are not well equipped with phytosanitary controls for horticultural products, and the legal framework for phytosanitary control is not in line with WTO standards. The National Quarantine and plant protection system needs to be harmonised with international standards. Variety testing services and the system for Plant Variety Protection needs improvement. Assistance for the modernization of the research institutes in terms of both material and technical assistance is required – especially for the seed and horticulture sector – and funds and grants from the International Financial Institutions should finance the modernization.

[30] https://tashkenttimes.uz/national/4509-shavkat-mirziyoyev-approves-uzbekistan-s-agriculture-development-strategy-for-2020-2030
[31] https://lex.uz/docs/4567337?otherlang=3

Rational use of natural resources and environmental protection
Optimal use of available water resources is a major challenge for Uzbekistan, and the strategy explains the situation clearly:

"Of 20.2 million hectares of agricultural land, only 20.7 percent are irrigated. Over the past 15 years, the availability of irrigated land per capita has decreased by 24 percent (from 0.23 ha to 0.16 ha). This is the result of population growth, reduced water supply and the transfer of agricultural land to other categories of land fund. According to forecasts, over the next 30 years the area of irrigated land may be reduced by another 20–25 percent."

Development of modern public administration systems
It is recognised in the strategy that most of the service infrastructure, material supply structures, and research and educational institutions are intended to produce raw cotton and cereal grains. Horticulture has not been supported and adequate public services such as phytosanitary services, certification and advisory and marketing intelligence services to enter new markets are missing.

Phased diversification of government spending to support the sector
A reallocation of state budgets from irrigation-related expenditures is foreseen to finance the diversification. Consequently, Research and development as well as information and consulting services (advisory) will receive more budget support.

Development of institutes in agriculture
It is recognised in the strategy that there is no dissemination of practical science-based knowledge through the agricultural research institutes to the sector. Locally developed varieties have low yields and do not meet the export requirements. The dependency on expensive and less-adapted imported varieties is growing as per the strategy document.

To improve the situation, the government wants a radical reform of science and research organisations as well as agricultural education and training with technical assistance from donor organisations. Information and consultation centres based on public-private partnerships should be created in all the regions of the country.

On the one hand, the strategic priorities will create a push for better starting material to increase yield and quality of (fresh)produce for export and to safe (water) resources with modern disease-resistant varieties both in open-field and protected cropping systems. On the other hand, the need for institutional support will be triggered to develop the enabling environment. This will most likely include legislation relating to up-to-date seeds, intellectual property and phytosanitary issues. It will also involve the modernisation and training of inspection services to certify and register new varieties as well as ensure the alignment of import and phytosanitary regulations with international standards.

Development of horticulture and increase export

President Shavkat Mirziyoyev in late autumn 2019 adopted a number of decrees and resolutions to improve horticulture, in line with the new 2020-2030 strategy for the horticulture and greenhouse sector. He stated to introduce effective state support mechanisms to increase production of high-quality, competitive and export-oriented products based on modern resource-saving technologies and to accelerate development of the food industry. These measures should support increasing the export of fruits and vegetables to ''*2.5 billion dollars next year and to 5 billion dollars in the next three years''*[32].

Some of the improvements proposed and bottlenecks recognised by the President can be found in figure 19. The President recognised the weak research work in selection and the need to import seeds.

	Proposed improvements
1.	Abandon the old systems and work in cooperatives and larger (export) clusters.
2.	Grow export-oriented products in 55 districts, involving foreign experts.
3.	Increase productivity through the creation of new, modern orchards of cherries, apricots, pomegranates, peaches, plums, walnuts and other fruits with involvement of funds from international and local financial organisations.
4.	Allocate 1 trillion sums ($100 million) to create new orchards and vineyards.
5.	Improve the supply of mineral fertilisers and enhance pest and disease control.
6.	Create plots of 1–5 ha under new lease construction.
7.	Organise plantations next year to grow seedlings of apricots, cherries, peaches, table and wine grapes, pomegranates, walnuts and almonds.
8.	Subsidise farmers to cover part of the cost for purchasing seedlings and stocks of intensive varieties, stop the import and planting of seedlings that do not have a health certificate, from April 1, 2020.
9.	Plant additional food crops on 77 thousand hectares in 2020, and vegetable crops by the method of "ninety days" on 200 thousand hectares.
10.	Organise in vitro laboratories in the regional sections of the Research Institute of Horticulture, Viticulture and Winemaking named after Mahmud Mirzayev, financed by the WB.
11.	Open horticulture training centres in each district.

Figure 19: Proposed improvements.

[32] According to our findings, 2018 export value of vegetables and fruits (HS codes; 07,08) is 633 M $

Legal framework

There are several laws that regulate the Uzbek seed and plant propagation sector:

i. The Law on Breeding Achievements regulates relations in the field of legal protection of new plant varieties and the use of selection achievements and was last amended in August 2002[33];
ii. The Law on Seed Farming regulates the certification and production of seeds and was last amended in 2018[34];
iii. The Law on Plant Quarantine regulates the phytosanitary control and import of seeds and plants[35].

The FAO recently reviewed the seed legislation and came to the following conclusions:

"Phytosanitary and seed legislation are not in compliance with International standards and practices. The Law on Plant Quarantine does not contain key principles of the WTO Sanitary and Phytosanitary Measures Agreement, such as scientific evidence requirement, and that phytosanitary measures should be based on risk assessment. The Law is still based on the old Soviet approach of division between plant protection and plant quarantine measures and does not provide the ultimate responsibility of the NPPO (Plant Quarantine Inspection). Local authorities (regional Khokimiyats) are included in the list of authorized bodies for plant quarantine, which is confusing and not compliant with the International Plant Protection Convention."

The Uzbek seed laws are tailored for agricultural crops, such as cotton, and do not provide any guidance in terms of private sector development for horticultural crops. Moreover, the different agencies, like the patent office and the State Variety Registration office, as well as regional authorities (Khokimiyats) seem to have overlapping responsibilities. Additionally, the Law on Breeding Achievement does not use the same definitions provided for by the Union for the Protection of New Varieties of Plants (UPOV), which leads to confusion.

International seed association memberships

In 2004, Uzbekistan became the 57th member of the International UPOV and signed the 1991 Act. This Act includes a PBR protection of 20 years and up to 25 years for (fruit) trees. During the field research, it became clear that (Dutch) breeders have been facing difficulties in enforcing their PBR and are thus reluctant to register their latest and most-resistant varieties. Propriety varieties on which royalties are collected are not offered to Uzbek growers. An important reason for this phenomenon is the insufficient knowledge of PBRs in the entire chain and the low priority of the Uzbek government to align and enforce legislation at the international level.

In 2018, the Centre for the Development of Seed Production (Urugmarkaz)[36] received the status of an authorized organization representing the interests of the Republic of Uzbekistan in ISTA. Further, the Centre has started the application process to become an accredited lab with a tender procedure that has been initiated to acquire the laboratory equipment.

Import requirements

Uzbekistan follows a liberal seed import policy and has (temporarily) abandoned the testing and registration of vegetable seeds to support the uptake of foreign varieties to improve the (export)

[33] https://www.lex.uz/acts/64972
[34] https://www.lex.uz/acts/4202692?ONDATE=16.02.2019%2000#4206777
[35] https://www.lex.uz/acts/119459
[36] http://www.urugmarkaz.uz/

growth of the sector. There is registration of varieties involving varietal testing for potato, wheat and cotton. “Automatic registration” is carried out for all other crops, including fruit trees. without varietal testing but with the mandatory collection of necessary information about the cultivar and its characteristics.

The import of (vegetable) seeds, seed potatoes or rootstocks or plants into the territory of Uzbekistan is allowed if the following criterion are fulfilled:

i. Potatoes’ varieties are included in the state register of crops recommended for sowing in Uzbekistan;
ii. For seeds and plants if there is a certificate of conformity, phytosanitary certificate as well as quarantine permission;
iii. Seeds are intended for breeding, research and exposure.

Seeds imported and exported for scientific purposes and variety testing are not subject to customs duty and are not subject to quotas and licensing. The application process should begin at the patent office.

The Intellectual Property Agency under the Ministry of Justice (patent office) is responsible for the PBR applications[37]. Documents can be downloaded from their website, and applications online with ID identification are also possible via a local partner. The website also provides datasets on the registered breeding achievements[38].

Quarantine and phytosanitary and other requirements

In June 2018, a new Law on Plant Quarantine[39] came into force and a resolution[40] of the cabinet of ministers dated June 2019 describes the regulations and procedure for regulated plant quarantine objects, including starting materials, in more detail.

Seeds imported into the country for sale must comply with minimum quality standards for germination, cleanliness and health according to the prescribed rules. The phytosanitary requirements for quarantine products[41] and sample phytosanitary certificates can be downloaded from the State Inspection on the Quarantine of Plants[42]. The importer is responsible for confirmation of data from a foreign supplier, and authorized bodies may take samples of imported seeds to verify compliance. To this end, at the first import of new varieties, a small sample of seeds must be provided to the National Bank of Genetic Resources at the Research and Production Centre for Agriculture and Food Security.

Rootstocks and saplings must be free from soil. The government recently announced stricter control on imports of rootstocks and will stop the import of planting material without a proper phytosanitary certificate completely by April 2020. This may prevent many issues such as those caused by diseased rootstocks and saplings.

Tariffs

While not a member of the WTO, Uzbekistan benefits from the duty-free regime under the protocol signed with the CIS FTA member countries. On average, this gives the advantage of 8–10% lower tariffs

[37] http://www.ima.uz/ru/gosserv/250/
[38] https://data.gov.uz/ru/datasets/2202?dp-1-sort=G1&dp-1-page=2
[39] https://lex.uz/ru/docs/3815506
[40] https://regulation.gov.uz/ru/document/3877
[41] https://karantin.uz/uploads/karantin/Phytosanitary%20Requirements%20PDF.pdf
[42] https://www.karantin.uz/ru/menu/fitosanitariya-sertifikat-namunasi

in the markets of both Kazakhstan and Russia in comparison to the suppliers from countries without trade preferences.

Presidential Resolution PP-3818, issued on June 29, 2018, set new import tariffs[43] in Uzbekistan. The resolution includes tariffs for import duties and import excise taxes, and customs duties for imported goods range from zero to more than 100%. The import duties for seed potatoes (HS0701) and vegetable seeds under HS1209 are 0%, while the duty is 10% for rootstocks HS0602. The cost of imports also includes 15% Value Added Tax (VAT) and customs clearance fee, which is 0.2% of the declared customs value. However, goods imported by investors for their own needs, implementation of projects in Uzbekistan, further export or under a temporary importation regime are indefinitely exempt from customs duties. Further, some companies and investors may enjoy duty-free importation preferences based on the decisions of the government.

[43] http://lex.uz/docs/3802366

The fruit sector

Fruit orchards in Uzbekistan

Some of the regions of Uzbekistan are specialized in the production of a particular type of fruit. The Fergana valley, is one of the main fruit producers in Uzbekistan. Namangan is well known for its apricot, cherry, prune and persimmons. Fergana produces wide variety of grapes, apricots and peaches. The company Gold Fresh Fruits LLC[44] in Turakurgan district has recently planted new orchards (800 acres) around Yandama village, Namangan, of which 85% are cherry trees.

Figure 20: Intensive fruit orchard planted by Gold Fresh Fruits. Source; http://gdf.uzi.

Syrdarya, Kashkadarya (Varganza) and Surkhandarya are the main producers of pomegranates. The local pomegranate variety (Kuk anor) from Varganza is bright in colour and sweet tasting, making it an excellent product for local markets. On the other hand, the pomegranate (Kayin anor) from Syrdarya has black seeds with a higher amount of juice content and makes for an excellent product for juice factories.

Walnut orchards and forests in Kashkadarya produce almost 60% of walnut production of Uzbekistan. In recent years, new walnut orchards were planted in Jizzakh and Samarkand – the climate of Surkhandarya is very suitable for most fruit types. Furthermore, Surkhandarya and Kashkadarya's harvests are a month earlier compared to other regions.

[44] http://gdf.uz/en/

Potential for growth

In general, Andijan, Samarkand and Fergana are the most important fruit-growing regions according to the official statistics from 2018 (see figure 21).

According to the Horticultural and Greenhouse Development and Agency[45], Uzbekistan has 25,000 orchards with 160,000 ha of net planted surface (gross area of 190,000 ha). The average farm size is 7,6 hectares with apples occupying 43% of the area. Half of the farms are smaller than 10 ha. About 25% (46,000 ha) are intensive or high-density orchards planted with M100/M109 rootstocks, and about half of those farms have drip irrigation systems. More than 80% of the orchards however are over 50 years old and should be renewed.

In the decree "On Measures to Improve the Efficiency of the Use of Land Plots of Farms in the Area of Vegetable Growing, Melon Crops, Horticulture and Viticulture"[46] issued by the government on April, 2018[47], it was indicated that almost 100,000 hectares were to be transferred from cotton and grain to horticultural land use. The candidate regions for the modernization are Syrdarya (20,143 ha), Surkhandarya (16,222 ha), Namangan (11,294 ha) Kashkadarya (10,000 ha) and Jizzakh (10,000 ha).

Another path of growth is the announced intensification of orchards. The average annual extensive production of Class 1 apples is from 2 up to 5 kg and the average annual intensive production of Class 1 fruit is from 10 up to 15 kg. However, if better managed, the marketable yield should be over 30–50 tons/ha according to one of the experts interviewed.

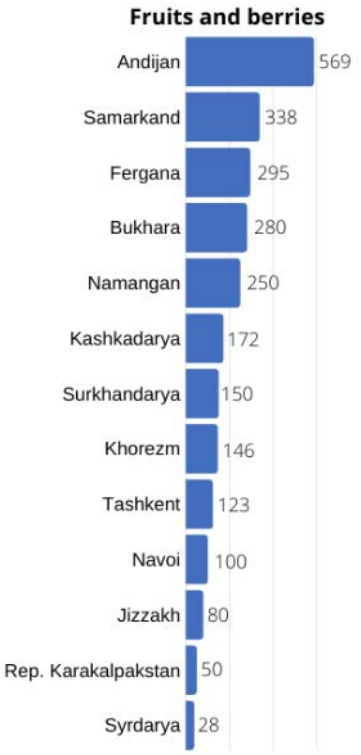

Figure 21: Fruit and berry production per region, in 1000 tons. Source; The state committee of Uzbekistan on statistics, 2018a

Learnings from Jizzakh

In 2011, the Uzbek government offered loans to approximately 800 to 1,000 farmers to import and plant grafted apple trees of seven varieties including Granny Smith, Turkish Fuji, Mondale Gala, Golden Delicious, Ezamarot, Red Chief and Starking Delicious. This was in line with the government policy of encouraging the transition of agricultural land from water-inefficient cotton to high-value alternatives, such as fruit trees, grapevines and vegetables. The rootstocks used included M9[48] and MM106[49]. At the time, government loans allowed farmers to purchase grafted apple trees as well as irrigation equipment including drip systems, pumps and water storage tanks from companies in Turkey. The purchase included installation of equipment, irrigation systems and underground bores, yet the

[45] Source interviews
[46] https://lex.uz/docs/3647470
[47] http://www.agriculture.uz/en.php?/news/read/437
[48] a dwarfing type, plant height of 2.4 to 3.0 m, fruiting after 3 to 4 years, reaching full capacity 23 to 29 kg per plant after 5 to 6 years
[49] semi-dwarfing type

projects failed to include technical support and propagation of rootstocks. Despite the investments, many farmers have not been able to produce quality fruits acceptable to international markets[50].

Export of fresh fruits

Based on the above discussion the export of fresh fruit will thus support the further growth and development of the local fruit sector. Moreover, in July 2017, the horticultural export was liberalized and no longer state-controlled via "Uzagroexport"[51]. Which increased also the export volumes of fruit[52] from $360 million in 2016 to $536 million in 2018[53]. Kazakhstan is the main export destination for fruits with an exported value of $290 million in 2018, followed by Russia $107 million and Kyrgyzstan $69 million and China $21 million. Fresh cherries, grapes and apricots made up 70% of the export to Kazakhstan in 2018 (see figure 22).

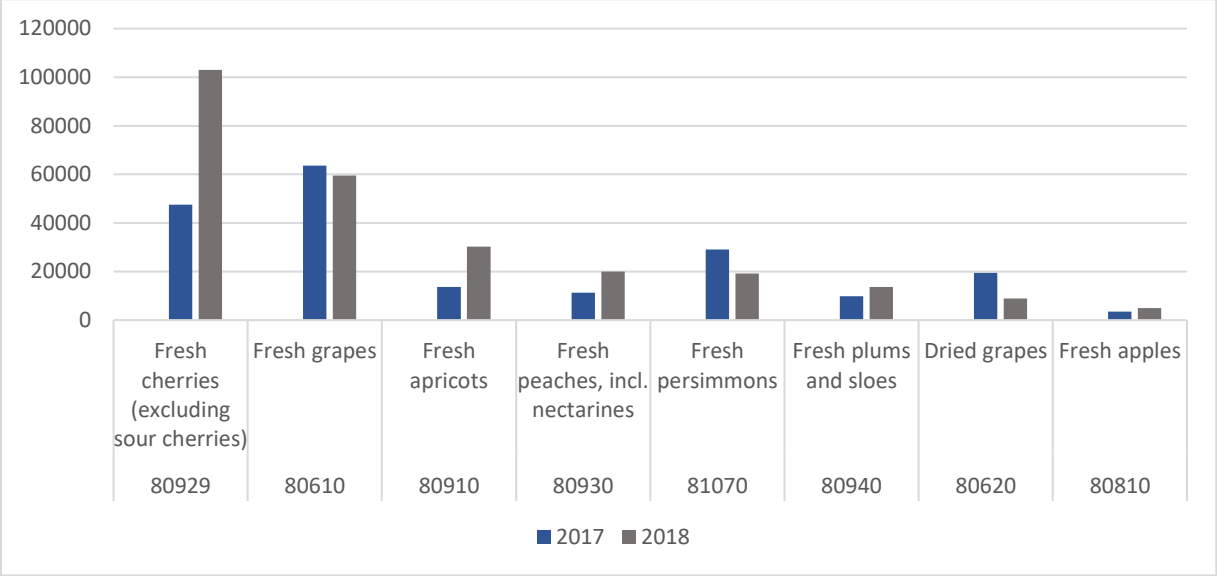

Figure 22: Export to Kazakhstan by HS code in 1 M USD. Source; https://www.trademap.org/.

During the interviews, a keen interest to explore the opportunity to export fruit to Europe was noticed. However, most local fruit varieties are not suitable for export to the European market at this point in time. European consumers are accustomed to seedless grape and melon varieties, but those grown in Uzbekistan are not seedless. Other export barriers include grading and packing, which is mainly done in wooden crates. Conversely, the European market increasingly demands fresh fruits that are sorted into carton boxes, trays and punnets. Carton packaging must be imported and is costly for exporters. Moreover, certification (HAACP) and uncertainty about residue levels is another concern for European importers.

Drivers of demand for rootstocks

Cherries

Uzbekistan ranks fifth in terms of total production volume with 95.000 tons and had 4.1% shares of world cherry imports in 2019. Cherries are also one of the promising export-oriented fruit crops for Uzbekistan. The harvest season for the fruits start the end of April and continues till the end of July. The most important producers of cherries are situated in Tashkent and Namangan region. China is an

[50] Regional government of Jizzakh, 2019
[51] http://uzagroexport.uz/en/
[52] HS code 008
[53] https://www.trademap.org/

upcoming import market for cherries.[54] Uzbekistan is relatively early on the market but is in competition with South Korea.

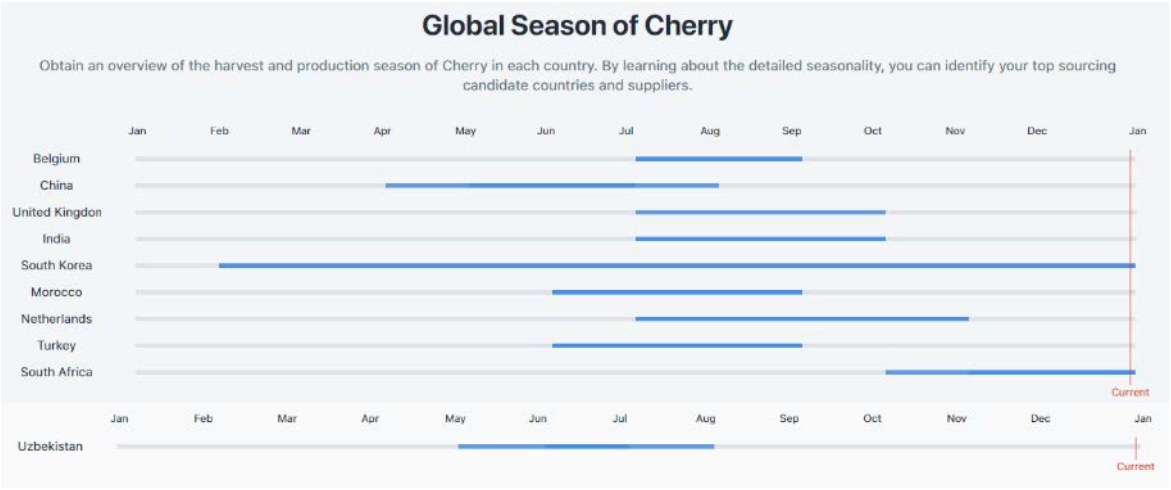

Figure 23: Global Season of Cherry. Source; https://www.tridge.com/.

Apricots

In 2019, Uzbekistan ranked second after Turkey with 662.000 tons of apricot production and had a 17.1% share of world imports (see figure 24). Apricot harvest in Uzbekistan is between April and September (Table 17), and local varieties and cultivars of apricot are Galta Roja Apricot, Moniqui Apricot, Dina Apricot, Spring Gold Apricot and Brittany Gold Apricot,

The density of most of traditional apricot orchards in Namangan is low with around 300 trees per ha. The ten-year-old trees will yield between 20–50 kg apricots and older trees, up to 100 kg/per tree. In 2017, within the framework of the EU-funded "Sustainable Development in Rural Areas of Uzbekistan", an intensive dwarf tree apricot orchard was established in Namangan. In its third year, 10–20 kg apricots per tree were harvested, and the projected yield will be around 50 tons per ha.

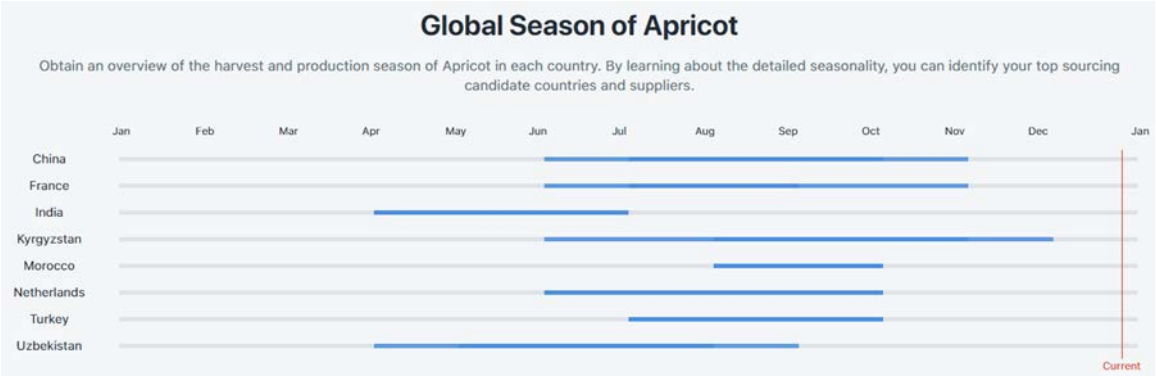

Figure 24: Global Season of Apricot. Source; https://www.tridge.com/

Uzbekistan is early on the market which creates opportunities for export, provided the quality, packaging and post-harvest conditions are up to international standards.

[54] https://www.producereport.com/article/season%E2%80%99s-first-shipment-uzbek-cherries-reaches-shanghai

Figure 25: Fruit in Uzbekistan at a local market

Fruit Processing Developments in Uzbekistan

Fruit Drying

Most fruits are produced for the fresh market as there is limited processing capacity for fruits in Uzbekistan. The most important fruit processor and exporter is Gold Dried Food Export LLC, which was founded in 2012. A modern factory was built in 2016 with foreign expertise and includes a cold storage/freezing capacity of 10,000 m^2 built by a Dutch company[55].

Sunny Fruit is another major processor of dried fruits. They are fully certified (ISO 9001 and HACCP) and offer organic grown fruits and nuts[56].

Figure 26: Dried fruits offered for sale at a local bazaar. Source; Sunny Fruit.

Juice extracting

Within the framework of the EU-funded project "Sustainable Development in Rural Areas of Uzbekistan", an Austrian pomegranate juice-extracting line was procured and installed in the village of Dehkanabad, Mirzabad district, Syrdarya region in the premises of the Dehqonobod Asl Anori Cooperative. Additionally, in 2019, companies from Korea, Turkey and the Netherlands showed interest in the Syrdarya pomegranates. In order to increase the trust of potential buyers, the cooperative was able to pass certain stages of international quality testing such as GLOBAL GAP and HAACP.

Juice concentrate

Multinational companies like PepsiCo have been sourcing apple juice concentrate from Uzbekistan. The company LLC Afrosiyob Meva invested $3.5 million with the support of a WB loan to purchase European processing lines to fulfil these demands. The company sources the fruits from 1000 different Dekhans farmers and independent commercial farmers in the Samarkand region[57]

[55] https://www.celtic.nl/en/news/
[56] Sunny fruit LLC, 2019
[57] The World Bank, 2017.

Some recent government initiatives to improve the processing of fruits initiated a joint venture between Egypt and Uzbekistan businesses to produce natural jams and pastes.

Walnut cracking and packing

Besides the juice extraction line in Syrdarya, a walnut cracking and packing line was installed in Kitab, Kashkadarya within the framework of the "Sustainable Development in Rural Areas of Uzbekistan" project. The walnut processing line will be tested in the upcoming 2020 season.

Shock freezing of fruits

In recent years, shock freezing of fruits has also become popular. There are several processors in Tashkent for freezing berries, cut fruits and vegetables. An Uzbek-German joint venture project "Navigul'' based in the Khojaabad region of Andijan is processing and freezing fruit and vegetable products.

Policies to support innovation and growth of the fruit sector

The government aims to increase the export of fruits and vegetables to $5 billion in the next three years. The conversion of agricultural land planted with cotton into fruit orchards and the modernisation and replanting of old, less-productive orchards with modern ones should support this export. Investments have been planned with the support of the WB to build in vitro laboratories and improve research institutes. The productivity and focus will be on cherries, apricots, pomegranates, peaches, plums and walnuts. However, starting material to support this growth will have to be imported.

The Agency for Development of Horticulture and Greenhouses has been tasked by the Min AG to organise this transition. The agency was founded in spring 2019 and their main short-term aim is as follows:

i. Allocate crops per region, (re)plant 36,000 ha orchards with new trees in the next three years of which 10,000 ha will be from wheat and cotton;
ii. Create nurseries to grow rootstocks;
iii. Promote investments and public private partnerships.

The agency seeks to establish cooperatives and combine farms to create better economies of scale. The plan is to attract investments in the processing of fruits and offer land to investors. The short-term challenge will be the production of rootstocks and training to farmers on how to grow fruit trees using drip irrigation.

The Research Institute of Horticulture, Viniculture and Winemaking named after Makhmud Mirzaev – is under the agency and will support the developments. Currently Uzbekistan has 5 in vitro labs of which 2 are at the Mirzaev institute. The government strategy is to increase the funding to research institutes, and the WB is developing budget support to invest in laboratories while looking for other donors to support the management and drive these institutes.

AgLinks and AgLinks Plus projects by DAI have invested in the operation of a tissue culture lab and supporting government institutions to propagate disease-free, true-to-type plant materials locally and distribute them to certified nursery operators. This technology could produce around 5,000 virus-free and salt-tolerant rooted fruit plants each week and produce seedlings all year round. However, examples showed that the lab operates on less than half its capacity due to a lack of specialists.

There is also a total of 17 subsidiary research centres located in the provinces that fall under the overall management structure of the Mirzaev Institute. Following the new government policy on the horticulture sector, the institute has been active in propagating improved fruit trees on improved

dwarfing rootstocks – a total of 5.5 million trees have been produced by the institute in the past five years and subsequently distributed to Uzbek farmers[58] with the aim of improving and intensifying orchard production. Planting material from the institute is in high demand because of the institute's reputation and lower price of the materials. For example, in the summer of 2019, the price of one sapling (apples, cherries, grapes, etc.) was between 8,000–12,000 SUM ($1–$1.2), while the price of identical imported material was between $5–$6. Most of the saplings and rootstocks produced by the Mirzaev institute and private enterprises have no true-to-type certificates, and most of them cannot ensure that they are virus-free. In addition to these formal outlets, many Dekhan farms produce and trade their own seeds and saplings.

Although the government of Uzbekistan aims to develop local fruit chains and clusters to modernize the planting and cultivation, most of the support doesn't reach small-scale farmers as the ambitious investment proposals and projects seem to not match with current small-scale practice and traditions. Some of the main bottlenecks smaller farmers face include the following:

i. Cultivation advice is often written down in Russian, which most Uzbek farmers can't read and/or write. Further, the language used is too academic and the advice is not practical enough;
ii. Through excessive (over)use of fertilizers, much farmland is completely weary. This is particularly applicable to farmland cultivated with cotton. Restoring soil structure and fertility is needed before former cotton land is suitable for fruit production;
iii. Lack of post-harvest storage facilities. Apple-growing Dekhan farmers annually rent local private cold storages to store their apples. In 2018, the costs of storing escalated because of high demand, but the market prices during the off-season for apples remained low, and the farmers thus lost money;
iv. Uncertainty about the new cluster approach and an increase in minimum plot-sizes for vegetable and cotton contracts.

Post-harvest storage

Today, most fruit is sold off the tree before the harvest by traders, consequently their bargaining power is extremely low. Several projects have been initiated by TGS[59], GIZ, FDI[60] and EU to improve post-harvest fruit storage and the income of farmers. In this context, the government has announced the building of eight Agri-logistic centres using ADB and WB loans; these centres will provide packing and storage facilities[61].

Water

Most areas suitable for agriculture deal with large periods of drought and extreme temperatures, without irrigation harvests will fail. Good irrigation water is however scarce and often provided through open irrigation channels. These open irrigation channels are not efficient; evaporation is high. For new modern fruit orchards, drip irrigation seems to be the new standard. The decree # PQ-4243 from March 2019 by President Sh. Mirziyoyev states that fodder crop producers will be provided with subsidies to improve efficiency of water use. The decree however does not consider the drip irrigation investments for modern orchards at Dekhan farms. While drip irrigation costs between 1600–2500 $/ha. Many irrigation systems in Uzbekistan are not calculated on the crop water needs but are

[58] Turaev,(2019)
[59] www.tgsbusiness.com
[60] https://www.fruitdevelopment.com/
[61] See World Bank and ADB paragraphs

calculated to provide a competitively priced product. As a result, the system capacity is reduced to the disadvantage of the crop. The pump, filtration system, main pipes, valves and other components are too small to deliver the correct amount of water and because they are smaller, they are cheaper but resulting in suboptimal growing conditions especially during the hot summer conditions.

Import of fruit trees and rootstocks

In 2018, Uzbekistan imported plant propagation starting material (HS0602) that was mostly for fruit trees and root stocks worth $37 million. This was an increase of $7 million compared to the year before. Turkey, China and Italy are the major suppliers. Export from the Netherlands is limited and dropped to only $0.8 million in 2018 from $1.6 million in 2017 (see figure 27).

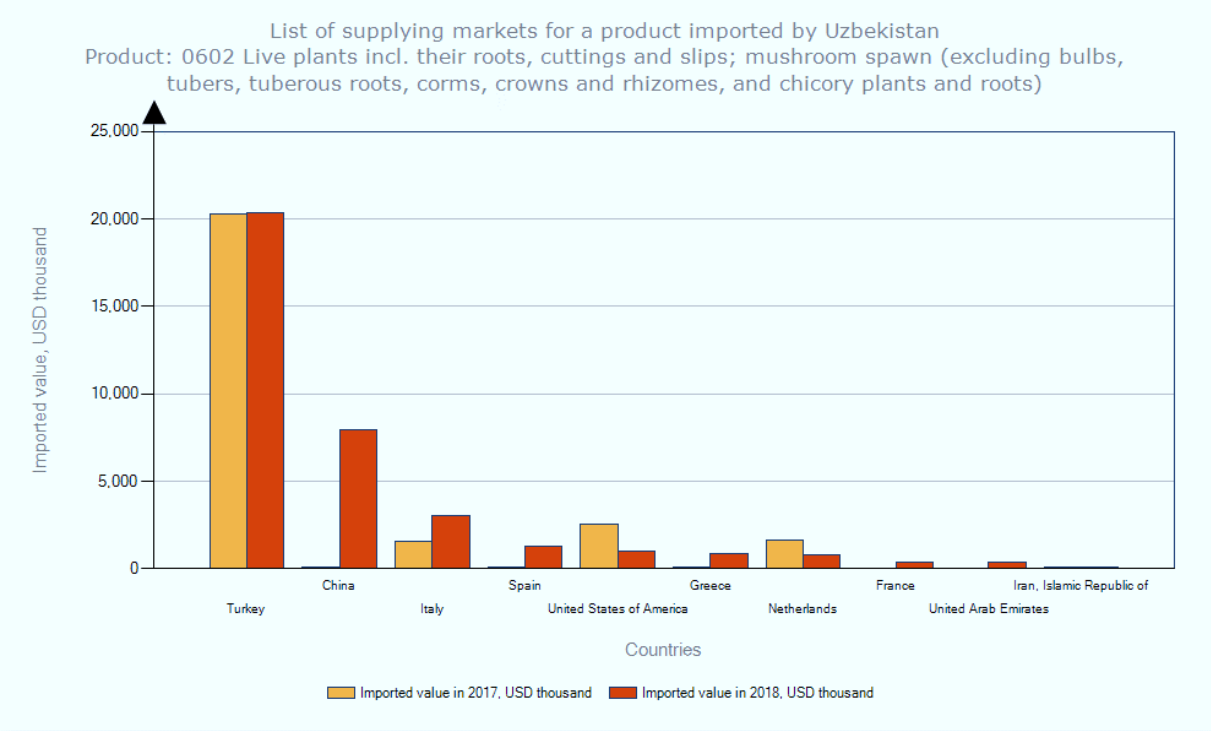

Figure 27: List of supplying markets for products imported by Uzbekistan. Source; https://www.trademap.org/.

There are several factors for why export from Netherlands is minimal:

i. Turkey entered the Uzbek market earlier than the Netherlands. Consequently, Turkey became a trusted partner of the government and farmers in intensifying orchards and collaborated in implementing many government projects besides the Turkish language and culture are close to the Uzbek language and culture;

ii. The Netherlands entered the market in 2010, but their prices were high compared to Turkish rootstocks and saplings. At that time, the price was more of an important factor rather than quality. If an apple sapling from the Netherlands costs between 5–7 €/tree, Turkey sold it for 1–5 $/tree. Walnut trees from China are offered at 3 $/tree, from Turkey at 8 $/tree and from Europe at 15 $/tree;

iii. To meet the Uzbek requirements in terms of price the quality is compromised resulting a disappointing product performance. Today according to some interviews, private investors require saplings with better quality and look at the bigger picture. This has created opportunities for Dutch suppliers of rootstocks and saplings. State procurement agencies however are still extremely price oriented.

According to statistics given by a horticulture expert, the rootstocks in figure 28 are frequently imported. Geneva rootstock for apples was especially named as a suitable rootstock because of its tolerance for drought, pests and diseases.

Apple – M9, M106, M111, Geneva
Cherry – Gisela 6, Maxma, Krymsk 5
Pear – Quince BA, OHF
Hybrid rootstocks – Myrobolan, Lovell, Nemeguard

Figure 28: import rootstock varieties

Technical Knowledge

While horticultural knowledge at local research institutes and universities are outdated, there are several demonstration projects to bridge the knowledge gap and train growers and evaluate new varieties. Most of these projects are supported with the knowledge of foreign experts and financed via donor programs.

The German development agency GIZ[62] has 7 demo plots with different planting and irrigation systems, their main focus in terms of fruits is on apples, pears, cherries, apricots, walnuts and pomegranates and in terms of regions; Karakalpakstan, Khorezm, Surkhandarya, Jizzakh, Syrdarya and Kashkadarya as well as the three regions in the Fergana Valley – Namangan, Andijan and Fergana. In this context, four demonstration orchards were established during the EU-funded "Sustainable Development in rural areas of Uzbekistan" project. While the Namangan demo orchard has apricots primarily, pomegranates were planted in the Syrdarya demo orchard. The Jizzakh demo orchard is one of the biggest among these four in terms of tree numbers and varieties with seven varieties of cherry (Burlat, Satin, Ferrovia, Sabrina, Fernier, Kordia and Ferdiva), seven varieties of pear (Passacrasana, Red Williams, Pero William, Hosui, Nyissieki, Carmen and William C), five varieties of apricot (Big Red, Springblush, Orange Rubista, Fardao, Faralia) and hybrid rootstocks (Myrobalan), while the Kashkadarya demo plot has Chandler walnuts. Further, pumps, drip and sprinkler irrigations were installed in all the orchards, and this season, the first fruits were harvested.

DAI/USAID [63]customized and installed drip irrigation systems in nine regions; introduced improved rootstock material for plum, cherry and peach; identified and defined financing options with financial and agricultural actors to promote growth; and provided technical assistance in the best agricultural practices at demo plots for crops such as cherry, peach, apple, grape, pomegranate, tomato, cucumber, onion and carrot.

Holland Rosetta will start with a cherry tree demonstration orchard. This project is supported by RVO under the DHI subsidy scheme[64].

[62] Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
[63] https://www.dai.com/our-work/projects/uzbekistan-aglinks-plus
[64] https://english.rvo.nl/subsidies-programmes/dhi

SWOT analysis

Based on our research findings a SWOT analysis for the Uzbek fruit starting material sector is summarised in figure 27.

	**Strengths** • Fruit tradition • Early on market • Export Russia / Kazakhstan • Cherries, Apricots, Grapes	**Weaknesses** • Landownership • Starting material • Export quality / grading • Low marketable yield
	Opportunities • Processing • New export markets • Modern varieties • Government strategy • Donor programs • UPOV membership	**Threats** • Water restrictions • Lack of virus free starting material • Legislation, breeder's rights, certification • Knowledge gap • Government interference

Figure 29: SWOT analysis fruit sector.

Opportunities for Dutch starting materials

Local apple and pear farmers have been facing problems with fire blight (*Erwinia amylovora*) and late blight (*Phythophthora*). Thus, virus-free and fire blight-tolerant varieties are requested. Additionally, each region has significant variations in climate, soil and availability of (fresh) water and/or salinity of water. For the introduction of new varieties, it is crucial that Uzbek farmers can see for themselves whether a variety is suitable for the local soil and climate. At the same time, it is also important that foreign varieties are adapted to the local biotic and abiotic stress conditions.

Rootstocks that can cope with periods of droughts, high temperatures and large temperature differences between day and night are best suited for the Uzbek conditions. Rootstock suppliers from the Netherlands will face strong competition from Italian and Turkish suppliers. However, the Netherlands has a good reputation in this aspect.

The WB financed Agricultural Modernisation Project[65] included a subcomponent, with the objective to piloting intensive orchard farms (with tentative budget of $ 65 million) The objectives of this subcomponent are to;

i. establish demonstration/extension pilots for intensive orchards
ii. build up technical and managerial capacities, infrastructure, to and assist with provision of external finance as well as external agronomic and business inputs needed for the orchard farms to succeed.

These pilots will involve commercially-driven farmers and will be executed as turn-key services provided by competitively-recruited private companies.

[65] Further information under the WB paragraph

Thus, the opportunities for Dutch breeders are as follows:

i. Finding suitable rootstocks for Uzbek climate and soils and exporting them for affordable prices; rootstocks for pears (Quince BA, OHF) are one such example. The current prices for OHF in Uzbekistan are between 0.8–1 $/rootstock[66];
ii. Opening or supporting local vitro labs in order to propagate rootstocks and saplings locally; train specialists who can manage these labs.
iii. Market certified saplings with a warranty that proves its quality and will increase the interest in Dutch starting materials;
iv. Establishing the Dutch version of demonstration orchard and nursery in regions where new orchards are being planted;
v. Look for private investment partners and offer turnkey solutions, incl. extension services.

[66] De Nova Agro

The potato sector

Uzbekistan is a net importer of ware potatoes. In 2017 and 2018 around 200.000 ton of fresh potatoes were imported, mainly from Kazakhstan[67]. Potato is the third most produced crop (see figure 30) after vegetables and cereals. According to the official statistics, the annual consumption of fresh potatoes is around 54 kilograms per capita, which is half of the consumption of the neighbouring country of Kazakhstan. Both potato production and consumption have shown an upward trend driven by population growth and changing consumption patterns. Further, the overall demand for processed potatoes, like French fries and crisps, is expected to grow in the next decade. The fast-food chain, Kentucky Fried Chicken, just opened its first restaurant in Tashkent[68] this autumn.

The potato area is increasing yearly by 2–3%, and according to the Min AG, the total production area planted with potatoes was around 90.000 ha in 2018[69]. Most of the potatoes are furrow irrigated. Potatoes are mostly sold unpacked by farmers and traders at difference price levels beside the road or at local bazaars.

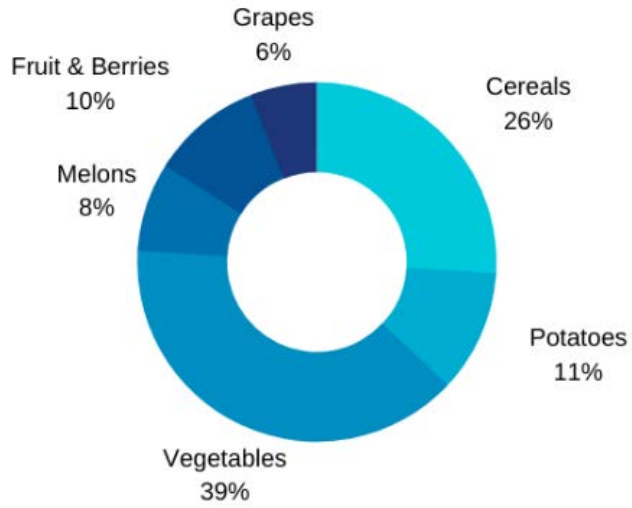

Figure 30: Volume of crop production in percentage per crop, source 2018, https://www.stat.uz/.

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Most potatoes were planted in the Samarkand area on almost 17,000 ha of land in 2017, followed by the Tashkent region (almost 15,000 ha in 2017). Two crops per year are planted in Uzbekistan, first the spring crop from February till June and the shorter autumn crop from the end of July to the end of October.

According to the official statistics, the total harvest was around 2.7 million tons in 2018. This means a statistical average yield of 30 tons per hectare, which is well above the world average[70]. During our field research, farmers claimed that under good conditions, starting with the right quality virus free seed potatoes, yields between 30 and 40 tons are realistic. However, yields are much lower in practice at small holders' fields where farm saved seeds are primarily used. Estimated is the overall average

[67] https://trademap.org
[68] https://tashkenttimes.uz/national/2864-first-kfc-outlet-opens-in-uzbekistan
[69] Consumption production area in the Netherlands is 78.000 ha, source NEPG 2019
[70] World average yield = 20 ton/ha FAOSTAT 2019

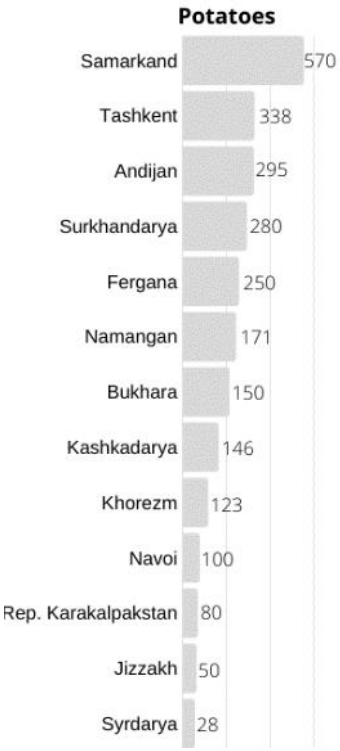

Figure 31: Potato production per region, in 1000 tons. Source; The state committee of Uzbekistan on statistics, 2018a.

gross yield per ha to be around 20–25 tons per hectare for Uzbekistan. Most farmers save about 15% (approx.4–5000 kg) of their harvest for replanting[71] and buy new seed potatoes every 3–4 years.

The post-harvest situation and storage capacity is limited, and storage conditions are not ideal; therefore, it is expected that more than 10% of the crop is lost during storage or downgraded to cattle feed. By increasing the potato post-harvest conditions and moving away from farm saved seeds, Uzbekistan can take their potato industry to a higher level with the same amount of land and fulfil the increasing demand.

Since the Uzbek Government plans further reductions of cotton production, it seems realistic that the potato area will continue to grow. However, the limited availability of water could frustrate further growth of the area.

Figure 32: Selling potatoes in Uzbekistan.

Figure 33: Potato field (variety Gala)

[71] Farmers plant an avg. of 3500 kg seed potatoes per ha, and we assume a storage loss of 10–15%

Farm structure

A small number, of large agri-companies and clusters, grow potatoes on a larger scale. Most of the production volume (88%) is achieved however by Dekhan farmers on their small plots of land (see figure 34).

	All categories of farms	Independent commercial farms	Dekhan farms	Agricultural enterprises
Potatoes	2.750	300	2.433	18

Figure 34: Production by type of farmer. Source; https://stat.uz/uploads/doklad/2018/yanvar-dekabr/en/4.pdf.

Major players

Around the 10 – 12 of the leading larger potato-growing companies can buy seed potatoes and farm technology directly.[72] The company Agrover[73] is by far the biggest potato grower and packer with a cropping area of 6000 ha. Yield on their furrow-irrigated fields is 25 ton/ha and on fields with sprinklers, it is 30–40 ton per ha. The company imports annually around 10,000 ton[74] of elite seed potatoes. The elite seed potatoes are replanted by specialized farms for further multiplication and resale as well as Agrover's own use.

The early planting season start in the Surhondarya area in January followed by the Tashkent region in February/March. In the uphill areas, the planting starts in May–June. The second crop is after the wheat harvest in July–August. The harvest is from June till November.

Agrover has a state-of-the-art potato facility that uses Dutch potato trailers and a Dutch professional storage. The company has a packaging line and a brand-new potato processing line for frozen pre-fried potato products and potato flakes. The processing line has an output of two tons finished product per hour. The line was not yet in operation during the visit.

Agrover has potato trial fields with varieties of all major Dutch and German potato breeders and are a founder of the Association of Potato Growers[75] .

[72] Source interviews
[73] https://agrover.uz/en/#home/1
[74] 10,000-ton elite seeds will generate approx. for 15,000 ha of starting material for the next season
[75] http://kartoshka.uz/en/

Processors

Besides Agrover, the other noteworthy potato processor in Uzbekistan is Bahteev Renat, a company located in Qarshi. Bahteev Renat produces a small range of potato crisps.

Foreign investment in potato processing is limited. One of the leading Dutch potato processing companies has studied the opportunities to build a factory in Uzbekistan. They have a keen interest in the region but decided to build a new factory in the South of Kazakhstan.

The total input of raw material in the total Uzbek potato processing can be estimated at 60,000 tons per year. However, the availability, reliability and constant supply of high-quality potatoes to the factory cannot yet be guaranteed in Uzbekistan.

Figure 35: Agrover processing line Figure

Figure 36: Local crisp brand

Several high end retailers offer a small range of modern pre-fried frozen potatoes for extreme high prices, mostly imported from Belgium or Belarus.

EU funded potato projects[76]

Development of the potato value chain in the Fergana valley is supported through the framework of the EU funded project "Sustainable Rural Development in Uzbekistan". In 2017 demo plots were planted with French varieties. Training sessions on technologies for harvesting, storing and processing potatoes, as well as soil preparation, fertilization and pest control had been organized by a French expert from the National Federation of Potato Plants Producers. The project is being managed by GIZ and co-funded by the EU and Ministry of Economy of the Republic of Uzbekistan. It will be completed in 2020.

[76] http://uzruraldev.eu/en/content/study-visit-france-potato-sector-development

Seed potatoes

It is estimated by the interviewed experts that 95–98 % of Uzbekistan's potato area is planted with farm-saved seeds. Only a few percent of the total crop are planted with certified seeds, mainly from Europe. There are conflicting statistics available on the total import of seed potatoes. According to the field research, the total import of certified seed potatoes is between 20.000–30.000 tons per year. The total import of both certified and non-certified seed potatoes was 40,000 tons in 2017. Around 80% of the total imported certified seed potatoes to Uzbekistan are of European origin, the Netherlands has the largest market share. The six-year average import of seed potatoes from the Netherlands is 10 million tons. Fluctuations are large and depend on late season availability of seed potatoes.

Besides the Netherlands, seed potatoes are also exported to Uzbekistan by France and Germany. The other 20% includes imports of non-certified seed potatoes from Russia and Kazakhstan.

Imported potato varieties
Rozara (DE), Picasso (NL), Sante (NL early)
Astrix (NL), Mondial (NL), Necskiy (RU)
Manitu (NL), Romano (NL early), Aladin (NL)
Diamant (NL), Pekaro (NL)

Figure 37: Main imported potato varieties by Uzbekistan.

Over the last six seasons, Uzbekistan has imported the following quantity of seed potatoes from the Netherlands:

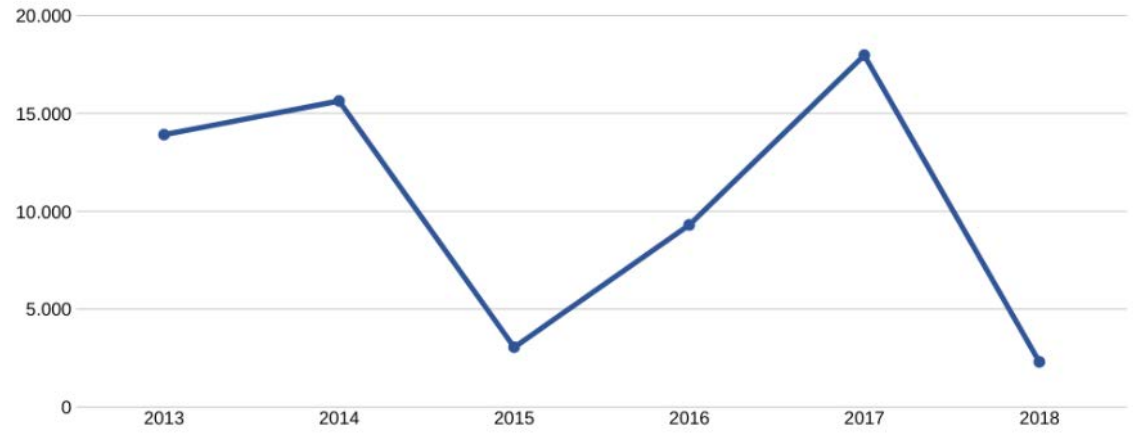

Figure 38: Export volume seed potatoes based on harvest year ('000 tonnes). Source; NAO, 2019.

All imported seed potatoes must be registered in the State Variety Register[77], have an import permit and be checked by the Uzbek Quarantine Department. The inspection of seed potatoes is conducted yearly in the Netherlands by inspectors from Uzbekistan.

[77] www.goskomsort.uz

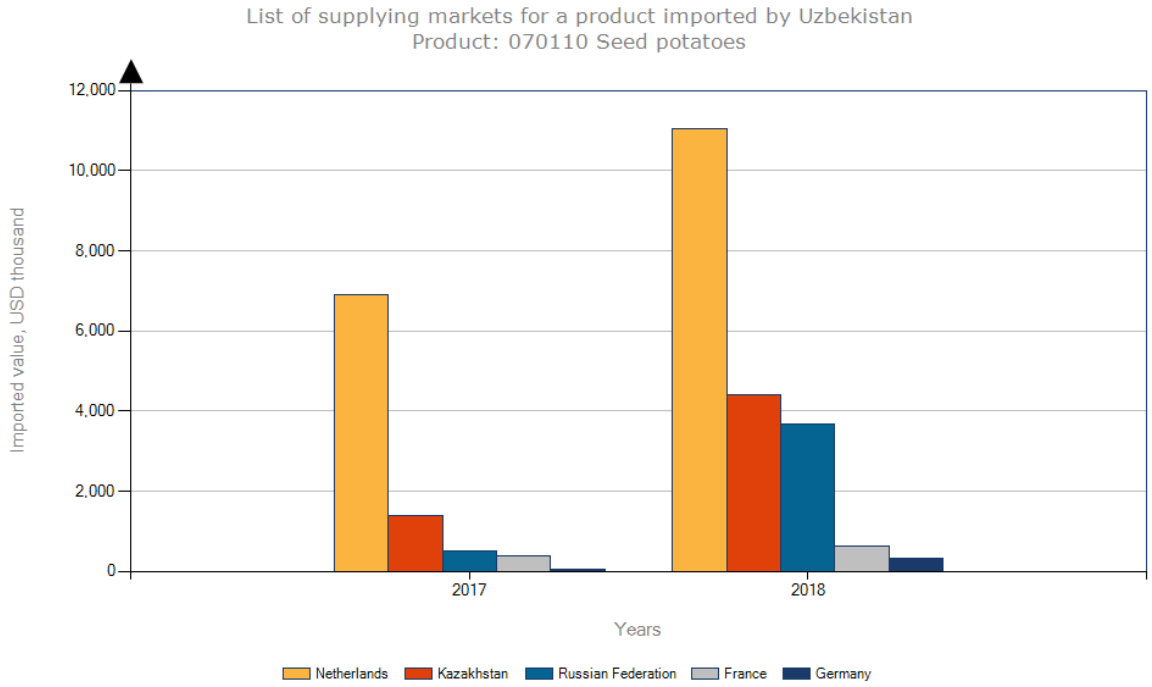

Figure 39: Seed potato import volumes by country based on year statistics. Source; https://www.trademap.org/.

Most of the imported seed varieties are classes S, SE and E (G5–G7) and so-called ''free'' varieties. In practice, Dutch breeders do not feel comfortable enough to send their exclusive potato varieties, like the new generation high-yielding processing varieties to Uzbekistan due to the lack of PBR protection and enforcement.

The association of potato producers

The Association of Potato Producers was established by resolution "On measures for the further development of seed potato cultivation Uzbekistan"[78] by the President of the Republic of Uzbekistan in February 2018. Agrover is one of the founders of the association along with Usimliklar Technologies LLC. The main purpose of the association is as follows: "*…to develop the domestic potato seed production based on foreign technologies, establish regional specialized potato seed centres, ensure the varietal purity, training….*"[79]

The association is involved in forecasting the volumes seed and consumption potatoes in Uzbekistan, as well as coordinating of the activities of potato-seed growing organizations and farms. Based on the soil and climatic features of the republic, seven potato-growing centres have been created[80] (see annex 2). The association has an in vitro laboratory and planning a very ambitious first generation (G1) in 2022 with an average yield of 20 ton/ha on 12500 ha via the production of mini and micro tubers.

The potato centres within the association are exempted from paying import duties for imported equipment, seed potatoes until 2022.

[78] https://sovminrk.gov.uz/qr/pages/show/6747
[79] http://kartoshka.uz/
[80] http://kartoshka.uz/assotsiatsiya/centers/

Invitro laboratories and hybrid seeds

The Polish Institute of Seed Farming and Potato Protection, the Institute of Bio-organic Chemistry and the Academy of Science of Uzbekistan are building a new Invitro laboratory to supply farms with healthy virus-free potato seeds[81]. Additionally, at the Institute for Potatoes, Melons and Vegetables, mini tubers are grown and researched in a greenhouse. Hybrid True Potato Seed varieties are demonstrated with support from the Netherlands Enterprise Agency in Uzbekistan by Solynta[82]. The first demonstration fields were set up in close cooperation with the company Agrohouse[83]. In 2020, additional demonstration fields will be planted with hybrid seed varieties in several districts.

Figure 40: Mini tuber production at the Institute for Potatoes, Melons and Vegetables

Figure 41: Seed potato demonstration using elite hybrid true potato seeds.

Within the framework of the WB financed Agricultural Modernisation Project[84] the Institute of Vegetables, Melons, and Potatoes will receive $2.6 Million for innovative potato seed tuber technologies.

[81] https://www.potatobusiness.com/agro-news/poland-backs-potato-seed-production-developments-in-uzbekistan/
[82] https://solynta.com/
[83] http://www.agro.house/
[84] See WB paragraph for more details

SWOT analysis

Successful potato production largely depends on the quality, genetic capacity and health status of the planted tuber, i.e. the starting material. With each generation, multiple virus infections reduce the yield of the potato crop by 10–30%[85]. Virus-free starting materials are, therefore, crucial, and they directly contribute to obtaining higher yields. This is one of the major challenges for Uzbekistan as there is no certification scheme or service in place to ensure that the seeds are certified and meet the requirements, resulting in a low average yield and the inefficient use of land and water resources. The major findings are summarised in below SWOT matrix.

	**Strengths** • Potato area • Two crops per year • Local demand • Donors/government attention to agriculture	**Weaknesses** • Landownership • Irrigation systems • Post-harvest facilities • Knowledge • Lack of good starting material
	Opportunities • Added value; processing, retail • Export early/late • Increase yield and quality with modern varieties/technology • UPOV membership • Hybrid True Potato Seeds	**Threats** • Water scarcity • Lack of virus free starting material • Legislation, breeders' rights, no certification • Knowledge gap

Figure 42: SWOT analysis potato sector

Barriers for Dutch seed potatoes

Transport

Uzbekistan has no seaport, so all transport must go over land. This is a major challenge, especially for seed potatoes. Seed potatoes from the Netherlands are usually shipped by a combination of sea and train or only by train. The potatoes have 2–4-weeks transfer time, which is a quality risk —especially if the potatoes are not shipped in refrigerated containers or trucks. The transportation costs from the Netherlands for non-refrigerated containers cost around € 300,- per ton. However, this form of transport is only an option after the winter. Transport by refrigerated truck costs around €400,- per ton. Transport is considered by both exporters as well as Uzbek buyers one of the most important challenges.

Planning and timing and payment of shipments

Uzbekistan is the last destination on the export calendar for Northern European seed potato exporters. Uzbek importers do not guarantee, reserve and prepay for the seed potatoes in advance.

[85] Seed potato technology, Struik and Wiersema – Wageningen University

Consequently, European exporters only offer what is still available at the end of the export season. The available varieties are the so-called ‘‘free’’ or non-royalty bearing varieties.

Planning and availability

If seed potato yields in Europe are down because of wet or too dry conditions, the export volumes will be first allocated to industry clients, who order years in advance and to importers who have guaranteed the orders. The fluctuation in seed potato export volumes to Uzbekistan we observed in recent years can be partly explained by the availability of seed potatoes.

Plant breeders’ rights

Breeders are reluctant to send their high-value varieties with better yield and disease resistance to Uzbekistan because of the potential infringement of their breeders’ rights. Besides Uzbekistan’s importers are generally not ready to pay the premium for these varieties.

Opportunities for Dutch starting materials

Although the potato association has ambitious plans to produce, through rapid multiplication technics large volumes of local certified seed potatoes in the next years, the local challenges will be immense, and success not guaranteed. The centres were recently created, besides the climate is not ideal and there is a potential lack of expertise to keep the seed potatoes free from viruses and to achieve the predicted volumes. The demand for elite seed potatoes is expected to remain high in the next years and will increase each year with the growing population and the demand for processed potatoes in the country. High value varieties with higher yields and better disease resistances combined with Dutch potato technology under drip irrigation will improve efficient land-use and reduce the area under potatoes and could fuel the demand.

Hybrid True Potato Seeds could become an alternative new starting material in the next years, the small seeds are easy to transport, store and available year round.

The vegetable sector

According to official statistics[86], Uzbekistan produced 11.5 million tons of vegetables and melons in 2018. Compared to 2017, the total production under melons and vegetables reduced by 2.0 million ton, primarily due to lower levels of vegetable production, melon production remained fairly stable. Dekhan farmers account for 75% of vegetable production and 60 % of melon production.

Andijan, Samarkand and Tashkent are major vegetable-producing districts. Although all districts of the country produce melons of which Syrdarya, Surkhandarya and Jizzakh are the major regions (figure 43).

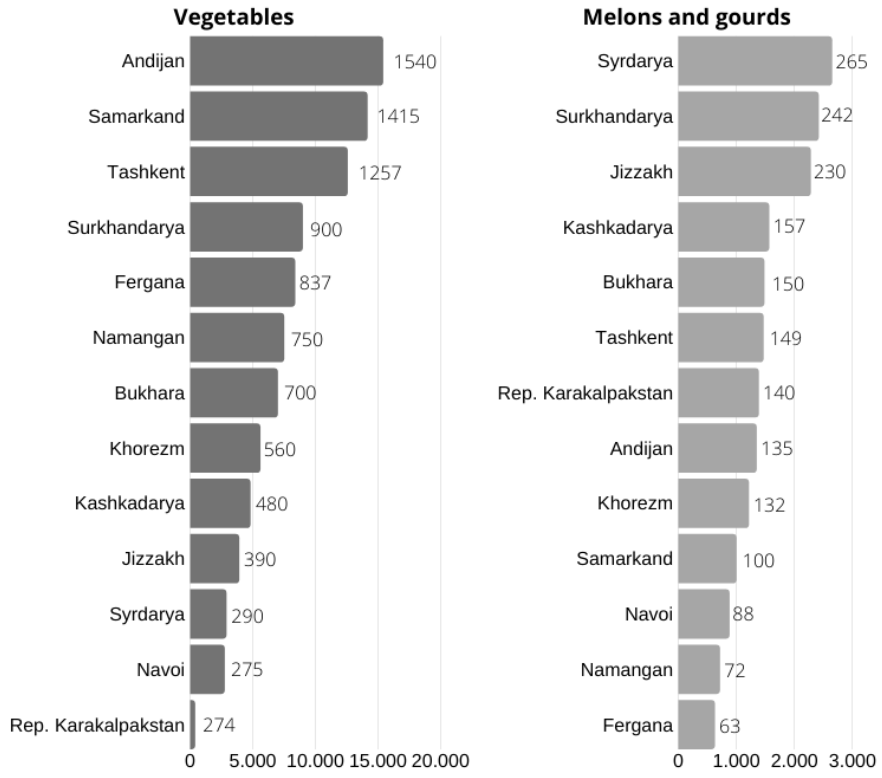

Figure 43: Vegetables and melon production in thousand tons per region, source www.stat.uz

The main cropping season in Uzbekistan is from March till the end of October. Tomatoes, watermelons, carrots and onions are the most popular vegetable crops in Uzbekistan, accounting for 75% of the total area under vegetables (figure 44).

Tomatoes are cultivated in open fields—during the long hot summer—and in plastic greenhouses and tunnels to prolong the season. Open field production is for fresh consumption as well as for production of tomato powder and paste. The open-field production levels are low with 50 to 60 ton of marketable yield. Tomatoes are also grown in so-called mid-tech tunnels in soil or hydroponics. Tunnel production helps increasing yield and improving quality of fruits and reducing waste. Yield levels in tunnels can be 65-70 ton per hectare.

[86] www.stat.uz

Crop	2010 ha	2017 ha
Tomatoes	63.100	60.486
Watermelons*	33.530	35.704
Carrots and turnips	24.600	30.948
Onions	29.900	28.063
Cucumbers and gherkins	13.00	19.537
Melons**	14.370	15.302
Cabbages and other brassicas	11.800	11.429
Chillies and peppers, dry	1.600	1.549
Chillies and peppers, green	600	829
Beans, green	500	564
Eggplants (aubergines)	200	520
Leeks, other alliaceous vegetables	200	418
Lettuce and chicory	200	346
Total area under vegetables	**193.600**	**205.725**
*Watermelon area is recalculated and split with melon 70/30 **Melon is not recorded by FAOSTAT, own calculations		

Figure 44: Vegetable production in ha source FAOSTAT, interviews

On March 20, 2019, the President of the Republic of Uzbekistan issued the decree on "Measures for the further development of horticulture and greenhouses in the Republic of Uzbekistan". To develop these sub-sectors the Horticulture and Greenhouse Development Agency was created under the management of the Ministry of Agriculture.

The Agency's main tasks are to increase the area of greenhouses, use modern resource-saving technologies, such as drip irrigation, develop a cooperative system and organize the value chain from harvesting to selling. It plans to establish cooperatives in 55 areas. During the field research, we observed that the government's involvement in the allocation of crops and reallocation of land is significant and contradictory to the 2020–2030 strategy to create a more entrepreneurial sector. The Agency focuses on state regulation of greenhouse crops and orchards, and central procurement of input supplies such as seeds and plants for the new cooperatives. Outdoor vegetable crops are beyond its scope; participation of Dekhan farmers responsible for the bulk of vegetable and melon output are also out of its scope. The Agency reports that there are 1800 different farms with greenhouses, covering a total area of 4100 ha.

Export

Export of fresh vegetables and melons increased up to 40% from 217 million $ in 2017 to 307 million $ in 2018[87]. Facilitated by the geographical proximity and CIS Free Trade agreement, Kazakhstan was one of the largest export markets for Uzbek vegetables. Value of vegetables exports (HS Chapter 07) to Kazakhstan was 75.1 million $ in 2017 and 92 million $ in 2018. Tomatoes, onions and cabbages are the mostly exported vegetables to Kazakhstan (figure 45). With the ambitious agriculture strategy plan 2020–2030, the export of vegetables is expected to continue to grow. However, Russia has doubled its own greenhouse area since the EU embargo and production of greenhouse vegetables has increased by 65% since 2014[88]. Most newly built Russian greenhouses are modern Dutch glasshouses that deliver high yields[89] up 60-70 kg per m². Thus, the cost price per kg of produce will be very competitive. Uzbekistan has, compared to Russia, enough sunshine in winter and relatively mild winters, which will reduce the cost of heating, but their export markets are further afield.

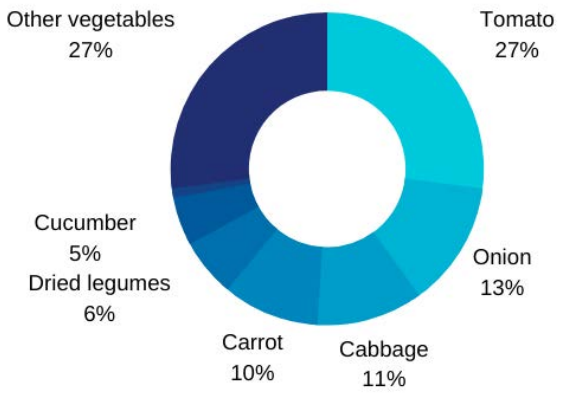

Figure 45: Structure of the export in 2018 to Kazakhstan. Source; tradmap.org

Around 20% of the fresh tomatoes from the open field production and almost 60% from the indoor production is exported, making tomatoes an economically valuable crop, which can increase farmers' income. Besides the major horticultural crops, eggplant and pepper were frequently referred to as potential growth crops for export during our field research.

The import of vegetables into Uzbekistan was small with less than 4 million $ in 2018.

Greenhouses

Uzbekistan has 4100 ha plastic film greenhouses of which 1500 ha are mid to high-tech greenhouses[90]. High-tech greenhouses grow plants on hydroponics systems and achieve much higher yields. Approximately 80% of the greenhouse area is planted with tomatoes and 20% with cucumbers. In the last 2 years, acreage of greenhouses increased with approximately 1000 ha. In coming years, another

[87] HS code 07 edible vegetables, source https://www.trademap.org
[88] https://www.hortidaily.com/article/9131530/russia-s-greenhouse-vegetable-production-up-65-since-import-ban-five-years-ago/
[89] Yield up to 40-50 kg/m2
[90] Interviews & Horticultural Development Agency based on new data

1500–2000 ha is to be build. The Horticulture Development Agency reported that last year, approx. 750–1000 ha of greenhouse construction materials was imported mainly from Korea, Turkey and China.

In November 2018, a presidential decree on "Measures to create additional conditions for the development of greenhouse complexes" was published[91]. It describes 105 projects with a total surface of 800 ha and investment of 343 million $. Part of the funding (200 million $) is planned to be included in credit lines from the World Bank, Asian Development loans and other international institutions. The decree has announced favourable investment conditions such as manufacturers' tax incentives and exemption from customs fees for imports of construction materials.

The first Dutch glass greenhouses have been completed in Tashkent region by Delfland Asia. The total project is 3 ha and first 1500 m are under test production with cucumbers since December 2019[92]. The company Bilancia from the Netherlands will provide agronomy support and train the local team of growers. It aims to grow tomatoes according to Dutch technology and achieve 50 kg per m2 in a full year cropping cycle after the test production.

Kubo, another Dutch company, announced the construction of an Ultra-Clima greenhouse of 5.5 hectares in the Khorzem region[93].

In Bukhara region, a free economic zone has been created since 2018 on 3000 ha of land. One of the investment projects is the construction of modern glass greenhouses on an area of 115 hectares with Turkish investment. The first 30 hectares are being developed to produce 30–56 kg per m2.

Several other investment projects to build greenhouses have been announced; the Russian Eco-culture[94] announced a project to build 300 ha greenhouse with total project budget of 320 million $. The British company "Paraglide Limited" and the Russian company "Petromaruz Capital" are planning to create a modern agrarian-industrial cluster in Tashkent region,[95] which also includes greenhouses.

[91] https://lex.uz/docs/4068990
[92] https://www.uzdaily.uz/en/post/49783, source interviews
[93] https://www.kubogroup.nl/
[94] https://invest.gov.uz/map/organizatsiya-sovremennoj-teplitsy-na-ploshhadi-300-ga/
[95] https://kun.uz/en/news/2018/12/05/

Vegetable seeds market

In 2018, Uzbekistan imported $12.5 million vegetable seeds[96], an increase of $5 million compared to 2016. The growth is primarily due to the expansion of the area under greenhouses[97]. Most of the imported seeds are from the EU; all imported varieties are hybrid varieties. The Netherlands, with $4.3 million, is the biggest supplier of vegetable seeds. The Netherlands and France are losing some market share to Israel and Italy. Italians are strong in the processing tomato segment for paste and powder production.

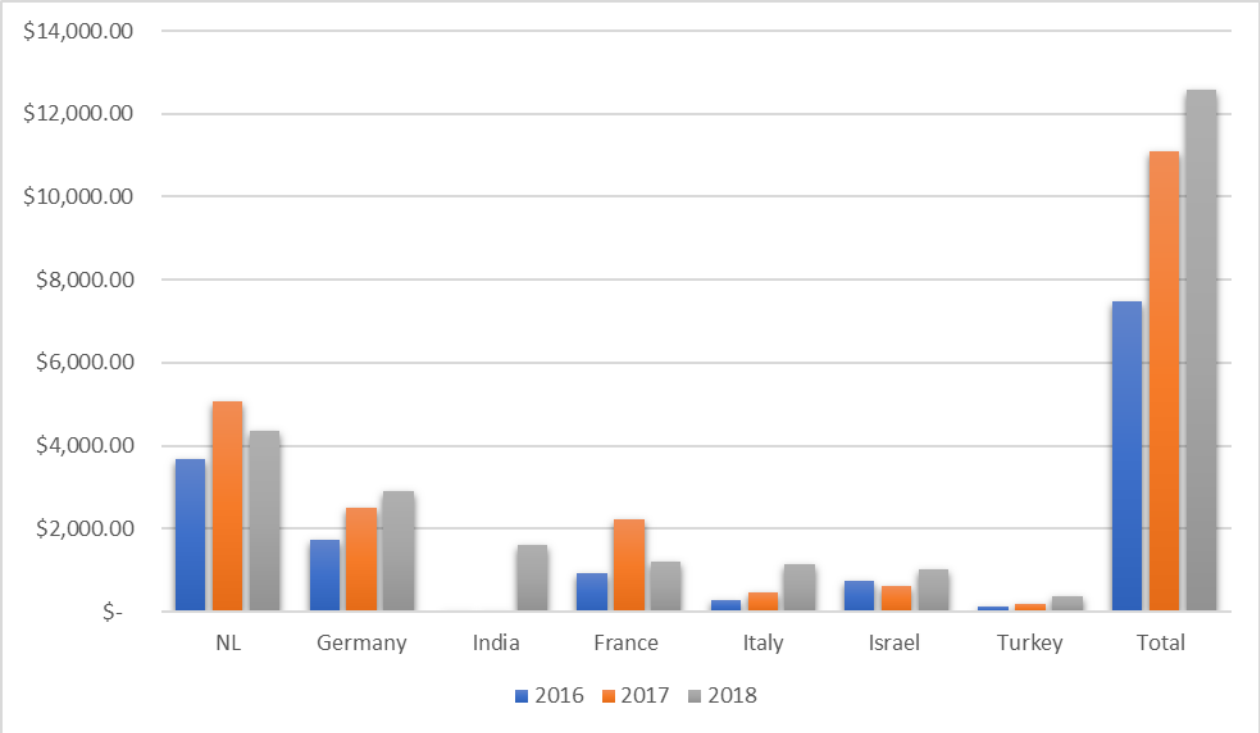

Figure 46: Import of vegetable seeds 2016–2018, based on export data by country HScode120999, source www.trademape.org

It is estimated that 80% of the import value comprises varieties for greenhouse segments. Local varieties cannot compete in this segment with varieties from Dutch and multi-national breeding companies. Imported hybrid varieties have better disease package[98], yield and post-harvest quality.

The Pink Paradise beef tomato is one of the most popular indoor varieties and in high demand for its taste by retailers and traders, both in Uzbekistan and Russia. However, the variety is difficult to transport. Beef tomatoes (> 200 grams) are today the biggest segment and make up the bulk of the indoor segment with varieties such as Buran, Charlotte/Lamya, Jalila/Pink Paradise,, Alamina/Chinto. An overview of imported hybrid varieties can be found on the website of the "Centre for development of seed production"[99].

[96] based on export data by country HScode120999 (www.trademape.org)
[97] See the chapter greenhouse
[98] Desired are TYLCV/TOC/Pepino, typical diseases package; ToMV:0-2 / TSWV / Ff:A-E / Fol:0,1 / Va:0 / Vd:0 TSWV / Ma / Mi / Mj j
[99] http://urugmarkaz.uz/public/uploads/reestorvvozaseman.docx

With increased focus on export, the assortment might shift towards smaller truss tomatoes for export markets. The total market for greenhouse tomatoes and cucumber varieties is expected to continue to grow up to 10–20% in the coming years based on the ambitious plans to increase the greenhouse area with hundreds of hectares per year.

Figure 47: Demonstration of tomato hybrids at demo greenhouse of Agrohouse in Tashkent

In melon and watermelon seed segments, open pollinated varieties are still dominant. With an increasing focus on export, melons with better shipping characteristics or seedless types will be desired. Onions are mainly open pollinated; growers are used to save their own seeds and do see less advantage in using hybrids.

Figure 48: Farm-saved seed production of onions

The local seeds market

Most of the local varieties are open pollinated. From the list of 86 recommended local varieties[100], only 1 melon, 1 eggplant, 1 pepper and 2 tomato varieties are hybrid. The tomato hybrid varieties display no specific disease resistances. Its yield potential is low between 8 to 18 kg/m2 under greenhouse conditions. Many local open pollinated varieties are reproduced through farm-saved seed practices. Local varieties have a limited yield potential but are in general very tasteful. These varieties lack, however, post-harvest qualities and cannot be stored or transported over long distances.

Formal seed systems

The Research Institute of Vegetable Melon Crops and Potatoes is responsible for the maintenance of the varieties and produces the super elite material used for seed production at one of their research and farm locations. The Institute has created more than 170 different vegetable and melon varieties; mainly open pollinated.

A presidential decree established a new Centre for the Development of Seed Industry in spring 2018[101]. This Agency under the Ministry of Agriculture was initially created to develop cotton and wheat seeds. As the government plans to develop the vegetable sector, the Centre also focuses on vegetable seeds. The Centre is creating seed production clusters in Bukhara, Namangan, Kashkadarya, Samarkand, Surkhandarya and Ferghana regions.

The clusters will be engaged in production, processing and marketing of seeds including hybrid vegetable seeds. The Centre has ambitious plans to set up a modern system of seed production including the "organization of elite seed farms, research institutions and other enterprises engaged in primary seed production, testing of new and promising varieties''. It has established 71 farms to produce seeds and will distribute seeds to farmers also.

How the Centre will build the capability and capacity for hybrid seeds and interact with the research institute is not clear[102].

Figure 49: Seed shops Tashkent region

[100] http://urugmarkaz.uz/public/uploads/katalog.doc
[101] http://www.agro.uz/ru/news/agro/v-nashey-strane-v-nyneshnem-godu-sozdano-48-elitnykh-semenovodcheskikh-khozyaystv/
[102] Despite several attempts we did not succeed to set up a meeting with the Centre

Seed and seedling production projects

The WB financed Agricultural Modernisation Project[103] included a subcomponent, with the objective to rebuild local seed and seedling production systems, focusing on critical public functions. The objectives of this subcomponent are to:

i. increase the supply, in sufficient quantity and acceptable quality, of elite and super-elite seeds, seedlings, and other planting materials to private sector multipliers for commercial seed production and sales to farmers;
ii. develop and update guidelines related to seed production, testing and registration, and certification for public and private sector seed/seedling nurseries. Increasing the supply of super-elite and elite seeds/seedlings that are demanded by beneficiaries with the aim for drought and pest-resiliency and alignment with different agro-ecological zones.

The sub-component will strengthen institutions involved in (and responsible for) variety registration, seed production, and seed/seedling quality assurance to achieve the above stated objectives. Support will include:

i. human resource development, including training, workshops, seminars, conferences and study tours;
ii. construction (of new), rehabilitation/renovation (of existing), and refurbishment (of both new and existing) office, laboratory etc. buildings;
iii. upgrade of irrigation infrastructure/facilities on state seed farms;
iv. establishment and/or upgrading of ICT infrastructure;
v. procurement of laboratory equipment, reagents, field equipment, farm machineries and vehicles;
vi. support of accreditation of laboratories, including to the International Seed Quality Control Agency's requirements.

A budget of $ 36 Million is available for this horticultural related seed and seedling project.

Figure 50: Dekhan farmer harvesting carrots

[103] Further information under the WB paragraph

Horticultural Research institutes

The Research Institute of Vegetable Melon Crops and Potatoes conducts research in the following areas:

i. Breeding and selecting vegetables, melons and potatoes with focus on taste, post-harvest and resistance breeding and environmental stress conditions;
ii. Development of scientifically based seed production systems of vegetables, melons and potatoes and production of elite and super elite starting material, micro tubers in potato;
iii. Development cultivation technology melons and potatoes;
iv. Development of organic vegetables, melons and potatoes;
v. Development of pest and disease control in the open field and greenhouses;
vi. Hybrid breeding of tomato for greenhouses and development of vegetables growing technology for greenhouses.

Based just outside of Tashkent, the Institute has several regional research stations in Andijan, Kashkadarya, Samarkand, Syrdarya, Surkhandarya and Khorezm.

SWOT analysis

Based on our research findings a SWOT analysis for the Uzbek vegetable starting material sector is summarised in figure 51.

	**Strengths** • Vegetable tradition • Climatically benefits • Export CIS countries • Tomatoes, onions, cabbage • Greenhouse developments	**Weaknesses** • Technology level • Starting material • Variety registration • Export quality, grading • Low marketable yield • No focus outdoor veg. • Landownership • Education / Research • Weak processing
	Opportunities • Processing, clusters • New export markets • Hybrid varieties, modern technologies • Government strategy • Donor programs, private investments • Yield, post-harvest, quality, improvements	**Threats** • Water, quality/scarcity • Legislation, breeder's rights, certification • Knowledge gap • Import restrictions • Gas allocation • Old habits, government interference

Figure 51: SWOT analysis

Opportunities for Dutch starting material

Based on our research findings, it is expected that the demand for Dutch hybrid varieties will increase and that demand for local open pollinated varieties (except certain local traditional varieties) will

further decrease. Government's new agricultural 2020–2030 strategy will drive the demand towards higher yielding varieties, which can endure longer cropping cycles and have better disease resistance.

Clearly, the greenhouse sector will continue to grow, modernize and produce year-round crops for local and export markets. New greenhouse technologies, with soilless cultivation will require specific genetics, adapted to local conditions. Local varieties not being suitable, the import of high value varieties will continue to be the better solution. Investments in (Dutch) greenhouses, in drip irrigation systems and other modern technologies require yield improvements to maintain a positive return on investment. The export driven strategies of the Uzbek government will support the overall demand for hybrid varieties with better postharvest quality.

For outdoor crops, the transition into hybrid crops will continue to grow at par with the technology level. Investments in drip irrigation and improvements in fertigation and the demand for export quality will support the transition to hybrids seeds. Despite the ambitious plans of the Uzbek government to rebuild the local seed and seedling production systems, it seems not realistic to expect that hybrid seeds with competitive traits will become available via local governmental seed systems in the next years.

International institutional organisations

Uzbekistan cooperates with several international organisations[104] including the IMF, UN, FAO, World Bank, World Intellectual Property Organisation (WIPO), and UNESCO. For this research study, we review those organisations that play an active role in the development of the agricultural economy of Uzbekistan, either through projects, grants, loans, or advice.

World Bank

The WB portfolio in Uzbekistan comprises 23 projects[105], with net commitments totalling $4.0 billion in water, agriculture, transport, energy, education, health, and urban development. The WB's Country Program in Uzbekistan is one of the largest in the European and Central Asian region.

The WB focus areas for Uzbekistan are based on three pillars:

- A sustainable transformation to a market economy;
- The reformation of state institutions and citizen engagement;
- Investments in human capital, including the development of the health and education sectors.

In the agri- and horticultural sector in Uzbekistan, the following projects have been committed to by the WB:

i. **Horticultural Development Project** ($650 million): This project aims to enhance the productivity and profitability of the horticulture sector in Uzbekistan.

The initial project was approved in 2014 ($150 million) and received additional financing in January 2018 ($500 million). It supports improving access to long-term finance for tailored investments in horticulture value chains and building strong leading agro firms and farms critical for future agricultural development. As of October 2019, the project has financed 819 sub-projects related to modern greenhouses, cold storage, packaging and processing, and intensive orchards. At the end of December 2019, about 90% of the money was disbursed.

Two pipeline projects related to the agri- and horticultural development of the country are in a concept phase:

i. **Science Commercialisation Project**[106] ($50 million): The project aims to support the dissemination specifically of research results from public research organisations to the enterprise sector and has four components, which are listed below. It will be submitted for board approval in March 2020;
    a. **Applied R&D and Commercialisation Program** ($20 million): This part of the program will finance applied R&D project grants for Uzbek scientists and young researchers motivated to undertake applied R&D as per international standards as well as scholarships for students and scientists to study or conduct research abroad;
    b. **Enterprise Innovation Program** ($16 million): The Enterprise Innovation Program aims to spur enterprise-level innovation focused on the development of new or improved products, technologies, or processes by Uzbek enterprises for both domestic and export markets. Matching grants will become available to cover up to 70% of project costs, with a maximum of $200K for projects of up to 24 months' duration;

[104] https://mfa.uz/ru/cooperation/international/22/
[105] End of December 2019
[106] https://projects.worldbank.org/en/projects-operations/project-detail/P170206

c. **Policy and Capacity Building Support** ($12 million): Uzbekistan has undertaken broad-based economic and institutional reforms and will require significant technical assistance (TA), including strategy and diagnostic studies and capacity building, to design and implement such reforms.
d. **Project management** ($2 million): This component will support project-implementation activities.

ii. **Agricultural Modernisation Project**[107] ($500 million): The project is expected to be submitted for board approval mid-July 2020 and has four components:
   a. **Enhancing productivity-supporting agricultural services:** The sub-components are the following: (i) applied agricultural research and development, (ii) seed and seedling production, (iii) natural resource management, and (iv) farmer adoption support;
   b. **Supporting investments in high-value horticulture value chains:** These objectives will be achieved through a mix of technical support provided under Component 1 and two credit windows offering long-term financing tailored to the needs of farmers and agribusinesses;
   c. **Facilitating trade and marketing:** The sub-components are the following: agro-logistics, (ii) plant protection and plant quarantine measures, and (iii) market information system;
   d. **Supporting project management:** A project coordination unit will be established to coordinate the implementation of the entire project.

The implementing agency for both projects will be the Ministry of Agriculture. The Agency for Implementation of Projects in the Field of Agroindustry and Food Security (UZAIFSA[108]) will be responsible for the coordination and facilitation of the day-to-day implementation of the project in close collaboration with other implementing institutions including research institutes, departments, centres, and agencies under ministries such as the State Plant Quarantine Inspection.

Asian Development Bank

The Asian Development Bank (ADB) has a new Country Partnership Strategy (CPS) for Uzbekistan. The five-year partnership strategy, from 2019–2023, supports the government's reforms to help the economy's transition towards a more inclusive and market-driven growth path. With its loan programmes, the ADB supports horticulture infrastructure, production, export, and efficient irrigation systems. In 2018, the ADB committed five loans, totalling $1.1 billion to improve power generation efficiency, primary healthcare services, access to finance for horticulture farmers and businesses, access to drinking water in the western part of Uzbekistan, and economic management in the country. ADB had 97 active projects the end of 2019 of which 7 were directly or indirectly related to agriculture and horticulture.

The **Horticulture Value Chain Infrastructure Project** has been a major project for ADB since 2016.

The first loan of $154 million allowed the government to provide subsidiary loans to participating financial institutions (PFIs). The project aimed to help PFIs expand their lending portfolio to interested and qualified farmers and help enterprises finance horticulture operations, including planting

[107] http://documents.worldbank.org/curated/en/505361576858343474/Project-Information-Document-Agriculture-Modernization-Project-P158372
[108] http://www.uzaifsa.uz/en

materials, greenhouses, intensive orchards, processing and storage facilities, and machinery and equipment.

In total, 167 ha of greenhouses and 3700 ha of orchards and cold storage facilities were constructed with the support of the credit lines provided by the ADB[109].

A second credit line ($198 million) was approved in 2018. This loan will support the Government of Uzbekistan's plan to establish horticulture clusters where production and post-harvest services can be consolidated to improve efficiency and economies of scale. It will finance the establishment of Agro-Logistic Centres (ALCs) in two locations: the Andijan and Samarkand regions. The loan will help scale up the outreach of seven of the project's PFIs—Asaka Bank, Davr Bank, Ipak Yuli Bank, Ipoteka Bank, National Bank of Uzbekistan, Turon Bank, and Uzpromstroybank—and improve the access of farmers, agro-processing enterprises, owners and operators of cold storage facilities, and trading and logistics service suppliers to market-based bank finance.

A new Horticulture Value Chain infrastructure project loan is planned for additional ALCs in the region.

FAO

The FAO has been active in Uzbekistan since the country joined the Organization in 2001. FAO and Uzbekistan have recently signed a new Country Programming Framework 2022[110].

FAO will provide support the Uzbek Government in three priority area's:

i. institutional and policy assistance for the Ministry of Agriculture and other government institutions;
ii. agricultural and food value chain development and market access;
iii. and sustainable management of natural resources, climate change and biodiversity.

The FAO has a strategic partnership with the WB in Uzbekistan. The FAO provides in depth knowledge though his consultancy networks to the WB. FAO has been an active contributor to the 2020-2030 agricultural strategy process and conducted studies on organic agriculture[111] and Good Agricultural Practices and seed legislation in Uzbekistan. Procurement of goods and consultancy services of both WB and FAO can be viewed via the development aid website[112].

European Union[113]

As part of its bilateral and regional cooperation[114] with Uzbekistan, the EU has allocated €168M to the country between 2014 and 2020. This cooperation is focused on rural development. The EU provides support to the agricultural sector with the specific objective of strengthening local agri-food public services, increasing farm income and rural employment, enhancing food security, and ensuring the sustainable use of national resources. The EU supports the WB and ADB horticultural projects with

[109] ADB conditions included 2% for 25 years. The GovU supported 8 banks with credit for 3%. The banks gave these loans to business clients for 5–7% for 10 years, with a $5M limit per client.
[110] http://www.fao.org/home/search/en/?q=uzbekistan
[111] http://www.fao.org/family-farming/detail/en/c/1110669/
[112] https://www.developmentaid.org/#!/home
[113] https://eeas.europa.eu/delegations/uzbekistan/1926/node/1926_uz
[114] https://eeas.europa.eu/delegations/uzbekistan/1927/node/1927_uz

grants varying from €5 million to €21 million[115]. The total agriculture-related project portfolio of the EU is €136 million (see figure 52).

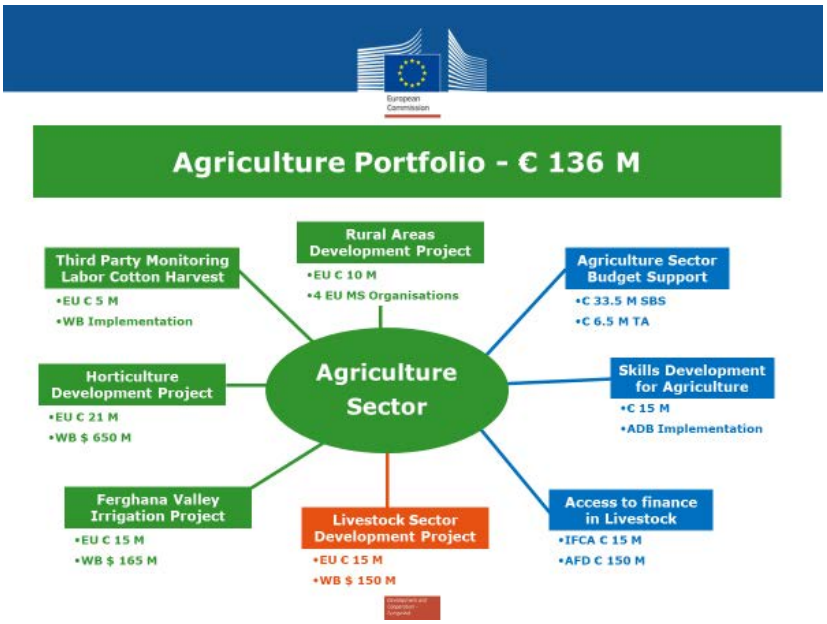

Figure 52: EU agricultural portfolio, source presentation EU Uzbekistan, 2019.

The agricultural sectors' budget support for 2020–2022 will be €40M. Knowledge transfer is one of the key areas in which the EU aims to support the Uzbek 2020–2030 strategy. A first prenotice for a tender[116] with a budget indication of €6M has been posted by the EU. The purpose of the project is to provide an Agriculture Support and Knowledge Facility (ASK) to assist the Government of Uzbekistan in creating an enabling policy and regulatory environment and strengthening key institutional capacities, in particular, agri-food advisory services. The tender will be published mid-January 2020.

International Finance Corporation

The IFC's strategy in Uzbekistan is in line with the World Bank Group Country Partnership Strategy and is mainly focused on the financial sector. In terms of agriculture, IFC has one extension services project in cotton.

Currently, the IFC manages a $61 million investment portfolio, which mainly includes projects in the financial and textile sectors. IFC's advisory services have been implementing seven projects designed to assist the country in privatising SOEs, transforming the cotton sector, developing and diversifying the financial market, promoting energy efficiency in the chemical sector, and piloting public-private partnership transactions in the renewable energy and health sectors. There are 11 active projects and 6 pipeline projects, none of which are related to agriculture.

[115] https://ec.europa.eu/europeaid/news-and-events/eu-signs-agreement-eur-215-million-boost-agriculture-development-uzbekistan_en
[116] https://www.epicos.com/tender/2019%252FS%2B237-580467

Deutsche Gesellschaft für Internationale Zusammenarbeit

In Uzbekistan, the Deutsche Gesellschaft für Internationale Zusammenarbeit[117](GIZ) GmbH implements projects and programmes on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), the German Federal Foreign Office (AA), and the German Federal Ministry of the Interior (BMI). The GIZ opened a country office in the capital, Tashkent, in 1992 and has regional offices in Syrdarya, Jizzakh, Kashkadarya, Andijan, and Karakalpakstan. Currently[118], 31 national and 4 international employees and 1 integrated specialist are working in the country. There are 57 active projects and the budget of the project portfolio is €57 million.

The main horticultural project of the GIZ is the 2012–2020 Sustainable Rural Development Project in 3 selected regions in Uzbekistan, which entails the following aims:

i. **Promoting selected value chains**. This component aims to enhance the competitiveness of enterprises by improving their production and marketing strategies. Agricultural enterprises producing fruit, fish, and milk receive practical training in demonstration orchards and farms to increase their production.
ii. **Green economy**. This component supports the promotion of energy efficiency and alternative energies and the introduction of modern, innovative agricultural concepts that conserve water and soil.

GIZ has established 5 ha demo orchards to test commercial varieties in several regions. They currently demonstrate 14 apple, 7 pear, and 1 cherry and peach varieties. Different planting systems are tested under this project. The major problem in the fruit sector is the lack of true type genotypes. They have supported the establishment of five clonal rootstock nurseries, each producing 20,000–40,000 trees per year.

DAI/USAID

DAI is a global development company active in Uzbekistan through the U.S. Agency for International Development (USAID) funded-project **Agricultural Value Chain Activity** (AVC).

The AVC is organised into four components, which are targeted at economic actors along with select fruit and vegetable value chains. The components are as follows:

i. Improve the quality and volume of agricultural production;
ii. Improve post-harvest handling and production;
iii. Facilitate market linkages;
iv. Link educational institutions with private sector demand.

The target value chains include stone fruits, pome fruits, grapes, vegetables, and gourds. AVC project work targets 33 districts across 12 of the 13 provinces of Uzbekistan.

In 2019, DAI started a new Human Centred Design Study of Domestic and Export Markets for 3 Uzbek horticultural value chains (grapes, cherries, and apricots). The Human Centred Design study will determine the specific barriers, pain points, motivations, and accelerators for targeted horticultural production and sales for value chain stakeholders in Uzbekistan.

[117] https://www.giz.de/projektdaten/index.action?request_locale=en_GB#?region=2&countries=UZ
[118] 31.12.2018

International Fund for Agricultural Development (IFAD)

The IFAD[119] has three projects in Uzbekistan, of which two are related to horticulture:

The Horticultural Support Project specifically focuses on the following:

i. Upgrading nurseries through the mechanism of a central nursery to import, test, and propagate modern varieties and root stock for sale in the horticultural value chain;
ii. Modernising 10 to 15 private agrofirms in the horticultural production and processing sector;
iii. Providing small-scale farmers with affordable investment finance, technical assistance, and training.

The project began in 2012 and will end in 2019. The total project costs are $32M of which IFAD has co-financed one-third.

IFAD also participates in the **Agriculture Diversification and Modernisation Project** (ADM), which has a total budget of $365M. The IBRD has committed $200M and the IFAD $93M. The remaining amount is provided by the Uzbek government.

The ADM project has three interrelated components:

i. Inclusive value chain development to enhance capacity and sustainable and efficient performance of stakeholders and enable a business environment for agribusinesses;
ii. Inclusive rural finance to increase productivity and efficiency among targeted smallholders and enable value chain actors to increase their investments in profitable value chains;
iii. Climate-resilient rural infrastructure through modernisation of the inter-farm irrigation network operated by water consumer associations (WCAs) with the aim of diversifying agricultural production, increasing land productivity, and improving WCAs' capacity for water management.

Project activities are concentrated in the Fergana Valley in the regions of Andijan, Fergana, and Namangan. Target groups include rural low-income households on Dekhan farms, small private horticulture and livestock farmers, and agribusinesses. Special attention is paid to ensure the participation of women headed Dekhan and private farming households as well as rural youth.

[119] https://www.ifad.org/en/web/operations/project/id/1100001606/country/uzbekistan

Doing business in Uzbekistan

In 2019, the WB ranked Uzbekistan 76th on the Ease of Doing Business indicator[120] out of 190 countries. Uzbekistan is just before India and after Greece in this ranking. The GovU has set itself a target to improve this ranking in the coming years.

In terms of doing business in Uzbekistan, local presence is key. Most Dutch companies work with local or Russian representatives who speak both the Uzbek and Russian languages. Repeated face-to-face meetings are needed to set up business relations. As of 2018, Dutch citizens do not require a visa, so planning a visit to the country is much easier. Uzbek Airlines has direct flights from Frankfurt, and good connections can be found via Istanbul or Moscow. S7 airlines also has good connections to several Russian destinations.

The Investment and Promotion Agency of Uzbekistan[121] has a guide for investors, which is useful for companies who want to establish a local hub or agency. It contains practical information on how to set up a representative office and a local bank account. The site has a list of projects for investors, which include investments in building greenhouses, 10 ha and 3 ha orchards, and modern orchards of almost 1000 ha in which lemons, walnuts, and almonds are grown.".

Recently, a new website was launched by the ministry of agriculture UZAGRO[122]. Although the site appears to be under construction, it provides some information on the advantages investors in Uzbekistan's agricultural sector can expect. The benefits include the following:

i. State support, such as the provision of land for 49 years;
ii. Customs and VAT exemptions on breeding materials, seedlings, and drip irrigation;
iii. Tax breaks for foreign investment, starting from $300,000.

Figure 53 provides more detail on investment benefits:

[120] https://www.doingbusiness.org/content/dam/doingBusiness/media/Annual-Reports/English/DB2019-report_web-version.pdf
[121] http://invest.gov.uz/investor/
[122] http://invest.agro.uz:8000/about/

Figure 53: Investment benefits

Agro Industries and Food security Agency (UZAIFSA)

The UZAIFSA[123] is a state agency under the Ministry of Agriculture tasked to assist in the development, organisation, and implementation of large projects, including investment. The major partners of the UZAIFSA are the WB, EU, and ADB. The UZAIFSA handles the official procurement for agri-related projects. Its responsibilities are listed below:

i. Phased diversification of government spending to support the sector;
ii. Development of science, education, systems of information, and advisory services in agriculture;
iii. Rural development;
iv. Creating a transparent system of industry statistics.

The Agency will among other play an important role in the execution of the Agricultural Modernization project financed by the World Bank.

[123] http://www.uzaifsa.uz/en/content/about-agency

Annex

Annex 1 - Indicators Strategy 2020-2030

No.	Names of indicators	Basis (2018)	Target for 2021	Target for 2025	Target for 2030
1.	Annual increase in value added in agriculture	117.3 trillion sums ($14 billion)	3%	5%	5%
2.	The increase in the number of jobs in the agri-food sector: Agriculture Food industry Textile industry	3.671.300 91.420 140.200	2% 3% 3%	1% 4% 4%	1% 5% 3%
3.	Increase in agricultural exports	$2.3 billion	$3.5 billion	$10 billion	$20 billion
4.	Proportion of food shortages	6.3%	5%	$5.400	$6.500
5.	Labour productivity in agriculture (per employee per year, in US dollars)	$3.960	$4.300	$5.200	$6.500
6.	Reducing agricultural greenhouse gases	15.740 gigrams (2016)	10%	30%	50%

No	Names of indicators	Basis (2018)	Target for 2021	Target for 2025	Target for 2030
I. Ensuring food security of the population					
1.1	An increase in the average yield of cereal crops	43 c/ha	60 c/ha	70 kg/ha	75 c/ha
1.2	Increase in average milk yield of cow's milk	2.320 kg per cow	2.700 kg per cow	3.100 kg from one cow	3.500 kg per cow
1.3	The share of forage crops in the overall structure of the sown area	7%	10%	12%	15%
II. Creating a favourable agribusiness climate and value chains					
2.1	The share of exports of products produced as part of a partnership of agricultural enterprises and associations	2%	15%	23%	30%

2.2	Introduction and promotion of the brand of agricultural products of Uzbekistan	Low coverage brand	5 additional product coverage	Coverage of 20 complementary products	Coverage of 40 complementary products
2.3	Improving the position of Uzbekistan in the World Bank ranking on the Global Logistics Performance Index	99th place	96th place (rice by 3 points)	89th place (rise by 10 points)	79th place (rise by 20 points)
2.4	Increased share of processed products in total exports	25%	30%	35%	40%
2.5	The share of employees in the food and light industry (as a percentage of the total number of jobs in agriculture)	6%	10%	15%	20%
III.	**Reducing the role of the state in managing the sphere and increasing investment attractiveness**				
3.1	Raising the rating in the World Bank index "Enabling the Business of Agriculture"	No rating	Rating	5 points rating increase	Rating increase by 10 points
3.2	Increase in attracted investments in the agri-food business	$650 million	20% increase	40% increase	80% increase
IV.	**Rational use of natural resources and environmental protection**				
4.1	The total area of agricultural land for the production of goods for public procurement	2.5 million ha	0.9 million ha	Not	Not
4.2	Increase in the number of farmers applying good	2%	5%	10%	20%

	agricultural and environmental practices, as well as an international management quality system				
4.3	The total area of agricultural land with the introduction of water-saving technologies	1.7%	10%	20%	32%
4.4	Reducing the proportion of land with high salinity	45%	43%	41%	37%
4.5	Expansion of forest cover	3.2 million ha	20%	25%	30%
4.6	Expansion of the area under nut crops (pistachio, walnut, almond)	11.634 ha	10%	15%	18%
V. Development of modern public administration systems					
5.1	Establishment of sector coordination mechanisms	Creation of industry coordination mechanism: interagency public-private state and development partners	Publication of annual reports on the state of the agricultural sector (using monitoring and evaluation systems)	Publication of annual reports on the state of the agricultural sector (using monitoring and evaluation systems)	Publication of annual reports on the state of the agricultural sector (using monitoring and evaluation systems)
5.2	Conducting a functional analysis of public administration structures in the sector	-	Implementation of functional analyses in agriculture; veterinary medicine; phytosanitary; food safety; water sector	Implementation of functional analyses of all relevant governance structures at the regional and district levels	Completion of functional analyses of all relevant subordinate bodies
5.3	Approval and implementation of sector institutional reform plans	-	Approval of institutional reform plans and the start of agricultural implementation;	Approval of institutional reform plans and their implementation in all relevant	Approval of institutional reform plans and their implementation in all relevant

			veterinary medicine; phytosanitary; food safety; water sector	governance structures at the regional and district levels	subordinate organizations
5.4	Adopting long-term strategies for the development of public services	Not accepted	Adoption of and strategies and their implementation by veterinary services; phytosanitary services; food safety services; consulting services; irrigation services	Regular publication of reports on monitoring and evaluation of the implementation of strategies for improving public services	Regular publication of reports on monitoring and evaluation of the implementation of strategies for improving public services
5.5	Privatization of state-owned enterprises in the agri-food sector	Audit of state enterprises of the agri-food sector	The plan was approved and privatization of the state share in enterprises of the agri-food sector started	At least 50% of the privatization plan implemented	Full implementation of the privatization plan
VI. Diversification of government spending in support of the sector					
6.1	Increased State Budget Expenditures on Non-Irrigation-Related Agro-Food Services	20% of total agricultural spending	30% of total agricultural spending	35% of total agricultural spending	40% of total agricultural spending
6.2	Phased increase in expenditures of the State budget for research in the field of agriculture (as a percentage of gross agricultural product)	0.02%	0.05%	0.5%	1%
6.3	Implementation of a medium-term budget planning system	Developed and approved the medium-term budget 2020-2022	Implementation of the medium-term budget for 2020-2022	Implementation of medium-term budgets for 2022-2023 and 2025-2027	Implementation of medium-term budget for 2028-2030

VII.	**Development of science, education, systems of information and advisory services in agriculture**				
7.1	Creation of the Coordinating council for the integration of science, education and production in agriculture and the introduction of medium-term budgeting of scientific research	-	Approval and implementation of the medium-term budget for research funding for 2019-2021	Development and approval of a medium-term research funding budget for the next three-year cycles	Development and approval of a medium-term research funding budget for the next three-year cycles
7.2	Increase in the number of graduates of educational institutions engaged in agribusiness	2180	10%	30%	50%
7.3	Increasing the number of farmers with access to advisory and extension services	51.100	10%	35%	50%
7.4	Increase in the number of farmers satisfied with extension centres and advisory services	41.100	20%	40%	80%
	VIII.	**Rural development**			
8.1	An increase in the total number of small enterprises (microfarms) in rural areas	129.211	10%	20%	30%
8.2	Increased number of woman-run enterprises in rural areas	5.648	10%	20%	30%

8.3	An increase in the number of youth-run enterprises in rural areas	11.543	10%	20%	30%
IX. Development of a transparent system of industry statistics					
9.1	Improving the availability and reliability of agri-food statistics	Incomplete / Unreliable	Annual publication of agri-food sector statistics based on new collection systems	Annual publication of agri-food sector statistics based on new collection systems	Annual publication of agri-food sector statistics based on new collection systems
9.2	Improving the availability of market information in prices and trends	Inconsistent / Incomplete	Weekly publication of market information. Monthly and annual market trend reviews	Weekly publication of market information. Monthly and annual market trend reviews	Weekly publication of market information. Monthly and annual market trend reviews
9.3	Improving the availability of farm productivity data	Inconsistent / Incomplete	Conducting targeted farm assessments, publication of gross profit information	Publication of annual farm productivity indicators	Publication of annual farm productivity indicators

Annex 2 - Regional potato centres of potato growing

No.	Region	Director of the Center	Address	Email post office
1.	Andijan region Kurgantepa district	Mamaturaev Khabibullo Turakhonovich	Andijan region Kurgantepa district st. Andijan 1	inter.agrostar@mail.ru
2.	Kashkadarya region Kitab district	Nasimov Utkir Akhmadovich	Kashkadarya region Kitab district st. Katta yul 32	kartoshka_ markazi@mail.ru
3.	Namangan region Yangikurgan region	Askarov Khaydarali Akbaralievich	Namangan region Yangikurgan district, Beshbulok MSG, Chartak St. 5	yangi_kartoshka@inbox.uz
4.	Samarkand region Bulungur district	Suvonkulov Isakul Karimovich	Samarkand region Bulungur district, Bulungur st. Aktepa d. 71	bulkartoshka@inbox.uz
5.	Jizzakh region Bakhmal district	Kurbanov Shohruh Zulpanovich	Jizzakh region Bakhmal district, Tangotar, Tangotar village	shoxrux_1985a@mail.ru
6.	Ferghana region Sokh district	Mamajonov Abbosjon Sobitovich	Ferghana Region Sokh District, Mulgon MSG, ul. Sokhskaya d. 105	mabos1977@mail.ru
7.	Tashkent region Bostanlyk district	Alimov Zhamshid Ravshanovich	Tashkent region Bostanlyk district, Gazalkent SSG	alimov.djamshid@gmail.com

Annex 3 - Agro/Horticultural Exhibitions in Uzbekistan

1. AgroExpo Uzbekistan / Agrotech Expo 2020

15th International exhibition for agricultural machinery, plant production and animal husbandry

Date: May 27-29, 2020

City: Tashkent

Venue: UzExpoCentre

Official site: www.agroexpouzbekistan.com

Exhibition Sections:

Agriculture
Agricultural machinery and inputs
Tractors and trailers
Logistic and transportation
Harvesting and post-harvest equipment
Fertilizers, sprayers and spreaders
Irrigation technology, pumps
Plant protection, fertilizers and additives
Components and spare parts
Horticulture equipment and technology
Greenhouses, equipment and supply
Cooling and cold storage
Grain processing and storage
Plant breeding, seeds

2. Agro-Pack Uzbekistan 2020

International trade fair for food, packaging and agriculture

Date: Jun 11-13, 2020

City: Tashkent

Venue: Uzkurgazmasavdo Exhibition Center

Official site: http://uzbekistan.agro-pack.com

Exhibition sections:
Agricultural Machinery
Agricultural Spraying
Agriculture
Food
Food Sewing Machines
Grain Technologies
Greenhouse Technologies
Irrigation Equipment
Livestock Machinery
Milk Industry
Packaging Machines
Packaging Materials
Poultry Equipment
"Seeds, Seedling, Sapling and Gardening"

3. UzAgroExpo – 2020
16th International Specialized Exhibition

Date: Nov 25- 27, 2020
City: Tashkent
Venue: Uzexpocentre
Site of the organizer: www.ieg.uz

Exhibition Sections:
Agricultural machinery;
Plant growing. Gardening;
Cattle breeding. Poultry. Veterinary;
Storage and processing of agricultural products.

4. Tek Uzbekistan 2020
19th Annual International Exhibition of Agriculture

Date: Nov 04-06, 2020
City: Tashkent
Venue: Uzexpocentre
Organizer Website: www.expoposition.com

Exhibition sections:
Harvesting & post-harvesting equipment
Horticulture Technology & Supplies
Horticultural seeders and planters
Fruit & vegetable harvesting machines
Horticultural sorting & packaging machines
Greenhouses & film tunnel structures
Greenhouse covering material
Irrigational & fertilization technology
Fertilizers & soil conditioners
Insecticides, herbicides & fungicides
Heating & air conditioning equipment
Seeds & nursery materials
Horticultural supplies
Floriculture technologies & supplies

5. TransLogistica Uzbekistan 2020

17th International Specialized Exhibition in Uzbekistan

Date: Oct 28-30, 2020

City: Tashkent

Venue: Uzexpocentre

Site of the organizer: https://iteca.uz/trans/eng/index.php

Warehouse:
Storage, Handling, Interlogistics
Packing and packaging equipment
Warehouse racking systems
Storage solutions
Warehouse equipment

6. FoodWeek & Horeca Uzbekistan 2020

The 25th International Exhibition of Food and Drinks, Food Processing and Packaging and HoReCa in the Republic of Uzbekistan

Date: Nov 04-06, 2020
City: Tashkent
Venue: Uzexpocentre
Organizer Website: www.expoposition.com
Exhibition sections: Fruit and vegetable processing technologies; Dairy production and processing technologies; Refrigeration, storage and transportation technologies; Agricultural, horticultural and floricultural technologies.

7. UzProdExpo-2020

16th International Exhibition "UzProdExpo-2020 - Food Industry, Trading and Refrigerating Equipment, Packaging, Food and Beverages"

Date: Nov 25-27, 2020
City: Tashkent
Venue: Uzexpocentre
Site of the organizer: www.ieg.uz
Exhibition Sections: Food industry; Trading equipment, refrigerating equipment; Packaging; Food and beverages.

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