

**QO‘QON  
UNIVERSITETI  
XABARNOMASI  
1-SON**

**KOKAND  
UNIVERSITY  
HERALD  
VOLUME 1**

**ВЕСТНИК  
КОКАНДСКОГО  
УНИВЕРСИТЕТ  
ВЫПУСК 1**

1/2021

# QO'QON UNIVERSITETI

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("Вестник Кокандского университета – Kokand University Herald") ilmiy-elektron jurnali Qo'qon universiteti Kengashining qaroriga asosan tashkil etilib, 2020-yil 10-oktabrda O'zbekiston Respublikasi Prezidenti Administratsiyasi huzuridagi Axborot va ommaviy kommunikatsiyalar agentligi tomonidan №1138 raqami bilan ro'yxatidan o'tkazilgan, shuningdek davlatlararo standartlar talabi asosida O'zbekiston Milliy kutubxonasidan jurnal uchun 2181-1695 ISSN-raqami olingan.

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#### Tahririyat manzili:

150100, Farg'ona viloyati, Qo'qon shahri, Turkiston ko'chasi, 28 a-uy, 1-xonadon.

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## ANALYSIS ON THE FOREIGN TRADE OF GRAIN IN CENTRAL ASIAN COUNTRIES: TAKING EXPORT TO CHINA AS AN EXAMPLE

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ARTICLE INFORMATION	ABSTRACT
<b>Received:</b> November 08, 2021 <b>Accepted:</b> February 02, 2021 <b>Volume:</b> 1 <b>Issue:</b> 1 <b>DOI:</b> <a href="https://doi.org/10.54613/001001">https://doi.org/10.54613/001001</a>	Agricultural cooperation is the common demand of Central Asian countries, and all countries have needs in food trade. This article analyzes the complementarity between China and Central Asian countries in grain production and demonstrates the possibility of further promoting grain trade. In order to improve the scale and quality of agricultural cooperation, it is advisable to incorporate food trade into the international food security cooperation system. Attempts to combine trade with poverty reduction, capacity building, agricultural investment, and the construction of a common food market, put forward an effective path for China and Central Asian countries to develop agricultural cooperation, and put forward relevant policy recommendations.
<b>KEYWORDS</b> Central Asian countries, agricultural cooperation, food security, cooperation advantages	

The five Central Asian countries are about 3000 kilometers long from east to west, 2400 kilometers wide from north to south, with a total population of about 73 million and a total area of about 4 million square kilometers. Food production and consumption in the five Central Asian countries are different, but as a whole, Central Asia is not short of food, and some of them can be exported. The main variety of grain production and consumption in the five Central Asian countries is wheat, and the main purpose of importing grain from outside the region is to enrich food varieties.

1. Characteristics of food production and consumption in Central Asian countries

From 2012 to 2016, the grain planting area of the five Central Asian countries has the following characteristics. First, there is little change in the annual grain planting area in the five Central Asian countries, with an average annual total area of 18.90 million hectares. Kazakhstan is 14.93 million hectares, Uzbekistan is 1.65 million hectares, Turkmenistan is 1.34 million hectares, Kyrgyzstan is 0.58 million hectares, and Tajikistan is 0.41 million hectares.

Second, from the perspective of grain planting structure, the grain planting structure of the five Central Asian countries is not much different. They are mainly wheat and barley. The wheat planting area accounts for about 82%. The barley planting area accounts for about 12%. The rest is corn, rice and soybeans.

Third, wheat is the main food crop in Central Asian countries. The proportions of wheat planting area are: Kazakhstan 82%, Kyrgyzstan 54%, Tajikistan 74%, Uzbekistan

87%, Turkmenistan 87%. Since 2000, the wheat acreage in Kazakhstan, Uzbekistan, and Kyrgyzstan has not changed much. Turkmenistan has increased by 20%-36%, mainly due to increased production and reduced imports. Tajikistan has dropped by about 20%. The purpose is to reduce the area of food planting, expand the area of fruit and vegetable planting, and increase the income of residents in the environment with limited arable land.

Fourth, the planting area of corn and soybeans in Central Asia is not large. There are only about 300,000 hectares of corn, which is mainly used for feed for domestic consumption. Soybean planting area is less than 200,000 hectares, mainly produced in the black soil belt of northern Kazakhstan. The rice planting area is about 300,000 hectares, mainly distributed in the river valleys of Kyrgyzstan and the irrigation areas of Kazakhstan, Uzbekistan and Turkmenistan.

From 2012 to 2016, the grain production and consumption of the five Central Asian countries have the following characteristics:

First, the annual grain output of the five Central Asian countries is about 30 million to 35 million tons, of which Kazakhstan is 17 million to 20 million tons, Uzbekistan is 7 million to 8 million tons, Kyrgyzstan is 1.5 million to 1.8 million tons, Tajikistan is 1.2 million to 1.5 million tons, and Turkmenistan is 2.5 million tons. 3.5 million tons. In terms of varieties, the main grain in Central Asia is wheat, with an annual output of about 23 million tons, accounting for more than 67%; followed by barley, with an annual output of about 3.07 million tons, accounting for 10%; the rest are corn, rice, oats, and soybeans.

**Table 1 Central Asian countries' grain planting area from 2012 to 2016 million hectares**

Variety	Year	Kazakhstan	Kyrgyzstan	Tajikistan	Uzbekistan	Turkmenistan	Total area of five countries
Grain	2012	14.78	0.57	0.41	1.61	1.06	18.43
	2013	15.59	0.59	0.42	1.62	1.32	19.54
	2014	14.59	0.6	0.39	1.64	1.18	18.39
	2015	14.54	0.58	0.41	1.65	1.46	18.65
	2016	15.14	0.57	0.41	1.71	1.67	19.51
	<b>5-year average</b>		<b>14.93</b>	<b>0.58</b>	<b>0.41</b>	<b>1.65</b>	<b>1.34</b>
Wheat	2012	12.41	0.32	0.3	1.4	0.92	15.36
	2013	12.95	0.35	0.32	1.44	1.15	16.21
	2014	11.92	0.34	0.29	1.45	0.99	15
	2015	11.57	0.3	0.3	1.45	1.26	14.87
	2016	12.37	0.27	0.3	1.45	1.48	15.86
	<b>5-year average</b>		<b>12.25</b>	<b>0.32</b>	<b>0.3</b>	<b>1.44</b>	<b>1.16</b>

Source: FAO Statistical Database, <http://www.fao.org/faostat/>

Second, in terms of grain yield, Uzbekistan has the highest yield and Kazakhstan has the lowest. The relatively high yield in Uzbekistan is related to its long farming history, and the relatively low yield in Kazakhstan is related to its climatic conditions and low use of chemical fertilizers. In terms of quality, the quality of wheat in Kazakhstan is the best, with a protein content of 10.3% in flour; while Uzbekistan is affected by climatic conditions, and many internationally-known wheat varieties are not suitable for planting; the quality of wheat in other Central Asian countries is poor and usually not suitable for high-quality flour. China needs to import some high-quality wheat and flour from Kazakhstan and other places every year.

Third, in terms of inventory, Kazakhstan's grain inventory has been maintained at a level of 13 million to 14 million tons throughout the year. The average annual inventory of wheat exceeds 30% of consumption, and the proportion of the other four Central Asian countries is less than 30%, but they are all higher than 17% which recognized safety line in the world.

Fourth, from the perspective of consumption, Central Asia consumes about 22 million-26 million tons of grain each year, and the remaining 4 million-10 million tons are used for export. The main export targets are the interior of Central Asia and the

Middle East. The grain trade volume between Central Asian countries is about 2 million-3 million tons per year.

Fifth, from the perspective of consumption level, on the one hand, as the total population grows, the total food consumption in Central Asia continues to increase; on the other hand, as the residents' dietary structure improves, the proportion of food in the region's dietary structure gradually declines, the per capita annual food consumption is generally on the decline, but it is still higher than the world average, and the per capita daily dietary energy intake is slightly higher than the World Bank standard. In terms of food expenditure, compared with developed countries, the food expenditure of residents in Central Asian countries still accounts for a larger proportion of their total consumption expenditure.

Grain and food price fluctuations will have a certain impact on residents' living standards, consumption structure and consumption habits. Central Asian countries all have the problem of widening the gap between rich and poor. Food and food prices may affect social stability. In addition, since the 21st century, food prices have become more and more financial in nature, which is not only reflected in the spot market, but also affects the futures market and financial derivatives.

**Table 2 Wheat production in Central Asian countries from 2012 to 2016**

Variety	year	Kazakhstan	Kyrgyzstan	Tajikistan	Uzbekistan	Turkmenistan	Total area of five countries
Wheat production (thousand tons)	2012	9840	540	810	6610	1200	1901
	2013	13940	820	950	6840	1600	2415
	2014	13000	570	870	6960	1200	2259
	2015	13750	700	900	6960	1410	2372
	2016	14990	660	920	6940	1600	2510
	<b>5-year average</b>		<b>13100</b>	<b>660</b>	<b>890</b>	<b>6860</b>	<b>1400</b>
Wheat yield (thousand kg/ha)	2012	79.3	167.5	267.6	471.0	130.9	-
	2013	107.6	236.5	297.4	473.9	139.6	-
	2014	109.0	168.9	296.8	478.2	121.0	-
	2015	118.8	237.0	303.2	481.8	111.3	-
	2016	121.1	244.6	308.3	479.9	108.3	-
	<b>5-year average</b>		<b>107.2</b>	<b>210.9</b>	<b>294.6</b>	<b>476.9</b>	<b>122.2</b>

Source: FAO Statistical Database, <http://www.fao.org/faostat/>

**Table 3 Agricultural output efficiency in Central Asian countries**

Country	Land output efficiency (USD/ha)				Labor efficiency (USD/person)				Output growth rate (%)		
	1990	2000	2010	2014	1990	2000	2010	2014	1991~2000	2001~2010	2010~2014
China	433	691	970	1 058	582	1 053	1 922	2 593	5.2	3.5	2.4
Kazakhstan	52	26	36	42	6 803	2 905	3 361	5 679	-7.2	3.1	4.2
Kyrgyzstan	152	161	177	184	2 786	1 841	2 692	2 665	0.8	0.9	0.7
Uzbekistan	259	254	431	534	2 351	2 248	3 683	4 046	-0.5	5.0	5.4
Tajikistan	313	173	320	402	1 687	697	1 035	1 250	-5.8	6.6	5.6
Turkmenistan	40	54	81	85	2 663	2 107	2 477	2 435	1.1	3.6	1.1

Source: The International Food Policy Research Institute (IFPRI), Food Policy Indicators: Tracking Change, Agricultural Total Factor Productivity (TFP)

The current situation and significance of grain trade between China and the five Central Asian countries

According to China Customs statistics, the grain trade between China and Central Asian countries mainly exists between China and Kazakhstan. China's grain imports from Central Asian countries all come from Kazakhstan, the main variety is wheat, and the others include flour, wheat bran, and soybeans. Imported wheat is mainly used as high-protein feed, except for some processed into high-grade flour. The main targets of China's grain exports to Central Asian countries are Kyrgyzstan and Kazakhstan. The main export varieties are rice, and others include potatoes and beans.

In August 2009, COFCO Group Co., Ltd. purchased 10,000 tons of Kazakhstan spring wheat, marking the beginning of China's official resumption of wheat imports from Kazakhstan. Since then, wheat has been one of the largest varieties of agricultural products exported by Kazakhstan to China. The export volume accounts for about 33.3% of the agricultural product trade volume between the two countries each year, and the overall export volume has shown an increase.

**Table 4 Kazakhstan's agricultural exports to China from 2016 to 2017**

Year	2016		2017	
	Quantity (thousand tons)	Amount (millions of dollars)	Quantity (thousand tons)	Amount (millions of dollars)
Total agricultural trade	-	261.0	-	345.0
Kazakhstan's agricultural exports to China	-	134.4	-	180.5
wheat	281.1	52.4	306.9	57.5
Frozen fish	1.3	1.4	2.9	3.2
Sunflower seeds	73.8	18.6	123.7	32.8
Other oil crops	31.6	8.0	36.7	8.9
Sunflower oil and cottonseed oil	11.5	10.1	27.0	21.9
Soybean oil	5.8	5.0	4.2	3.4
Rapeseed oil	52.0	4.3	8.7	6.7
Cotton fiber	0.3	0.4	2.7	4.1
Soybeans	-	-	7.7	3.1
Stallion	-	-	0.1	0.2

Source: <http://agroinfo.kz/kazaxstanskoy>

It is generally believed that based on the balanced diet model, China's per capita annual food demand does not exceed 400 kg, but due to the unreasonable food consumption structure, the per capita food demand calculated based on the actual consumption value will be greater than the per capita food demand based on the balanced diet model the amount. Based on China's market demand, the motivations for Central Asian countries to develop grain trade are in the following aspects:

First, a win-win model. In addition to buying and selling, food trade can extend cooperation in the upstream and downstream, expanding to the fields of planting, processing, storage, soil and water resources management, technology, facility construction, insurance, and finance. Central Asian countries can use China's market, capital and technological advantages to increase production and income, and China can use food cooperation to consolidate relations with Central Asian countries, ease pressure on food security, and achieve mutual benefit and win-win results. In addition, Central Asian countries can use China's convenient transportation infrastructure to strengthen ties with Asia-Pacific countries such as Japan, South Korea, and Southeast Asia. On February 5, 2018, 720 tons of Kazakhstani wheat had been sent to Vietnam via the Lianyungang Railway. The entire delivery time was about 20 days, marking the opening of a safe passage for Kazakhstan's grain transit from China to the Southeast Asian market.

Second, meet diversified consumer demand and industrial raw material demand. The grain quality of Central Asian countries is relatively high. For example, Kazakhstan has high gluten content and is suitable for high-end foods such as bread and bio-energy. From the perspective of market consumption structure, the Chinese market has an increasing demand for high-quality wheat. According to market research estimates, China's annual output of high-quality high-gluten wheat is about 3.5 million-4.5 million tons, and the market demand is about 6 million-8 million tons. Kazakhstan's high-quality wheat can make up for the market gap.

3. Advantages and difficulties of food cooperation between China and Central Asian countries

First, all countries have reached a consensus. Both China and Central Asian countries face the problem of ensuring food security and accelerating agricultural modernization. In terms of adjusting the structure of food and agricultural production, limited by arable land and water resources, countries need to strike a reasonable and effective balance among the four aspects of ensuring food rations, adapting to the diversified diet of residents, satisfying the supply of industrial raw materials, and earning foreign exchange through exports. In terms of ecology, all countries need to curb soil and grassland desertification, salinization, and protect animals and plants. In terms of controlling food prices and curbing inflation, food expenditures account for a large proportion of residents' total consumption expenditures. Residents are sensitive to grain and food price fluctuations and need to guard against financial risks and avoid fluctuations in food prices. Therefore, all countries hope to seize the opportunity to deepen cooperation and ensure regional food security.

Second, in terms of geography and natural resources, countries are highly complementary. Central Asian countries are basically located in the main grain producing areas of the world. The internationally recognized global grain producing areas, especially grains, are mainly located in the black soil belt, the most fertile soil on the earth. According to the United Nations Food and Agriculture Organization, the future global agricultural resource potential is distributed as: Southeast Asia mainly produces rice, Central Asia mainly produces wheat and corn, the equatorial region mainly produces palm oil, South America mainly produces soybeans, corn and sugar, and North America mainly produces grains and Soybeans. Central Asian countries are all landlocked countries, far away from the world economic center, and more than 3,000 kilometers away from the nearest seaport. Their products need long-distance transportation to sell to Europe, America and the Asia-Pacific region. China is the closest and most promising partner for

cooperation with Central Asian countries. Central Asian countries can also use China's railways, highways, pipelines, air routes and sea ports to develop the Asia-Pacific market.

Third, in terms of agricultural technology, countries have different advantages. For example, Central Asian countries have technical expertise in fields such as irrigated agriculture, cotton and wheat breeding, while China has advantages in crop breeding, cultivation technology, pest control, water-saving irrigation, facility agriculture, land improvement technology, and small agricultural machinery. As a result, China can import land-intensive agricultural products from Central Asian countries, export labor-intensive and capital-technology-intensive agricultural products to Central Asian countries, and drive the export of agricultural machinery, fertilizers, pesticides and other agricultural materials.

The 2008-2015 agricultural product trade between China and Central Asian countries shows that compared with Central Asian countries, China's agricultural products have comparative advantages, while agricultural products such as live animals and oils have comparative disadvantages. The grain trade cooperation between China and Central Asian countries may also face the following problems:

First, environmental constraints. Central Asian countries have been weighing the food security, environmental constraints, and increasing agricultural income. Based on their efforts to ensure food security, they have rationally used land and water resources to maximize economic benefits. In order to protect water and soil, all countries strictly supervise water resources, land use conditions, and the use of fertilizers and pesticides. The decline in soil quality in Central Asia is mainly manifested in desertification, salinization and weakening of fertility, which not only affects crop yields, but also forces agriculture to use large amounts of chemical fertilizers to ensure yields. According to statistics from the Statistics Committee of the Ministry of National Economy of Kazakhstan, in 2017, the country's salinized land was approximately 0.11 billion hectares, and the land eroded by wind was approximately 24 million hectares, accounting for about 11% of the total agricultural land, which was eroded by water. Approximately 5 million hectares of land, accounting for 2% of the total agricultural land area. Approximately 26.6 million hectares of arable land has experienced severe fertility decline. About 98% of irrigated land and 63% of non-irrigated land have reduced humus. The average thickness of humus in forest areas has decreased from 0.52 meters drops to 0.47 meters.

Second, there is a shortage of water resources. Central Asian countries are located inland, and their water resources mainly depend on winter snowfall and snow melting from snow-capped mountains, but the distribution of water resources is uneven. The shortage of water resources has a great impact on the agriculture of Central Asian countries. It is necessary to adjust the planting structure and planting area upstream and downstream to reduce the planting of crops that consume a lot of water. Kazakhstan believes that with reference to the development speed and scale of water use in 2012 and 2013, plus climate change factors, it is estimated that by 2040, Kazakhstan's surface runoff will be reduced by 11.4 billion cubic meters and 25 billion cubic meters of water will be consumed annually. By then, the country's water resources can only meet half of the consumption demand, that is, 12.2 billion cubic meters of water shortage each year. In addition, the problem of transboundary rivers in China and Kazakhstan has become increasingly prominent. Kazakhstan believes that as the upstream China's economy develops too fast and water consumption is growing rapidly, it has affected the downstream to maintain ecological balance and normal production and life. China's annual water withdrawal from the Irtysh River has increased from 1-1.5 billion cubic meters to 1.5-2 billion cubic meters, and 400,000 hectares of land is irrigated from the Yili River, which may expand to 600,000 hectares in the future. The amount of water flowing into the Yili River in Kazakhstan has been reduced from 12 billion cubic meters to 10 billion cubic meters each year.

Third, higher logistics costs. Mainly manifested in three aspects, one is to be limited by the number of ports and

infrastructure, most of Xinjiang's current foreign trade grains pass through the Alashankou port, and other agricultural products are mainly imported through the Jimunai and Horgos ports. The other is the agriculture in Central Asia is greatly affected by the climate and its annual output is unstable. It is difficult to meet the long-term purchase demand of Chinese companies, and it is far from the standards of the US futures market. The last is the risk of health inspection and quarantine. Central Asia is the hardest hit area of smut, and the main wheat producing area in Kazakhstan is the most severely affected area of wheat smut. The average annual incidence rate is 5%-16%, and the epidemic year reaches 30%- 54%, resulting in a 30%-50% reduction in production.

#### 4. Policy recommendations

In order to strengthen the grain trade and cooperation between China and Central Asian countries, the focus of all countries is to carry out in-depth and extensive cooperation, incorporate grain trade into the international food security cooperation system, and integrate trade and poverty reduction, capacity building, agricultural investment, and common food market construction. Combine all fields.

First, combine trade with poverty reduction. For example, Tajikistan and Kyrgyzstan import a large amount of food every year, which is one of the targets of poverty reduction and food aid by international organizations. China can also learn from the experience of other countries. Within the framework of poverty reduction cooperation, food can be used as part of foreign aid to the two countries. Grain can be purchased from Kazakhstan. This will not only meet the needs of Kazakhstan's food export, but also help Kyrgyzstan and Kyrgyzstan. Tajikistan has improved the level of food security.

Second, combine trade with capacity building. Improve agricultural production capacity through the exchange of development experience, such as technology research and development and promotion, manpower training, risk management, water conservancy infrastructure construction, financial credit support, market information early warning, improvement of food storage conditions.

Third, combine trade with overseas agricultural investment. In addition to the import and export trade of agricultural products, another form of the development of overseas agriculture by countries with large grain needs is the development of import by agricultural enterprises, which establish stable grain production, sales, and transportation bases or channels overseas. Start with the source of goods and logistics, let yourself take more initiative. For example, agricultural products can be obtained directly by leasing or purchasing foreign farmland, and agricultural products can be obtained indirectly by purchasing or participating in foreign agricultural production, storage and transportation enterprises.

Fourth, combine trade with the construction of a common grain market. On the basis of respecting the market mechanism, with the help of the administrative adjustment of various countries, the cost of market circulation and the risk are reduced. We can discuss grain trade rules suitable for various countries, improving product quality certification, studying the establishment of an efficient cross-regional grain transportation system, improving customs clearance, strengthening market supervision and dynamic analysis, establishing a food crisis relief fund, and playing the role of an e-commerce platform.

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## THE ROLE OF INVESTMENT IN AGRICULTURE

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ARTICLE INFORMATION	ABSTRACT
<b>Received:</b> December 18, 2021 <b>Accepted:</b> February 08, 2021 <b>Volume:</b> 1 <b>Issue:</b> 2 <b>DOI:</b> <a href="https://doi.org/10.54613/001002">https://doi.org/10.54613/001002</a>	The article emphasizes the importance of strengthening the investment process in agriculture in the context of economic reforms and production development. It is necessary to improve effective economic mechanisms for agricultural restructuring, based on the fact that investments are an important economic factor in forecasting agricultural structures. Scientific findings and scientific advice are developed based on research and analysis.
<b>KEYWORDS</b> Agriculture, investment attractiveness, seasonality, structural changes	

### 1. Introduction

A report from the United Nations Office of Economic and Social Affairs admits that the coronavirus pandemic could lead to a 1% slowdown in the global economy by 2020. In the third quarter of 2020, the global economy will continue to face restrictions on economic activity, which could be even more damaging if the decline in incomes and consumer demand cannot be stopped. Global GDP May Shrink 0.9% in 2020 Due to COVID-19 Coronavirus Pandemic (UN, 2020)

In our country, as in other countries, the quarantine has been announced to prevent the spread of coronavirus infection COVID-19 in the country. At the same time, along with other sectors of the economy, the negative impact of quarantine will have an impact on agriculture. The continuation of these processes is likely to further confuse the current problem of food security in the world and lead in this regard to a food crisis.

Today there are problems in the republic, especially in rural areas, which need to be addressed in terms of employment. Weak efforts to attract foreign investment in agriculture,

incomplete employment opportunities in processing, social infrastructure and home-based work, high labor force participation, low economic activity and employment in rural areas, poor organization in rural areas. Most of the jobs provided are short-term and seasonal, a significant proportion of the employed population is employed in low-wage sectors, the informal sector and precarious jobs, and external and internal labor migration is poorly organized.

Food security, creation of the necessary economic and organizational basis for the development of agriculture and water resources in the country will further increase the need to create additional conditions for structural changes. This, in turn, will accelerate work on the modernization of agriculture in Uzbekistan, the introduction of new equipment and advanced technologies, more efficient use of limited land and water resources, capital and labor, as well as the main tasks to increase investment attractiveness. Modern research in this industry is distinguished by its relevance at the present time.

### 2. Main part

It should be emphasized that investments are an important factor in supporting, accelerating and developing the country's economic growth and agricultural development. Only on the basis of investments is it possible to renew fixed capital, as well as on the basis of increasing the competitiveness of products by reducing production costs and improving quality.

In this regard, according to the Decree of the President of the Republic of Uzbekistan "On Approval of the Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030" (2019), the development of the following priorities has been highlighted: ensuring food security of the population, creating a favorable environment for agribusiness and a supply chain, increasing investment attractiveness, achieving an increase in employment of the rural population, increasing human resources, developing economic mechanisms to ensure the development of science in agriculture (Decree, 2019).

Also, the Decree of the President of the Republic of Uzbekistan N°-5969 of March 19, 2020 "On priority measures to mitigate the negative impact of the coronavirus pandemic and the global crisis on the economy" (Decree, 2020), also April 3, 2020 No.PF-Resolution No. 5978 "On additional measures to support the population, economic sectors and business during the coronavirus pandemic" (Resolution, 2020) and in order to provide additional support to the budget, enterprises in agriculture, utilities and energy, agreements with international financial institutions totaling \$3 billion US dollars were adopted. Preliminary agreements on long-term concessional loans and grants, as well as the development and implementation of the

"Roadmap" to attract grants and long-term concessional financing for measures to combat the negative consequences of the global coronavirus pandemic and instructions to create a coordination group to attract grants and long-term concessional financing. The above-mentioned decree, the decree is to mitigate the impact of the global economic crisis on the country's economy, as well as in the development of sectors of the economy, support for the population.

Changes in structures in the national economy, in particular, the intensive development of agriculture and the acceleration of innovation and investment activity in the activities of all participants in economic processes, characterize the features of modern socio-economic processes. In economically developed countries (USA, Japan, Switzerland, and Sweden), the share of investments in science and innovation in GDP is 3.0% of GDP, and 2/3 of these funds come from entrepreneurship in innovation, more than 70% of scientific developments are accounted for by non-state sectors of the economy. In addition, the volume of investments attracted in the integrated development of the countryside, increasing the efficiency of intensive factors of agricultural development, the creation of non-agricultural jobs in the world is 8-9% of the total investment.

"Scientific research in the agricultural sector is an important source of future innovative ideas that can be implemented in the industry. At the same time, due to the high need for the development of the industry based on scientific results, the introduction of science should be materially

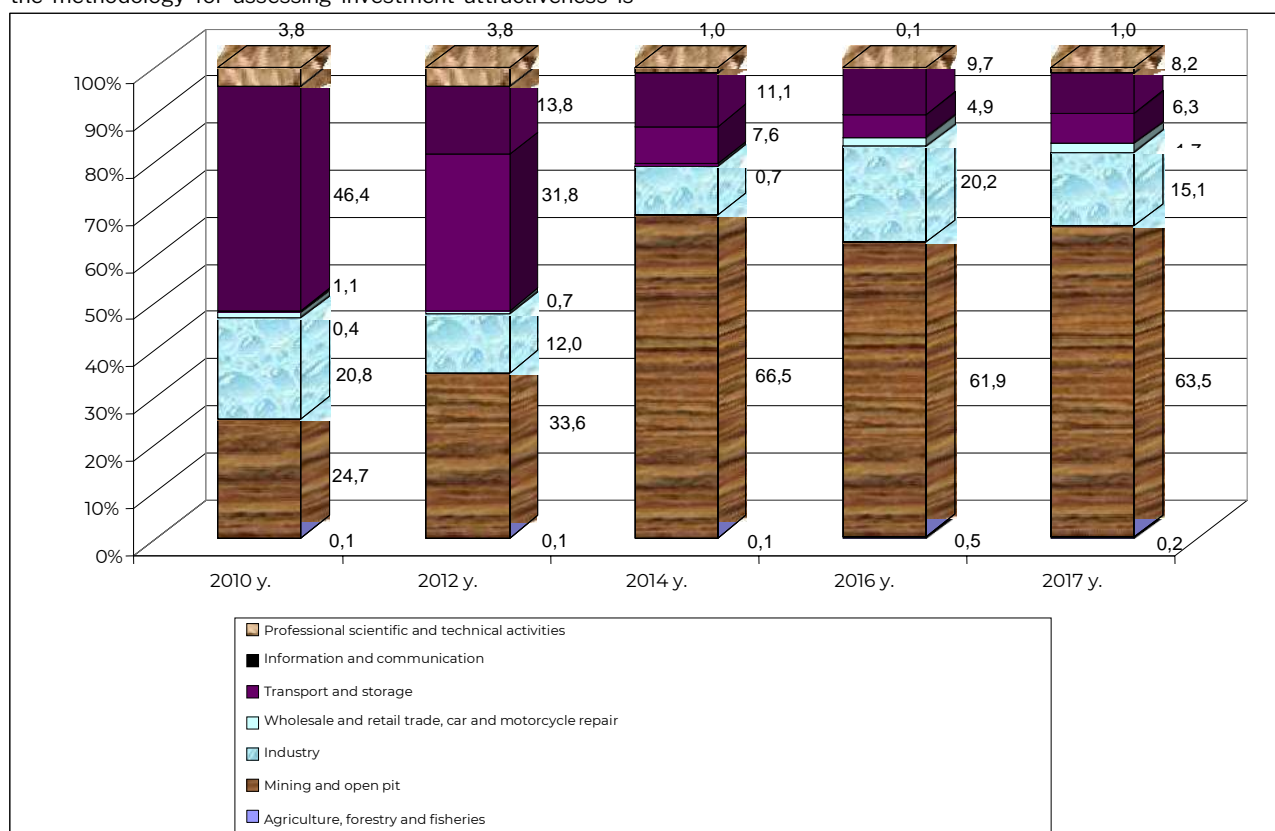


encouraged by the state. It is also important to consider increasing the interest of researchers. First of all, it is necessary to introduce scientific innovations in the industry, taking into account the specifics of the regions (soil-climate, etc.), i.e. in this case, it is important to develop a concept for the development of agriculture in the country and finance them. The interrelation of the agricultural sector creates a solid foundation for the development of agricultural research in accordance with modern requirements (Ushachev, 2006). At the same time, based on the experience of the development of the agrarian sector in world practice, it remains important to study ways to increase the investment attractiveness of various levels of organizational structures and determine ways to ensure competitiveness, a comprehensive assessment of the effectiveness of investments in agriculture, and improving the mechanism for investing in innovative activities. The investment consists of replacing the uncertain present value of capital with uncertain probability and expected future value. This can be proved by the risks in attracting investments, which are deliberately clear and unambiguous (Gozibekov, 2003).

Indeed, one of the main obstacles in the development of economic sectors today is the lack of investment in the real sector of the region's economy. Investment attractiveness of regions is the basis for the development of investment policy. It should be noted that today the investment attractiveness of the country's regions (especially in rural areas) is rather low. Also, the methodology for assessing investment attractiveness is

underdeveloped and requires improvement. For this reason, the issue of assessing the investment attractiveness of regions and identifying the sources of its increase is relevant both theoretically and practically.

Based on the existing approaches and methods for determining the investment attractiveness of regions of the country, it should be noted that according to the generalized classification of groups of factors (indicators) that affect the investment attractiveness of a region, this system of investment attractiveness covers all areas, taking into account different wishes (interests). It should be noted that the distribution of investments by industry reflects both the rapid development of priority sectors, which are entrusted with the implementation of comparative economic advantages, and its structural trends, in connection with which it is advisable to analyze changes in investments in fixed assets. The total investment amounted to 16.463 billion in 2010, 44.810 billion in 2015 and 72.155 billion in 2017, and in 2010 - 1,655 billion in agriculture, forestry and fisheries, in 2015 - 4.515 billion, and in 2017 - 6.110 billion soums (Figure 1). This means that the funds allocated to this sector are relatively small compared to investments in other sectors of the economy, as can be seen in the figure below. The data in Figure 1 show that in the years analyzed, investments in mining and quarrying, wholesale and retail trade, and production increased, and in 2017 6.4% of the total funds were allocated to agriculture, forestry and fisheries.



**Figure 1. Investments attracted in fixed capital of the Republic of Uzbekistan in 2010-2017 by economic activity (%)**

Recently, investment processes have livened up in our country. The analysis shows that the basic part of investments is directed to the development of key sectors of the economy, which will accelerate the formation of production and infrastructure. Structural changes aimed at increasing the production of competitive products and the creation of new industries on the ground have contributed to an increase in the demand for investment for industrial development. To support the agricultural sector and increase investment attractiveness, it is necessary to further improve the organizational and economic mechanism, which includes private and state forms. The mechanism of investment activity in the agricultural sector is formed taking into account the specifics of the industry, it is

advisable to take into account the specific economic laws of agriculture.

Firstly, reproduction in agriculture is closely related to natural processes in nature. It takes into account living organisms (animals, plants, microorganisms) as necessary elements, as well as soil, fertility, which is associated with biological factors. Studies show that when forming the mechanism of investment activity in this area, it is necessary to take into account the influence of laws on development.

Secondly, the disconformity between the period of activity in the agricultural sector and the period of continuous production is determined by the fact that production in this sector is seasonal. For this reason, the seasonality of production

in the industry has a significant impact on the organization of production, the efficient usage of equipment and technologies, labor resources and investment funds.

Thirdly, land is the main factor in agricultural production. Differences in soil fertility and location of the farm in relation to the delivery of the grown product to the point of sale do not create the same conditions for a restitution on investment.

Fourthly, an important feature of agriculture is that the created product is directly involved in the production process, i.e. some of the grain, potatoes and other crops are used for sowing. The crop is also used as seedlings, livestock feed, and most of the livestock is used to restore and enlarge the herd. In this regard, additional investments are required for the construction of barns and production facilities.

Fifthly, the cultivation of agricultural products is carried out over large areas and is distributed over different climatic zones. This seriously affects farm productivity. The spread of agricultural production over large areas leads to the transportation of a large amount of various goods - crops, feed, fuels and lubricants, fertilizers and spare parts. This situation calls for excessive demand for agricultural energy resources and additional means of production. Their purchase requires large investments.

Sixthly, the use of agricultural machinery also has its own characteristics, that is, it is associated with factors of the regional breadth of land plots and the seasonality of production. The labor required to plant, care and harvest on farms reduces the use of machinery, and this process increases the demand for fixed assets. Since most production processes are seasonal, they are performed once a year and for short periods of time. In this regard, for a long and effective use of agricultural machinery throughout the year, as well as depending on the specialization, it is necessary to take into account the characteristics of the crops grown. With this, it is necessary to take into account their universality. This is reflected in the volume of investments aimed at purchasing the necessary agricultural equipment to replace morally and physically obsolete equipment.

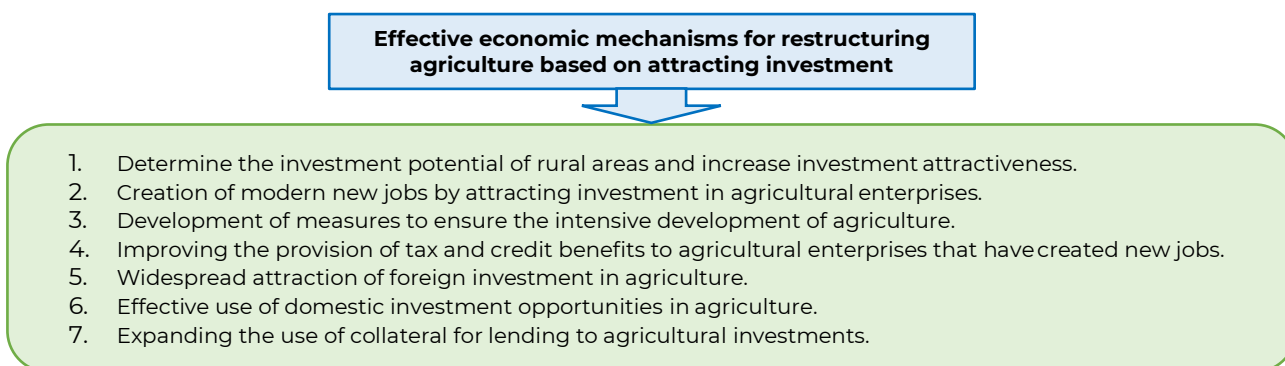
Seventhly, the results of agricultural production depend on the productivity of the enterprise, agro-climatic factors and weather conditions. The yield changes over the years depending on the meteorological climatic conditions. This is reflected in the investment policy aimed at developing capacities for the storage and processing of agricultural products. The inflow of capital into reserves is covered by that part of the crop that creates favorable conditions for storing the large-scale harvest of the year. Ignoring these features leads to large crop losses and requires large investments in growing agricultural products in the future.

Eighthly, the organization of labor processes in crop and livestock farming has its own characteristics. The contractor will not have a permanent job. Therefore, depending on the seasonal nature of plant care, workers perform different work, in which the types of work can change not only every day, but also within one working day, depending on the conditions. In this regard, the demand for intellectual and social investment in rural areas is growing.

In agriculture, an effective economic mechanism for carrying out investment activities, based on the specifics of the industry, is shown in Figure 2 below. General principles of the main directions of the use of investments in the agricultural sector directly affect the final results in this area and specific principles. They create the placement of investments in specific areas and facilities under the influence of specific socio-economic, environmental and technical factors. Therefore, in this situation, it becomes necessary to strengthen the material and technical base of agriculture and improve inter-branch relations through the effective formation of regional and economic processes in the country. By increasing the volume of investments, improving the management of labor, financial and other types of resources, agro-industrial complexes will be able to solve social, economic and investment problems and have a significant impact on attracting foreign investment in agriculture.

Research shows that in areas with high levels of agricultural production, there are disparities in the supply of consumer goods compared to other areas, as well as in the production and sale of agricultural products locally.

The objects of management within the framework of investment are all types of resources: land directly used for agricultural production, especially the interregional division of labor for agricultural production and investment in the agricultural sector. During the period of agricultural production reform, the relationship between investment and factors of economic growth will change. The introduction of new agricultural technologies and equipment will lead to a decrease in material consumption and the capacity of stock funds in the agricultural sector, and, as a consequence, an increase in the return on funds and product quality. From the point of view of the final results of agriculture, these processes will lead to a decrease in unit costs for the final product, a decrease in labor costs and an increase in indicators that determine the effectiveness of investments in this area. At the same time, in each cycle of the reproduction process, living labor is the main creative force, and the process of materialization of knowledge significantly affects the investment process.



**Figure 2. Effective economic mechanisms for restructuring agriculture based on attracting investment**

The criteria for the effectiveness of investments in the agricultural sector represent the achievement of bilateral results, i.e. a complete description of the factors of the process of investing in agriculture with the standard of living of the rural population in increasing economic efficiency.

Objective scientific approaches are necessary in the implementation of the main stages of the methodology of investment research in agriculture. Because without scientific

approaches, even in small investment projects, the existing structure can lead to undesirable consequences in achieving the final results in a restructured agricultural economy. Therefore, scientifically based conclusions and approaches are needed when studying key areas of investment and the effectiveness of projects being implemented. In addition, the basic general principles of investment in agriculture have a direct impact on private principles. They occur on the basis of

territorial selection for investment in agriculture under the influence of a specific situation. For example, the creation and placement of new industries in the region should be focused on the needs of the material and technical base of agricultural production (the level of development of productive forces, structural specialization of fixed assets and social infrastructure) and the current state of investment processes.

In addition, the dynamic development of technological progress in agriculture creates new production needs for investment in less advanced equipment and technologies, and the greater the difference between the ratio of personal and production needs, each significant innovation for technical support of agriculture and its departments. It can be seen that the growth rates of the entire agricultural production system

### 3. Conclusion

Investments are the creation of a material and technical base corresponding to each stage of the development of industrial relations, fully consistent with the achievements of scientific and technological progress. Consequently, investment is a factor affecting the level of socio-economic development of society.

The transition to a system of regulated market relations requires an approach to solving problems related to investment efficiency. Therefore, it is necessary to develop new indicators to determine their effectiveness by methods of assessing the effectiveness of investments. However, their use in practice does not seriously affect for the following reasons: insufficient consideration of the peculiarities of agricultural production, lack of consideration of factors of low profitability and objective conditions of production in the country's agriculture.

Effective use of investments in the agricultural sector will increase production volumes and ensure consistency in solving problems related to ensuring the economic sustainability of the industry. In the formation and distribution of investments, various forms and methods are used.

In the first form, two or more regions invest in the process

are often determined not only by needs, but also by the economic capacity of resources.

Accordingly, the proposed methods of the main stages of the methodology for researching the effectiveness of agriculture are as follows:

- ✓ substantiation of the rational relationship between the structural and investment restructuring of the economy and the socio-economic situation in the village. Investment is an important economic tool in forecasting agricultural structures;
- ✓ prospects for the development and improvement of agricultural production structures;
- ✓ Identify the factors related to future growth in agricultural gross income.

of using private resources on their territory to meet long-term needs. In the second form, the distribution of investments is carried out throughout the country to jointly solve existing problems. In this case, production facilities are created in one area with the participation of other regions interested in using the finished product.

The third form means the implementation of the process of joint investment in accordance with the existing capabilities of enterprises in the respective regions.

Therefore, the forms and methods of investment are constantly being improved. The role of this process is due to the expansion of the scale of agriculture, the complexity of its structural structures, inter-branch, intra-branch and regional ties and their interconnections. The essence of the matter is that the strengthening of the investment process in agriculture will accelerate the solution of problems associated with the development of production in the industry. In this regard, it is advisable to take measures to organize the effective use of agricultural land in various sectors of the economy, in particular in agriculture, to ensure the widespread use of resource-saving technologies and ensure food security.

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## QUANTITY, PRICE AND RISK RATIONING IN RURAL CREDIT MARKETS – AN EMPIRICAL ANALYSIS OF KYRGYZ RURAL CREDIT DEMAND AND UPTAKE

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ARTICLE INFORMATION	ABSTRACT
<p><b>Received:</b> December 23, 2021  <b>Accepted:</b> February 14, 2021  <b>Volume:</b> 1  <b>Issue:</b> 3  <b>DOI:</b> <a href="https://doi.org/10.54613/001003">https://doi.org/10.54613/001003</a></p> <p><b>KEYWORDS</b></p> <p>credit rationing, risk adversity in agricultural finance, credit take-up, risk rationing</p>	<p>Low access to rural credit is hampering agricultural and rural development in developing and transition economies. Credit rationing or quantity rationing, defined as insufficient credit volumes at adequate interest rates and collateral requirements, is commonly been hold responsible. This paper is researching into the contribution of demand-side factors like internal price rationing and risk rationing, in addition to supply-side factors along the case example of Kyrgyzstan. Towards this aim, we explore the determinants of credit application and take-up along the nationally representative Life in Kyrgyzstan (LIK) dataset of 3000 rural households in Kyrgyzstan. The results of hierarchical analysis indicate that are restrained by demand-side factor that reflect farmers' perceived risk of credit default and loss of collateral. Supply-side factors, such as real credit constraints and collateral requests, meanwhile have a stronger influence on credit applications and take-up rates. These findings support recent works that highlight the role of risk rationing for agricultural investment, suggesting a stronger focus of development policy on improving risk-sharing mechanisms for farmers.</p>

### 1. Introduction

Rural credits are able to release liquidity constraints and thus positively support rural self-employment (Han & Hare, 2013). Agricultural credits increase capital input in agriculture (e.g. Narayanan, 2016) and factor productivity (e.g. Abdallah, 2016). By inciting growth in and outside agricultural activity, rural credit and agricultural credit in particular can thus improve rural incomes (Burgess & Pande, 2005; Nadolnyak, Shen, & Hartarska, 2017).

In smallholder systems, underinvestment into the agricultural sector is generally understood as a symptom of credit constraints among farm households (Petrick, 2003). Credit constraints particularly deter long-term investment and investments whose returns are subject to uncertainty (Garicano & Steinwender, 2016): Due to information asymmetries and difficulties to enforce payments, interest rates and collateral requirements of formal credits in high-risk conditions like agriculture are particularly high (Hoff & Stiglitz, 1990). Especially smallholders are disadvantaged as banks tend to use farm size as a proxy for unobserved farm characteristics and thus discriminate against small farms (Carter, 1988). Overall, credit market imperfections and dysfunctions are seen as the major impediment against the spread of formal credit and underinvestment among farm households (Hoff & Stiglitz, 1990).

Commonly, excess demand for formal credit in contrast to informal credit solutions, as well as an excess demand for agricultural credit itself is assumed. The universal validity of both assumptions meanwhile is contested by empirical evidence. Research by Binswanger and Sillers (1983) showed that most farmers across the world are risk-averse, with few variation across cultures, income levels or production

### 2. Conceptual framework

The most straightforward explanation for low credit take-up is credit rationing. The concept of credit rationing itself eludes a universal definition, with wide variation of understandings of the concept being given in international research literature. On the most fundamental level, the term describes a setting under which credit demand exceeds the

environment. This property leads to the preference of high interest rates over collateral requirements, channelling potential borrowers towards informal credit agencies, who rather offer credit lines which such properties. Indeed, Pal (2002) found that farmers indeed prefer informal credits, also due to uncomplicated and adequate access. This finding adds support to Lerman and Zedik's (2009) argument that the general conservative and risk averse nature of farmers may lead to low formal credit demand, also in absence of credit rationing.

This article's aim is therefore to assess whether credit constraints and the low take-up of credit in rural areas of transformation economies are truly due to supply side factors like quantity constraints/credit rationing or simply the low demand for formal credit, which is a result of the risk rationed condition of farmers in low- and middle-income countries. Towards this aim, we conduct hierarchical regression analysis of 2016 rural credit data collected in the scope of the survey Life in Kyrgyzstan (Brück et al., 2014). Our findings shed new light on the role of demand-side factors and in particular risk rationing among rural households, suggesting further support towards the development of risk-sharing in smallholder agriculture.

In the following, chapter two will provide a conceptual framework for the study, followed by chapter three, an introduction of credit market structure in an exemplary developing country characterized by low credit take-up in agriculture, Kyrgyzstan. Chapter four introduces the empirical model, followed by the data in section five. Chapter six presents empirical results, which are discussed in the final chapter seven.

amount of loans that lenders are willing to provide at the current market rate (Turvey & Weersink, 1997). In practice, credit rationing is exerted for instance by imposing caps on the total volume of credit lines. Stiglitz and Weiss (1981) argue that credit-rationing also takes place when banks can't or won't adapt the interest rates to the actual default risk. Instead they

chose to restrict credit access via non-price terms, for instance high transaction costs or high collateral requirements. In this case, customers are not denied access per se but are crowded out to informal credit markets or completely refrain from taking a credit (Boucher, Guirking, & Trivelli, 2009). Alternatively, credits rationing can also occur when the loan volume adjusted at below the level of the loan requested by the applicant, albeit interested rate remains at the initially agreed level (Jaffee & Russell, 1976).

Other definitions simply define credit rationing under a situation in which banks are not willing to adjust interest rates or collateral to the individual loan risk, even though a lender is ready to accept these conditions.<sup>1</sup>

The definitions above share the common denominator that applicants are fundamentally quantity rationed if they do not receive a loan even though they are willing to accept the related interest rates and collateral requirements. Under a slightly different scenario, individuals refrain from an application in the assumption that the application will be unsuccessful. This internal self-selection is, according to Bayda et al. (1994), most common in developing and emerging economies. In cases where the underlying assumption on the availability of credits is accurate, this phenomenon can also be classified as quantity rationing. Otherwise, this ex-ante self-selection is a mere expression of low demand or risk-aversity on the side of the farmer, which prevents him or her from further enquiries into the availability of credits.

Equilibrium markets, in which banks use interest rates and collateral requirements to screen the risk of credit default, meanwhile should not be confused as a case of credit rationing (Bester, 1985). As proposed by Boucher et al. (2008), information asymmetries and the resulting transfer of risk of credit default to the borrower translate into high collateral requirements. Farmers in these markets might see lower benefit of taking a credit and coping with extensive transaction costs and the risk of losing their collateral, as compared to low-value but safe production. These farmers in consequence refrain from filing a credit application or reject a loan offer, thus are risk-rationed (Boucher et al., 2008). Applicants, in contrast, that fail to come up to said collateral requirements and negotiate an arrangement with higher credit rates are in contrast quantity rationed. Similarly, credit agencies might decide to deal with the risk resulting from information asymmetries or generally high default risk by raising the credit rates. According to the framework proposed by Verteramo Chui et al. (2014), potential applicants may thus again decide not to apply for credits when confronted with high interest rates, resulting in internal price rationing.

Based on these possible outcomes of decision-making processes among farmers and creditors, as defined by previous research, we conclude with a process like depicted in figure

Figure 1 reflects the neuralgic points in the process of applying for a credit. On the one hand, the question of whether or not individuals' credit application is rejected or not is a rather clear-cut question of quantity rationing. On the other hand, whether or not applicants decide for an application in the first place, or whether they decided a take on a proposed credit line could point to quantity rationing, price rationing and risk rationing alike. Verteramo Chui et al. (2014) identify a survey scheme, which helps to dissect demand from supply-side factors. Meanwhile, many datasets may lack such detailed structure. What is more important, many interview partners may choose to conceal the true nature of their decision-making process.

Therefore, a crucial question remains: How to identify supply- and demand side factors influencing credit take-up when lacking trustworthy details on the individual decision-making process? A potential solution might be to not focus on the latent decision-making process but instead to focus on individual, household or farm characteristics, which are easier to measure and are typically contained in unspecialized household data sets.

Empirical evidence on credit demand is ample. As also depicted in figure 1, required collateral is given as main factor

influencing credit take up. Availability of collateral could be proxied either via household income (e.g. Sekyi, 2017), off-farm income, both positive (Muhongayire, Hitayezu, Mbatia, & Mukoya-Wangia, 2013) and negative (Jia, Heidhues, & Zeller, 2010), household capital endowment (Duy, D'Haese, Lemba, & D'Haese, 2012), or ownership of livestock and consumption goods (Angioloni, Kudabaev, Ames, & Wetzstein, 2018). While the role of land holding depends on national land regulations and land titling systems, they are, when acting as collateral, a decisive factor for credit access (Swain, 2002). Another factor pointing towards the importance of collateral is the positive relationship between crop insurance and credit access and demand, as for instance empirically found by Mishra (1994). However, it should be noted that collateral reflects both the need for credit, but also the opportunity to attain a formal credit, thus might contribute to both supply-related and demand-related non-application.

The importance of the presence of geographic proximity to informal financial systems was highlighted for instance by Muhongayire et al. (2013). Social status meanwhile can be linked to credit applications via collateral, but also point to elite capture (Jia et al., 2010). Recent researched confirmed the significant positive influence of access to local social networks for microcredit access (Asante-Addo, Mockshell, Zeller, Siddig, & Egyir, 2017; Wydick, Hayes, & Kempf, 2011).

As argued before, credit take-up may also be influenced by intrinsically low demand for credit. Trust issues, risk attitude, high risk of credit default or other individual factors can decrease demand for credit in the first place. Most prominently, farmers' risk preference might inhibit the demand for formal credit. Binswanger and Sillers (1983) argue that farmers and rural population is on average more risk averse than the main population. Asante-Addo et al. (2017) find that fear of loan default and thus loss of collateral is the most important reason deterring farm households from joining credit programs. Instead, farmers seeking credit are likely to turn to the informal sectors offering low-collateral loans at high interest rates: As pointed out by Binswanger and Silas (1983), risk averse individuals prefer high interests over collateral-requirements to avoid high additional costs at the default case. Beyond risk attitude, also actual or perceived risk can influence the demand for credit. For agricultural producers, credit is a risk management instrument, thus credit demand is found to be positively correlated with perceived risk of production shocks (Saqib, Ahmad, Panezai, & Ali, 2016).

Finally, there are certain individual factors that can contribute to self-selection both from the supply-side and the demand-side. Education for instance was found to influence not only credit rationing (Barslund & Tarp, 2008; Jia et al., 2010) but also credit demand (Mpuga, 2010) and thus credit market participation in whole (Muhongayire et al., 2013). Gender may play a role for both credit access and demand. In particular, lower access of women to formal collateral like land titles may worsen credit access (Fletschner, 2009; The World Bank, FAO, & IFAD). Also, difference in credit demand could be found (Mpuga, 2010). Gender difference meanwhile may vary with cultural and political backgrounds. For instance Baydas et al. (1994) find so no significant differences in credit demand and credit rationing between genders in Ecuador.

Previous literature overview showed that low credit take-up can be a consequence of a) low credit supply in terms of overall amount at given market rates or the lack of flexibility in adapting rates and collateral requirements to individual credit applications and/or b) lack of demand for credit at interest rates and collateral requirements caused by risk rationing and/or internal price-rationing at the side of the farmer. At given credit rates and collateral requirements, demand for credit is the result of a complex cost-risk assessment, taking into account existing risk coping strategies, potential investment gains, but also individual factors like prudence, risk preferences and risk perception. The strength of each of these factors in determining both credit application and credit take-up has so far not been weighted against each other and will be empirically tested in this study.

### 3. Agricultural credit in Kyrgyzstan

As case study, we select rural Kyrgyzstan, where agriculture is employing as significant share (26%) of the country's population (The World Bank, 2019) and climate conditions are fairly favourable. The vast majority of farms are led by households, the typical farm size being two hectares (Mogilevskii et al., 2017). Under these conditions, agriculture yet fails to provide meaningful income sources. During the past 15 years, the value added of agriculture hardly increased, unlike in other former countries in Eastern Europe and Central Asia. Especially in comparison to benchmark neighbours Tajikistan, Kazakhstan, Uzbekistan and even Turkmenistan, agricultural development is low. For example, between 2001 and 2016, the value added in agriculture, forestry and increased by 52% in Kazakhstan, by 154% Uzbekistan, 201% and 55% in Ukraine. In Kyrgyzstan, by contrast, we observe an increase of the same indicator by only 33% for the same period (FAO, 2019). The failure of agriculture to provide meaningful income to the rural population has led to massive seasonal or permanent migration of rural population into labour markets of urban centres inside or outside the country.

Due to the distinct smallholder character of Kyrgyz agriculture, household and farm budgets are usually entangled, household investment and farm investment decisions being made simultaneously. Overall, Kyrgyzstan features a relative credit take-up, which is among the lowest in the CIS countries (see Table 1). In 2016, the banking sector allocated USD 26 agricultural credits per hectare of agricultural land, compared to USD 58 in Azerbaijan or even USD 169 in Armenia (FAO, 2016). As of now, rural or agricultural credit therefore is unlikely to provide the necessary means to modernize smallholder agriculture.

The first important feature that might lead to low credit take-up is quantity rationing. The Kyrgyz credit market is dominated by the state-owned banks and several private banks. In terms of rural credit supply, we observe state supported credit lines with more affordable rates and credits by private banks with very high rates. For smallholders, a limited number of loans at state-subsidized rate was first introduced in 2013 under the name *Affordable Loans for Farmers* (International Monetary Fund, 2016). The most favourable rate of 10 % is given for crop and livestock production activities as well as developing rural cooperative. Credits at higher rates of about 20 % (still lower than market rate) are distributed for rural entrepreneurship activities such as processing and marketing. The state compensates its partner banks the difference between the subsidized loan interest rate of 10% and the average market interest rate. The total amount of loans was determined at 7 billion Som in 2018 (about USD 1 million) (The Government of the Kyrgyz Republic, 2017). Concessional credit lines for the agriculture sector were extended to the Aiy Bank, the Financial Company for Support and Development of Credit Unions, RSK Bank, Bakai Bank, Bank Kyrgyzstan, and Kyrgyz Investment and Credit Bank. Subsidized credit lines targeting agriculture sector have also been made available by the State Economic Development Fund under the Ministry of Finance and by the National Bank of the Kyrgyz Republic (IBP, 2016). The volume of support, however, is again limited (FAO 2018).

About eight private banks offer rural credits (Japan International Cooperation Agency 2014). Many of these credit lines feature high interest rates due to the significant transaction costs when collecting information on financial histories of small farmers (Angioloni et al., 2018).

Due to the quantitative restrictions of credits with subsidized interest rates, non- bank financial institutions are another popular credit source in Kyrgyzstan (FAO and EBRD 2011). The microfinance system is in place since 1994; by 2013 there were 249 microfinance institutions across the country (Japan International Cooperation Agency, 2014). These forms of credits taken are usually provided based on market rates without subsidies, often without a difference in terms between rural or urban household. Therefore, the interest rates are high, on average 39%, in some cases up to 59%. The size of loans

provided is usually very small, only up to 110 USD (FAO and EBRD 2011). The microfinancing sector has an advanced legal framework and suitable outreach capacities to service poor rural households. Additionally, regulations concerning borrowing history and collateral are less strict than in the formal banking sector (Angioloni et al. 2015). In formal banks, collateral is necessary if the debtor makes a down payment only less than 30 % of the total value (Japan International Cooperation Agency, 2014). However, according to Kyrgyz legislation, commercial banks cannot own agricultural land, thus farmland is not accepted as collateral (Akramov & Omuraliev, 2009). Mortgaging of houses is not an option for remote areas and for real estate that does not meet certain quality standards (FAO and EBRD 2006). In general, houses in rural areas are of very low value, which in most cases is not enough for mortgage (Japan International Cooperation Agency, 2014).

Consequently, microfinance plays an important role in improving credit access in rural Kyrgyzstan (Akramov & Omuraliev, 2009) and in particular to farmers: 49-67% of the total credit volume is invested into the agricultural sector (Japan International Cooperation Agency, 2014). Additional credit agencies are credit unions that are being promoted by the government and donors in the rural areas of the Kyrgyz Republic. There are currently about 270 credit unions in the country (Akramov & Omuraliev, 2009), however again with rather high interest rates of 18-35 % p.a. (FAO and EBRD 2006). Nevertheless, there has been a substantial increase in the amount of credit provided by banks that is directed to the agricultural sector (Figure 2). Especially since the year 2007, we observe a substantial rise of agricultural credits, both in absolute terms and as compared with total credit volume.

Also, the sources of agricultural credit have been shifting, as is illustrated in figure 2. While in 2008 commercial banks provided 2312 million Som to farmers, this increased to 24663 million Som in 2016, or by 967 %. At the same time, there was an increase in credits provided by non-bank financial institutions. In particular, the total value of loans from microfinance institutions grew, from 94 million Som in 2004 to 2884 million Som in 2017, an increase of 2968%. The decrease of absolute loans by microfinance institutions since 2015 is explained by the conversion of several microfinance institutions into banks.

As illustrated in figure 4, interest rates in the 1990s were fluctuating considerably around an average of 50%. Following a constant decrease during the 2000s, interest rates stabilized around 20%, however still fluctuating between 15% and 31% during the last 15 years. Interest rates for credits by microcredit agencies and credit unions were more stable, at about 34% and 28%, and less fluctuations (ranging between 31- 42% and 25-29%, respectively). In the period 2008-20018, the interest rates of both credit unions and microfinance meanwhile were usually considerably higher than commercial bank credits, which featured average rates of 24% during that period.

According to a survey among Kyrgyz farmers, interest rates in many instances did not seem to fit to the demands of farmers (Japan International Cooperation Agency, 2014). Among 200 surveyed farmers, one third expressed their wish of interest rates of maximum 8-10% (FAO and EBRD 2006), which is clearly below the level of unsubsidized credits. A further issue is the maturity period of bank loans, which is on average 28.9 months and 17 months for microfinance loans. Often, this maturity period does not provide sufficient support for agricultural investment (International Monetary Fund, 2016). Another closely related factor is credit history, empirically confirmed for instance by Barslund and Tarp (2008). Additionally, farmers may lack information and instructions concerning the loan application process and the related paperwork (The World Bank, 1999). Furthermore, the same study showed that many Kyrgyz farmers were very much aware of the risk of a credit default following production loss and thus refrained from applying for a credit in the first place (The World Bank, 1999). Another study confirmed that some farmers give

up having a consultation with a bank due to anxiety about the failure of repayment, although they were interested in taking a credit (Japan International Cooperation Agency, 2014). Furthermore, numerous banking crises during transition additionally created a general lack of confidence into the banking system of Kyrgyzstan (Akramov & Omuraliev, 2009). For instance a World Bank study revealed that farmers did not even try to apply for one of the subsidized loans, many of them in the firm believe that access without a “shapka”, a bribe, was impossible (The World Bank, 1999).<sup>2</sup> The same study lists reports on fraud in Naryn region, where scammers charged villagers for support in obtaining a loan without delivering true access to credit (The World Bank, 1999).

All in all, the Kyrgyz farmers might not face general quantity rationing, but rather a mix of price, risk and quantity rationing as the number of credits at affordable rates is limited.

#### 4. Materials and Methods

To estimate the relative effect size of demand side and supply side factors, we conduct a hierarchical regression analysis. This type of regression analysis allows testing whether a specific set of independent variables explains a statistically significant amount of variance in a dependent variable after accounting for all other variables (Cohen, Cohen, West, & Aiken, 2002). Firstly, we add first the block of individual variables, then the two blocks of demand-side and supply-side independent variables. Following the natural process of decision-making, we add demand-side variables at the second stage and then supply-side variables at the third stage. Since the sequence, in which the blocks of variables are added, matters for the interpretation of the analysis, we conduct a second regression for reasons of robustness testing. In this second regression, supply-side variables enter the model at the second stage, while demand-side variables are added last.

Following Binswanger and Sillers (1983), we discern explanatory variables into between supply-side restrictions (like lack of collateral or high debt/equity ratios), and demand-side restrictions like the perceived utility or risk of a credit.

In terms of dependent variables, the dataset at hand provides us with three variables representing credit demand and credit take-up. First, we use a binary variable on whether a rural household had ever applied for a formal credit (see also table 2).

Second, the dataset includes a variable on whether a household took a credit in the past twelve months. Finally, the dataset includes the sum of outstanding loans in the households. The choice of dependent variables is based on the literature review and the conceptual framework established in chapter 2.

Thus we conduct three series of hierarchical OLS and logit multivariate regression analyses, given as:

$$A_{ht} = \beta_1 I_{vt} + \beta_2 D_{vt} + \beta_3 S_{vt} + \varepsilon_{ivt} \quad (1)$$

$$C_{ht} = \beta_1 I_{vt} + \beta_2 D_{vt} + \beta_3 S_{vt} + \varepsilon_{ivt} \quad (2)$$

$$L_{ht} = \beta_1 I_{vt} + \beta_2 D_{vt} + \beta_3 S_{vt} + \varepsilon_{ivt} \quad (3)$$

The three models differ mostly in terms of the dependent variable.  $AA_{ht}$  is a binary variable capturing whether or not a household  $h$  ever applied for a formal credit at year  $t$ .  $CC_{ht}$  is a binary variable on whether or not a household  $h$  took a formal credit during the past twelve months in year  $t$ ,  $LL_{ht}$  is the original sum of the loan taken by household  $h$  in year  $t$ . For each of these regressions, we introduce three sets of explanatory variables. First, we introduce a vector of control variables describing gender, age and education of the household member that makes the decision on household finances and credits in particular.

Second, a set of demand-side variables  $DD_{h, t-1}$  of household  $h$  in year  $t-1$  enter the regression. This vector includes the self-assessed risk adversity of the decision maker on a ten-point scale, a households' economic outlook on a five-point Likert scale, the number of community group memberships to give the density of a households' network. The incidence of a drought shock in the community during the past year captures the objective risk of production loss. Further, the vector

In practice, most farmers won't have access to subsidized credits due the limited number of this credit line, which translates into quantity rationing for this particular credit market. Those farmers that accept high interest rates and satisfy collateral requirements of credits at market conditions are unconstrained. However, for some farmers the high rates and transaction costs of commercial credits may be unacceptable. Here, internal price rationing takes place as farmers decide not to borrow at these given market prices and other transaction costs. Some applications for commercial credits are certain to be rejected for missing collateral, resulting in quantity rationing, i.e. supply-side constraints.

The empirical differentiation between supply-side and demand-side rationing meanwhile requires more detailed analysis. The empirical model is presented in the following section.

includes in for reception of remittances from a household member as a proxy of access to informal credit.

Third, the regression includes a vector of assets  $SS_{vtt}$  of supply-side factors. First, this vector includes three variables proxying the collateral of a household. One collateral proxy is an aggregated asset index generated by principal components analysis and rescaled to a range between 0 and 1, 0 indicating the lowest stock of assets and 1 the highest. The second collateral proxy is the housing quality on a seven-point scale, composed of equally weighted scores on quality of the floor, the walls, the roof, and the cooking fuel. The third collateral proxy is land holdings in hectare. Two further supply side variables is binary variable on the existence of a credit agency branch in the community to represent the physical access to a financial institution, and membership in a local borrow group. For the third model, additional a categorical variable on bank type was included, as caps on loan sizes differ across bank types.

The basis for this empirical discussion of credit demand among Kyrgyz farm households is the 'Life in Kyrgyzstan' (LIK) study. LIK is an open access, longitudinal survey of 8000 individuals in 3000 households. Due to a stratified two-stage random sampling in all seven Kyrgyz oblasts as well as the cities of Bishkek and Osh, the data are representative at national and at the regional level (East, West, North, South).

The survey was first conducted in 2010, credit items are included since 2012. For this paper, we make use of the time-series character of the survey: While we are interested in the credit decisions in 2016, we employ many time-lagged indicators from earlier waves of the survey to avoid endogeneity issues and allow for causal inference.

The survey covers various topics, among them household demographics, assets, expenditure, migration, employment, agricultural markets, risks and shocks, social networks, subjective well-being. The 2016 wave also covers credit behaviour and some more detailed agricultural data. The 2013 and 2012 waves provide the data for most time-lagged dependent and control variables.

In our dataset, there are 1738 rural households for which we have valid observations from both 2016 and time-lagged variable from earlier waves. Table 1 illustrates the credit demand in 2016. 265 of the sample households stated to have applied for a loan at a microfinance agency, bank or credit union during or before 2016, among which 83.7% succeeded with each of their application. 230 households (13%) took a commercial credit during the past 12 months. With share of 45%, the most frequent lenders were microcredit agencies, followed by commercial banks (25%), private lenders (14%) and credit unions (11%).

Among the most frequent purposes for taking a credit was the purchase of agricultural machinery (20%), covering current household consumption (16%), and funding business launches (12%). A large share of “other purposes” indicates the heterogeneity of reasons to take credit.

According to the schematic by Verteramo Chui et al. (2014), the sample can be disaggregated into following groups: 1451 households stated to never have applied for a loan. These households might be either price rationed (i.e. deterred from

applying from a loan due to high interest rate), risk rationed (deterred from applying for a loan due to high collateral requirements and/or the fear of losing this collateral), or quantity rationed (i.e. deterred from applying for a loan, knowing they would be denied the loan anyway). Among these three groups, the composition of which is unknown to us, only the quantity rationed group would be restricted from the supply side. Among the 265 households that reported to ever have taken a loan, 29 households reported a rejected application. At least 29 households were thus truly quantity constrained, thus suffering from credit rationing as defined by Turvey and Weersink (1997).

Summary statistics on model variables are given in table 3. As mentioned above, 15% of the households filed a loan application, 13% took up a credit. The mean loan volume taken by sample households was 86,082 Soms (USD 1235). We learn that about 26% of decision makers were female and the rest male. The definition of “decision-maker” was based on self-

## 5. Results

Table 4 shows the results from our three estimation models introduced above, the marginal effect for the probit regressions are presented in table 5. For continuous or categorical variables, marginal effects are reported for changes from the mean of sample observations.

The first model estimates the impact of a set of variables on the application decision of sample farmers. Among our variables of interest, we found demand-side variables to be mostly relevant for credit application and uptake: Both risk adversity and external shock events in the same year had apparently deterred credit application, both regression coefficients being negative and statistically significant. While risk averse households were by 9 percentage points (p.p.) less likely to apply for a credit, a unit change of the shock score decreased the odds of applying for a credit by 63%. These findings suggest that past risk experience or being uncomfortable with risk deterred farm households from taking another risk in the form of potential credit defaults.

While risk adversity was not statistically significant for credit uptake, recent shocks did significantly decrease credit uptake as well: A decimal change in the 2016 shock score decreased the odds of credit uptake by 38 p.p. Apparently, recent shocks put farm households into a worse position to receive or take up a credit, either due to self-selection to perceived high risk of a further shock in the format of a credit default, or due to low credit-worthiness in the eyes of the bank.

On the other hand, shocks in the previous wave of 2013 and remittances by family members were found to be positively correlated with credit applications as well as credit uptake. A decimal change in 2013 shocks increased the odds of applying for a credit by 29 p.p., while it increased the probability of taking up a credit by 20 p.p. We can assume that the higher uptake was a consequence of either risk coping measures or ex-ante risk management measures to be safeguarded of future risks.

Family remittances increased the probability of credit application by 8 p.p and credit take-up by 6%. The positive effect of remittances may be explained by the possible function of remittances in increasing the ability of households to serve the monthly repayments, thus decreasing the risk of credit default and loss of collateral for the household.

While supply-side factors were not correlated to credit applications, we found a significant positive correlation between credit uptake, and land ownership as well as membership of borrow groups. Land ownership increased the likelihood of credit take-up by 1.2 p.p. per ha, while a membership increased the probability of take-up by 18%.

## 6. Discussion

The estimations conducted above aimed at unveiling the reason for yet low credit take-up among rural households in low-income countries, differentiating between demand-side and supply-side factors. The results of hierarchical regression confirms that application was to a large degree driven by demand-side factors, in particular individual risk perception, financial shocks or financial shortage, as well as local spill-over effects. Here, apparently the risk of credit default and loss of

stated decision-making processes inside the household. The average age of the decision maker was 54 years, 13% had a university degree. The average score for stock of assets is 0.2 with a left-skewed distribution, indicating that only few households were rich and the majority with a low stock of assets. Overall 28% of the respondents can be labelled as risk averse, defined by a score of 0-4 on a 11-level scale. On a PCA-based shock scale ranging from 0 to 1, the average household scored 0.6 in 2016 and 0.12 in 2013. The scale is based on a PCA shock index drawing on a list of 28 different agricultural, health or various other shocks with financial consequence. 12 percent of households received remittances from relatives working abroad or outside their hometown. The mean size of owned land was 0.84 hectare, 0.96 hectare when not taking into account households with zero own land holdings. These low average land holdings are a consequence of agricultural restructuring during the past decades (Mogilevskii et al., 2017).

Supply side variables seemed to be much stronger at play in terms of credit volume. Since model 3 features a linear regression, regression coefficients in table 4 can be used as basis of interpretation: Here, we found that both house and land ownership in 2013 were statistically significantly correlated with credit volume in 2016, very likely due to their function as collateral. With house ownership, the credit volume increased by 69%, with each hectare of land ownership by 6.5%. At the same time, also the membership in a borrow group significantly increased the credit volume, by 45%. Finally, in cases in which the credit was given by a commercial bank, credit volume was higher by 78%, clearly since most other lenders typically award only small credits.

Table 6-8 illustrate the explanatory power added by the three blocks of variables for models 1-3. For model 1, the higher increase in explanatory power for credit applications was introduced by the block of demand-side variables, reflected by a change in  $R^2$  of 0.034. The addition of supply-side variables meanwhile only contributed a  $R^2$  change of 0.012. This observation is robust to a reversal of the sequence according to which the two blocks entered the regression: Even if demand-side variables enter the regression last, they still generate a higher  $R^2$  change (0.031) than the supply-side variables (0.015). The contribution of individual control factors was low, even though this block entered the regression first. These results indicate that in fact, true self-selection driven by intrinsic demand for credit or investment may indeed play an equally important role than self-selection motivated by credit-rationing.

For the second model (table 6), the take-up of credit was explained both by demand side variables ( $R^2$  delta: 0.015) and supply side variables ( $R^2$  delta: 0.019) to a nearly equal degree. When the sequence was changed, supply side variables' contribution power was higher ( $R^2$  delta: 0.022) than demand side variables' ( $R^2$  delta: 0.011). Again, individual factors were negligible.

In model 3 (table 8), the balance of explanatory power changed. As illustrated by the  $R^2$  change, supply side variables ( $R^2$  delta: 0.188) contributed stronger to explaining the size of loans than individual or demand-side variables ( $R^2$  delta: 0.021). When supply-side variables entered the regression first, this balance shifted even more to the side of supply-side variables, which now contributed a 0.196 point  $R^2$  change, while demand-side and individual factors contributed hardly or not at all.

collateral made potential applicants refrain from applying for a formal loan, i.e. risk-rationing. In terms of credit-take up, demand-side variables were still having a considerable impact, even though supply-side variables had stronger influence than just for credit applications.

Supply-side factors, both in terms of real credit constraints and screening of collateral, had the strongest



impact on the size of loans and only to a very minor degree by demand-side or individual factors.

Our results therefore indicate a two-sided credit situation in our sample. Apparently, the emergence of a large market for micro-credits and growth of credit lines in commercial banks led to an adequate supply of small credits, supply-side variables like the existence of collateral did not seem to fundamentally keep people from applying for and making use of credit opportunity. As our data on the usage of these credits shows, many of the funds were rather used for consumption purposes or to compensate for short financial bottlenecks than to conduct real agricultural investment. Demand for these types of credits seems to depend on individual willingness to take the risk of credit default and the actual financial need. Large-scale credits meanwhile clearly depend on the availability of collateral and other supply-side factors. Households without means for managing production risk, for instance via harvest insurance or existing stock of capital, were refraining from taking larger production credits. Once households had chosen to take a credit, the amount of credits and thus the potential to conduct effective investments apparently only depended on the collateral, the type of bank that was approached, and whether or not one organized him or herself in a borrow group.

In summary, we challenge the existence of general credit rationing in Kyrgyzstan. Our data shows an increasing market for smaller credits, which is regulated mostly via demand. Meanwhile, the fact that the productiveness of the investment or the availability of collateral played a minor role for application and general take-up, confirms concerns over growing take-up of unproductive credits in so far. While farmers seemed to be aware of the risk of default, reflected by their risk attitude, the economic outlook was not influencing the decision to take up a loan significantly. At least, applications seemed to undergo a filter at the level of local credit agencies, thus deterring risky loans before an official application was filed.

However, our data does confirm that credit markets of larger loans, which are ultimately required to achieve higher

#### Acknowledgements

This work was supported by the Federal Ministry for Research and Education under Grant FKZ 01LZ1705A.

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agricultural productivity, are apparently underdeveloped. First, very few rural households took up a larger investment credits. Second, the low influence of individual factors and demand-side factors points towards supply-side restrictions, which may continue to hamper agricultural development and thus the possibility for rural households to make meaningful profits from their production. The relative dominance of demand-side factors point towards high incidence of price and risk rationing, which is in line with the direct interview-based results by Boucher et al. (2008) and Verteramo Chui et al. (2014), who detect relatively large shares of price rationing and risk rationing as compared to quantity rationing.

This research is certainly limited by the comparatively small sample. Future research into the matter is advised and planned in the scope of new waves of the LIK survey. Nevertheless, our research data supports an increase of larger credit lines for agricultural investment loans to modernize production. Strong spillover-effect show that selected households and farms could serve as examples for their peers. Caution meanwhile is advised against the increasing spread of micro-loans for commercial purposes, as they were not strongly connected to potential value added or ability to pay back. The paper provides novel evidence on demand-side factors inhibiting credit take-up and investment in rural areas. Future research should put a more in-depth focus on the role of income volatility, which may influence of both supply and demand rationing but was beyond the scope of this study.

This study provides a new angle and credit constraints in low-income countries. A particular view might be community effects in strengthening the demand for credit via providing a way to share risk, for instance among borrower groups. When confronted with systemic risks like climate risks or economic fluctuations, these provisional risk-management constructs however may not be sufficient to mitigate the effects. Households with recent experience of such financial shocks will remain to have a low demand for agricultural credits, until more effective tools for risk management are created.

#### Data availability statement

The data that support the findings of this study are available for download upon application in the International Data Service Center of the Institute for Study of Labour at <https://datasets.iza.org>, doi:10.15185/izadp.7055.1.

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## TREND ANALYSIS AND SPATIO-TEMPORAL STUDY OF COTTON CULTIVATION IN UZBEKISTAN

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ARTICLE INFORMATION	ABSTRACT
<p><b>Received:</b> January 04, 2021  <b>Accepted:</b> February 08, 2021  <b>Volume:</b> 1  <b>Issue:</b> 4  <b>DOI:</b> <a href="https://doi.org/10.54613/001004">https://doi.org/10.54613/001004</a></p> <hr/> <p><b>KEYWORDS</b></p> <p>Cotton production, trend line, food security, white gold</p>	<p>Significance of the cotton growing in a country like Uzbekistan forms the base in agriculture where the majority of economic active population is employed, and considerable part of GDP is produced. One can distinguish several aspects of cotton significance for the country. From political point of view, effective functioning of cotton complex provides the country with important international reputation and prestige. In social aspect, sustaining dominant position of cotton complex in economic structure provides employment and income generation to majority of rural population. The economic aspect explains essential contribution of cotton chain to national economy development and its sustainability, states' role of the industry in earning foreign exchange reserves and supporting competitiveness of aggregate production.</p>

### 1. Introduction

Uzbekistan's economy depends heavily on agricultural production, with cotton as its main output. Cotton production in Uzbekistan is known as 'white gold' and constitutes a strategic centrepiece of the country's rural economy. Cotton production accounts for 20% of the country's total export income and 40% of the gross value of agricultural production. Uzbekistan is one of the leading producers and exporters of ginned cotton in the world market. It takes sixth place in worldwide cotton production (after China-25%, USA-25%, India-16%, Pakistan-9% and Brazil- 5%) harvesting 2 million tonnes of raw cotton, and second place in its export after USA (39%). The cotton sector's role is important in maintaining rural amenities and livelihoods. In areas where the rural economy has not diversified, cotton production remains the main source of income and employment and has been so for generations. Since the collapse of the Soviet Union and independence 22 years ago, Uzbekistan's agricultural structure has changed dramatically: today the number of private farms involved in cotton production is around 81,300, cultivating around 1,329,000 hectares, which represents 37% of the total irrigated land in the country.

The cotton sector is one of the most centralized in Uzbekistan's economy. It is still controlled by an administrative command system of management (a highly centralized system in which decisions are made by the government and enforced

### 2. Agricultural review

Uzbekistan has the advantages of a warm climate, a long growing season, and plentiful sources of water for irrigation. In the Soviet period, those conditions offered high and reliable yields of crops with specialized requirements. Soviet agricultural policy applied Uzbekistan's favourable conditions mainly to cotton cultivation. As Uzbekistan became a net exporter of cotton and a narrow range of other agricultural products, however, it required large-scale imports of grain and other foods that were not grown in sufficient quantities in domestic fields.

In the last decades of Soviet rule, the private agricultural sector produced about 25 percent of total farm output almost

by various forms of coercion). Since independence in 1991, the Uzbek government has passed at least 55 laws, decrees and resolutions concerning agricultural land yet retained state ownership and final decision-making authority. With one of the earliest privatization reforms, the government abolished state farms to relieve itself of the financial burden of paying the large state agricultural workforce. It then introduced a system of land leasing under which farmers rent land from the government and must fulfill terms of the agreement or lose their right to farm the land. Each year the government issues mandatory targets for cotton and grain production to local governments, who in turn assign quotas to individual agricultural producers. For failure to fulfill their targets, local hokims risk losing their positions and farmers are subject to a range of economic and administrative sanctions, including criminal prosecution and the reallocation of the land they farmed to other farmers. In other words, cotton production is forced on Uzbek farmers. The government's goal is to spend as little as possible on labour so as to maximize its profits from cotton revenues, which are concentrated in the hands of the central government. Thus, every year the government mobilizes the population en masse for up to two months in order to harvest cotton. These draconian methods do not increase the efficiency of cotton production. Under the current system, yields in Uzbekistan have trended downward.

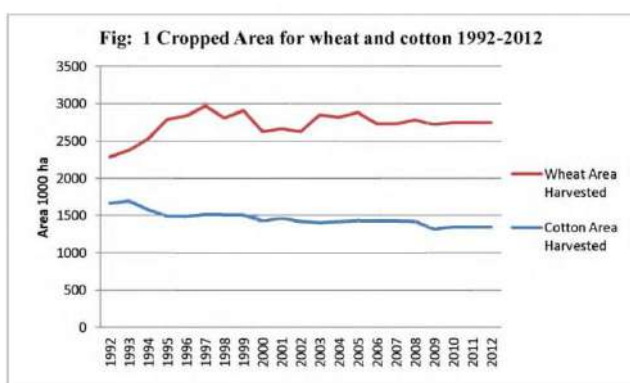
exclusively on the small private plots of collective and state farmers and non-agricultural households (the maximum private landholding was one-half hectare). In the early 1990s, Uzbekistan's agriculture still was dominated by collective and state farms, of which 2,108 were in operation in 1991. Because of this domination, average farm size was more than 24,000 hectares, and the average number of workers per farm was more than 1,100 in 1990. More than 99 percent of the value of agricultural production comes from irrigated land.

Uzbekistan's economy depends heavily on agricultural production. Approximately 60 percent of the value of agricultural production comes from the crop sector and the

remainder from the livestock sector. Cotton is the most economically important crop. This «strategic crop» produced in irrigated areas throughout the country, accounts for about 40 percent of cultivated land and makes up about 40 percent of export earnings. It makes Uzbekistan the sixth largest cotton producer and fifth largest exporter of cotton in the world. Since the independence, and as a result of self-sufficiency food policy

### 3. Trends Analysis in Cotton Cultivation

Uzbekistan's main agricultural resource has long been its "white gold," the vast amounts of cotton growing on its territory. It is a kharief crop which requires 6-8 months to mature. Its time of sowing and harvesting differs in different parts of the world, depending upon the climatic conditions. Uzbekistan always was the chief cotton-growing region of the Soviet Union, accounting for 61 percent of total Soviet production in the mid-1990s. It ranks as the sixth largest producer of cotton in the world and the world's fifth largest cotton exporter. In 1991-92 Uzbekistan produced over 7 percent of total world cotton supply of which more than 80 percent was classified in the top two quality grades. In 1987 roughly 40 percent of the workforce and more than half of all irrigated land in Uzbekistan—more than 2 million hectares—were devoted to cotton.



Source: USDA, Foreign Agricultural Service

A major policy change introduced after independence for Uzbekistan agriculture is the adoption of self-sufficiency policy in food. Cotton was widely produced and shipped out from the Republic of Uzbekistan under the central planning system in the Soviet Union. Wheat was then produced domestically in the Republic but was partly imported from other Republics for domestic consumption. The import substitution policy to grow wheat in Uzbekistan started right after 1991. With the introduction of the state order system to impose production quota for growing wheat, wheat production has increased. The land allocated for cotton production has declined as a result of the increasing use of arable land for wheat production. Since the government procurement prices for wheat as well as cotton have been maintained much lower than the international prices, the possibility for the improvement in profitability in agricultural production has been limited.

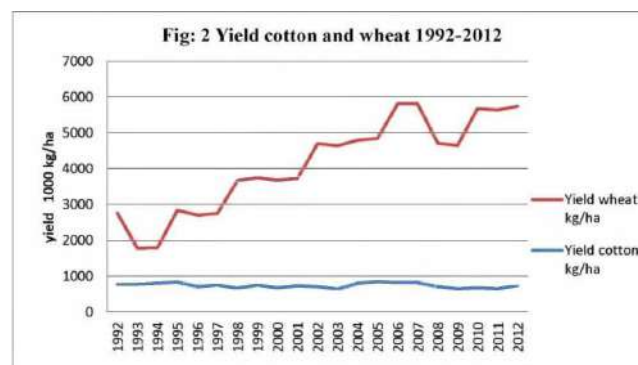
### 4. Comparison in Productivity

Uzbekistan's yield in 2012 is estimated at 742 kg/ha. This compares unfavourably both to yields in Uzbekistan twenty years ago and those in some other major producers now. Average yield for the largest producers is at 1438 kg/ha in 2012 and yield in Uzbekistan was 841 kg/ha in 1994/95. Figure below compares the evolution of cotton yields in Uzbekistan to those of other major producing countries and regions. At the beginning of the period, Uzbekistan's yields were equal to the best in the world but are now far below those of China and Brazil. While Uzbek yields are still above those in Africa and India, the gap has narrowed considerably. Other Central Asian countries "yields have also declined since independence and remain below Uzbekistan's but they have recovered slightly since the

adopted by the Uzbek Government, wheat had become the second "strategic crop". It accounts for about 30 percent of cultivated area. The rest of the cultivated area is used for growing fruit and vegetables (Uzbekistan continues to be one of the major suppliers of fresh and processed fruit and vegetables in the region), in addition to potatoes, tobacco and fodder crops.

The result was an expansion of the winter wheat area from 620,000 ha in 1992 to 1.4 million ha in 2012. As much of the areas newly sown had been amongst the best quality cotton fields, the result was a reduction in the cotton area of 30-35 per cent for at least one season per year. Wheat production did increase substantially, from one million tons in 1991 to 5.2 million tons in and Uzbekistan has now become a wheat supplier with exports of some 500,000 tons annually over the last six years.

Wheat is also a centralized crop, but the quota system for wheat is more flexible than for cotton. Farmers are only obligated to sell 50 percent of their wheat harvest to the central government at procurement prices - the rest can be consumed or sold in the free market. Farmers then have an incentive to pursue higher yields, so as to increase the amount of wheat they can sell at world prices. Cotton farmers do not have this privilege and must go through the black market in order to sell cotton at world prices (Abdullaev et al 2009). As Figure above shows, wheat yields have risen while cotton yields have declined, strongly suggesting that the rigid system of cotton quotas and lack of incentives are a critical factor holding back cotton yields since wheat and cotton otherwise face similar constraints.

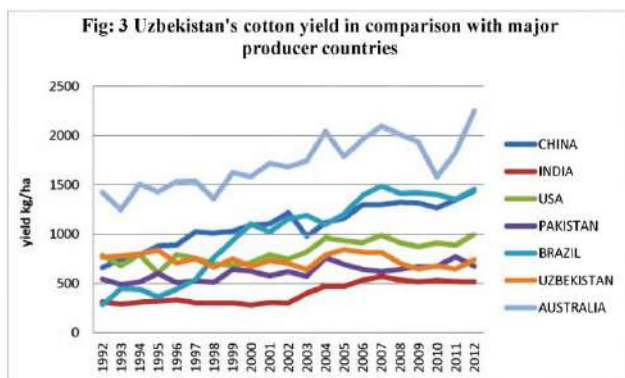


Source: USDA, Foreign Agricultural Service

There is a general belief that this system is a significant factor in the overall stagnation in cotton yields, especially when compared to wheat. This belief is at least partially supported by evidence from 1992 to 1995 when cotton production was partially liberalized and only 50 per cent fell under the quota system.

mid-1990s whereas Uzbek yields have continued to trend down.

The excellent performance of cotton yields in India, Brazil and China also reinforces the importance of liberalization and market incentives to foster innovation and efficiency. China's experience is particularly noteworthy in so far as it is a former centrally planned economy with climatic and soil conditions quite similar to Uzbekistan. China has experienced large productivity increases in cotton growing, due to dissemination of new technologies. Rising productivity of cotton production in China has occurred in a context of far-reaching liberalization of agriculture, higher prices to producers, and investments in infrastructure



Source: USDA, Foreign Agriculture service

India and Brazil have also made substantial progress through a combination of liberalization, assistance to farmers, and investment in infrastructure. In 2002, India introduced BT cottonseeds. This genetically modified variety produces much higher yields than organic varieties and reduced the need for insecticides. Higher yields meant increased production, and therefore higher revenues. An increase in revenues has enabled Indian farmers to invest in farm equipment, further increasing their productivity. From 1992 to 2012, average yield in India almost doubled, going from 311 kg/ha to 517 kg/ha. Brazil has a similar story: farmers have invested in new technologies, new crop varieties, mechanization, soil improvements and biotechnology to increase yields and enhance productivity. The

Brazilian government provides subsidized credit and price support to farmers.

There are some recent areas of progress in boosting cotton yields in Uzbekistan. Improved drainage funded by the World Bank has led to rising yields in South Karakalpakstan. Uzbek cotton breeders have been developing new varieties of cottonseeds, with potentially higher yields than organic varieties. Recently, breeders have focused on varieties that can withstand stress factors and survive harsher conditions. Also, government has been upgrading ginning plants and plans to purchase 200 new linters to replace some of the old ones, which should improve ginning efficiency. Without improving incentives, however, these initiatives are unlikely to suffice to reverse the long-term decline in yields.

From table 1 it is obvious that the highest area of 1583.4 thousand hectares was recorded in the period 1992-1996 and the lowest area was recorded during 2007-2011 period. The average area under the cultivation of cotton from 1992-2011 has been recorded 1461.25 (Table 1). The trend during the whole period has showed a decrease in area under cultivation. The average decrease in area has been recorded (-4.98) percent.

Trend in production has also followed the same path as the area with decrease in production, except 2002-2006 period where the production increased by 2.02 percent. The highest being 1230.084 thousand metric tonnes in 1992-1996 and the lowest being 964.504 thousand metric tonnes in 2007-2011 period. The average production from 1992-2011 has been recorded 1083.241 thousand metric tonnes (Table 1).

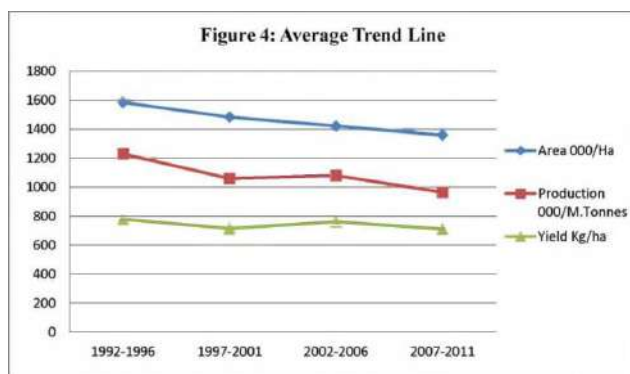
Table 1: Avg. Growth in Area, Production and Yield (1992-2011)

Year	Area	Production	Yield	%ge	%ge	%ge
	000/hectares	000/M/Tonnes	Kg/Ha	Area	Production	Yield
1992-1996	1583.4	1230.084	776.862	NA	NA	NA
1997-2001	1482.6	1058.476	71232	-6.36	-125	-8.10
2002-2006	1421	1079.9	759.957	-4.15	2.02	6.44
2007-2011	1358	964.506	710.240	-4.43	-10.68	-6.54
Average	1461.25	1083.241	740.247	-4.98	-7.53	-2.73

Source: Computed on the basis of FAO statistical yearbook 1992-2011

The trend in yield kg/ha has also been in a state of fluctuation showing a negative growth. The lowest yield of 710.247 kg/ha was recorded during 2007-2011 period and the highest 776.862 kg/ha was recorded during 1992-1996 period. The fluctuating trend showed an increase in percentage of yield

kg/ha with a growth of 6.44 percent during 2002-2006 period (Table 1).



4. Cotton: Trend Analysis in production

For analyzing the trends in cotton production in Uzbekistan Regression Model, has been used. The trend analysis has been calculated for two different time periods e.g.

In light of increasing water shortages in Central Asia and the end of the Soviet distribution system that guaranteed food imports, government leaders have proposed reducing cotton cultivation in favour of grain and other food plants to feed an increasingly impoverished population. In fact, between 1987 and 1991 land planted to cotton decreased by 16 percent, mainly in favour of grains and fruits and vegetables. But Uzbekistan's short-term needs for hard currency make dramatic declines in cotton cultivation unrealistic. Likewise, Uzbekistan's entire existing agricultural infrastructure, irrigation systems, configuration of fields, allocation and type of farm machinery, and other characteristics are geared towards cotton production; shifting to other crops would require a massive overhaul of the agricultural system and a risk that policy makers have not wished to take in the early years of independence. Under these circumstances, continued commitment to cotton is seen as a good base for long-term development and diversification.

from 1992 - 2000 and 2001 - 2011. By doing so the results have been carried out in a comprehensive way and plotted in graphic form.

**Table: 2 Trend Analysis of Cotton Production 2001-2011**

X year	Production Y	x=X-A	X <sup>2</sup>	xy
1992	1273890	-4	16	-5095560
1993	1320920	-3	9	-3962760
1994	1258000	-2	4	-2516000
1995	1249720	-1	1	-1249720
1996	1047890	0	0	0
1997	1138250	+1	1	1138250
1998	1001520	+2	4	2003040
1999	1127800	+3	9	3383400
2000	957972	+4	16	3831880
<b>N = 9</b>	<b>Σy = 10375960</b>	<b>Σx = 0</b>	<b>Σx<sup>2</sup> = 60</b>	<b>Σxy = 2467470</b>

$$y^t = a + bx \text{ ----- 1}$$

$$\sum y = Na + b\sum x \text{ ----- 2}$$

$$\sum xy = a\sum x + b\sum x^2 \text{ ----- 3}$$

$$-2467470 = (1152884.44).0 + 60b$$

$$-2467470 = 0 + 60b$$

$$-2467470 = 60b$$

$$b = \frac{-2467470}{60}$$

$$b = -41124.5$$

Substituting the values of "a" and "b" in equation - 1, we get;

$$y^t = a + bx$$

$$y^t = 1152884.44 + (-41124.5)x$$

Putting values of Σy, Σx and N in equation - 1, we get;

$$10375960 = 9a + b.0$$

$$10375960 = 9a$$

$$a = \frac{10375960}{9}$$

$$a = 1152884.44$$

Now putting values of Σxy, Σx<sup>2</sup>, Σx and "a" in equation - 3, we get

**Table 3: Trend values 1992-2000**

Year	x	y <sup>t</sup> = a + bx	Trend Value
1992	-4	1152884.44+(41124.5) (-4)	988386.44
1993	-3	1152884.44+(41124.5) (-3)	1029510.94
1994	-2	1152884.44+(41124.5) (-2)	1070635.44
1995	-1	1152884.44+(41124.5) (-1)	1111759.94
1996	0	1152884.44+(41124.5) (0)	1152884.44
1997	1	1152884.44+(41124.5) (1)	1194008.94
1998	2	1152884.44+(41124.5) (2)	1235133.44
1999	3	1152884.44+(41124.5) (3)	1276257.94
2000	4	1152884.44+(41124.5) (4)	1317382.44

**Table: 4 Trend Analysis of Cotton Production 2001-2011**

X year	Production Y	□ = X - A	□ <sup>2</sup>	□ □
2001	1066840	-5	25	-5334200
2002	1001520	-4	16	-4006080
2003	892660	-3	9	-2677980
2004	1132150	-2	4	-2264300
2005	1208360	-1	1	-1208360
2006	1164810	0	0	0
2007	1164810	+1	1	1164810
2008	1001520	+2	4	2003040
2009	849110	+3	9	2547330
2010	892660	+4	16	3570640
2011	914430	+5	25	4572150
<b>N = 11</b>	<b>Σy = 11288870</b>	<b>Σ □ = 0</b>	<b>Σ □<sup>2</sup> = 110</b>	<b>Σ □ □ = 6509840</b>

$$\square^t = \square + \square \text{ ----- 1}$$

$$\sum \square = \square + \square \sum \square \text{ ----- 2}$$

$$\sum \square \square = \square \sum \square + \square \sum \square^2 \text{ ----- 3}$$

Putting values of Σ □, Σ □ and N in equation - 1, we get;

$$11288870 = 11a + b.0$$

$$11288870 = 11a$$

$$a = \frac{11288870}{11}$$

$$A = 1026260.90$$

Now putting values of  $\sum x$ ,  $\sum x^2$ , and "a" in equation - we get;

$$6509840 = (1026260.90)0 + 110b$$

$$6509840 = 0 + 110b$$

$$6509840 = 110b$$

$$b = \frac{6509840}{110}$$

$$b = 59180.36$$

$$x^t = x + x^2$$

$$x^t = 1026260.90 + (59180.36) x$$

**Table 2: Trend Analysis of Cotton Production 1992-2000**

Year	X	Trend Value
2001	-5	1026260.90 + (59180.36) (-5)
2002	-4	1026260.90 + (59180.36) (-4)
2003	-3	1026260.90 + (59180.36) (-3)
2004	-2	1026260.90 + (59180.36) (-2)
2005	-1	1026260.90 + (59180.36) (-1)
2006	0	1026260.90 + (59180.36) (0)
2007	1	1026260.90 + (59180.36) (1)
2008	2	1026260.90 + (59180.36) (2)
2009	3	1026260.90 + (59180.36) (3)
2010	4	1026260.90 + (59180.36) (4)
2011	5	1026260.90 + (59180.36) (5)

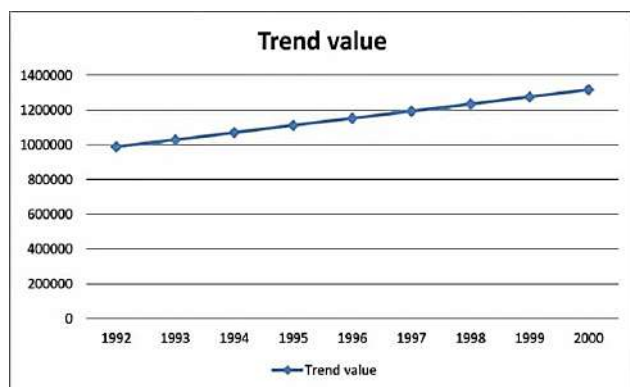
Since the year of origin is 2005, therefore the value of 'x' for the year 2030 will be 25.

$$x^t = 1026260.90 + 59180.36(25)$$

$$02030 = 1026260 + 1479509$$

$$02030 = 2505760.9$$

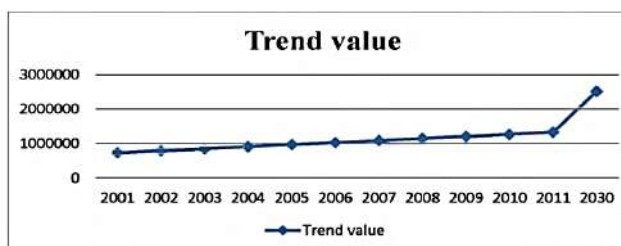
**Figure: 5 Trend Line 1992-2000**



Since independence in 1991, cotton production in Uzbekistan has declined by approximately one third. This decline is primarily a result of a reduction in the area devoted to cotton and, secondarily, of a minor decrease in yields. The decline in cotton cultivation and the current area planted to cotton are first and foremost results of explicit government policy. After independence, the government allowed some cotton areas to be transferred to the private cultivation of non-cotton crops and encouraged a shift to wheat production to cope with economic and political disruption and to meet new desires for national food security. The lesser cotton area which resulted has then been maintained by a coercive quota system for both planting and procurement. Should the quota system be removed with no other change in policy, it is fairly clear that cotton cultivation would decline further. However, it must also be remembered that output and input prices as well as credit are now controlled by the government. At current world price levels, a general freeing of the cotton sector would raise the prices farmers receive for their crops but would also raise the costs of production inputs. Predicting the net effect on both cotton output and farmer well-being, at least in the short term, is less than straightforward.

The minor decline in cotton yields is partially related to the decline in the volume of land used for cultivation. For example, farmers have been able to transfer some of the most productive cotton lands to the production of other crops including wheat and vegetables. However, other factors have also been at work. Environmental problems have certainly contributed to difficulty in maintaining, or increasing, cotton productivity. The shift from large collective farms towards family organization has resulted in a vacuum of responsibility and organization for the operation and maintenance of some irrigation and drainage systems. The impact, exacerbating problems emerging by the end of the Soviet period, has been land degradation primarily in the form of water logging and salinity.

**Figure: 6 Trend Line 2001-2011**



However, the true driving force in cotton productivity improvement, or lack thereof, becomes evident when comparisons are made with Uzbekistan's other major crop, wheat. Typically grown in the same irrigated fields as cotton, wheat yields have more than tripled since independence. The comparison between cotton and wheat is perhaps especially surprising given the increasing levels of salinization and cotton's relative salt tolerance. This evidence strongly suggests that it is not the natural environment which has held down cotton productivity but rather it is the policy environment which is the culprit. In particular, the stagnation in yield appears to be largely a response to a government quota system for cotton which gives little, if any, incentive to increase productivity beyond the levels required to meet production quotas.

While cotton yields have deteriorated in Uzbekistan, they have risen in other developing country producers, including China, Brazil and India. The experiences of these countries have important lessons for Uzbekistan. China in particular has climatic and soil conditions similar to Uzbekistan and also

emerged from Communism. The Chinese government has substantially liberalized agriculture since the early 1980s while supporting infrastructure and assisting farmers. As a result of this more favourable environment and farmers' incentives to boost productivity, Chinese farms have invested in technologies and adopted practices that have fostered sharply rising yields. Likewise, Brazik's cotton producers have benefited from liberalization and boosted both land area devoted to cotton and productivity. The heavy-handed control of the

Uzbekistan government over its cotton industry and the reliance on coercion rather than incentives are the main reasons for the unfavourable performance of Uzbekistan. This is also illustrated by the divergent performance of wheat and cotton yields in Uzbekistan. Although wheat is also subject to extensive government control, wheat farmers have substantially more flexibility than cotton farmers, and wheat yields have consequently trended upwards while cotton yields have fallen.

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## TENDENCIES OF AGRICULTURAL DEVELOPMENT IN UZBEKISTAN AND DIRECTIONS FOR INCREASING THE EFFICIENCY OF FARMERS' ACTIVITIES

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ARTICLE INFORMATION	ABSTRACT
<p><b>Received:</b> January 08, 2021  <b>Accepted:</b> February 22, 2021  <b>Volume:</b> 1  <b>Issue:</b> 5  <b>DOI:</b> <a href="https://doi.org/10.54613/001005">https://doi.org/10.54613/001005</a></p> <hr/> <p><b>KEYWORDS</b></p> <p>agriculture, farming, gross domestic product, land resources, economic models of cotton yield, information and communication technologies, digital service</p>	<p>The article analyzes the trends in the macro and micro economic development of agriculture in the country and its individual regions. The factors of growth and efficiency of production of food crops and raw materials in farms of a separate region and district in conditions of limited land-water and labor resources have been revealed. Proposals have been developed to improve the structure of production in farms, to develop strategic sectors of agriculture aimed at increasing the export of food products. Recommendations are given on the development of information systems of digital services for servicing farms in districts and regions.</p>

### 1. Introduction

As a result of economic reforms implemented in Uzbekistan, new economic entities based on private property- farms, have been formed and entered the stage of development. In the context of providing sustainable economic growth in Uzbekistan, one of the main tasks of farm management is to substantiate ways to further increase its contribution for the growth of the country's economy. The main purpose of this, is to ensure the competitiveness of agricultural products and increase their export potential in the world market. It should meet the needs of the population in food and raw materials produced in farms and the requirements of domestic and foreign markets of the republic's industries.

To achieve this goal, it is necessary to determine the optimal composition and prospects of production through the efficient use of labor, material and financial resources and to study in depth the trend of changing market conditions. The use of modern mathematical methods and information and communication technologies (ICT) is required to address these issues in an interconnected and coordinated manner and, as a result, to make informed decisions in farm management. On its

basis, it will be possible to develop multivariate management decisions based on the creation of a database for collecting, storing, processing and transmitting information related to the activities of farms.

With the help of models and information systems, the issues of production and processing management in the network of farms are solved jointly, simultaneously and in a coordinated manner. At the same time, it is possible to resolve issues of coordinating the volume of raw materials and the capacity of processing enterprises, and as well as to develop service sectors.

An important factor in increasing the volume and quality of agricultural products in our country is the solution of issues of improving the quality and reducing the cost of products by ensuring the material interests of farmers, and at present, it is being considered as crucial problem. One of the important tasks in solving this problem is to substantiate the strategy for the future development of farming activities using modern information technologies, which is one of the actual trends of scientific and practical research.

### 2. Literature review

The research of U.P.Umrzakov, A.M.Kadyrov, N.S.Khushmatov, H.T.Farmonov, K.A. Choriev and other economists is devoted to the trends of the development of agricultural economy, as well as the issues of deepening market reforms in the industry and increasing the efficiency of production in farms.

The research work of many scientists in our country is devoted to the modeling of agricultural sectors and industries, as well as farm management and solving scientific and practical problems in the application of information and communication technologies and digital economy. The scientific work of S.S.Gulomov, B.B.Berkinov, B.A.Beglov, Sh.I.Mustafakulov, D.T

Mukhamadiyeva and others can be included among them. In recent years, research in these areas has focused on the development of a system of methods and models for the analyzing and forecasting of management and development of farms in the context of limited land, water, labor and other resources.

On the other hand, there is a lack of research on improving the system of normative and statistical information of increasing the efficiency of farms and predicting their development. Research in these areas will accelerate the introduction of information and communication technologies and the digital economy into farm management.

### 3. Analysis and results

Agriculture plays an important role in the economy of Uzbekistan. Land fund, labor resources, machinery and technological equipment, as well as the irrigation system and a large part of other national wealth of the country are at the disposal of agriculture. Taking this into account, the government

of the republic is consistently implementing comprehensive measures aimed at accelerating the adaptation of agricultural producers to market relations, as well as, increasing the efficiency of their production.

According to the statistics, more than 3.3 million people were employed in the agricultural sector in 2019. Or the number of agricultural workers increased by 7.5 percent compared to 2000. In 2019, the share of agriculture, including forestry and fisheries, in the country's GDP amounted to 28.1 percent. This is 12.0 percentage points lower than in 2000. Although this is due to an increase in the share of other sectors and industries in GDP, in practice, gross agricultural products at current prices in 2019 increased by almost 9.5 times compared to 2000.1 The production of arable farming products increased by 20.3 times during the same period. Such positive changes have created opportunities not only to improve the supply of food to the population, increase exports, meet the demand for raw

materials of processing industries, but also to increase the income of the rural population. This is confirmed by the fact that the volume of production per worker engaged in agriculture in 2019 increased by 90 times compared to 2000. In other words, if in the same period, an occupied worker produced goods worth 449 thousand soums in 2000, then in 2019, this figure amounted to 40518.7 thousand soums.

At the same time, there is an upward trend in gross agricultural output. If the production growth decreased by 1.0% in 2018 compared to 2017, then in 2019, this indicator amounted to 14% compared to the same period, or GDP growth in the industry was 2.2 percentage points higher over the same period (Table 1).

**Table 1. Dynamics of changes in the main macroeconomic indicators of agricultural development in Uzbekistan, in billion soums[2]**

Figures	Years				Growth in 2019 compared to 2000, either % or times
	2000	2017	2018	2019	
Share in the country's GDP, %	30,1	31,6	31,5	28,1	-2,0
The number of occupied people, in thousands	3090,2	3120,9	3247,3	3323,2	107,5
The gross output (at current prices)	1387,2	90983,1	113660,7	130599,9	95,0
The growth rate of GDP (in % to the previous year)	103,1	101,3	100,3	102,5	-0,6
The volume of production per employed worker, thousand soums	449,0	29152,8	35001,6	40518,7	90,0

It is known that as a result of gradual reforms in the agriculture of Uzbekistan, a diversified system of agricultural production with the priority of private ownership has been formed, and farms (arable farms) plays a key role in it. At present, the farms with various production specialties is developing through the cultivation of products in agriculture, animal husbandry and other areas.

According to the State Committee on Statistics, at the beginning of 2020, the number of farms in Uzbekistan amounted to 92.6 thousand, of which 40 thousand (or 43.2 percent) were engaged in the cultivation of cotton and grain, 31 thousand (or 33.4 percent) in horticulture and viticulture, 14.8 thousand (16 percent) in livestock; 5 thousand (5.4 percent) in the cultivation of vegetables and melons, and 1.8 thousand (2.0 percent) in other agricultural production. Of the agricultural products produced in the agricultural sector, 26.9 percent belong to private farms and 70.1 percent to arable farms (gardening). Farms account for 33% of agricultural production in Andijan region, and this figure is the highest among all areas of the republic.

It should be noted that the economic potential of farms has increased and has become a major productive force in the countryside. This is confirmed by the following. The total land area of farms consist of 5987.8 thousand hectares. Its 5324.1 thousand hectares (or 89 percent) are occupied by agricultural land. Of these, 3652.0 thousand hectares (2019) are arable land and this consist of 89 percent share of all arable land in the republic.

Andijan region has great potential for the production of agricultural products and their sale on the market. The products (services) of agriculture, forestry and fisheries account for 24.4 trillion soums were produced in Andijan region, in 2019. This indicator is the second largest in the country after the Samarkand region. In addition, the growth rate of agricultural production in the region during this period amounted to 3.4 percent, and this is 0.9 percentage points higher than the national average (2019).

In 2019, Andijan region has accounted for almost 11 percent of agricultural, forestry and fishery products (services) produced in the country. This is the highest rate in our country. 66.9 percent of the agricultural output in the region are arable farming products.

As of 2019, 220.5 thousand hectares of land were planted with agricultural crops in Andijan region. In 2017-2019s, Andijan region accounted for 6.4 percent of the country's average GDP. In 2019, the region produced 10 625.6 thousand soums of gross yield (GY) per capita, which is 21.8 percent more than in 2018. The growth rate of gross yield in the region amounted to 6.5 percent in 2019, which is 3.3 percent less than in 2018. This year, the upgrowth of gross yield per capita in the region amounted to 4.5 percent.

In 2019, the share of Andijan region in the gross yield structure with agriculture, forestry and fisheries amounted to 45.1 percent. The share of the region in the industrial structure for this year amounted to 22.6 percent, in the service sector - 26.8 percent, in construction - 5 percent. These figures show that Andijan region occupies a high position in the agricultural sector of the republic. In 2017-2019s, the volume of gross yield in the region in agriculture increased from 9603.3 billion soums to 14304.8 billion soums at current prices, or more precisely, the figure increased by approximately 50 percent over the same period.

The results of this analysis show that Andijan region is one of the regions with high economic potential in the country. The economic potential of the region is determined by the role of its districts in production (services). An example of such districts is Balikchi district. As of 2019, agricultural, forestry and fishery products worth 1766.0 billion soums were produced in the district and this number constitutes

7.4 percent of the region's total output. This year, 72.2 percent of the district's production falls on the arable farming sector. The share of farms in the total output of the district amounted to 43.4 percent for the case of 2019.

In 2019, 7393 hectares of land in Balikchi district are planted with cereals and 10309 hectares with cotton. This year, 90.4 percent of land in the district has been allocated for these two crops. This shows that the district is mainly specialized in the production of grain and raw cotton. In 2019, compared to 2016, the production of raw cotton in the farms of the district increased by 1.8 percent, grain by 9.2 percent, potatoes, vegetables and melons by 1.5 times whereas meat decreased by 17 percent, milk by 22.6 percent, eggs by 32 percent.

However, in 2018, the manufacture of these products in the area increased sharply. In 2019, 99.8 percent of raw cotton,

92.7 percent of grain, 25 percent of potatoes and 50.6 percent of vegetables produced in the district account for the share of farms (Table 2). These analysis shows that the especial tendency for the development of arable farming production is observed in the farms of the Balikchi district. At the same time,

the transition to intensive methods of growing cotton, grain and other agricultural products in these multisectoral farms and increasing their efficiency is considered as one of the important tasks.

**Table 2. Dynamics of changes in the main indicators of farm development in Balikchi district of Andijan region[3]**

Figures	Unit of measurement	Years				The growth in 2019 compared to 2016, either % or times
		2016	2017	2018	2019	
Farms	In thousands	527	484	417	323	-39,0
Total land area	In thousand hectares	19325	17974	19171	19591	13,8
Agricultural products	In billions soums	289,2	363,0	571,4	754,4	2,6 m.
Crop area	In hectares	19325	17974	19171	19531	13,8
e.g., cereals	-// -	7550	7038	7519	7353	-2,0
Cotton	-// -	10594	10245	10435	10309	-2,7
Potato	-// -	67	15	108	91	1,4 m.
Vegetables	-// -	523	87	504	656	1,3 m.
Melons	-// -	43	40	38	88	2 m.
Food crops	-// -	548	546	563	1014	1,9 m.
Agricultural production: cotton	In tons	32701	29551	27973	33299	1,8
Grain (after processing)	-// -	49215	47540	50645	53753	9,2
Potato	-// -	5481	4443	6145	8002	1,5 m.
Vegetables	-// -	37865	34065	55893	56373	1,5 m.
Melons	-// -	21550	21576	22475	32617	1,5 m.
Meat (in slaughtered weight)	-// -	586	167,1	449,9	488,1	-17,0
Milk	-// -	3219	1848	2676	2708	-26,0
Egg	In millions	6527	1373	4210	4440	-32,0

Statistically, during 2008-2019s, the cotton yield in Balikchi district increased from 24.7 centners to 32.3 centners (Table 3). During this period, the income from a hectare of cotton field increased by 1,358,000 thousand soums, or almost twice. This was due to the increase in cotton yield and the purchase price of raw cotton. The average purchase price of a ton of raw cotton in 2008 amounted to 550.0 soums, and in 2019 - 4200 thousand soums, or in the same period, the

average purchase price of a ton of cotton increased by 3750 thousand soums, and the cost by 3128 thousand soums. This ensured the profitability of cotton production in the district at 15 percent in 2019. In other words, in 2019, the sale of a ton of raw cotton brought an average profit of 650,000 soums to its producer. Considering that farms have grown 333 thousand tons of raw cotton this year, the profit of farmers will be about 217 billion soums.

**Table 3. Dynamics of changes in the efficiency of cotton production in farms of Balikchi district, in thousand soums[4]**

Figures	Years					Increase (+), decrease (-) in 2019 compared to 2018
	2008	2016	2017	2018	2019	
Cotton yield, centner/hectare	24,7	24,9	27,9	25,9	32,3	+7,6
In terms of one hectare of land:						
- gross income	1358	2988	3766	9065	13889	+12531
- production costs	1290	2838	3575	8158	11805	+10515
A ton of product:						
-cost	522	1140	1281	3150	3650	+3128
- average selling price	550	1200	1350	3500	4300	+3750
Profitability level of production, %	5,0	5,0	5,0	10,0	15,0	+10,0

It is known that ensuring grain independence is one of the strategic development goals of Uzbekistan. Extensive measures have been taken in Andijan region and its districts in order to implement this strategy. As a result, in 2019, more than 636.7 thousand tons of grain were cultivated in the Andijan region, including 50.6 thousand tons of grain in the farms of the Balikchi region.

According to the analysis of statistical data, the volume of grain production in Balikchi district is mainly due to an increase in its yield. If the average grain yield amounted to 55.4 centners in 2008, then in 2016-2019 this figure averaged 67.4 centners.

In line with these changes in the growth of cotton and grain production, the functions and responsibilities of each specialist-manager in the system of farm management arising from the new agrarian relations are also improving. They have been entrusted with functional tasks aimed at providing sustainable development of agriculture and increasing efficiency in the field. One of these tasks is to organize and

control the effective use of water, equipment, labor, mineral fertilizers and other productive resources. In practice, this should result not only in the economical use of valuable productive resources, but also in the abundance and quality of crop yields.

From this point of view, farmers and agricultural specialists are required to have scientifically based information and knowledge about the results of land, water and other productive resources in the soil and climatic conditions of their territories. Data belonging to this category are reflected in various standards and statistical reports in the agricultural management system. A correct conclusion can be made about the efficiency of production only on the basis of objective data. However, it remains unclear to what extent each of the production resources, individually or in groups, affected the yield from the ground, and what the result might be if this continues in the future. One of the main ways to solve this problem from the point of view of information uncertainty is the

creation of multi-factor or single-factor econometric models to assess the impact of expended resources on production using mathematical methods. Econometric models are used in economic analysis and forecasting future changes in dependent variables to make decisions in conditions of uncertainty in system management. The purpose of creating such econometric models is to determine the degree of quantitative impact of a single factor of production or group of them on the dependent variable (for example, cotton yield) and whether it is positive or negative. It is known that the efficiency of resources used in agriculture is reflected in crop yields. Cotton is the main branch of agriculture along with grain production. Irrigated lands and a large part of industrial production resources are used in cotton growing. Therefore, an econometric research of the efficiency of agricultural resources can be carried out on the example of this sector. In the context of uncertainty of the information that determines the growth of cotton yield, the influence of factors is interrelated, but they cannot be considered as a simple sum of the effects of individual factors. Therefore, in the analysis of the impact of production factors on cotton yield, it is necessary to determine the quantitative indicator of the impact of each factor, taking into account the cumulative effect of all factors or taken separately. This problem is solved by creating single- factor or multi-factor econometric models of cotton yield. To study this issue, long- term statistics of the cotton industry Balikhchi district of Andijan region were obtained. Multi-factor models of regression analysis were developed based on statistical data.

It is known that the cotton yield is influenced by controlled and uncontrolled factors. Controllable factors might include factors that are formed through groups of agro-technical activities that take place from plowing to harvesting. Data on the factors included in this group is reflected in the business plan, statistical reports on the financial and economic activities of the economy. At the same time, uncontrollable factors could be information on the level of humus, heat, precipitation in the soil since they are extremely uncertain and are collected from special sources as a result of long-term observations. These specific features, completeness and accuracy of information uncertainty play a key role in the development of models of yields of cotton and other crops. The selection of factors to be included in the productivity model for a particular region is also based on the availability of this information. Taking this into account, the following factors were included in the econometric model of cotton yield (Y) for the district under consideration:

- X<sub>1</sub>- average land value (quality score);
- X<sub>2</sub>- applied mineral fertilizers (active substances / ts);
- X<sub>3</sub>- labor intensity (man-day / ha);
- X<sub>4</sub>- salary (thousand soums / ha).

The result is the following linear regression equation:

$$Y = 18,7 + 0,18 X_1 + 0,75 X_2 - 0,035 X_3 + 0,05 X_4, (1)$$

The multiple correlation coefficient (R) of the model is - 0.78. If the assessment of soil quality (x<sub>1</sub>) exceeds 1 point (as a factor of high uncertainty), the cotton yield might increase by 0.18 centners, and if the amount of mineral fertilizers (X<sub>2</sub>) is used by more than a centner, the cotton yield might increase by 0.75 centners. In the model, an increase in manual labor (X<sub>3</sub>) has a negative effect on the growth of cotton crop, while an increase in wages (x<sub>4</sub>) has a positive effect. In general, all factors selected in the model were strongly bonded with cotton yield. This is also confirmed by the value of the multiple determination coefficient (D = 0.425). This situation leads to the following conclusion: the change in cotton yield by about 42.5% is due to the influence of the factors under study. It should be borne in mind that modern software packages allow studying multicollinearity and identifying many factors that have a functional relationship. In our opinion, it is expedient to study separately the dependence of cotton yield on the cost of labor. The higher the level of wages, the higher the interest of workers in more productive and quality work and the higher the yield of cotton. To determine the dependence of the volume of cotton yield on the level of wages, a double correlation between the level of cotton yield and the level of wages was studied on the example of data from the cotton industry in Balikhchi district. The

regression equation of this double relationship has the following form:

$$Y = 12,05 + 0,07 x_1 (2)$$

Here, Y- the yield of cotton, c/ha,  
X - the level of wage, thousand soums.

The value of the exemption limit in this (2) regression equation assumes that the yield of cotton could be 12.05 c/ha when the minimum wage costs are met. That is, such a volume of cotton yield can be described as the yield of raw cotton in biological, potential or indeterminate volume per hectare for district conditions.

Perhaps the failure to grow the expected crop is due to other (including uncertain) factors not taken into account in this model. At the same time, in case the level of wage will rise indefinitely, this will not lead to an endless increase in cotton yields. The factor of wage allows achieving the expected result only in combination with other factors affecting the yield of cotton. In determining the development of farms specializing in cotton (substantiation of the business plan), it is important to predict the expected level of cotton yield as an uncertain value. The multi-factor econometric model developed above (1) can be used to forecast cotton yields. At the same time, it has been assessed that the possibility of obtaining additional yields through the expenditure of cotton production resources due to the change in production of each factor involved in the model on farms during the forecast period. The first variable factor of the model (x<sub>1</sub>) is the assessment of the quality of irrigated lands in the district, which occurs as a result of the introduction of crop rotations of cotton and grain in farms and the enrichment of land with organic fertilizers from livestock farming. Therefore, in the forecast of the first option for farms, the land quality in points was taken at its average level - 50 points. This is due to the possibility of delays in the introduction of crop rotation, and the use of organic fertilizers might only maintain the current fertility of the soil. In the second version, the probability of widespread crop rotation is high for large farms, while for medium-sized farms this possibility is relatively small. Therefore, the x<sub>1</sub> value for the forecast for option 2 was assumed to be 60 points for large farms and 58 points for medium farms. Due to this factor, an additional cotton yield of 9 to 10.5 centners per hectare can be obtained (Table 4).

Another important factor that positively affects cotton yields is the level of use of mineral fertilizers (X<sub>2</sub>) in cotton cultivation. The sharp rise in the price of mineral fertilizers limits the possibility of their use in growing cotton in scientifically based norms and ratios.

**Table 4. Forecast options for cotton yield in Balikhchi district on the basis of econometric model indicators[6]**

Variable factors	Unit of measurement	Correlation coefficient ----- (a <sub>1</sub> , i = 1,4)	Accepted values of variables for the future			
			Large farms		Medium-sized farms	
			1 <sup>st</sup> option	2 <sup>nd</sup> option	1 <sup>st</sup> option	2 <sup>nd</sup> option
X <sub>1</sub>	score	0,18	50	60	50	58
X <sub>2</sub>	hm/c	0,75	1,6	2,0	1,2	2,0
X <sub>3</sub>	person-day/hec.	-0,035	62,5	56,8	72,5	68,7
X <sub>4</sub>	thousand soums/hec.	0,05	1136,5	1136,5	1145,6	1145,6
a <sub>0</sub>	c/hec.	18,7	18,7	18,7	18,7	18,7
Y	c/hec.	-	28,2	30,5	28,0	29,6

With this in mind, the full use of mineral fertilizers by farms in the cotton industry is inextricably linked with the increase in prices for raw cotton. Taking this into account, the norms of use of mineral fertilizers by farms in cotton cultivation were established in accordance with forecast options. They are 35-60 percent more than the current norms. It is now estimated that 2 people spend 8 months growing cotton on a hectare of land in agriculture (as a rule). We determined the labor cost per hectare of cotton, taking into account the high potential for mechanization of agro-technical work in the district cotton growing, as well as the cost of labor on the technological map. The level of wages in the cotton industry of the district is obtained at the levels that form the basis of the formation of

cotton prices, and according to the forecast options, in large farms, they amounted to 1136.5 thousand and 1145.6 thousand soums, respectively. At the values of the factors of production included in the econometric model for the forecast period, on large farms it is possible to get an additional 10.5 (1st option) and 12.8 (2nd option) centners of cotton per hectare. The average cotton yield in farms account for 10.3 and 11.9 centners respectively on account of production factors. In these figures, on average, it can be expected to yield 28.2 centners per hectare in 1st option and 30.5 centners in 2nd one in large farms. According to the forecast options, the cotton yield on middle-sized farms might be on average 0.2 centners in 1st option or 0.9 centners in 2nd option (per hectare) lower than in large farms. At the projected level of cotton yield (first and second options) from the cotton fields set for 2018 in the district, there can be produced 31245 tons of raw cotton in the

forecast of option 1 and 33695 tons in option 2. Of this, 98.5 percent is accounted for the share of farms. At the same time, the average profitability of cotton production in the district is expected to be around 12-14 percent.

In conclusion, this level of profitability of cotton production ensures the financial and economic stability of farms in the district, which opens up a wide range of opportunities for their expanded reproduction and increased wages. The results of these calculations show that the proposed econometric models accurately reflect the modeled process and can be used by farmers and district specialists in determining the prospects for the development of cotton industry. The proposed models and the approach to their implementation can be applied in the analysis and forecasting of the efficiency of the use of production resources in cotton cultivation in other areas.

#### 4. Conclusions and suggestions

1. According to the analysis, the structure of agricultural production has been restructured in accordance with the requirements of the country's population, industries and the international market, new agrarian relations have fundamentally been formed. A middle class of landowners – farmers has been formed in the villages. Farms have become the mainstay of the country's agriculture. They had the resources they needed to produce strategically important raw cotton, grains, vegetables and other food products and this has largely laid the foundation for sustainable development in agriculture.

2. The state has introduced financial and economic mechanisms to support farmers and stimulate their development. Production of cotton, grain and other agricultural products has been stabilized, which has led to an increase in income and welfare of the rural population.

3. Increasing the efficiency of agricultural and livestock products produced by farmers in the regions, expanding infrastructural organizations serving farmers, is paving the way for the development of diversified farms based on production cooperation in the future. This will ensure the formation and development of financially and economically powerful and sustainable agro-industrial clusters.

4. For further improvement of farm activities, development and implementation of the following program measures is offered at the present stage of agrarian reforms:

- to improve the efficiency of the use of land, water, labor and other production resources;
- employment and well-being of the rural population;
- rural development;
- expansion of the rights of farmers.

5. It is necessary to improve the legislation related to the functioning and development of farms, including the transition to the optimization of the composition of farmland on the basis of criteria of high income and profitability.

6. Farmers can voluntarily establish processing and service organizations based on cooperation and it is necessary to create conditions for further development of diversified farms.

7. It is offered a gradual transition to a digital electronic system of information and communication technologies, including material and technical resources, as well as statistical, financial, tax reporting in the activities of farms, the development of an information system providing digital services to the agro-industrial complex in the regions and districts.

8. It is necessary to place agricultural crops optimally and determinate their normative value, expand and organize a network of consulting centers for legal, economic, financial, agro-technical and other services in the regions, and as well as, to stimulate cotton production and improve the system of training and retraining of farmers.

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## THE PROBLEM OF WATER AND LAND RESOURCES MANAGEMENT AND CLIMATE CHANGE IN UZBEKISTAN

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ARTICLE INFORMATION	ABSTRACT
<p><b>Received:</b> January 11, 2021  <b>Accepted:</b> February 08, 2021  <b>Volume:</b> 1  <b>Issue:</b> 6  <b>DOI:</b> <a href="https://doi.org/10.54613/001006">https://doi.org/10.54613/001006</a></p> <p><b>KEYWORDS</b></p> <p>Resources Management, climate change, agricultural productivity, soil salinity, water consumption</p>	<p>This article examines the current state of water and land resources in Uzbekistan. Since the agricultural sector in Uzbekistan occupies a significant share of the national and gross domestic product value, the quality of these resources is especially important for our republic. The main problem in obtaining the high- quality agricultural products in the region is the lack of water, salinization and soil erosion, as well as their secondary salinization, which is amplified due to climate change in this region. Studies show that this affects the productivity of an agricultural products. Taking this into account we understand the necessity of reduction of the harvesting of cotton and rice for less moisture consumed fruit and vegetable products. To achieve this expected results in the management of water and land resources, it is necessary to use the international experience of other countries, applying innovative water-saving technologies in the system of irrigation of land resources incorporating the problem of climate change.</p>

### 1. Introduction

The water problem in Uzbekistan is considered to be one of the main ecological and agricultural issues. Our republic belongs to countries with limited water resources, which in the future may have a negative impact on the development of the economy and the standard of living of the population. Of all the Central Asian states, Uzbekistan is the most dependent on water resources, since it has the largest area of irrigated land (4.3 million hectares), a high rural population (over 16 million people) and the highest population density among 5 countries (54.6 people/km<sup>2</sup>).

The main key environmental challenges for Uzbekistan of water scarcity is to meet the growing needs of the population, agriculture and industry, soil salinization and pesticide pollution, desertification of the territory against the background of deforestation, the Aral Sea crisis and climate change. Climate change carries risks in terms of cultivation with agricultural production in sufficient quantities, which may lead to changes in agricultural practices and dietary consumption of the population.

Uzbekistan possesses considerable ground and water resources, however the land and water use system which has developed today is characterised by irrational use of resources, not proper management efficiency, ageing of irrigating and collecting-drainage systems. All it causes shortage of water and land resources degradation. The growing population and growth of requirement for water, transition of water objects of neighbouring countries with irrigational on a power mode will aggravate the situation. According to some experts if current use of water resources to be continued without any changes than in 25-30 years Uzbekistan will face sharp shortage of water for agricultural needs. In intermediate term prospect the serious conflicts of interests will arise regarding the water distribution between economy sectors at an interstate level and at the local level such as, water users from the top and bottom

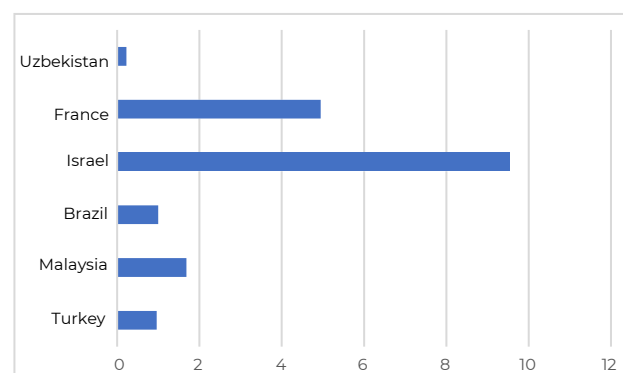
### 2. Materials and Methods

Uzbekistan enjoys several advantages of favorable natural and geographic conditions as its territory includes a combination of mountainous, plain, and desert terrain. In the east and south-east, sandy steppes make way for hills and piedmont areas. Mountains constitute the largest ecosystem in the region and are highly significant for the country's

current of the rivers, between water consumers and ecosystems. Increase of efficiency of water use, the water savings and demand management based on fair distribution of water and achievement of compromises and this is the vital problem for Uzbekistan and other Central Asian countries.

Agriculture is a key economic sector in Uzbekistan, accounting for about 19.2% of the GDP structure, 3.6 million people work in agriculture or 27% of the employed in this sector [1]. However, despite the high employment rate of the population in agriculture sector that leads to agricultural productivity, Uzbekistan is still behind many countries by its development (Fig1).

**Fig. 2 Agricultural productivity, 2017, USD / Employed**



Sources: 1 - Information BUYUK KELAJAK, World Atlas, Export.gov, World Bank, State Committee of the Republic of Uzbekistan on Statistics

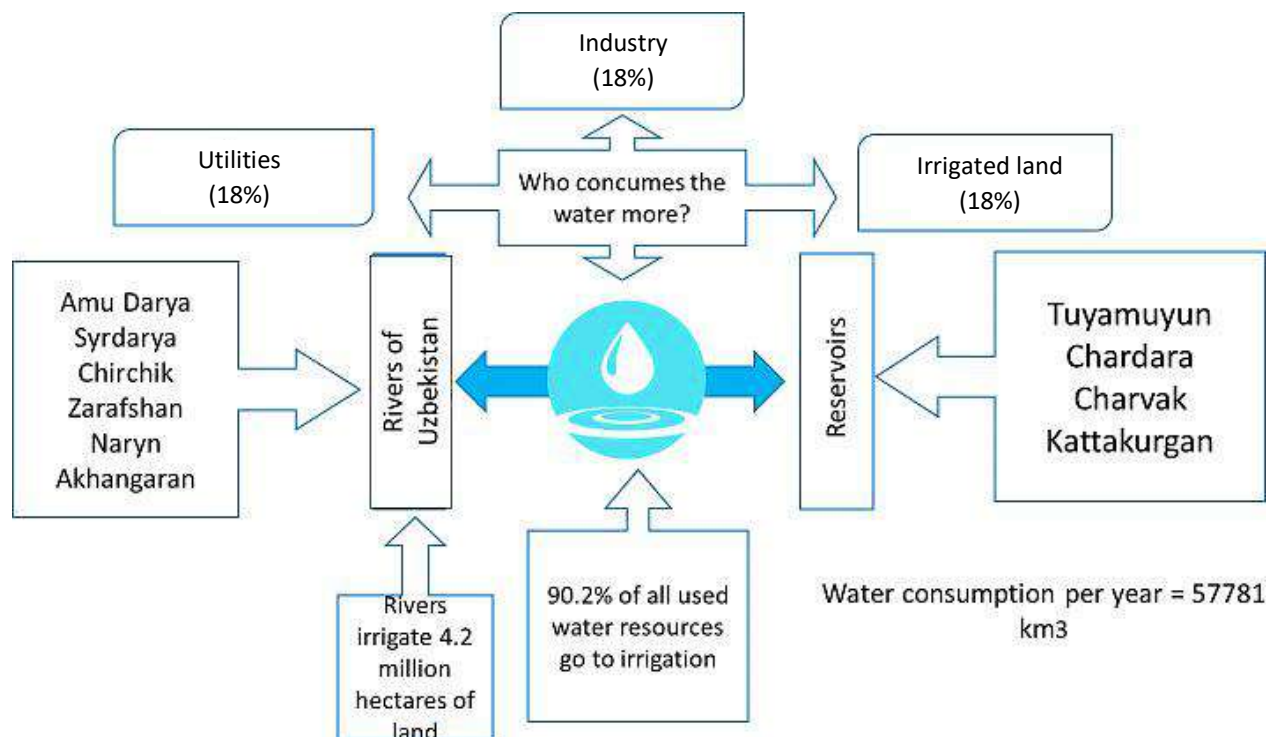
The share of small business in agriculture is 98.6% Agriculture sector is the main consumer of water resources in Uzbekistan (Fig.2).

environmental balance and sustainability. They are an important source of land, water, bio- diversity, energy and mineral resources, and have a determining role in climate and landscape diversity. Uzbekistan's climate is subtropical, sharply continental which is hot and dry, with marked differences in daytime - night time and summer-winter temperatures. Its

climatic features are due to a combination of three major factors: solar radiations, general atmospheric circulation and the local terrain. Favorable climatic conditions, land and labor resources stipulated the development of cotton, rice, vegetable

growing, gardening and vineyard which are characteristics of dry subtropical zone and require essential water consumption [2].

**Fig.2 Distribution of water resources in Uzbekistan**



Source: The Condition of environment and use of natural resources in Uzbekistan: Statistic Committee and the State Committee on wildlife management, Tashkent, 2019

We investigated the irrigated lands of Uzbekistan, to find out what influences the reduction and salinization, and what path to choose for the rational use of water and land resources.

From the middle 80th development of the new soils almost haven't been carried out in our republic. On the contrary, there was a reduction of the soils for an agricultural purpose, and every year the lands from a turn is deduced more and more. For the period of last 15 years the area of irrigated lands was reduced for more than 5%, and counted per capita - for 22%. Area of agricultural soils was reduced from 20,9 million in hectares to 17,8 million in hectares, that means 15% decrease. Reduction of farmland occurred basically at the expense of the pastures and this area decreased for about 19%. The size of arable land during the same period increased a little bit (by 2,7 %) at the expense of expansion of crops on the dry lands. Actually, reduction of farmland occurred in all areas of Uzbekistan, but fast rates were presented in Navoi region (34%). By estimations of Asian Development Bank, if existing tendencies remain, the area of irrigated lands will be reduced by 20-25% during the following 30 years [3].

The main task of the region is the preservation and restoration of water objects:

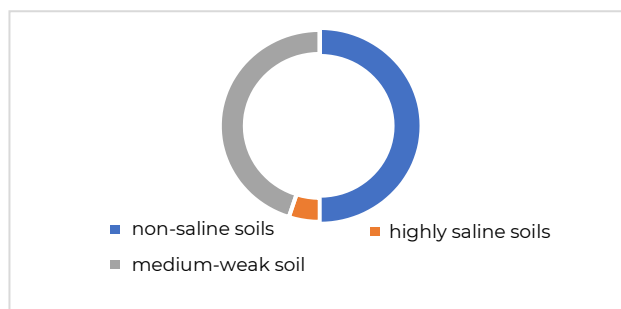
- Reduction of negative anthropogenic impact on water resources;
- Restoration and ecological rehabilitation of water resources that have lost their ability to self-cleaning;
- Monitoring of water resources, including those in border areas.

The main reasons for the decrease in water resources in the region are erosion and secondary soil salinization. In turn, the construction of reservoirs on loess massifs activates the development of erosion and landslide processes along the sides of artificial reservoirs.

The development of erosion processes is largely facilitated by human economic activity. In some areas the proportion of saline soil can reach up to 95%. In Khorezm region 95% of the used irrigated land is eroded. Erosion processes mainly happens by gully formation, it is ubiquitous along the

perimeter of intensively irrigated areas. The development of ravines occurs as a result of water leaks from irrigation canals and unregulated discharge of used irrigation water.

**Fig.2 The share of saline lands in Uzbekistan today, thousand ha**



At the moment, the share of saline soils is more than 50% (Fig.2). In Central Fergana – the most densely populated part of Uzbekistan 84% of irrigated lands are saline and underwent secondary soil salinization is a direct result of irregular irrigation. With excessive furrow irrigation, part of the water which is being filtered, replenishes the reserves of mineralized groundwater and contributes to a rise in their level. In addition, an increase in the level of groundwater in areas where reservoirs are located is observed.

The combination of semi-desert and desert conditions of agricultural dependence on irrigation and progressive climate change means that crop failures can affect entire regions, jeopardizing alimentary crops. Soil salinity is the reason for the decline in the yield of cotton and other crops by 20-30%. A high proportion (over 81%) of crops (cotton, wheat, rice) that deplete the soil remains in the crop structure, which does not meet environmental requirements and can naturally contribute to the development of processes leading to the land degradation (Tab.1).

Name of crops	2015 y.		2016 y.		2017 y.		2018 y.	
	thousand ha	%	thousand ha	%	thousand ha	%	thousand ha	%
Sown area	3560,3	100	3609,7	100	3608,6	100	3708,4	100
Cereals	1538,5	43,2	1559	43,2	1610,7	44,6	1679,4	45,3
Grain-ear:	1431,5	40,2	1472,3	40,8	1517,7	42,1	1559,9	42,1
Wheat	1382,2	38,8	1373,1	38	1354,7	37,5	1466,3	39,5
Corn for grain	34,1	1,0	32,3	0,9	30,1	0,8	28,3	0,8
Rice	48	1,3	33,8	0,9	43,6	1,2	69,2	1,9
Pulses	20,9	0,6	15,9	0,4	14,5	0,4	17,5	0,5
Industrial crops:	1477,1	41,5	1507,2	41,7	1423,1	39,4	1417	38,2
Cotton	1451,3	40,8	1425,1	39,5	1347	37,3	1342,5	36,2
Potatoes	55,6	1,6	59,9	1,7	62,8	1,8	70,7	1,9
Vegetables	159,8	4,5	162,8	4,5	165,4	4,6	173	4,7
Melons of food	39	1,1	42,2	1,2	44	1,2	47,9	1,3
Fodder crops	290	8,1	278,5	7,7	302,5	8,4	320,4	8,6

Most of the dekhkan (farmer) farms in Karakalpakstan are in such a deplorable situation. This is one of the driest regions of Uzbekistan, where water is valuable as gold. Agriculture is irrigated here. In some areas the rainfed agriculture is practiced.

In general, the irrigated lands of the country are quite favorable in terms of amelioration; nevertheless, in some regions it is necessary to carry out an appropriate reclamation measures aimed at eliminating and preventing salinization of irrigated soils. The measures of satisfactory drainage, leaching prevention, even vegetative irrigation will be sufficient on saline soils with deep groundwater. On soils with a close occurrence of groundwater, especially highly mineralized ones, the complex of reclamation measures will be required, such as; construction of

### 3. Results and Discussion

Uzbekistan is significantly exposed to the threat of climate change, and serious risks are already evident. Further climate change is projected to lead to higher temperatures, changes in rainfall patterns and more severe and prolonged droughts, with a corresponding decrease in water availability. The upward trend in average temperature in Uzbekistan is expected to continue and intensify in the near future. While the exact extent of the expected warming remains uncertain, the overall warming trend is clear.

By 2050, it is possible to reduce water resources in the Amu Darya basin by 10-15%. In the Syrdarya river basin, a reduction of 2-5% is possible. With a further increase in air temperatures, the river runoff decreases. Rivers of the Amu Darya basin and small streams are more sensitive to climate warming [5].

If to talk about the flow of the Amu Darya River, then recently it has been dramatically decreasing. According to the Amu Darya Basin Water Management Association, the situation with the Amu Darya river flow remains tense. So, in the third decade of July 2020, in the lower reaches, the deficit in Turkmenistan amounted to 24 percent of the water intake limit, and in Uzbekistan - 47 percent. The flow of the Amu Darya River in the section above the water intake in Garagum-dary River amounted to 1807 million m<sup>3</sup>, which is less than the forecast by 1515 million m<sup>3</sup>. The inflow to the Nurek reservoir was less than the forecast by 598 million m<sup>3</sup>. In the upper reaches, the actual water supply to Tajikistan was less than the limit by 59 million m<sup>3</sup> (12% of the water intake limit), to Uzbekistan - by 36 million m<sup>3</sup> (38%). In the middle course, the actual water supply to Uzbekistan was less than the limit by 84 million m<sup>3</sup> (20% of the water intake limit). In the lower reaches, the deficit in Turkmenistan amounted to 76 million m<sup>3</sup> (24% of the water withdrawal limit), in Uzbekistan - 442 million m<sup>3</sup> (47%) [6].

Recently, the climate has been getting hot and dry. In

### 4. Conclusions

It can be concluded that an increase in food shortages will be associated with limited land and water resources and projected climate change, in which irrigation rates will increase by 5-10% by 2030. While maintaining the current model of food land and water resources management deficit will continue to

a more frequent collector-drainage network, planning, annual capital leaching, special agrotechnical techniques etc. [4].

The elimination of cotton (by 60 thousand hectares) and grain (by 42 thousand hectares) on low-yielding lands will significantly increase the average crop yield.

Another risk is associated with food insecurity. Since the days of the Soviet Union the region has been known with its extremely high level of use of agrochemicals, and after the collapse, the use fell sharply. The agrochemicals that were in use at the time were so-called persistent pollutants, which means that the metabolites remain in the soil for many years and poison future crops. Moreover, in recent years, the use of agrochemicals has risen sharply again.

winter, dirty water enters the irrigated fields. Soil pollution was recorded in the Syrdarya, Surkhandarya, Navoi and Tashkent regions. Farmers wash salt with this water. Further, farmers use chemical and local fertilizers. Otherwise, due to lack of water in irrigated fields, the crop will not grow. According to experts, now the resource approach prevails in the water sector, i.e. satisfying supply rather than regulating demand, which will inevitably lead to water scarcity.

At the moment, in accordance with the state of the irrigated land, more than 75% of the area requires reconstruction of drainage, construction is required on an area of more than 400 thousand hectares, a radical reconstruction of the entire complex of pumping stations is necessary (more than 70% of pumps and pressure pipelines). Currently, up to 35% of the reservoir capacity is silted up.

Water facilities are supported by the state budget; however, the observed limited budgetary funds affect their physical and moral deterioration. Practice shows that physical wear and tear exceeds the rate of their reproduction.

In these conditions, the most important and priority are issues of increasing the efficiency of the use of land and water resources, their protection and reproduction, soil fertility. One of the tasks for 2019-2030 by the government of Uzbekistan is to reduce water loss by 10 percent and water consumption by 15 percent in agriculture.

In irrigated agriculture there are significant water losses due to low efficiency of irrigation technique (0.6-0.7%) and irrigation systems (0.75-0.86%), poor planning of irrigated areas and cases of over-irrigation of irrigated lands. On irrigation systems with a lower technical level, network losses are even more significant. For example, in the Republic of Karakalpakstan and Khorezm region, up to 48%, while in more advanced systems in Jizzakh region - 23% [7]

grow, the land quality will deteriorate, water supply will be reduced.

To solve the problems of land degradation, it is necessary to apply water- saving and resource-saving technologies for irrigation and irrigation regimes for agricultural crops and



improve reclamation regimes, irrigation, soil conditions of irrigated lands and their mutually related optimal combinations.

The goal is of course one - to solve the water problem and use water resources rationally. Reforms in agriculture are needed to improve water management in Uzbekistan. Among the reforms in the water sector of Uzbekistan, one can note such as limiting water use, step-by-step improvement of the legislative framework for water use, transition to the hydrographic basin principle of water resources management, improvement of land reclamation, diversification of crops, introduction of integrated water resources management (IWRM) and water-saving technologies, capacity improvement, large-scale investments in the development of innovative and accessible products and services responsive to climate change, etc.

One of the priorities can be called:

- Introduction of modern water supply and irrigation systems applicable in the conditions of the Republic of Uzbekistan;

- Development of water desalination technologies. In some regions of the Republic of Uzbekistan, there is a high level of groundwater (for example, Central Kyzyl Kum). In the case of the development of desalination technologies, groundwater

can become the basis for a decentralized, autonomous fresh water supply system;

- Development and implementation of monitoring systems for the quantity and quality of consumed water, the qualitative composition of soils. This makes it possible to predict in the future how much water will be available for each crop, and how much water will go to a certain area;

- Introduction of innovative technologies and approaches to create water-saving technologies, improvement of pastures, adaptation to climate change, etc.

Expanding water-saving irrigation methods and maintaining the maintenance of irrigation and drainage infrastructure will improve the quality of land and cover water scarcity

In the near future, the growing demand for water can be met by improving management, rationalizing use, and searching for internal reserves of water resources. The main task is to ensure the productive use of every drop of water in all areas of water use in order to reduce water consumption per unit of production or physical consumer. Problems of sustainable water resources management require constant attention, are the task of more than one generation, and it cannot be solved by the forces of only Uzbekistan or several states of the region.

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## RAQAMLI TEXNOLOGIYALAR ASOSIDA JAHON IQTISODIYOTI RIVOJLANISHINING ZAMONAVIY TENDENSIYALARI

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MAQOLA HAQIDA	ANNOTATSIYA
<p><b>Qabul qilindi:</b> 27-noyabr, 2021-yil  <b>Tasdiqlandi:</b> 20-yanvar, 2021-yil  <b>Jurnal soni:</b> 1  <b>Maqola raqami:</b> 7  <b>DOI:</b> <a href="https://doi.org/10.54613/001008">https://doi.org/10.54613/001008</a></p> <p><b>KEYWORDS</b></p> <p>Raqamli iqtisodiyot, sun'iy intellekt, blokcheyn texnologiyalari, internet ashyolari, elektron hukumat, onlayn-savdo, axborot-kommunikatsiya texnologiyalari</p>	<p>Maqolada mamlakatimizda intellektual axborot tizimlarini rivojlantirishdagi ustuvor yo'nalishlar tadqiq etilib, raqamli iqtisodiyot, uning elementlari, sun'iy intellekt, blokcheyn texnologiyalari kabi tushunchalar va ularning mohiyati yoritilgan. Shuningdek, kelgusida ushbu texnologiyalardan samarali foydalanish natijasida iqtisodiy samaradorlikka erishish yo'llari tadqiq etilgan.</p>

### 1. Kirish

Iqtisodiy va texnologik taraqqiyotning yangi bosqichi sifatida namoyon bo'layotgan raqamli inqilob insoniyat hayotini shiddat bilan o'zgartirib, keng imkoniyatlar yaratish bilan birga, xalqaro raqobat maydonining yanada keskinlashuv davrini boshlab bermoqda.

Jahon iqtisodiyotining globallashuvi va texnologik rivojlanish sharoitida O'zbekistonning iqtisodiy rivojlanishini raqamli iqtisodiyotsiz tasavvur qilish qiyin. Masalan, Accenture konsalting kompaniyasi 2022 yilga kelib, global YAIMning chorak qismi raqamli sohada bo'lishini tahmin qilmoqda. Buning ajablanarli joyi yo'q, chunki 2019 yilda texnologik gigantlar davri boshlandi, bunda texnologik sohadagi 7 kompaniya eng qimmat 10 ta kompaniyalar ro'yxatiga mahkam o'rnatilib oldi. Biroq, raqamli iqtisodiyotni rag'batlantirish uchun raqamlashtirish va raqamli tijoratni rivojlantirishga to'siqinlik qiladigan to'siqlarni olib tashlash kerak. Axborot-kommunikatsiya texnologiyalari (AKT)ning rivojlanishi indeksi bo'yicha O'zbekiston 170 dan ortiq davlat ichida 103-o'rinni egallab turibdi, masalan, Misrdan oldinda, ammo Turkiya va Braziliyadan keyin (1-rasm).

O'zbekiston Respublikasi Prezidenti Sh.M. Mirziyoyevning 2020 yil 24 yanvardagi Oliy Majlisga yo'llagan Murojaatnomasida alohida ta'kidlab o'tilgan masala «...raqamli iqtisodiyotni shakllantirish kerakli infratuzilma, ko'p mablag' va mehnat resurslarini talab etishini juda yaxshi bilamiz. Biroq, qanchalik qiyin bo'lmasin, bu ishga bugun kirishmasak, qachon kirishamiz?! Ertaga juda kech bo'ladi. **Shu bois, raqamli iqtisodiyotga faol o'tish – kelgusi 5 yildagi eng ustuvor vazifalarimizdan biri bo'ladi.**

Raqamli texnologiyalar nafaqat mahsulot va xizmatlar sifatini oshiradi, ortiqcha xarajatlarni kamaytiradi. Shu bilan birga, meni juda qattiq tashvishga soladigan va bezovta qiladigan eng og'ir illat – korrupsiya balosini yo'qotishda ham ular samarali vositadir. Buni barchamiz teran anglab olishimiz darkor.

Davlat va jamiyat boshqaruvi, ijtimoiy sohada ham raqamli texnologiyalarni keng joriy etib, natijadorlikni oshirish, bir so'z bilan aytganda, **odamlar turmushini keskin yaxshilash mumkin»**

Turli tadqiqotlar natijalari bo'yicha raqamli iqtisodiyotning dunyo iqtisodiyotidagi salmog'i 4,5 foizdan 15,5 foizgachani tashkil etadi. Jahon AKT sektorida yaratilayotgan qo'shilgan qiymatning deyarli 40 foizi va blokcheyn texnologiyalari bilan

bog'liq patentlarning 75 foizi Amerika Qo'shma Shtatlari va Xitoy Xalq Respublikasi hissasiga to'g'ri keladi.

Mamlakatimiz Prezidenti Sh.M. Mirziyoyevning 2020 yil 13 fevral kuni axborot texnologiyalarini rivojlantirishga bag'ishlangan tadbirda keltirgan statistik ma'lumotlariga muvofiq AQSHda raqamli iqtisodiyotning yalpi ichki mahsulotdagi ulushi 10,9 foiz, Xitoyda 10 foiz, Hindistonda 5,5 foizni tashkil etadi. O'zbekistonda bu ko'rsatkich 2 foizdan ham oshmaydi.

Raqamlashtirishning ahamiyati va ta'siri qanchalik ortib borayotganligini baholash uchun so'nggi o'n yillikdagi bir nechta yirik texnologik kompaniyalar va raqamli platformalarning jahon bozoridagi kapitalarining ulushini ko'rish kifoya. Xususan, BMTning savdo va rivojlanish konferensiyasi ma'lumotlarida qayd etilganidek, bu ko'rsatkich 2009 yilda 16 foizni tashkil etgan bo'lsa, 2018 yilning oxiriga kelib 56 foizga yetgan.

Lekin, "Raqamli iqtisodiyot" atamasini birinchi marta muomalaga amerikalik tadqiqotchi Nikolas Negroponte 1995 yilda kiritilgan. "**Raqamli iqtisodiyot**" (inglizcha: "Digital economy") – asosiy vositasi raqam shaklidagi ma'lumotlar bo'lgan, ulardan katta hajmda foydalanish ishlab chiqarish va xizmat ko'rsatish samaradorligini oshirishga xizmat qiladigan xo'jalik faoliyatidir deya ta'riflaydi. Aslini olganda raqamli iqtisodiyot tushunchasi juda keng tushuncha bo'lib, aniq bir mukammal yoki umumiy tarifi mavjud emas. Lekin ko'plab olimlar tomonidan turli qarashlar mavjud. Shu bilan birga adabiyotda "elektron iqtisodiyot" ("e-economy"), "internet-iqtisodiyot" ("Internet economy"), "tarmoq iqtisodiyoti" ("network economy"), "virtual iqtisodiyot" ("virtual economy") atamalari ham ishlatiladi. Ular "raqamli iqtisodiyot"ning sinonimlari hisoblanadi.[1]

2020 yilga borib jahonda 2,4 mlrd. "Internet ashyolari"ga ulanishi taxmin qilinmoqda. Bu dunyoda global iqtisodiy o'sishni 11,1 trln. AQSH dollarga ko'paytirish, jahon yalpi ichki mahsulotini 11% ga oshirish imkonini berishi kerak.

"Internet ashyolari" deganda ushbu atamani 1999 yilda muomalaga kiritgan Kevin Eshton ta'rifi bilan aytganda, "ulangan texnologiyalar vositasida bir-biri yoki tashqi muhit bilan inson ishtirokisiz o'zaro munosabatda bo'ladigan hisoblash tarmog'i konsepsiyasi" [2] tushuniladi. Ularga misol tariqasida hozirgi paytda keng ommalashayotgan "aqli iqtisodiyot", "aqli

shahar”, “aqli qishloq xo‘jaligi”, “aqli tibbiyot”, “aqli uy” va hokazolar anglanadi.

“Internet ashyolari”ga, jumladan, infratuzilmalarni (kommunal xo‘jaligi, jamoat transportini), avtomobillar va qishloq xo‘jalik texnikasini haydovchisiz avtomat tarzda boshqarish, jarrohlik operatsiyalarini robotlar yordamida amalga oshirishlar nazarda tutiladi. Masalan, Buyuk Britaniyada “Schneider Electric” kompaniyasi amalga oshirgan tadqiqotlar idoraning standart binosida yiliga 1 kvadrat metrga 200 kilovatt-soat elektr energiyasi sarf qilinishi aniqlangan. “Internet ashyolari” konsepsiyasi asosida “aqli uy” loyihasini amalga oshirish ushbu sarfni 2,5 marotabaga – 80 kilovatt-soatga kamaytirish imkonini bergan.

“Raqamli iqtisodiyot” yangi tushuncha – **“blokcheyn”**ni (inglizcha: “Block” – “blok” va “chain” – “zanjircha”, ya’ni **“blokklar zanjirchasi”**ni) paydo qildi. Blokchayn - turli ma’lumotlarni

## 2. Adabiyotlar tahlili

Raqamli iqtisodiyot, uning shakllari va ta’sir etuvchi omillarining ilmiy-metodologik jihatlari ko‘plab xorijlik olimlar, jumladan: M.Kastells, B.N.Panshin, A.I.Sokolov, A.A.Kunsmann, R.Buxt, R.Xiks, M.A.Poljoxina, I.A.Strelkova, M.L.Kalujskiy, S.A.Plugotarenko, M.Kastells, B.N.Panshin va boshqalar tomonidan tadqiq qilingan.

O‘zbekiston iqtisodiyotida axborot texnologiyalaridan foydalanish, raqamli iqtisodiyotni joriy etishning dolzarb masalalari va ijtimoiy-iqtisodiyotga ta’sirini o‘lchash bilan bog‘liq

## 3. Asosiy qism

So‘nggi yillarda milliy iqtisodiyotimizni tubdan modernizatsiya qilish bo‘yicha olib borilayotgan keng qamrovli islohotlar doirasida mamlakatimiz ijtimoiy-iqtisodiy hayoti va davlat boshqaruvi tizimiga raqamli texnologiyalarni joriy etish borasida qator chora-tadbirlar amalga oshirildi. Xususan, O‘zbekiston Respublikasi Prezidentining “O‘zbekiston Respublikasida raqamli iqtisodiyotni rivojlantirish chora-tadbirlari to‘g‘risida”gi 2018 yil 3 iyuldagi PQ-3832-sonli qarori qabul qilinishi raqamli iqtisodiyotni rivojlantirishda muhim qadam bo‘lib, mamlakatimizda raqamli iqtisodiyotni yanada rivojlantirish bo‘yicha quyidagilarni nazarda tutuvchi eng muhim vazifalar belgilab berildi:

- investitsiyaviy va tadbirkorlik faoliyatining turli shakllarini diversifikatsiya qilish uchun kripto-aktivlar aylanmasi sohasidagi faoliyatni, jumladan mayning, smart-kontrakt, konsalting, emissiya, ayirboshlash, saqlash, taqsimlash, boshqarish, sug‘urtalash, kraud-fanding (jamoaviy moliyalashtirish) texnologiyalarini joriy etish;

- blokcheyn texnologiyalarini ishlab chiqish va ulardan foydalanish sohasida zamonaviy axborot-kommunikatsiya texnologiyalarini yaxshi tushunadigan, amaliy ish ko‘nikmalariga ega malakali kadrlarni tayyorlash, shuningdek, yuqori malakali xorijlik mutaxassislarni jalb qilish;

- kripto-aktivlar bo‘yicha faoliyat va “blokcheyn” texnologiyalari sohasida xalqaro va xorijiy tashkilotlar bilan hamkorlikni har tomonlama rivojlantirish, shuningdek, ilg‘or xorijiy tajribani hisobga olgan holda zarur huquqiy bazani yaratish;

- raqamli iqtisodiyotni yanada rivojlantirish uchun innovatsion g‘oyalar, texnologiyalar va ishlanmalarni joriy etish sohasida davlat organlari va tadbirkorlik subyektlarining yaqin hamkorligini ta’minlash.

Chunonchi, mamlakatimizda “Elektron hukumat” tizimini joriy etish raqamli iqtisodiyotni rivojlantirishning ajralmas tarkibiy qismi bo‘lib, uning asosiy maqsadi ma’muriy tartib va taomillardan o‘tishni soddalashtirish, aholi turmush sifatini oshirish, investitsiya va ishbilarmonlik muhitini yaxshilashga qaratilgan.

Belgilab olingan asosiy vazifalar ijrosini amalga oshirish, shuningdek, mamlakatimizda raqamli jamiyat rivojlanishi, aholi va tadbirkorlar uchun qulay imkoniyatlar yaratish, byurokratik to‘siqlar va korrupsiyaviy omillardan holi samarali va ochiq

ishonarli hisobga olishga asoslangan ko‘p funksiyali va ko‘p darajadi axborot texnologiyasidir. Ushbu kriptografika shaklidagi o‘zaro bog‘liq blokklar zanjirchasi qat’iy izchillikka asoslangan. Blokchaynda barcha ma’lumotlar to‘planib, muntazam to‘ldirib boriladigan ma’lumotlar bazasi shakllantiriladi. Bunda blokchaynga kiritilgan ma’lumotlarni o‘zgartirishning iloji bo‘lmaydi. Blokchayni ma’lumotlar bilan cheksiz to‘ldirib borish mumkin. Shuning uchun uni superkompyuterga qiyoslashadi.

Dunyo hamjamiyatida ro‘y berayotgan bunday jadal o‘zgarishlar va raqobatning keskinlashuvi jarayonida innovatsiyalar va raqamli texnologiyalarni keng joriy etmasdan turib, yaqin va uzoq kelajakda mamlakatimiz iqtisodiyotini barqaror rivojlantirish, uning raqobatdoshligini ta’minlay olmasligimiz ayni haqiqat bo‘lib, bu esa, o‘z navbatida, ilmiy va amaliy harakatlarni kuchaytirishni talab etadi.

tadqiqotlar S.S.Gulyamov, R.H.Ayupov, O.M.Abdullayev, G.R.Baltabayeva, K.X.Abdurahmonov, O.Umarov va mamlakatimizning boshqa ko‘plab yetakchi iqtisodchi olimlari tomonidan olib borilgan. Ularning ilmiy tadqiqot ishlarida iste’molchilar va ishlab chiqaruvchilarning ehtiyojlarini ta’minlaydigan, shuningdek, ular o‘rtasida to‘g‘ridan-to‘g‘ri o‘zaro aloqa qilish imkoniyatini amalga oshiradigan funksiyalar to‘plamiga ega bo‘lgan raqamli muhit bo‘yicha izlanishlar o‘rin olgan.

davlat boshqaruvi tizimini rivojlantirish borasida ko‘zlangan maqsadga erishish uchun bugungi kunda iqtisodiyotning barcha sohalarini raqamli texnologiyalar asosida yangilashni nazarda tutadigan “raqamli iqtisodiyot” milliy konsepsiyasi ishlab chiqilayotgan bo‘lib, aynan raqamli iqtisodiyotni rivojlantirish orqali yalpi ichki mahsulot hajmini qo‘shimcha 30 foizga o‘stirish imkoni yaratilishi kutilmoqda.

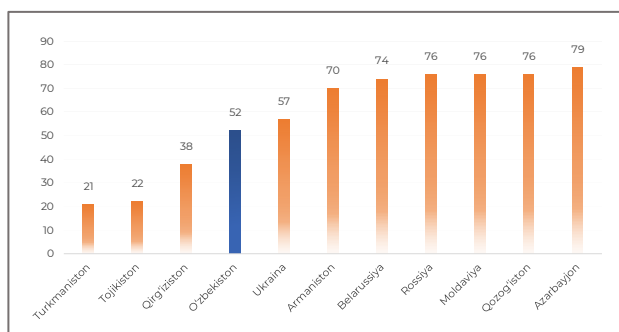
Shuni ta’kidlash kerakki, O‘zbekistonda raqamli iqtisodiyotni rivojlantirish muammolari rivojlanayotgan mamlakatlar duch keladigan umumiy muammolarga o‘xshashdir.

Asosiy muammolardan biri telekommunikatsiya infratuzilmasi va kommunikatsiyasining pastligi. AKTga investitsiyalarning kamligi

(2017 yildagi umumiy investitsiyalarning 2,8%) tufayli respublikada bazaviy aloqa stansiyalarining zichligi juda pastligicha qolmoqda

(1600 aholiga 1 ta baza stansiyasi). Bundan farqli o‘laroq, Qozog‘istondagi bunday minora 643, Rossiyada esa 235 aholiga AKT ehtiyojlarini qondiradi.

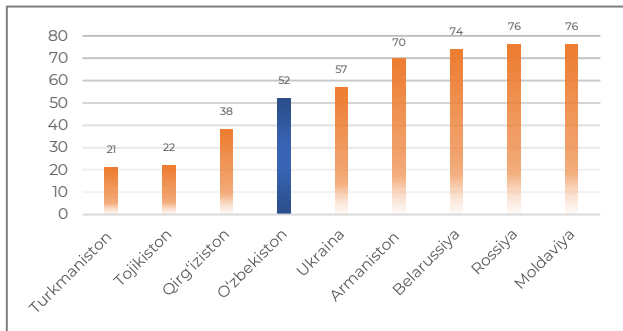
Bu esa yomon Internet va uyali aloqa xizmatlari raqamli iqtisodiy o‘shishni sekinlashtirishi va raqamli tafovutning kengayishiga olib keladi. MDH davlatlari bilan taqqoslaganda, 2019 yilda O‘zbekistonda Internetning o‘rtacha tezligi (mobil va qo‘zg‘almas keng polosali) taxminan ikki baravar past edi.



1-rasm. Ayrim mamlakatlar bo‘yicha AKT rivojlanish indeksi, 2018 yil holatiga.[3]

Raqamli ko‘nikmalarning yetishmasligi raqamli transformatsiyaga jiddiy to‘siq bo‘lishi mumkin. O‘zbekiston kam rivojlanayotgan davlatlardan biri sifatida aholi jon boshiga to‘g‘ri

keladigan YAIM darajasi mutlaqo (2016 yilda 100%) boshqa mamlakatlar bilan taqqoslaganda (masalan, Laos Xalq Demokratik Respublikasida 84,66%). yil). Boshqa tomondan, rivojlanayotgan mamlakatlarda kattalar savodxonligi darajasi yuqori bo'lishiga qaramay, raqamli savodxonlik past darajada qolmoqda. Ehtimol, buni maktablarda AKTning past darajasi va tarqalishi bilan izohlash mumkin. 2017 yilda 1000 talabdan 32 nafarida shaxsiy kompyuterlar mavjud. Bundan tashqari, maktablardagi kompyuterlarning yyetishmasligi, har 100 xonadonga 50 ta shaxsiy kompyuter to'g'ri kelmoqda. Buni mehnat bozoridagi tendensiyalar ham tasdiqlaydi - O'zbekiston mehnat bozorida malakalarning yyetishmasligini baholash bo'yicha o'tkazilgan tadqiqotga ko'ra, so'ralgan kompaniyalarning 68 foizi yangi nomzodlarni yollashda asosiy sabablardan biri sifatida IT va kompyuter ko'nikmalarining ahamiyatligini ta'kidlashadi.



2-rasm. Ayrim mamlakatlardagi internetdan foydalanuvchilar(aholi soniga nisbatan foizda) [4]

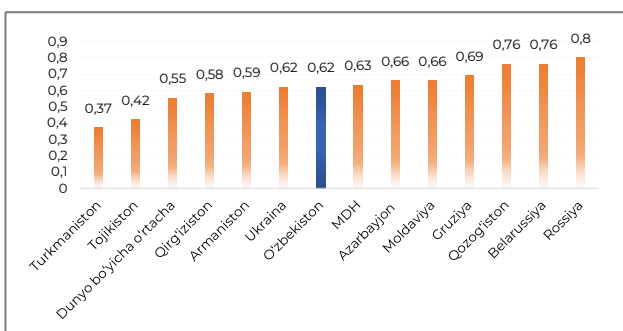
Raqamli infratuzilmaning zaifligi va mamlakatda raqamli ko'nikmalarining yyetishmasligi tufayli O'zbekistonda raqamli aylanmalar sust sur'atlar bilan rivojlanmoqda.

Buni mehnat bozoridagi tendensiyalar ham tasdiqlaydi - O'zbekiston mehnat bozorida malakalarning yyetishmasligini baholash bo'yicha o'tkazilgan tadqiqotga ko'ra, so'ralgan kompaniyalarning 68 foizi yangi nomzodlarni yollashda asosiy sabablardan biri sifatida IT va kompyuter ko'nikmalarining ahamiyatligini ta'kidlashadi.

Raqamli infratuzilmaning zaifligi va mamlakatda raqamli ko'nikmalarining yetishmasligi tufayli O'zbekistonda raqamli aylanmalar sust sur'atlar bilan rivojlanmoqda.

Masalan, O'zbekiston Respublikasi Prezidentining qarorida mamlakatda onlayn-savdo va savdo maydonchalarining yetarli darajada emasligi qayd etilgan.

Uyali aloqa, Internet, davlat xizmatlari, soliq va yig'imlar uchun onlayn to'lovlarni amalga oshirishga imkon beradigan mavjud to'lov tizimlariga (Click, Payme, M-bank, Upay, Humo, Oson va boshqalar), faqat 2017 yilda hisob egalaringning 34% raqamli to'lovlarni amalga oshirgan yoki olgan (3-rasm).



3-rasm. Elektron hukumat indeksi [5]

Birlashgan Millatlar Tashkilotining elektron hukumat indeksi mamlakat o'z aholisi uchun kirish va integratsiyani ta'minlash uchun axborot texnologiyalarini qanday ishlatishini aks ettiradi. 2018 yilda O'zbekiston bo'yicha ko'rsatkichlar MDH

bo'yicha o'rtacha ko'rsatkichga teng va dunyo bo'yicha o'rtacha ko'rsatkichdan yuqori. Reytingdagi 193 mamlakat orasida O'zbekiston 81-o'rinni egalladi (3-rasm).

Misol uchun, Janubiy Koreyada "elektron hukumat" va "elektron vositachilik"ning joriy qilish yiliga 10-15 milliard AQSH dollari miqdorida daromad keltirmoqda. Bu "raqamli iqtisodiyot" uchun sarf qilinayotgan xarajatlardan 30-40 barobar ortiqdir.

Internetning oshgan narxi, yetarli qamrov yo'qligi va Internetning xalqaro o'tkazuvchanligi pastligi telekommunikatsiya sohasining monopollashgan natijasidir. Rivojlanayotgan mamlakatlarda telekommunikatsiyalarning bozor shakli ko'pincha oligopoliya yoki hatto monopoliya hisoblanadi. O'zbekistonda va boshqa MDH mamlakatlarida telekommunikatsiya sohasi asosan bitta yetakchi kompaniya bilan cheklangan, ular maxsus vakolatlariga va manbalarga ega (masalan, Rostelekom, Ukrtelekom, Kazaktelekom, Aztelekom va boshqalar). Raqamli iqtisodiyot sari muhim qadam 2020 yilga mo'ljallangan xalqaro shlyuzlardagi davlat monopoliyasini bekor qilish bo'ladi. Telekommunikatsiya sohasini liberallashtirish O'zbekistonga o'z fuqarolariga xavfsiz va arzon Internet xizmatlarini taqdim etish va raqamli iqtisodiyotdan foyda olish imkonini beradi.

Raqamli texnologiyalarning rivojlanishi ko'plab sohalarda yengillik va ilg'or yutuqlarga olib keldi. Hozirgi kunda dunyodagi eng yuqori texnologiyalardan quyidagi sohalarda juda keng foydalanib kelinmoqda.

1-jadval

Dunyodagi eng yuqori va ilg'or texnologiyalari

<p><b>AKT (Information &amp; communication technology)</b></p> <ul style="list-style-type: none"> <li>- Sun'iy intellekt (Artificial intelligence)</li> <li>- Buyumlar interneti (Internet of Things)</li> <li>- Bulutli texnologiya (Cloud computing)</li> <li>- Katta/kichik hajmdagi ma'lumotlar tahlili (Large/small data analytics)</li> <li>- 5G</li> <li>- Interaktiv tarjima (Natural language interaction)</li> <li>- Giper birlashtirilgan tizimlar (Hyper converged systems)</li> <li>- Barcha ilovalarni birlashtirish (Mesh app &amp; service architecture)</li> <li>- Blokcheyn (Blockchain &amp; distributed ledgers)</li> <li>- Vertual reallik (Mixed reality (AR/VR))</li> <li>- Ma'lumot va kibexavfsizlik (Data &amp; cybersecurity)</li> </ul>	<p><b>Sog'liq va salomatlik (Health &amp; Wellness)</b></p> <ul style="list-style-type: none"> <li>- Immunitetni tiklash va ishlab chiqish (Immune engineering)</li> <li>- Gen tarkibini o'zgartirish (Gene editing)</li> <li>- Saraton o'smalari profilaktikasi (Cancer tumor profiling)</li> <li>- Bio bashoratli markerlar (Predictive biomarkers)</li> <li>- Inson mikrobiomali (Human microbiomics)</li> <li>- Hujayra terapiyasi (Cellular therapeutics)</li> <li>- Medtexnologiya (Medtech):</li> <li>- Aqilli yordamchi qurilmalar (Smart assistive devices)</li> <li>- Tibbiy yordam diagnostikasi (Point of care diagnostic)</li> <li>- Sog'liq informatorlari (Health informatics)</li> <li>- Oziqlantiruvchi vositalar (Nutraceuticals)</li> </ul>
<p><b>Energiya va kommunal xizmatlar (Energy &amp; Utilities)</b></p> <ul style="list-style-type: none"> <li>- Batariya quvvatini boshqarish (Battery energy management)</li> <li>- Energiya ishlab chiqarish taqsimoti (Distributed energy generation)</li> <li>- Aqlli tarmoqlar (Smart grids)</li> <li>- Quyosh va shamol energiyasi (Solar PV/Offshore wind energy)</li> <li>- Lityum batareyalar (Lithium batteries)</li> <li>- Neftni qayta ishlash (Enhanced oil recovery)</li> </ul>	<p><b>Atrof Muhit (Environment &amp; Sustainability)</b></p> <ul style="list-style-type: none"> <li>- Uglerdan saqlanish va foydalanish (Carbon capture utilization &amp; storage)</li> <li>- Dengiz suvini chuchuklashtirish (Off grid desalination)</li> <li>- O'ta aniq rejalashtirilgan qishloq xo'jalik (Precision agriculture)</li> <li>- Oqava suvlarni yaroqli holatga keltirish (Wastewater nutrient recovery)</li> </ul>
<p><b>Ilg'or ishlab chiqarish va avtomatlashtirish (Advanced MFG &amp; Automation)</b></p> <ul style="list-style-type: none"> <li>- Robot egzoskelitlari (Robotics exoskeletons)</li> <li>- Metal 3D printlari (Metal 3D printing)</li> <li>- Sanoatda robotlar hamkorligi (Collaborative industrial robots)</li> <li>- Ishlab chiqaruvchi va mijoz o'rtasidagi umumiy nazorat dasturlari (CIM)</li> <li>- Nano 3D printlari (Nano 3D printing)</li> <li>- Tahilliy bashorat (Predictive analytics)</li> <li>- Barqaror ishlab chiqarish (Sustainable manufacturing (C&amp;G))</li> </ul>	<p><b>Tibbiy Asboblari va qurilmalar (Medical devices &amp; Imaging)</b></p> <ul style="list-style-type: none"> <li>- Super aniqlikdagi mikroskop (Super resolution microscopy)</li> <li>- Sun'iy organlar (Artificial organs)</li> <li>- Optik biopsiya (Optical biopsy)</li> <li>- Jarrohlik robotlari (Surgical robots)</li> <li>- Tasvirlarni ko'rish orqali sezish (Tactile imaging)</li> <li>- Nervstimul (Neurostimulation)</li> <li>- Lazer sanoati (Image engineering)</li> </ul>
<p><b>Mikroelektronika (Microelectronics)</b></p> <ul style="list-style-type: none"> <li>- Simsiz texnologiyalar (Wearables)</li> <li>- Oled chiroqlari (OLED lighting)</li> <li>- Keyingi Gen ma'lumotlarini saqlash (Next gen data storage)</li> <li>- MikroLED (Micro LED)</li> <li>- Kolografik displey (Holographic display)</li> <li>- Simsiz quvvatlash (Wireless charging)</li> </ul>	<p><b>Sensor qurilmalar (Sensors &amp; Instrumentation)</b></p> <ul style="list-style-type: none"> <li>- Biosensolar (Biosensors)</li> <li>- Vositasiz ta'sir etmoq (Touchless sensing)</li> <li>- Aqlli vositalar (qo'l, yuz va ko'z) (Smart haptics)</li> <li>- Elektron pustin (teri) Electronic skin</li> <li>- Haydovchilarga yordam berish tizimlari (Driver assistance systems)</li> </ul>

Ekspertlarning hisoblashicha, 2020 yilga borib jahon iqtisodiyotining sanoat taraqqiyoti bosqichi nihoyasiga yetadi. Jahon iqtisodiyotining shundan keyingi davrdagi rivojlanishi kognitiv (lotincha "cognitio" - "bilim", "tafakkur" so'zidan) omillar hamda tejamkor iqtisodiyot, nano- va biotexnologiyalarga asoslangan ishlab chiqarishlar ta'siri ostida bo'ladi. Bu makroiqtisodiyotda boshqaruv qarorlari ishlab chiqish va qabul

qilish uchun talab qilinadigan axborot hajmlarining keskin ortishiga olib keladi. Natijada xodimlarning bilimi va har bir mamlakatda axborot-kommunikatsiya texnologiyalarining rivojlanishi darajasi uning taraqqiyotini va raqobatbardoshligini belgilab beradi.

Ishonchimiz komilki, ushbu texnologiyalar (katta hajmdagi ma'lumotlar tez va oson tahlil qilish, Nano 3D printlari yordamida eng katta aniqlikdagi jismlarni yasash, texnikalarni boshqarishda sensor boshqaruv vositalaridan samarali foydalanish, sanoatda robotlar hamkorligini yuqori darajada tashkil etilishi va boshqa-boshqalar) taraqqiyotning yangi davri bo'ldi.

“Raqamli iqtisodiyot” o'zining tizimli mezonlari va xususiyatlariga egadir (2-jadval).

Hozirgi paytda dunyoda judaham ulkan hajmdagi ma'lumotlar yaratiladi va qayta ishlanadi. Bu shuni anglatadiki, ushbu ma'lumotlarni qayta ishlashni, kerakli hajm va formatda, tezkor va sifatli qarorlar qabul qilishda foydalanishga tayyor bo'lishimiz zarurligini anglatadi.

2-jadval

**“Raqamli iqtisodiyot”ning tizimli mezonlari va xususiyatlari**

“Raqamli iqtisodiyot”ning tizimli mezonlari	“Raqamli iqtisodiyot”ning tizimli xususiyatlari
Ishlab chiqarishni tashkil etishning tizimi	Ishlab chiqarish markazlashishi darajasining kamayishi
Xodimlarning roli	Xodimlarning yirik iqtisodiy markazlardan olisda ham ishlab chiqarish jarayonlarida to'laqonli ishtirok etishi
Iqtisodiy boshqaruv tizimi	Xodimlar mustaqilligining ortishi, tashkiliy birliklarning “funktional modullar”ga aylantirilishi
Qadriyatlar tizimi	Kompaniyalar ijtimoiy funksiyalarining kengayishi
Iqtisodiy jarayonlarning xususiyati	Jahon miqyosida iqtisodiy jarayonlar o'zaro bog'liqligi darajasining ortishi

2017 yil uchun marketing tendensiyalari bo'yicha IBM tomonidan chiqarilgan hisobotda har kuni 2,5 kvintilyon bayt ma'lumotlar yaratilayotganligi qayd etilgan. Ularning qayd

yetishicha, bugungi kunda dunyodagi 90 foiz ma'lumot faqat so'nggi ikki yil ichida yaratilgan.

Mamlakatimizda raqamli iqtisodiyotni rivojlantirishning quyidagi asosiy shartlari va ustuvor yo'nalishlarini sanab o'tish maqsadga muvofiq deb hisoblaymiz:

- raqamli texnologiyalar barqaror faoliyat ko'rsatishi uchun institutsional muhit va raqamli infratuzilmani yaratish, davlat xizmatlarini ko'rsatish, iqtisodiyotning real sektori tarmoqlari, sog'liqni saqlash, davlat kadastr va boshqa sohalarda raqamli texnologiyalarni keng joriy etish, shuningdek, O'zbekiston Respublikasi hududini rivojlangan mamlakatlar darajasida internet global tarmog'iga ulanish imkoniyatlari bilan imkon qadar to'liq qoplashni bosqichma-bosqich ta'minlash;

- kadrlar tayyorlash ko'lamini kengaytirish va bu yo'nalishlar bo'yicha chuqur bilimga ega malakali dasturchilar va injener-texnik xodimlarni yetishtirish, ta'lim tizimining barcha bosqichlarida xalqaro andozalarga to'liq javob beradigan zamonaviy axborot texnologiyalarini o'qitish, shu jumladan, xorijiy hamkorlarimiz bilan birgalikda “1 million dasturchi” loyihasini muvaffaqiyatli amalga oshirish;

- raqamli iqtisodiyot sohasida ilmiy-nazariy bazani mustahkamlash va bu sohada “Raqamli ishonch” jamg'armasi mablag'laridan maqsadli foydalangan holda ilmiy faoliyatni qo'llab-quvvatlash;

- aholining keng qatlamlari o'rtasida “raqamli savodxonlik”ni targ'ib qilish va kengaytirish, ularni axborot texnologiyalarini o'zlashtirishga jalb qilish maqsadida o'quv yurtlarida seminar, kurslar va boshqa tadbirlarni o'tkazish;

- raqamli iqtisodiyot sohasida me'yoriy-huquqiy bazani mustahkamlash va qonunchilik hujjatlarini takomillashtirish, shuningdek, “startup” tushunchasi, faoliyati, venchur fondlari orqali ularni moliyalashtirishning huquqiy asoslarini yaratish;

- raqamli iqtisodiyot talablariga javob beradigan mehnat bozorini tashkil etish va uning mobiligini oshirish, yangi texnologiyalarni tezkorlik bilan o'zlashtirish uchun mutaxassislar malakasini oshirib borish;

- raqamli iqtisodiyot sohasidagi xalqaro hamkorlikni mustahkamlash, yetakchi xalqaro texnologik kompaniyalar bilan o'zaro hamkorlikdagi loyihalarni amalga oshirish.

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## RAQAMLI IQTISODIYOT DAVRIDA MAMLAKAT EKSPORT TARKIBINI DIVERSIFIKATSIYA QILISHNING DOLZARBLIGI

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MAQOLA HAQIDA	ANNOTATSIYA
<p><b>Qabul qilindi:</b> 10-dekabr, 2021-yil  <b>Tasdiqlandi:</b> 20-fevral, 2021-yil  <b>Jurnal soni:</b> 1  <b>Maqola raqami:</b> 8  <b>DOI:</b> <a href="https://doi.org/10.54613/001009">https://doi.org/10.54613/001009</a></p> <p><b>KALIT SO'ZLAR</b></p> <p>Raqamli iqtisodiyot, eksport tarkibini diversifikatsiya qilish, iqtisodiy o'sish, tashqi savdo</p>	<p>Maqolada raqamli iqtisodiyot davrida mamlakatning eksport salohiyatini baholash ko'rsatkichlaridan biri bo'lgan eksport takribini diversifikatsiya qilish ko'rsatkichi, uning iqtisodiy xavf-xatarlarni bartaraf etishdagi o'rni va iqtisodiy o'sishga ta'siri ko'rsatilgan. Mamlakatning asosiy savdo bo'yicha hamkor davlatlari eksport tarkibining diversifikatsiyalashganlik darajasi bo'yicha qiyosiy tahlil keltirilgan. Shuningdek, kelajakda eksport tarkibini diversifikatsiya qilish bo'yicha takliflar berilgan.</p>

Hozirgi kunimizga kelib raqamli texnologiyalarning jadal rivojlanishi iqtisodiyotning globalashuv jarayonlarini yanada tezlashtirayotganiga guvoh bo'lib boryapmiz. Raqamli iqtisodiyot (Digital Economy) tushunchasi bir qator mamlakatlarning iqtisodiy nazariyasi va amaliyotida paydo bo'ldi. Raqamli texnologiyalardan foydalanish orqali ijtimoiy-iqtisodiy aloqalar tobora kengayib va murakkablashib bormoqda.

Raqamli iqtisodiyot tushunchasiga turli xil olimlar tomonidan turlicha ta'riflar berilgan bo'lib, ularning barchasining bir-biri bilan kesishgan nuqtalari mavjud. Ulardan biri bilan tanishib chiqamiz:

Tomsk davlat universitetining professori R. Meshcheryakovning fikricha "raqamli iqtisod" atamasiga ikkita yondashish mavjud, deb hisoblaydi. Raqamli texnologiyalar asosida iqtisodiyotning va elektron tovar va xizmatlar ekslyuziv domen tavsiflovchi raqamli iqtisodiyot: birinchi yondashuv "klassik" deb nomlanib, klassik misollar – teletibbiyot, masofaviy ta'lim, dori-darmonlarni sotish (filmlar, televizorlar, kitoblar va boshqalar). Ikkinchi yondashuv: "raqamli iqtisod" ilg'or raqamli texnologiyalardan foydalangan holda iqtisodiy ishlab chiqarishdir. Ushbu ta'rifning ikkinchi yondashuviga e'tibor qaratamiz, unda iqtisodiyotning ishlab chiqarish sohasiga ilg'or texnologiyalarni qo'llagan holda raqamli iqtisodiyotga o'tish haqida gap ketyapti. Bizning maqolamizda ko'tarilgan mavzu raqamli iqtisodiyot davrida eksport tarkibini diversifikatsiya qilish, ya'ni ishlab chiqarish korxonalarimizning mahsulot tarkibini yanada ko'paytirish va bu orqali mamlakat YAIMni oshirish hamda raqamli iqtisodiyotga o'tishni yanada jadallashitirish hisoblanadi.

O'zbekiston Respublikasi Prezidentining 2020-yil 5-noyabrda PF-6079 sonli "Raqamli O'zbekiston – 2030" strategiyasini tasdiqlash va uni samarali amalga oshirish chora-tadbirlari to'g'risida farmoni imzolandi. Ushbu farmonda mamlakatimizda raqamli iqtisodiyotni faol rivojlantirish bo'yicha zamonaviy axborot-kommunikatsiya texnologiyalarini iqtisodiyotning barcha tarmoqlariga keng joriy etish bo'yicha kompleks chora-tadbirlar amalga oshirish belgilab qo'yilgan. Bu strategiyani amalga oshirish orqali mamlakatimizda raqamli iqtisodiyotga jadallik bilan o'tish hamda ijtimoiy-iqtisodiy sohalarda kompleks iqtisodiy barqarorlikni ta'minlash ko'zda tutilgan.

Mamlakatimiz iqtisodiyotini tashqi iqtisodiy raqobatbardoshlik bo'yicha muhokama qiladigan bo'lsak, unda to'lov balansi bo'yicha ijobiy natijaga ega. So'nggi yillarda eksport hajmi sezilarli darajada, ya'ni 2000 yillarda eksport o'sish sur'ati 0,9 foizni tashkil qilgan bo'lsa, 2019 yilga kelib esa 24,8 foizga o'sdi<sup>1</sup>, eksport qilinayotgan mahsulotlar tarkibi va sifati yaxshilanishi natijasida xom ashyo bo'lmagan tayyor tovarlarning ulushi 80 foizdan ziyodni tashkil etib kelmoqda.

Shu o'rinda eksport tarkibini diversifikatsiya qilishga alohida e'tibor qaratish lozim. Chunki tashqi bozorlarni egallashda, milliy eksport tarkibining tur va hajm jihatidan ko'p bo'lishi, mamlakatning jahon xo'jaligida raqobatbardosh bo'lishiga yordam beradi. Eksport diversifikatsiyasi, ya'ni xorijga sotilayotgan tovarlar va xizmatlar xilining kengayishi, jami eksportda alohida tovar yoki xizmat turi (ayniqsa, xom ashyo) ulushining salmoqli bo'lishiga barham berilishi mahsulotlar eksport qilinayotgan mamlakatlar geografiyasini kengaytiradi, eksport hajmining barqaror bo'lishini ta'minlaydi, milliy iqtisodiyotning tashqi bozordagi salbiy o'zgarishlarga ta'sirchanligi darajasini pasaytiradi. Eksport tarkibini diversifikatsiyalashganlik darajasini UNCTAD tomonidan keng qo'llaniladigan Xerfindal-Xirshman indeksi<sup>2</sup> (Herfindahl-Hirschman Index) orqali ifodalanishi mumkin:

$$H_j = \sqrt{\sum_{i=1}^n \left(\frac{x_{ij}}{X_j}\right)^2}$$

Bu yerda  $H_j$  - eksport tarkibining diversifikatsiyalashganlik darajasi – **Xerfindal-Xirshman indeksi**;  $x_{ij}$  – ma'lum bir  $j$  mamlakatning  $i$  mahsulot eksporti (to'rt darajalik tovar kodi ko'rinishida);  $X_j$  –  $j$  mamlakatning umumiy eksporti.

Yuqoridagi formula asosida dunyoning bir qator rivojlangan va rivojlanayotgan davlatlari, shu jumladan O'zbekiston eksport tarkibining diversifikatsiyalashganlik darajasi hisoblab chiqildi (1-chizmaga qaralsin). Dunyo davlatlarining yuqori diversifikatsiyalashgan **Xerfindal-Xirshman indeksi** 0,05 ko'rsatkichidan past bo'ladi. 0,05-0,1 – oraliqidagi ko'rsatkich kam diversifikatsiyalashgan eksport savatchasiga ega davlatlardir. 0,1 va 0,4 oraliqidagi ko'rsatkichlar iqtisodiyotning ma'lum bir mahsulotlarga ixtisoslashuvini anglatadi. 0,4 dan yuqori ko'rsatkichlar yuqori

<sup>1</sup> <https://stat.uz/>

<sup>2</sup> Umarov I. Eksport tarkibining diversifikatsiyalashganlik darajasi – milliy iqtisodiyot raqobatdoshligining asosiy indikatorini. // Materialy Forumi ekonomistov Uzbekistana; UNDP, IFMR – Tashkent, 2012.

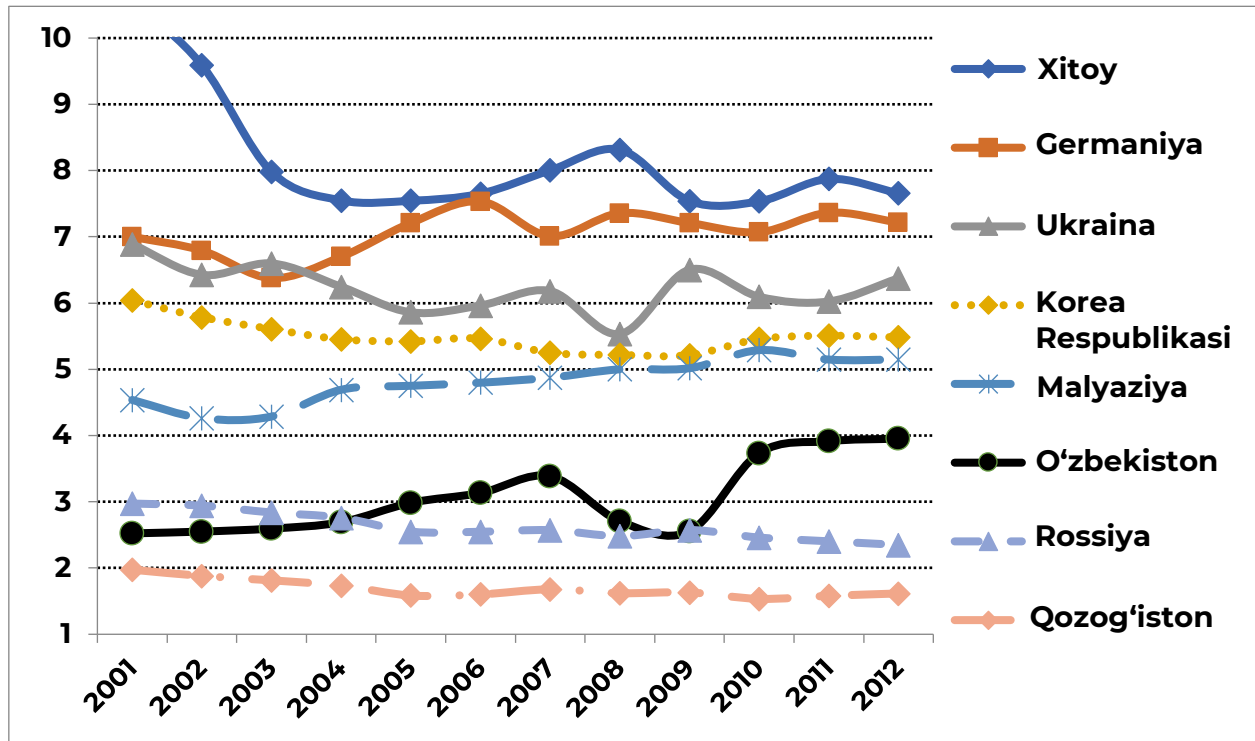
ixtisoslashganlik darajasi deyiladi<sup>3</sup>. Bu ko'rsatkichlarni tushinishga qulay bo'lishi uchun 1 soniga bo'lib 0 dan 10 gacha bo'lgan oraliqda ifodalaymiz: 0 – eng past daraja, 10 va undan yuqori son – eng yuqori daraja. Bunday talqin qilish bilan muallif tomonidan ushbu indeksga yangilik kiritilgan.

Mazkur indeksning 2001-2012 yillar bo'yicha 12 yillik tahliliga e'tibor qaratadigan bo'lsak, milliy eksportimizning diversifikatsiya-lashganlik darajasi 2001 yilda 2,52

ko'rsatkichdan 2012 yil 3,95 ko'rsatkichgacha oshib borgan. 2005 yildan boshlab MDH davlatlari bo'yicha o'rtacha ko'rsatkich 2,52 ga teng bo'lgan bo'lsa, bizning mamlakatda esa 2,98 ko'rsatkichga teng bo'lgan va bu tendensiya 2012 yilga qadar MDH davlatlari bo'yicha o'rtacha ko'rsatkichdan yuqori bo'lganligini ko'rsatdi (1-chizmaga qaralsin). Bu esa o'z navbatida mamlakatimizda amalga oshirilayotgan lokalizatsiya dasturlarining to'laqonli natijasini ko'rsatmoqda.

1-chizma

Mamlakatning asosiy savdo bo'yicha hamkor davlatlari eksport tarkibining diversifikatsiyalashganlik darajasi (2001-2012 yillar)



\*1-minimum; 10-maksimum

Manba: JST ma'lumotlari asosida muallif hisob-kitoblari

Xulosa qilib aytish mumkinki, Raqamli iqtisodiyot tizimiga jadallik bilan o'tishda eksport hajmini oshirish, uning tarkibini takomillashtirish, umuman tashqi savdo aylanmasini diversifikatsiya qilish iqtisodiyotimiz tarkibiy tuzilishida sifat o'zgarishlariga erishish, uning raqobat-bardoshligini oshirish orqali iqtisodiy yuksalish va aholi turmush farovonligini yanada ko'tarish maqsadlariga xizmat qiladi.

Shu o'rinda ta'kidlash joizki, so'nggi yillarda mamlakatimizda raqobatbardosh mahsulotlar ishlab chiqarish bo'yicha qator me'yoriy-huquqiy hujjatlar qabul qilinmoqda. Masalan, O'zbekiston Respublikasi Prezidentining 2020 yil 21 oktyabrdagi PF-6091-sonli "Eksport faoliyatini moliyaviy qo'llab-quvvatlashni yanada kengaytirish chora-tadbirlari to'g'risida"gi farmonini keltirsak bo'ladi. Bundan tashqari mamlakatimizda eksport qiluvchi korxonalarini qo'llab-quvvatlash bo'yicha qator chora-tadbirlar amalga oshirilmoqda. Bular jumlasiga, O'zbekiston Respublikasi Prezidentining 2021 yil 14 yanvardagi PQ-4949-sonli "2021 yilda O'zbekiston Respublikasining eksport salohiyatini amalga oshirish chora-tadbirlari to'g'risida"gi qarorni keltirsak bo'ladi. Ushbu qarorda eksportchi korxonalariga moliyaviy va amaliy ko'mak berish bo'yicha qator masalalar qo'yilgan. Bunday qarorlarning qabul qilinishi mamlakat eksport tarkibini diversifikatsiya qilishga katta yordam beradi.

Xorijiy davlatlarda mamlakatimizda ishlab chiqarilayotgan yoki ishlab chiqarishni yo'lga qo'yish mumkin bo'lgan mahsulotlarga bo'lgan talabni o'rganish, bunday tovarlar

bozorlariga kirib borish va raqobat qilish strategiyasini ishlab chiqish eksport qilinayotgan tovarlar sonini va mamlakatlar geografiyasini kengaytirishga ijobiy ta'sir ko'rsatadi. Jahon bozorlarida korxonalarimiz mahsulotlarining raqobatbardoshligini ta'minlashda eksport qiluvchi korxonalariga mahsulot tayyorlash va sotish xarajatlarini kamaytirishda ko'maklashish, ularni tashqi bozor kon'yunkturasidagi o'zgarishlar, istiqbolli bozorlar, raqobatchilar to'g'risida olib borilgan tadqiqotlar natijalari bilan tanishtirish, transport-kommunikatsiya va logistika tizimlarini rivojlantirish, yangi transport yo'laklarini ochish orqali transport xarajatlarini kamaytirish chora-tadbirlarning amalga oshirilishi muhim ahamiyat kasb etadi. Bu hozirgi sharoitda strategik aniq belgilangan yo'nalishlarga erishishda global logistik tizimlarning roli oshib borayotganidan dalolat beradi<sup>4</sup>.

Yuqoridagi ko'tarilgan masalalardan kelib chiqib mamlakat iqtisodiyotini uzoq istiqbolga rivojlantirish uchun butun kuch-g'ayrat va resurslarni quyidagi yo'nalishlarga qaratish lozim:

- Iqtisodiy o'sishning barqaror yuqori sur'atlarini (7-8%) ta'minlash. Buning uchun tarkibiy qayta qurishni jadallashtirish va iqtisodiyotni modernizatsiya qilish, o'sishning innovatsiyaviy omillarini oshirish, YAIMning material va energiya manbalariga muhtojlik darajasini ikki barobar kamaytirish lozim;
- Birinchilar qatorida innovatsiyaviy mahsulotga bo'lgan talabni ta'minlashga qodir tizimlarni modernizatsiya qilish kerak. Buning natijasida davlat ta'lim standartlariga rioya qilish, barqaror iqtisodiy o'sishning boshqa elementlari va

<sup>3</sup> Export diversification and Competitiveness in Developing Countries. // V. Chandra, J. Boccardo and I. Osorio. March 9, 2007.

<sup>4</sup> Alimov A. Milliy iqtisodiyot raqobatbardoshligini oshirishda logistika xizmatlari tizimini maqbulashtirishning konseptual asoslari. // Материалы Форума экономистов Узбекистана; UNDP, IFMR – Tashkent, 2012.

innovatsiyaviy infrastruktura uchun zarur qulay investitsiyaviy muhitga rioya qilgan holda amalga oshirish lozim;

- Tamoman yangi mahsulot va texnologiya turlarini ishlab chiqarishni o'zlashtirish. Bu yerda gap yangi texnik va texnologik bazalarni shakllantirish haqida ketyapti. Bu yerdagi bazalarga sanoat sohasida erishilayotgan ilg'or yutuqlarni, ya'ni biotexnologiyalar, informatika va nanotexnologiyalar hamda milliy iqtisodiyotning ko'p tarmoq va sektorlarida katta salohiyatga ega energiya va suv tejaydigan texnologiyalarni amalga qo'llash;

- Milliy iqtisodiyotning jahon moliyaviy-iqtisodiy tizimiga integratsiyasini yanada jadallashtirish, tashqi iqtisodiy

kon'yunkturaning muhim sohalari qaram bo'lib qolishning oldini olish, buning uchun eksport tarkibini diversifikatsiya qilish zarur, uning tarkibida tashqi bozorlarga chiqish uchun tayyor, sifatli va xaridorgir tovarlar ulushini ko'paytirish lozim;

Mamlakat yoqilg'i-energiya balansini takomillashtirish va mustahkamlash kerak. Iqtisodiyotni energiya manbalari bilan ta'minlashda tabiiy gaz ulushi chegaraviy qiymatidan oshmoqda. Buning uchun muqobil energiya manbalaridan keng foydalanish lozim hamda ilg'or innovatsiyali energiyani tejaydigan texnologiyalarni qo'llash bo'yicha xalqaro tajriba bilan hamkorlikda faol ishlab chiqarishni amalga qo'llash lozim.

#### **Foydalanilgan adabiyotlar ro'yxati:**

1. O'zbekiston Respublikasi Prezidentining 05.10.2020 yildagi PF-6079 sonli "Raqamli O'zbekiston – 2030" strategiyasini tasdiqlash va uni samarali amalga oshirish chora-tadbirlari to'g'risida"gi farmoni.
2. Umarov O.S. Raqamli iqtisodiyot va uning rivojlanish tendensiyalari.// "Iqtisodiyot va innovasion texnologiyalar" ilmiy elektron jurnali. № 3, may-iyun, 2018 yil. www.iqtisodiyot.uz
3. Umarov I.I. Eksport tarkibining diversifikatsiyalashganlik darajasi – milliy iqtisodiyot raqobatdoshligining asosiy indikatori.// Material Forumu ekonomistov Uzbekis-tana; UNDP, IFMR – Tashkent, 2012.
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# THE SIGNIFICANCE AND WAYS OF DEVELOPMENT OF DIGITALIZATION OF THE ECONOMY IN AGRICULTURE

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ARTICLE INFORMATION	ABSTRACT
<p><b>Received:</b> December 28, 2021  <b>Accepted:</b> February 12, 2021  <b>Volume:</b> 1  <b>Issue:</b> 9  <b>DOI:</b> <a href="https://doi.org/10.54613/001009">https://doi.org/10.54613/001009</a></p> <hr/> <p><b>KEYWORDS</b></p> <p>Digitalisation, resource efficiency, system dynamics, food supply chains</p>	<p>Resource efficiency in the agri-food sector is a global urgent issue considering the urbanization phenomena, the increased nutritional needs, and the emergence of diversified dietary norms. Despite the ongoing progress in digital technologies that could enable resource-efficient operations in the sector, their effectiveness even in developed countries remains debatable mainly due to the limited understanding that further impedes their adoption by farmers. Among others, ease of access, training, and engagement with digital technologies appears to be challenging for most stakeholders, especially during the production (farming) stage. Specifically, in developing countries, that often encounter major natural resources challenges, the diverse socio-cultural background of the farmers hinders the adoption of digital technologies to perform highly auto-mated and efficient agricultural operations for ensuring sustainability output. In this regard, we explore publicly available data sources (i.e., institutional reports, databases) to identify key challenges in adopting digital technologies for efficient resource use from a systems-level perspective. Thereafter, we map the determinant factors using the System Dynamics methodology in order to identify areas of interventions to limit natural resources' appropriation and support agri-food sustainability.</p>

## 1. Introduction

The way agriculture influences food security and humanity poses a very complicated issue. However, it is unquestionable that its impact is significant. An agri-food system depends on different operations such as arable farming, soil cultivation, production of diverse products such as crops, fibres, and timber, breeding and raising livestock, and manufacturing and marketing of foods. Thus, today's societies request the global agri-food system to use fewer resources and be more environmentally friendly.

Digital technologies significantly influence all segments of the economy including the agri-food sector. The latest report from the World Bank outlines the key gains from the application of advancements in Information and Communications Technologies (ICT) in the agri-food system. In particular, ICT support higher involvement in the wider economy, boost effectiveness by supplementing other production elements, and foster innovation by intensely decreasing transaction costs. Smartphones and the Internet assist in overcoming information obstacles that limit market entrance for small producers and expand current knowledge supplying extension services that advance food supply chain management. Despite the numerous encouraging examples of concrete results, these have not been materialised to the anticipated level. The key cause is that technology can only address some, but not all, of the barriers encountered by food supply chain stakeholders in developing countries.

The challenges facing the agri-food sector differ significantly, depending on the economic status and development level of every region. Developed countries deal with overweight malnutrition while, in the other extreme developing countries, like the Middle East and North Africa (MENA) region, struggle with undernourishment. In this regard, a prevailing concern, given the resource efficiency issues in such regions is the expanding dependence on the global market for essential food products. Current policies in the MENA area focus on sustaining cereal production and consumption and, as

a result, 65% of cropland is planted with water-demanding grains. The outlook of the Organisation for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization of the United Nations (FAO) for the MENA region foresees on-going dietary changes toward meat consumption, extended freshwater appropriation at non-sustainable rates, and progressive dependence upon global markets. Initiatives to reduce poverty and produce added-value agricultural products could contribute to more diversified and nutritious diets. However, such changes require capacity building in the agri-food system by leveraging digital technologies. A holistic view in the agri-food system should also consider the implementation of management accounting and control system principles since these facilitate the evaluation of the benefits stemming from the adoption of sustainability-driven innovations in organisations. Indicatively, the external focus of management accounting and control systems is documented to enhance export propensity for the establishment of food value chains.

This research attempts to map the agri-food sector's resource efficiency related challenges in the developing world from a "how to leverage digital technologies" perspective. In the extant literature, management accounting and control systems have been used to align individual operations with organisational goals. In this regard, in order to effectively capture the underlying complexities and the non-linear behaviour of the agri-food system over time, we adopt the System Dynamics (SD) methodology to further understand the long-term effects of digital technologies in sustainable agri-food systems. SD is a simulation-based approach, which has been proven quite successful in policy-making at a strategic level regarding a wide range of sectors and challenges. Our research findings, reflected upon the proposed causal loop diagram, echo the major resources' efficiency challenges being encountered by developing countries since these are identified

in the reviewed policy documents. Therefore, we do not focus on a particular country as an exemplar case.

This research contributes to the extant body of literature by systematically mapping the complex interrelations governing the resource-constraint agri-food sector in developing countries and by indicating targeted digital technology interventions to tackle major sustainability challenges from an end-to-end supply chain perspective. In addition, existing systems-level analysis methods for agri-food sustainability are mainly positioned on a high-level conceptual space whereas the provided mapping approach has been

## 2. Research Objective and Approach

The object of scrutiny in the current work is two-faceted, including synthesis of the extant literature (i.e., institutional reports and research articles) and mapping of sustainability related challenges in developing nations with reference to the agri-food system. The multi-faceted character of our approach aims to inform a coherent construct about the complex topic of this research.

### Research Objective

The main objective of this research is to support academics and practitioners alike toward ensuring sustainability and viability of the agri-food sector in developing countries by specifically providing an SD-based mapping framework that could inform the effective assessment and implementation of digital interventions. In this regard, we first map the key challenges that affect the triple-helix of sustainability with regard to the agri-food sector in developing countries. At a greater extent, we identify targeted digital technology-driven interventions and recognise their causal effect in an end-to-end agri-food supply chain system, which could promote sustainable performance.

### Methodology

At the first stage, the methodological step refers to a literature review in order to recognise the key challenges that govern agri-food supply networks in developing countries. In this regard, to ensure a high integrity, our review focuses on reports by FAO as the appreciated public actor that provides widely accredited standards with regard to food agriculture sustainability. We also retrieved major publications by OECD since the organisation that gauges the impact of national agricultural policies towards global food security and

## 3. Challenges in the Agri-Food System

The impact of digital technology interventions on agricultural outcomes and overall supply chain's performance sustainability and efficiency is unquestionable especially in developing countries. First, digitalisation significantly improves market transparency and traceability. Mobile phone coverage in Niger resulted in greater arbitrage openings, reduction in price dispersion, lesser waste, and welfare growth for consumers and producers. In India, Internet kiosks contributed to rises in farm prices due to bargaining advances with middlemen as well as better market involvement in isolated areas via effective management and marketing. Second, digital technologies are associated with an increase in farm productivity. In Peru, mobile phone coverage improved income and food security (mainly at a rural household level) over better management practices. In India, hotline voice services facilitated the acceptance of enhanced inputs by allowing cost-effective extension guidance and weather forecasts while supporting agricultural investment decisions. Third, a considerable improvement in logistics efficiency occurred. In Zambia, an SMS-based service optimized supply chain management by enabling better coordination of transportation and delivery of products. Lastly, in Kenya, mobile money simplified secure payments, which allowed quick and secure money transfer for agri-inputs and subsidies etc.

Nonetheless, fundamental problems remain unresolved and key challenges need to be addressed. Our review attempts to identify such challenges. For a more meaningful presentation

thoroughly structured to be able to inform further quantitative analysis and provides the backbone for a simulation-based decision support tool.

The paper is structured as follows. The next section sets the objectives and describes the research approach employed. Afterwards, we discuss the key challenges under the different agri-food system levels, which is followed by a synthesis of results at a Systems Dynamics causal-loop projection. In the last section, we outline the main conclusions and provide the implications of the current work through future research suggestions.

sustainability. At a second stage, we use SD mapping to capture the causal effects of the identified challenges across end-to-end supply systems. SD defines problems dynamically through two stages, i.e., mapping and modelling, in order to ensure modelling robustness and inform targeted and efficient policy interventions. The structural elements of the SD include feedback mechanisms, causal loop diagrams, and stock and flow maps.

- Feedback structures assist in capturing the actual patterns of a system's behavior over the course of time.
- Causal loop diagrams help capture the mental models that describe a system. Annotated arrows depict the causal influences among a system's variables. A positive (denoted as "+") polarity denotes a reinforcing loop, which means that the cause and the resulting effect change toward the same direction. On the contrary, a negative (denoted as "-") polarity denotes a balancing feedback where the cause and the effect change towards the opposite direction.

- Stocks provide memory to a system, which enables a dynamic disequilibrium.

Contrary to traditional optimisation and simulation techniques that are appropriate for analysing static and linear systems, SD can help capture the dynamic behaviour of a system, introduce system interventions, and assess a system's response and evolution phenomena in time. Recent sustainability-focused studies incorporate SD to evaluate the impact of alternative interventions at either a policy or a technological level on the resulting sustainability performance of agri-food supply chains

of the review's output, we adopted an end-to-end supply chain perspective. Thus, in the following five sub-sections, we provide a taxonomy of key challenges with respect to the main pillars of sustainability (i.e., economy, environment, society) regarding production (farming), processing-manufacturing, distribution (transportation-logistics), wholesaling-retailing (trade) and consumption levels, respectively.

### Production (Farming)

Global food availability is the common denominator among the several challenges at the production (farming) level. Increasing demand, due to income and population growth, overtakes expected supply gains stemming from productivity advancements and increased mobilisation of land, water, and other resources. Tighter global markets indicate higher food prices and, therefore, the availability issue affects nations with low food affordability. In particular, the identified key challenges mainly refer to the food "safety-security-affordability" nexus and the associated resources' efficiency issues. As a result, one of the main challenges relates to the effective way farmers gain access to new knowledge in agriculture and resource management in an era of patent rights and regulations imposed by the World Trade Organization. Investments in the agri-food system could result in bridging the gap between production and the growing demand for food commodities, adjusting to the evolving dietary patterns in a more sustainable way. Such a sustainable increase in productivity could offer greater scope compared to mobilising more resources.

### Processing-Manufacturing

The agri-food manufacturing sector is a vital sector in many agri-based developing countries. For instance, in sub-Saharan Africa's most countries, agriculture signifies between 30% and 50% of total production value added while, in some countries, this respective value accounts for more than 80%. Nonetheless, the lack of essential infrastructure—from rural roads and electrical power grids to storage and refrigerated transportation—refrains any attempt from further growth. Financing essential infrastructure and new technology interventions could result in significant improvements with respect to efficient energy use, reduction in waste, and water scarcity.

### Distribution (Transportation-Logistics)

Increasing need for greater volumes of high-value food commodities raises challenges at both the upstream supply chain, from the suppliers of production inputs and manufacturers/processors, and downstream to the packaging, distribution, and storage levels of operations. At a greater extent, a lack of appropriate infrastructure typically impacts the quality of the distributed food supplies. Distribution is a critical echelon of operations in an agri-food system. Supporting the sector with infrastructure and technology investments to improve links among all supply chain actors could assist in overcoming the prevailing challenges.

### Wholesaling-Retailing (Trade)

In addition to the previously mentioned established challenges governing agri-food systems in developing nations, there are rising doubts about trade risks globally. Agri-food trade plays a vital role towards food security and emphasising the need for supporting trade-related digital technology interventions. Global trade can influence positively rural development by supplying inputs and equipment and by fulfilling food demand. Nevertheless, trade liberalisation results in growing imports, which benefits consumers and restrains local production at the same time.

### Consumption

Food demand depends on population/income growth, emerging dietary patterns, and diversified consumer preferences. Current trends suggest developments in consumer demand patterns due to the observed increase in average incomes such as the declining role of cereals and the growing demand for protein-rich diets.

### Synthesis of Results

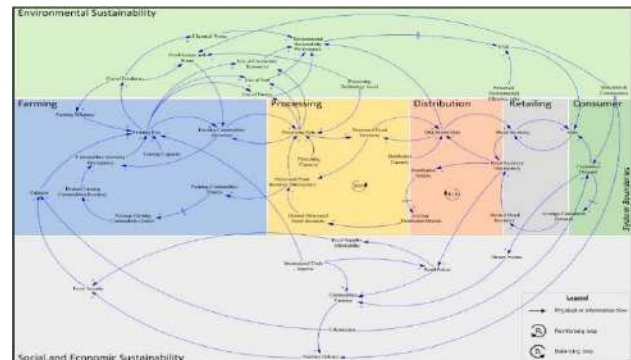
Below, we present the complexity and non-linear behaviour of the challenges governing agri-food supply chains in developing countries through the respective causal loop diagram. In particular, we synthesise the literature results and we map the key challenges and their interrelations to structural elements of an agri-food supply chain.

### System Description

We consider an agri-food supply chain that consists of the following stages: (I) agricultural production, (II) processing, (III) distribution, (IV) wholesaling-retailing, and (V) consumption. Each stage accounts for sustainability in a variant degree. We identify a total of 78 feedback loops (described in detail in Appendix A), which denote a sequence of causes and effects that circulate across each loop and impact a food sustainability related challenge. Compared to the common traditional methodological approaches that have a static and free-of-feedback view of agri-food systems, SD allows us to capture the dynamic nature of the sustainability issue in the agri-food sector. Overall, our mapping approach includes 29 reinforcing (denoted as R—Table A1 in Appendix A) and 49 balancing (denoted as B—Table A2 in Appendix A) loops.

Indicatively, in the reinforcing loop R10 (see Figure 1), an increased "Retail Inventory Discrepancy" results in higher "Retail Prices". However, increased prices of food commodities reduce "Food Supplies Affordability", which, in turn, reduces "Food Security". Nevertheless, increased "Food Security" assists in sustaining the population of "Farmers", which further supports an increased "Farming Rate" and high "Farming

Commodities Inventory" levels. The availability of commodities can then sustain an enhanced "Processing Rate", which increased the "Use of Freshwater Resources". However, the appropriation of freshwater resources negatively impacts the "Environmental Sustainability Performance" of the respective supply system, which accordingly impacts "CSR" and "Sales". In turn, enhanced "Sales" reduce "Retail Inventory", which



decreases the "Retail Inventory Discrepancy".

**Figure 1. System Dynamics—causal loop diagram.**

Furthermore, in the balancing loop B33 (see Figure 1), as the "Retail Inventory Discrepancy" increases due to the difference between the market demand and the retailer's inventory, enhanced "Distribution Orders" are placed to balance supply and demand. Thereafter, the "Average Distribution Orders", which are the smoothed "Distribution Orders" over time due to the physical response limitations of the ordering system, are increased and, in turn, increase the "Desired Processed Food Inventory". Augmented "Desired Processed Food Inventory" increases the "Processed Food Inventory Discrepancy", which associates to greater "Farming Commodities Orders". However, increased "Average Farming Commodities Orders" result in an elevated "Desired Farming Commodities Inventory", which widens the agricultural "Commodities Inventory Discrepancy". The greater this discrepancy, the more intense is the "Farming Rate". Thus, an enhanced "Farming Rate" results in augmented "Farming Commodities Inventory". The more the availability of commodities, the greater the "Processing Rate", which results in greater "Use of Freshwater Resources". The intensive appropriation of freshwater resources decreases the "Environmental Sustainability Performance" that negatively impacts "CSR (Corporate Social Responsibility)" and market "Sales" due to the environmental consciousness of consumers. Lower "Sales" have a minimal impact on the "Retail Inventory", which results in a lower "Retail Inventory Discrepancy"[1].

The developed SD-based causal loop diagram imparts a better understanding of the enhanced complexity in sustainable agri-food supply chain management by capturing the dynamic relationships among natural resources' appropriation, consumers' social sensitivity in terms of food security, markets' responsiveness towards commodities' prices, and corporate social responsibility. At a greater extent, the provided causal loop diagram, in conjunction with any external sustainability goals and drivers at both corporate and institutional levels, assist the ex-ante assessment of the sustainability performance resulting from the potential implementation of digital technologies. In particular, Figure 1 could support business stakeholders in selecting appropriate digital technologies to tackle challenges across end-to-end agri-food supply chains. The selected technology-driven interventions should result in a balanced, yet optimum, nexus among environmental impact, economic effects, and social phenomena. Indicatively, the FAO and the International Telecommunication Union recognise the role of unmanned aerial systems to address the challenges of hunger, malnutrition, and counter the effects of climate change with further implications to prices and natural resources' use.

#### 4. Conclusions

There are many challenges in the agri-food sector toward resource efficiency, both in developed and developing countries. Several of these challenges refer to the same issues at a global level, e.g., energy-related concerns, yet others differ dramatically depending on the country's status of (economic) development, e.g., water scarcity. Without any doubt, a key approach to tackle these challenges is by leveraging digital technologies not only from a practical and applied perspective but also from a policy-making angle.

The most essential challenges identified refer to: tackling hunger and malnutrition, sustainably improving productivity, reducing waste, and ensuring a sustainable natural resource base. However, the main contribution of this research is the comprehensive illustration of the complex interactions among the factors influencing these challenges within the agri-food system. The SD approach clearly demonstrates that every challenge requires a set of actions to be properly addressed due

to numerous interdependencies among different processes and stakeholders. Investigating this topic by employing an end-to-end supply chain approach reveals that individual interventions in a single supply chain echelon or operation are highly unlikely to resolve any challenge.

Implications of our findings and, at the same time, suggestions for future research imply the quantification of the proposed SD causal loop, which employs data for high priority developing regions. Particular focus should be attributed to the modelling of the social sustainability parameters captured in the modelling approach and assess the behaviour and performance of the agri-food system toward potential interventions. This shall initially validate the theoretical approach and then strengthen the impact of any interference derived from such an analysis. In a greater scale, this concept could be applied at a country (or even system of countries) level, leveraging digital technologies in feeding.

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## THE IMPACT OF LOCAL GASTRONOMY ON THE DEVELOPMENT OF ECOTOURISM

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ARTICLE INFORMATION	ABSTRACT
<p><b>Received:</b> January 05, 2021  <b>Accepted:</b> February 26, 2021  <b>Volume:</b> 1  <b>Issue:</b> 10  <b>DOI:</b> <a href="https://doi.org/10.54613/001010">https://doi.org/10.54613/001010</a></p> <hr/> <p><b>KEYWORDS</b></p> <p>Advantages of local gastronomy, ecotourism, individual characteristics of food, local gastronomy at the designated place</p>	<p>Local food products of each region play an important role in the development of ecotourism. The availability of facilities for the consumption of local food in places where ecotourism is located is not only to meet the basic needs of tourists, but also to improve the economic situation of the local population. Therefore, this article discusses the food-related characteristics of tourists and the benefits of local gastronomy for both the local community and ecotourism tourists around the world.</p>

### 1. Introduction

The concept of ecotourism emerged in the 1980s and 1990s, and as a result, various definitions have emerged by many ecotourism associations around the world. However, these definitions have the same basis. The concept of ecotourism, which treats tourism and the natural base as recreation, aims to preserve the environment in order to be sustainable. The foundation of ecotourism was laid by Ceballos-Lascurain (1996) in "Ensuring the socio-economically active participation of the local population in ecologically responsible, enlightened travel to relatively unstable natural areas for the enjoyment and appreciation of nature (past and present cultural features) that help preserve nature"<sup>5</sup>.

Analyzing the different definitions of the concept of "eco-tourism" and generalizing it, it is necessary to distinguish the following features:

- indirect use of wildlife as a tourist destination;
- minimal damage to the environment;
- recreational and positive educational impact on the person;
- to get acquainted with new landscapes, to study samples of flora and fauna for protection;
- the use of funds from tourism for the conservation and restoration of flora and fauna of the region;
- observation of the code of respect for wildlife and local people by all tourists and service providers, etc.<sup>6</sup>

### 2. The main part

Ecotourism concerns the protection of the environment on the basis of lies." Such trips are out of the preliminary nature of the small group of tourists, protection of natural resources and means for the implementation of the various projects on the works. This concept - the concept of the International Ecotourism Society says, ecotourism - "responsible travel to zones of nature, where social status is the protection of the local population".

The nature of the experiments showed that protection of land in different regions of the globe, especially in the mountainous areas of protection "should not go to the people with the land" or "manage the living environment of the local population, their thoughts generations sent to protect the

Summarizing the concept of "eco-tourism", we can conclude that the principles formed in the above-mentioned features of the organization of tourism are not local, but global in nature. Therefore, these principles should apply not only to certain parts of the world or parts of the land, water and air space, but to the field of tourism activities around the world.

As one of the nature-based types of tourism, ecotourism has become one of the fastest growing segments of the world tourism market. In the last few decades, many people and the world community have begun to see ecotourism as a unique economic key to supporting nature conservation. Many proponents of ecotourism also express the view that an important component of it should be environmental education or education for the participating tourists. Such studies suggest that tourists can gain more knowledge about nature and be more supportive of nature conservation, as well as gain more political and financial support.

While there is a lot to be gained from developing ecotourism, not all of the proposed ecotourism projects are cost-effective, they provide little or no benefit to those involved in the ecotourism business, and the level of financial risk is high. This article analyzes the advantages and disadvantages of ecotourism from the point of view of its nature conservation tool and assumptions and considerations such as further development of ecotourism by expanding the consumption of national gastronomic products.

future. In the absence of any component of these factors, there is no need to think about eco".

2014 At present, there are four different types of ecotourism.

1. Scientific tourism. At the same time carry out monitoring works in the field of tourists, nature will take part in the study. For example, one of the Latin American countries - Colombia, to explore the rich world of birds, "birds of Colombia", which was held in ecotypes ornithologists from other countries will also participate in scientific research. The tourists are actively working methods, will be able to enjoy the natural beauty. Tourism is scientific research expedition abroad, including students, faculty and natural field practices.

<sup>5</sup> Ceballos-Lascurain H (1996) Tourism, ecotourism and protected areas. IUCN: Gland, Switzerland.

<sup>6</sup> O.H.Hamidov, A.N.Norchayev "Ekoturizm" TDIU-Toshkent 2011

2. The study of the natural history of species. This trip was to learn about the environment and local culture. They usually reserves and national parks can be created. To be established in these areas have a variety of natural phenomena. School trips for students, teachers, students nature of the stories about the history of places. Samarkand is located in the mountains south-west of the city of Karatepa on its peak in the cave of King David. This is the way to go in the cave and he can go all the revamped. However, his time in the cave appear to be a qualified cave tour was led by the head of explaining the history and identity, and presumably will be the way it would comment on the myth of the cave. In addition to eco tourists who work inside and outside the cave can be modified in view of the strong.

3. Adventure tourism. This tour includes all types of active tourism and recreation in nature, it includes trips included. Target them feel new emotions, impressions of tourists to experience physical improvements and new forms of sports success. This tour tourism and mountaineering, rock hiking, mountain, walking, water-skiing, walking and mountain skiing and horse tourism.

4. Specially protected tourism. Natural area is the main type of eco-travel.

The main difference between the ecological functions and features are ecotourism unique features:

- The territory of the local population to participate in social and economic development;
- Most of the tourist facilities in the course;
- Independent of nature;
- Low power consumption;

-Environmental knowledge in the field of tourism.

Recreation resources, eco-tourism, nature, mountains and plains, rivers, deserts and oases, and the lake are a different landscape zones. Also, based on eco-divided into the following components:

- Marine and ocean eco-tourism;
- Forest Eco-zones and parks;
- River and Lakes ecotourism;
- Mountain Ecotourism;
- Ancient Sites and ecotourism;
- Architecture Monuments ecotourism;

- Eco-tourism and ecological crisis zones;
- Separate tourism in protected natural areas.

As defined above, ecotourism plays a significant role in the last parts of the concept of ecotourism and many scientists employ only specially protected natural territories ecotourism.

The development of eco-tourism in Uzbekistan, as the use of natural resistant device Ecotourism

- travel with the nature of this responsibility.

Ecotourism activities include the following:

**1. The involvement of the local population:**

- Development of the local population in the field of environmental protection;

- The development of local small businesses in the tourism sector of the population, the distribution of traditional crafts and souvenirs, involved in the production of environmentally friendly products and production;

**2. Information Program:**

- The creation of a booklet and a Web site;

- The creation of a database;

- The distribution of information through the network;

**3. National parks and reserves providing practical help:**

- Recreation is allowed to determine the limits of pressure and obedience;

- The establishment of sanitary and environmental actions and conduct;

- Environmental control;

**4. The structure of the state and tourism companies to work with:**

- Ecotourism and protect the interest.

**5. Education programs:**

- Operators of Eco tour the local population and the production of scientific organization of scientific seminars, workshops and training;

- Eco management program production;

- The organization of information seminars and the involvement of the local population; Information services;

- To restore the customs and traditions of the local population;

**6. International programs include:**

- Eco-exchange programs;

International education and training projects;

**7. The establishment of ecotourism development program.**

#### Eco-types and their purpose

Nº	Ecotourism types	The main objectives
1.	Aimed at scientific and educational tourism	Poultry, botanical, decorative, geographical, archaeological, ethnographic and other scientific research
2.	adventure tourism	On foot, traveling on horseback in the mountains and water
3.	Summer school students	Introductory practice, practice, practice and other summer schools
4.	Summer camps and other summer programs	Lore, botanical, zoological, archaeological, geological, and others
5.	Eco-types and their purpose	Participation in environmental conferences, symposia, friends and relatives and other.

Source: Ibadullayev N.E. *Turistik resurslardan foydalanish samaradorligini oshirish imkoniyatlari.* – Samarqand, 2010

The basic assumption in using this approach is that a buyer's attitude towards an attribute of a property (physical, aesthetics, or environmental) is reflected in the willingness to pay for the property. In deciding to buy a house, one would expect its value to be equal to its construction costs plus an appropriate mark-up. In reality, decisions to buy a house are influenced by a wide range of attributes, only some of which are physical. Other considerations are location to certain amenities, distance from good schools, markets, and other general neighbourhood attributes. The property-value approach is designed to control certain variables so that any remaining price differential can then be assigned to the unpriced environmental effect-either good or bad. A drop in property value may be due

to increased noise or air pollution, or view obstruction; an increase in property values will occur if these undesirable environmental attributes are corrected. Benefits from an urban flood-control project could, in part, be estimated by examining price differences between housing units located in a flood-prone district and identical housing situated in less frequently flooded areas. Based on the assumption of a freely functioning and efficient price market, the approach is founded upon a sound theoretical base and is capable of producing valid estimates of benefits as long as individuals can perceive environmental changes (Georgiou, et al., 1997). In 1993, North and Griffin used the hedonic property valuation approach to assess the willingness-to-pay for water using water source as a

housing characteristic. The study, from a survey of 1,903 Philippine households, developed a bid-rent function and found that households are willing to pay about half their imputed rent to have piped water.

Wildlife-based tourism can be classified into two areas: non-consumption (when seeing or watching wildlife, photography, etc.) or for consumption (hunting and fishing). Ecotourism is more related to the passive form of tourism that is not consumed. The second direction of ecotourism will develop in a sustainable way if the form of tourism carried out for consumption is properly managed and efforts are made to maintain stability. In the United States, for example, hunting organizations such as Ducks Unlimited protect ponds and lakes, providing food for migratory ducks and geese. In the Navoi region of Uzbekistan there is a project on wild breeding of Tuvaluans, which is funded by the Government of the United Arab Emirates.

A.Nigmatov, N.Shamuratova (2006, 2007), A.Nigmatov, Sh.Yakubjanova (2009) were the first to divide the territory of Uzbekistan into ecotourism and agro-tourism regions and divided the territory of the country into 14 ecotourism and 15 agro-tourism regions.

Any ecotourism activity is usually in natural areas, where it should contribute to the preservation or development of not only natural areas, but also local culture that realizes ethnotouristic potential, thereby creating added value for travelers and increasing network revenue. Such events help to appreciate cultural diversity both in the region and in the local community. Thus, the measures taken are to increase the well-being of local communities by improving their economic and social development. One of the dimensions of ecotourism listed by the Food and Agriculture Organization of the United Nations (FAO) is the economic dimension of ecotourism. Activities related to ecotourism in this area are often in the areas of products and services, which involve a variety of stakeholders, from area managers to local communities. Among the products and services offered, food and beverages, although not the

main product, play an important role. This study focused on local gastronomy and food consumption, which occurs in national parks, nature reserves, and any other protected areas.

Despite the fact that food is neophobic and food-related personal characteristics among consumers, local food can become the most important aspect of the quality of the tourist experience; as the main or partial cause of the visit and as a multiplier effect providing a gastronomic route, benefits not only tourists but also locals. Research in recent years has shown that in addition to the environmental quality of the place you visit, good local food also affects the satisfaction and experience of tourists. Many aspects are taken into account when choosing a place for a tourist to travel, including the presence of local food types. Although this may not be the main motivation, it does play an important role as a partial motivation for the visit. Local food not only serves as food, but also serves as a vehicle for tourists to understand the local community and its culture through the gastronomic route.

The advantage of consuming local food is that it helps to maintain small farms and support rural communities as the money spent remains with the local community. It also reduces travel miles spent on food, thereby reducing fossil fuel consumption and air pollution. In return, consumers will be able to better understand the process of making gastronomic products by choosing eco-friendly food to eat and talking to the people who set up the production of these products, as well as awakening the desire to buy it, bringing additional income to local producers.

It can be seen that food and beverages produced locally and in a designated area can have an impact not only on the local economy, but also on local culture and the environmental sustainability of tourist destinations. This in turn benefits both the hosts and the guests<sup>4</sup> (Симс, 2009). The following table provides an analysis of previous research samples related to the benefits of local food in tourist destinations.

**Table 2 Opinions and comments of scientists on the combination of ecotourism and local gastronomy**

Nº	Authors	Thoughts
1.	Adeyinka-Ojo and Khoo-Lattimore (2013)	The slow food event at Bario in Sarawak, Malaysia has the potential of becoming a high yielding tourism destination with the cooperation between the community, organizational and other tourism stakeholders.
2.	Pratt (2013)	Growing foods locally in Fiji island do not only minimize food miles, but also decrease leakage of the local economy while preserving the quality food tradition.
3	Hjalager and Johansen (2012)	Environmental and economic sustainability with food production, services in protected area represents economic possibilities and provide higher food production and service quality which lead to exciting food experience
4.	Everett and Slocum (2013)	Selling local food to tourists to support local sustainability agendas which are the traditional industries, job development, rural economies, encouraging social justice and diversifying agriculture is endorsed by the U.K government bodies.
5.	Sims (2009)	Promoting iconic local food that can draw new tourists to a destination. Such image can be linked to traditional 'landscapes' of farming methods that tourists can experience.
6.	Choo and Tazim (2009)	The preliminary research in the local organic farm study shows definite parallels between tourism practice and ecotourism principle which is sustainable for the environment and the local community.
7.	Telfar and Wall (1996)	Encouraging the use of local food by the tourism industry can reduce conflict in the direction of symbiosis between local economic linkages and tourism destination.

*Summarized by the authors*

In the table above you can see a generalized summary of the conclusions drawn from the work done by a number of scientists in this field. These findings also highlight the importance of local food strategies in the development of ecotourism.

There are also a number of ecotourism and tourist destinations in Nurabad district of Samarkand region.

Jarkuduk: The mausoleum of the ram father IV-V centuries. The Kochkorli ota shrine is located on the slopes of a

mountain in the village of Kochkorlibobo in the Jarkuduk village of the district.

Arabota: White Mosque IX-X centuries. According to the Kufic inscription preserved on the roof of the mausoleum, the monument is a pilgrimage and ecotourism site built during the reign of Noah ibn Mansur (977-997) of the Bukhara Samanid dynasty.

Aksay: The shrine of Hazrat David in the XVII-XIX centuries. David is one of the prophets from the Children of Israel. After the death of David Tolut, he was appointed king of

the Children of Israel. The flora and fauna of Aksay village can be described as a bright combination of pilgrimage, gastronomic and ecotourism sites, attracting many local tourists.

According to Table 3, significant changes in the dynamics of economic indicators were observed at 3 ecotourism facilities in Nurabad district. In particular, in Kochkorli ota mausoleum in 2019, despite the fact that the level of income increased by 8428 thousand soums or 14.9% compared to 2017, the profit increased by 11303 thousand soums or 32.6%, resulting in a decrease of 2875 thousand soums or 13.2%. In return for the decline in profits, the rate of return also fell by 21.8 points.

Despite the fact that the level of income in the mausoleum of the White Mosque in 2019 increased by 5833 thousand soums or 16.4% compared to 2017, the profit increased by 9710 thousand soums or 45%, resulting in a decrease of 3877 thousand soums or 28%. In return for the decline in profits, the rate of return also decreased by 32.4 points. Despite the fact that the income level of the shrine of Hazrat David in 2019 increased by 28,864 thousand soums or 18.4% compared to 2017, the increase in expenses by 15,998 thousand soums or 18.5% led to a decrease in profits by 3,877 thousand soums or 28%. In return for the decline in profits, the rate of return also decreased by 32.4 points.

**Table 3. The main economic indicators of ecotourism in Nurabad district (in thousands of soums)**

Nº	Authors	Thoughts
1.	Adeyinka-Ojo and Khoo-Lattimore (2013)	The slow food event at Bario in Sarawak, Malaysia has the potential of becoming a high yielding tourism destination with the cooperation between the community, organizational and other tourism stakeholders.
2.	Pratt (2013)	Growing foods locally in Fiji island do not only minimize food miles, but also decrease leakage of the local economy while preserving the quality food tradition.
3	Hjalager and Johansen (2012)	Environmental and economic sustainability with food production, services in protected area represents economic possibilities and provide higher food production and service quality which lead to exciting food experience
4.	Everett and Slocum (2013)	Selling local food to tourists to support local sustainability agendas which are the traditional industries, job development, rural economies, encouraging social justice and diversifying agriculture is endorsed by the U.K government bodies.
5.	Sims (2009)	Promoting iconic local food that can draw new tourists to a destination. Such image can be linked to traditional 'landscapes' of farming methods that tourists can experience.
6.	Choo and Tazim (2009)	The preliminary research in the local organic farm study shows definite parallels between tourism practice and ecotourism principle which is sustainable for the environment and the local community.
7.	Telfar and Wall (1996)	Encouraging the use of local food by the tourism industry can reduce conflict in the direction of symbiosis between local economic linkages and tourism destination.

\* Summarized by the authors

In the table above you can see a generalized summary of the conclusions drawn from the work done by a number of scientists in this field. These findings also highlight the importance of local food strategies in the development of ecotourism.

There are also a number of ecotourism and tourist destinations in Nurabad district of Samarkand region.

Jarkuduk: The mausoleum of the ram father IV-V centuries. The Kochkorli ota shrine is located on the slopes of a mountain in the village of Kochkorlibobo in the Jarkuduk village of the district.

Arabota: White Mosque IX-X centuries. According to the Kufic inscription preserved on the roof of the mausoleum, the monument is a pilgrimage and ecotourism site built during the reign of Noah ibn Mansur (977-997) of the Bukhara Samanid dynasty.

Aksay : The shrine of Hazrat David in the XVII-XIX centuries. David is one of the prophets from the Children of Israel. After the death of David Tolut, he was appointed king of the Children of Israel. The flora and fauna of Aksay village can be described as a bright combination of pilgrimage, gastronomic and ecotourism sites, attracting many local tourists.

According to Table 3, significant changes in the dynamics of economic indicators were observed at 3 ecotourism facilities in Nurabad district. In particular, in Kochkorli ota mausoleum in 2019, despite the fact that the level of income increased by 8428 thousand soums or 14.9% compared to 2017, the profit increased by 11303 thousand soums or 32.6%, resulting in a decrease of 2875 thousand soums or 13.2%. In return for the decline in profits, the rate of return also fell by 21.8 points. Despite the fact that the level of income in the mausoleum of the White Mosque in 2019 increased by 5833 thousand soums

or 16.4% compared to 2017, the profit increased by 9710 thousand soums or 45%, resulting in a decrease of 3877 thousand soums or 28%. In return for the decline in profits, the rate of return also decreased by 32.4 points. Despite the fact that the income level of the shrine of Hazrat David in 2019 increased by 28,864 thousand soums or 18.4% compared to 2017, the increase in expenses by 15,998 thousand soums or 18.5% led to a decrease in profits by 3,877 thousand soums or 28%. In return for the decline in profits, the rate of return also decreased by 32.4 points.

Some of the infrastructure in these areas is still in dire need of repair and investment in ecotourism. As a result of the study, the following recommendations were developed:

- It is necessary to develop ecotourism in the region in accordance with modern requirements and preserve the natural state. To do this, it is necessary to provide government subsidies and economic support to businesses that can develop this sector.

- In addition, in these regions, the creation of a gastronomic tourism business in connection with the consumption of food products can lead to an improvement in economic performance in the region.

- Based on the above economic situation, it is necessary to properly assess the potential of these regions, first to introduce it to visitors throughout the country, and then around the world (on the Internet, television, radio, etc.).

- It is also necessary to conduct appropriate research on all possible economic and social situations.

By implementing these proposals, along with the development of ecotourism in these areas, it is possible to achieve additional employment and some improvement in the social and economic situation of the population.



**Table 3 The main economic indicators of ecotourism in Nurabad district  
(in thousands of soums)**

№	Indicators	2017	2018	2019	Change in 2019 compared to 2017	
					Quantitative (+ ; -)	Relative %
<b>The Kochkorli ota shrine</b>						
1	Income	56423	51236	64851	8428	114,93
2	Cost	34568	38514	45871	11303	132,69
3	Benefits	21855	12722	18980	-2875	86,84
4	Profitability, %	63,22	33,03	41,37	Decreased by 21.8 points	
<b>White Mosque</b>						
1	Income	35421	39456	41254	5833	116,46
2	Cost	21546	25894	31256	9710	145,06
3	Benefits	13875	13562	9998	-3877	72,057
4	Profitability, %	64,39	52,37	31,98	Decreased by 32.4 points	
<b>The shrine of Hazrat David</b>						
1	Income	156783	174561	185647	28864	118,41
2	Cost	86452	95648	102450	15998	118,50
3	Benefits	70331	78913	83197	12866	118,29
4	Profitability, %	81,35	82,50	81,20	Decreased by 0.14 points	

### 3. Conclusion

The popularity of the unique food products of each ecotourism destination attracts tourists to these destinations. Consumption of foods such as nuts, mushrooms, berries, herbs and fruits can cause guests to make their next visit. Ecotourism destinations can also be promoted by a particular food product if it is sold strategically. Studies show that many tourists are definitely interested in the food base of this destination when choosing a destination. In addition, among the local population, this direction will become a form of entrepreneurship.

It should be noted that another goal of ecotourism is to preserve the unique flora and fauna, to preserve it for future generations. COVID-19 has become a global problem around the world. The pandemic has caused a number of socio-economic challenges globally, led to the postponement or cancellation of sporting and cultural events, and raised

concerns about shortages of medicines, electronics and food. Measures have been taken to prevent the spread of the disease, such as travel restrictions, quarantine, curfew, postponement and cancellation of events, and closure of institutions. Apparently, ecotourism trips were also limited. But we can't say that this has been a huge loss for ecotourism. The reason is that the current restrictions on the operation of some industries, the self- isolation of people have led to the revival of the natural environment around the world, which has led to the further development of ecotourism. In this case, we can observe a decrease in the cost of rehabilitating ecotourism sites.

Thus, the organization of local gastronomy in the development of ecotourism leads to the social and economic prosperity of this region.

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## STUDY ON THE IMPACT OF THE COVID-19 PANDEMIC ON HOUSEHOLD FOOD CONSUMPTION IN UZBEKISTAN: RESULTS OF AN ONLINE SURVEY

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ARTICLE INFORMATION	ABSTRACT
<b>Received:</b> December 10, 2021 <b>Accepted:</b> February 16, 2021 <b>Volume:</b> 1 <b>Issue:</b> 11 <b>DOI:</b> <a href="https://doi.org/10.54613/001011">https://doi.org/10.54613/001011</a>	The paper investigates the impact of the COVID-19 pandemic on household food consumption in Uzbekistan. The study focuses on the effects of changes in food prices, declining consumption, and changes in household incomes. The Multinomial Logistic Regression Model was used in the factor impact analysis. Data for analysis were collected online by messenger groups from families in urban and rural areas of Uzbekistan. Results of the Econometric analysis demonstrated that the decline in food consumption in households was assessed by a decrease in income, a growth in total expenditures, and debt factors. The declining food supply in rural areas did not have a significant impact on consumption, but this figure was higher in urban regions.
<b>KEYWORDS</b> COVID-19 pandemic, family food consumption, family income, food supply chain	

### 1. Introduction

The COVID-19 pandemic flow is harming the food supply chain in mostly all countries in the world (Torero Cullen, 2020; FAO, 2020; Hobbs, 2020). At the starting phase of the pandemic, the government's "Stay at home" proposal (or command) and the panic of the pandemic has had a strong impact on and disordered the population (Bracale & Vaccaro, 2020; Fowler et al., 2020). The lockdown-induce has reduced/stopped the activities, except for the most important sectors (medicine, agriculture, food supply, and some other related sectors) (Galanakis C. M., 2020) thereafter, there is a shortage of manpower in sectors of the food supply chain (Lal, 2020; IPES- Food, 2020). Moreover, "Panic buying" is further complicating (Nicola et al., 2020) demand for food products in wholesale and retail outlets and open (dehkan) markets have risen sharply. Shops and warehouses are almost emptied. It has even led to a decline in imports of food products in many countries. Of course, this situation has also affected food prices increase (FAO, 2020a).

The outbreak of COVID-19 worldwide it is reached into Uzbekistan in March 2020.<sup>1</sup> The numbers of policy implications and measures have been taken to prevent the spread of coronavirus in the country. In order, to protect the health of citizens' government established a strict regime against the spread of infection from March 24. Almost all institutions have ceased operations and tightened border controls have been introduced into the country and its interiors. And, the activities of educational institutions, organizations, and the implementation of payments began to be done as an online. The food supply system has been provided with "green corridor" opportunities. The sale of products by the rules of hygiene and control over their prices are established. Furthermore, at the request of low-income families (to dial-up to the organized call centers), the most important staple food products (flour, fat, meat and meat products, eggs, sugar, rice, tea, and other similar products) are allocated from the state budget and other charitable foundations. In the country, overall, 127 such policy response measures are implemented so far (IFPRI, 2020b).

The number of measures taken is yielding positive results. However, in the families, the self-isolation has both positive and negative effects on "staying at home" (Nicola et al., 2020; Belso-Martínez et al., 2020). Positive effects prevent the spread of the virus and allow more health (Naja & Hamadeh, 2020), negative consequences are decreased in the supply of daily necessities, food and medicine, and the proliferation of various other illnesses through the restriction of physical activity (Ammar et al., 2020; Reyes-Olavarría et al., 2020). In addition to that, the availability of food for consumption is one problem, while the solvency is another (Siche, 2020; Guerrieri et al., 2020). Therefore, the ability of the population to pay depends on their income and savings. In developing countries, such problems have a greater negative impact on the social welfare of the population (FAO, 2020d; Laborde et al., 2020; Qian & Fan, 2020).

The negative effects listed above may vary in urban and rural areas of Uzbekistan. The population of cities in the country consists of more than half of the totals<sup>2</sup>. The urban population is denser than in rural areas, and most families live in apartment buildings. Therefore, in the case of policy lockdown, urban residents face more difficulties than rural ones. In terms of food supply, rural families have advantages over urban. In the villages, the population is located in scattered areas and most of them have land plots for gardening. As a smallholder farm, usually, they produce their agricultural food products (flour, fruits, vegetables, lettuces, eggs, meat, milk, and dairy products, etc.) own (FAO, 2020b). Moreover, their family members can apply physical exercises safe in the house yard.

The literature reviewed above suggests that rising food prices and declining supply may harm family food security. This article is aimed to study the impact of the COVID-19 pandemic on household food consumption in Uzbekistan and finding solutions to its problems. In order, to determine the impact of factors on household food consumption during the pandemic, the following questions were answered: (i) Did family food consumption change during the COVID-19 pandemic? (ii) What

are the factors influencing changes in family food consumption during a pandemic? (iii) What are the impacts on family food consumption in urban and rural areas?

Data were collected through an online survey. We have used Survey Monkey online platform. The survey link was distributed throughout Uzbekistan via various messenger groups (Telegram, Whatsapp, and IMO) and e-mails. The surveying process lasted for two weeks (July 21 to August 4,

## 2. Material and methods

### 1.1. Study design and data collection

In the context of the COVID-19 pandemic, cross-sectional data collection poses many challenges for all researchers. It is difficult to determine the impact of the pandemic consequences on social spheres, which has put all people on the planet in a tough "lockdown" situation. Therefore, we tried to conduct an online survey on the impact of the COVID-19 pandemic on household food consumption in Uzbekistan. It was obtained anonymously and at random by the Survey Monkey online platform privacy policy (<https://www.surveymonkey.com/mp/legal/survey-research-privacy-notice/>).

The content and condition of the online survey as follows: the survey was designed to assess eight multidimensional lifestyle behaviors sections during the COVID-19 outbreak. The online survey questions were in the Uzbek language, and names and contact information were not received from respondents. Those who did not want to fill out the questionnaire voluntarily could stop at any stage. Only the data of the respondents who clicked the "Yakunlash(complete)" submit button was collected automatically.

#### Survey tool

The survey consisted of 38 questions and sub-questions separated with demographic (12 questions), property (7 questions), food consumption satisfaction (6 questions), physical expectation (1 question), family income and expenses changes (8 questions), social support (2 questions), free time activities and infected to COVID-19 (2 questions) multi-sections.

The first section focuses on the socio-demographic data of respondents. The questions were mainly related to education, living place, age, marital status, and the number of children, spent the time on children's care, type and field of working activity. The second property section focuses on that the householders produce agri-food products on their house yard and the time they spend on the farm management during the pandemic, as well as changes in income from that activity. The questions in the food consumption satisfaction section are regarded as changes in the amount and timing of food consumption in the family. In the family income and expenses changes section, the questions are designed to determine the family's income and expenses, the amount of their change, and the debts received. Other sections of the survey included questions about respondents' access to social assistance, weight changes, leisure activities, and exposure to the virus. The answers to the questions were marked in dummy, nominal, and ratio indicators.

The responses of the dependent and independent variables selected to study the impact of the COVID-19 pandemic on family food consumption were as follows. (Table 1). (1) The academic background of the respondents was mainly determined by 4 answer options. Because in Uzbekistan, secondary school education is compulsory and the following

### 1.2. Data analysis

The data analysis was performed using Microsoft Excel 2010 and STATA version 15. Collected data by Survey Monkey online survey platform transferred to Microsoft Excel 2010 for editing, sorting, and coding. The prepared excel file data was then imported into STATA V.15 software. Descriptive statistics (frequencies, percentages, means, and standard deviation),

2020) and involved 1,282 respondents independently.

In this paper, a multinomial logistic regression model (MNL) is a generalization of a logistic regression model for three unordered response categories. Thus, the MNL methodology allows for the consideration of food consumption changes during the COVID-19 pandemic as the dependent, responsible, variable (Y), using a set of independent explanatory variables (X).

stages are defined as independently: Vocational college, High school, and Ph.D. (Ganiev et al., 2018). Respondents were asked to indicate their academic backgrounds in the first three and were left to enter them if they had another high level. (2) Respondents were divided into 3 age groups. At the same time, mainly young-aged people (young people - 18-30), middle-aged people (31-60), and the elderly (people of retirement age - over 61 years) were identified. This is because the main age boundaries are divided into the above groups for implementing family and home activities (Liu et al., 2016; Brajša-Ťganec et al., 2011). (3) In the context of the pandemic, it is given three answer options to determine affect families' food consumption: the family food consumption was not affected; a decrease in purchases due to rising prices; and a decrease in consumption due to a decrease in product supply were identified as response options. According to scientists, the rise in food prices during the pandemic can be observed more in developing and importing countries (FAO, 2020d; IFPRI, 2020a; Akter, 2020), and there is a possibility of a shortage in staple food in stores or a decrease in food supply (IPES-Food, 2020; FAO, 2020f). (4) At a time when the panic of the pandemic is confusing people, the demand for high-protein foods would be particularly high (Arora & Mishra, 2020). According to Muscogiuri et al. (2020), it is advisable to consume well and eat more foods that contain serotonin, melatonin, minerals, antioxidants, and vitamins to prevent COVID-19 infection. People focus on better nutrition to strengthen the body and boost immunity. Given the above, the survey asked about the unchanged or decreased consumption of meat products. (5) Various factors can affect the change in the amount of food purchased in the family. In particular, the funds for the purchase, the decrease in the supply of products, high prices, and so on. According to the recommendations of Udmale et al., (2020) to the governments of developing countries on measures to mitigate the negative effects of the pandemic, attention should be paid to the purchasing power of households. Therefore, to determine this situation in the survey, we offered respondents three different response options (No change, increased, and decreased). (6) The income of the population is one of the main factors influencing changes in the volume of consumer goods (Ren et al., 2019). Its increase will surge consumer spending (Siman et al., 2020). The survey looked at the impact of income on household food as a particular factor and suggested three possible responses. (7) Another factor is related to changes in family expenses. In order to determine its change and impact, respondents were also offered three different answer options. (8-9) The responses were dummy (1=yes, 0=no) in order to determine whether the family had sufficient income for food and borrowed money from other entities for family expenses. (10) Respondents were divided into two classes (married and unmarried) according to their marital status.

some first order and multinomial logistic regression (MNL) analyses were executed by STATA software. According to the dependent variable the multinomial logistic regression was performed with a 95% confidence interval to determine significant associations between categorical dependent and independent variables. The food consumption change variable

was taken as a dependent variable in the model. Outcome measures in this analysis are the impact to change family food consumption during the COVID-19 pandemic – no change, food prices have risen, so our purchases have decreased and shortage of food for purchases – from which we are going to see what relationships exist with a set of independent variables

### 3. Results & discussion

In the context of the COVID-19 pandemic, the answers to the questions related to changes in household food consumption and its effects, and their differences between groups (urban and rural) were studied (Table 1).

During the survey, a total of 1198 respondents have been actively attended to the questions (Table 2). Hence, 51.9% live in cities, and the rest in rural areas. The most of respondents (80.4%) participate in the survey were obtained a higher education. Especially, rural respondents who are educated at high schools have been more active than other groups. As mentioned above, the age of the respondents was divided into three groups. The main participants were 18-30 and 31-60 years old, with a participation rate of 55.0% and 43.9%, respectively. Of these, 60.4% of respondents aged 18-30 lives in the city.

According to the survey result, 50% of respondents indicated that the consumption of food in families has decreased due to rising prices. At the same time, 12% of respondents consumed less food owing to the decrease in food

(income for food purchases, education, age, living place, protein intake, food purchase change, family overall income, family overall expenses, marital status and borrow). We select the “No change” outcome measure of the dependent variable as a base. It is calculated the variance inflation factors (VIFs) for the independent variables in the MNL analysis.

outlets and markets during the pandemic. We can see in the table that these figures are partially higher in urban inhabitants than rural.

In the survey, when asked about changes in the consumption of meat products alone, 58.7% of respondents pointed out that their consumption did not change, but 41.3% of respondents demonstrated that their consumption has been decreased.

The role of income is high in family food consumption. If we look at the figures, in 37.6% of respondents the income of families has not changed. However, unfortunately, 59.7% of respondents indicated that the income decreased and only 2.7% of respondents pointed out that it has been increased. It should also be noted that the decline in income was higher among the respondents living in rural areas. If we pay attention to the change in family expenses, 38.2% of respondents did not change their total expenses. Interestingly, 32.5% of respondents reported a decrease in total costs, but 29.3% of respondents reported an increase.

**Table 1. Demographics, steering survey questions (variables), and responses results**

Questions & var. name	Answer/s	Total		Urban		Rural	
		N	%	N	%	N	%
(1) What is your academic background? (educ)	School	39	3.3	20	3.2	19	3.3
	Vocational collage	193	16.1	122	19.7	71	12.3
	High school	963	80.4	478	76.9	485	84.0
	PhD	3	0.2	1	0.2	2	0.4
(2) How old are you? (age)	18-30	659	55.0	375	60.4	284	49.3
	31-60	526	43.9	237	38.2	289	50.0
	60-76	13	1.1	9	1.4	4	0.7
(3) How has the COVID-19 pandemic affected your family's food consumption? (fcons)	Had no effect	455	38.0	225	36.2	230	39.9
	food prices have risen, so our purchases have decreased	599	50.0	313	50.4	286	49.5
	Shortage of food for purchases	144	12.0	83	13.4	61	10.6
(4) Do you consume enough (as before) meat (beef, lamb, fish, poultry, etc.) during the COVID-19 pandemic? (pcons)	Consume as before	703	58.7	355	57.2	348	60.4
	Consumption has decreased than before	495	41.3	266	42.8	229	39.6
(5) How much has your family's food purchasing volume changed during the COVID-19 pandemic? (fpurch)	No changed	540	45.1	279	44.9	261	45.3
	Decreased	481	40.2	249	40.1	232	40.1
	Increased	177	14.7	93	15.0	84	14.6
(6) How has your family income changed during the COVID-19 pandemic? (faminchange)	No changed	450	37.6	249	40.2	201	34.9
	Decreased	715	59.7	352	56.7	363	62.8
	Increased	32	2.7	19	3.1	13	2.3
(7) How has the COVID-19 pandemic affected your family expenses? (fexchange)	No changed	396	38.2	213	40.3	183	36.1
	Decreased	337	32.5	156	29.5	181	35.7
	Increased	303	29.3	160	30.2	143	28.2
(8) Is your income during the COVID-19 pandemic enough to cover your food purchases? (infpurch)	Yes	703	75.1	355	73.6	348	76.6
	No	233	24.9	127	26.4	106	23.4
(9) Did you borrow during the Covid-19 pandemic? (borrow)	Yes	397	42.2	224	46.1	173	38.0
	No	544	57.8	262	53.9	282	62.0
(10) How is your marital status? (ms)	Married	587	63.5	276	58.2	311	69.0
	Unmarried	338	36.5	198	41.8	140	31.0

(pcons)

If we look at the change in these indicators by region, the costs have been decreased for most people living in rural areas compared to urban and adversely, increased for most people living in urban areas.

The purchasing power of income was positively assessed by 75.1% of 936 respondents, while 24.9% indicated a lack of income. Besides, 42.2% of respondents reported borrowing for consumption during the pandemic.

According to descriptive statistics, a total of 1,198 respondents participated in the econometric analysis. 84

respondents were not included in the analysis due to the complete absence of answers. Among the variables in the Econometric analysis, respondents were less responsive to income for food purchase, marital status, and borrow variables (Table 2).

The MNL model was used for analysis to answer the above-mentioned questions to determine the impact of factors on changes in household food consumption. Because the independent variables used in the model were different, they were tested for multicollinearity. The result showed that the

independent variables mean the VIF level is equal to 1.31. Therefore, since its level is less than 10, we found it suitable for the analysis of independent variables.

The results of the MNL model are illustrated in table 3. Factors influenced the security of food consumption in families as follows.

**Table 2. Descriptive Statistics**

Variable	Obs	Mean	Std.Dev.	Min	Max
Family food consumption change (fcons)	1198	.74	.658	0	2
Income food purchases (infpurch)	936	.751	.433	0	1
Respondent education (educ)	1198	2.776	.494	1	4
Respondent age group (age_group)	1198	1.461	.52	1	3
Respondent live place (place)	1197	1.481	.5	1	2
Protein consume (pcons)	1198	1.413	.493	1	2
Food purchase change (fpurch)	1198	.697	.712	0	2
Family income change (faminchange)	1197	.651	.53	0	2
Family expanses change (fexchange)	1036	.91	.817	0	2
Marital status (ms)	925	.635	.482	0	1
Borrow (borrow)	941	.422	.494	0	1

#### Food consumption decreased due to price increase relative to unchanged

Compared relative to families whose food consumption unchanged, those whose consumption has decreased due to higher prices, the sufficiency of income for the purchase of food products changes, consumption of meat products changes, purchase amount of products change, family total income and expenses change, and borrow variables are significantly affecting ( $p<0.01$ ). Increase income by one unit for food purchases, the multinomial log-odds for food consumption decrease due to rising prices to unchanged would be expected to decrease by 0.666 ( $p<0.01$ ) unit while holding all other variables in the model constant. Meat consumption declines are strongly affecting food consumption decreases. Increases by

one unit for meat consumption in the families, the multinomial log-odds for food consumption decreases to unchanged would be expected to increase by 1.642 ( $p<0.01$ ) unit while holding all other variables in the model constant. Other variables effects to family food consumption reduction that increase one unit of family food purchase volume, increase one unit family overall income, increases one unit of family overall expenditure, one unit rises borrow are greater than before family food consumption decrease by

0.465 ( $p<0.01$ ), 0.512 ( $p<0.01$ ), 0.532 ( $p<0.01$ ) and 0.571 ( $p<0.01$ ) units respectively.

#### Food consumption decreased due to food shortages relative to unchanged

The COVID-19 pandemic condition, food consumption decreased due to food shortages in stores and bazaars measure relative to no change food consumption group is giving the following results. Escalation of the age group score by one point, the multinomial log-odds for food consumption shortage group to unchanged would be expected to fall by 0.566 ( $p<0.05$ ) unit while holding all other variables in the model

constant. Other variables, protein consume, family food purchase, family expanses overall upturn, married and borrow, increase food shortage odds ratio than unchanged by 0.954 ( $p<0.01$ ), 0.506 ( $p<0.01$ ), 0.397 ( $p<0.05$ ), 0.628 ( $p<0.05$ ) and 0.483

( $p<0.1$ ) units respectively.

**Table 3 Multinomial logistic regression results for family food consumption change**  
(The base outcome is "Unchanged food consumption")

fcons	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
<b>conf_decreased</b>							
infpurch	-0.666	0.235	-2.83	0.005	-1.127	-0.204	***
educ	0.181	0.170	1.07	0.286	-0.152	0.515	
age_group	-0.016	0.203	-0.08	0.937	-0.414	0.382	
pcons	1.642	0.192	8.57	0.000	1.267	2.018	***
fpurch	0.465	0.126	3.69	0.000	0.218	0.712	***
faminchange	0.512	0.172	2.98	0.003	0.176	0.848	***
fexchange	0.532	0.115	4.61	0.000	0.306	0.758	***
ms	0.357	0.220	1.62	0.105	-0.075	0.788	
borrow	0.571	0.193	2.96	0.003	0.193	0.949	***
Constant	-3.496	0.615	-5.68	0.000	-4.702	-2.290	***
<b>conf_shortaged</b>							
infpurch	-0.158	0.319	-0.50	0.620	-0.783	0.467	
educ	0.191	0.239	0.80	0.424	-0.277	0.659	
age_group	-0.566	0.271	-2.09	0.037	-1.098	-0.034	**
pcons	0.954	0.258	3.69	0.000	0.448	1.461	***
fpurch	0.506	0.166	3.05	0.002	0.181	0.831	***

faminchange	0.361	0.235	1.54	0.124	-0.099	0.821	
fexchange	0.397	0.157	2.54	0.011	0.090	0.704	**
ms	0.628	0.286	2.20	0.028	0.068	1.189	**
borrow	0.483	0.260	1.86	0.063	-0.026	0.992	*
Constant	-3.388	0.848	-4.00	0.000	-5.050	-1.727	***
Mean dependent var	0.721		SD dependent var		0.661		
Pseudo r-squared	0.192		Number of obs		911.000		
Chi-square	338.747		Prob > chi2		0.000		
Akaike crit. (AIC)	1466.692		Bayesian crit. (BIC)		1562.982		

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

The COVID-19 pandemic has put all regions in a difficult position. In urban or densely populated areas, the spread of the disease is high, and at the same time, it is difficult to meet the demand for consumer goods. Especially in consumer goods, food products are very important for people's daily lives. Food security depends on the location, conditions, production capacity, sources of income, and natural resources. Studies have shown that food security is higher in rural areas than in urban in the short term such as the pandemic period (OECD, 2020).

In our analysis, we separately examined changes in food consumption of families living in cities and villages (Table 4 & Table 5). In the MNL model analysis, 463 urban and 448 rural

respondents were studied. According to the results of the analysis, the increase in income for food consumption of families living in the city had a positive effect. In other words, an increase in income per unit reduces the decrease in consumption of food by 1,029 ( $p < 0.01$ ) units for groups whose consumption has not changed. The increase in meat consumption has been shown to increase consumption in both regions compared to the ratio of unchanged consumption. Besides, the decline in consumption was due to an increase in the amount of food purchased by urban families, a decrease in family income, and an increase in expenditures. In rural areas, marriages and debt have had an additional impact.

**Table 4. Multinomial logistic regression results for family food consumption change in the urban region (The base outcome is "Unchanged food consumption")**

fcons	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
conf_decreased							
infpurch	-1.029	0.332	-3.09	0.002	-1.680	-0.377	***
educ	0.089	0.227	0.39	0.695	-0.356	0.534	
age_group	0.065	0.296	0.22	0.827	-0.515	0.644	
pcons	1.731	0.272	6.37	0.000	1.198	2.264	***
fpurch	0.474	0.185	2.56	0.010	0.111	0.836	**
faminchange	0.411	0.240	1.71	0.087	-0.060	0.882	*
fexchange	0.651	0.165	3.95	0.000	0.328	0.974	***
ms	0.072	0.308	0.23	0.814	-0.532	0.677	
borrow	0.301	0.270	1.11	0.266	-0.229	0.831	
Constant	-2.889	0.844	-3.42	0.001	-4.543	-1.235	***
conf_shortaged							
infpurch	-0.605	0.416	-1.45	0.146	-1.421	0.211	
educ	0.183	0.303	0.60	0.547	-0.412	0.777	
age_group	-0.407	0.379	-1.08	0.282	-1.149	0.335	
pcons	0.880	0.348	2.53	0.011	0.199	1.562	**
fpurch	0.609	0.225	2.70	0.007	0.168	1.051	***
faminchange	0.329	0.308	1.07	0.285	-0.274	0.932	
fexchange	0.476	0.209	2.27	0.023	0.066	0.886	**
ms	0.307	0.379	0.81	0.418	-0.435	1.049	
borrow	0.377	0.345	1.09	0.274	-0.299	1.053	
Constant	-2.802	1.106	-2.53	0.011	-4.970	-0.634	**
Mean dependent var	0.762		SD dependent var		0.674		
Pseudo r-squared	0.197		Number of obs		463.000		
Chi-square	180.182		Prob > chi2		0.000		
Akaike crit. (AIC)	775.352		Bayesian crit. (BIC)		858.107		

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

In urban areas, consumer goods are mainly purchased in shops and local markets. The decline in product supply will have a significant impact on such areas. According to Table 5, the

increase in food purchases increases the shortage of consumer goods by 0.609 ( $p < 0.01$ ) units. In rural areas, this figure is insignificant.

**Table 5. Multinomial logistic regression results for family food consumption change in the rural region**  
(The base outcome is "Unchanged food consumption")

fcons	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
<b>conf_decreased</b>							
infpurch	-0.293	0.341	-0.86	0.389	-0.961	0.375	
educ	0.263	0.272	0.97	0.334	-0.271	0.797	
age_group	-0.119	0.285	-0.42	0.677	-0.677	0.440	
pcons	1.530	0.279	5.48	0.000	0.983	2.078	***
fpurch	0.461	0.175	2.63	0.008	0.118	0.805	***
faminchange	0.682	0.252	2.71	0.007	0.188	1.176	***
fexchange	0.395	0.165	2.39	0.017	0.071	0.719	**
ms	0.733	0.330	2.22	0.026	0.086	1.380	**
borrow	0.908	0.287	3.17	0.002	0.346	1.470	***
Constant	-4.148	0.936	-4.43	0.000	-5.982	-2.314	***
<b>conf_shortaged</b>							
infpurch	0.496	0.530	0.94	0.349	-0.543	1.535	
educ	0.144	0.418	0.35	0.730	-0.674	0.963	
age_group	-0.764	0.395	-1.94	0.053	-1.538	0.009	*
pcons	1.117	0.399	2.80	0.005	0.335	1.899	***
fpurch	0.373	0.250	1.49	0.136	-0.117	0.864	
faminchange	0.492	0.368	1.34	0.181	-0.229	1.213	
fexchange	0.336	0.241	1.39	0.164	-0.137	0.808	
ms	1.259	0.477	2.64	0.008	0.323	2.195	***
borrow	0.531	0.420	1.26	0.206	-0.292	1.355	
Constant	-4.364	1.400	-3.12	0.002	-7.109	-1.620	***
Mean dependent var	0.679	SD dependent var				0.645	
Pseudo r-squared	0.202	Number of obs				448.000	
Chi-square	170.532	Prob > chi2				0.000	
Akaike crit. (AIC)	715.332	Bayesian crit. (BIC)				797.427	

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

#### 4. Conclusion

The COVID-19 pandemic is bringing challenges to humanity and encourages families to provide self-sufficiency food in the long run and generate new changes in the supply food chain (Rizou et al., 2020). In this study, we studied the effects of household food consumption in Uzbekistan and tried to find a solution. According to the responses of the respondents to the online survey, 599 (50% of the total) respondents reported a decrease in food consumption due to an increase in prices, and 144 (12% of the total) respondents reported due to the food shortages. Results of the Econometric analysis demonstrated that the decline in food consumption in households was assessed by a decrease in income, an increase

in total expenditures, and a negative increase in debt factors. The analysis showed that the declining food supply in rural areas did not have a significant impact on consumption, but this figure was higher in urban areas.

Based on the results obtained, the political authorities should take measures to establish strict control over prices, to create opportunities for the population to maintain sources of income for staple food consumption, and to focus more on political and financial assistance (subsidies, soft loans) for the production of consumer goods in the food supply chain.

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## FOOD SECURITY AND AGRICULTURE PRODUCTION DURING THE COVID-19 PANDEMIC IN UZBEKISTAN

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ARTICLE INFORMATION	ABSTRACT
<p><b>Received:</b> December 29, 2021  <b>Accepted:</b> February 10, 2021  <b>Volume:</b> 1  <b>Issue:</b> 12  <b>DOI:</b> <a href="https://doi.org/10.54613/001012">https://doi.org/10.54613/001012</a></p>	<p>Since January 2020, the world faced one of the largest outbreaks of human history that coronavirus (Covid-19) began spreading among countries across the globe. Plenty of research institutes developed insights and estimations regarding the impact of the coronavirus pandemic on agriculture and food security system. The UN estimations indicate that more than 132 million people around the world may have hunger due to the economic recession as a result of the pandemic. The Food and Agriculture Organization (FAO) is pushing forward the strategies in order for increasing food supply in developing countries and providing assistance to food producers and suppliers. World Health Organization (WHO) indicated that the pandemic may not finish by the end of 2020 and countries should be prepared for longer effects within 2021. In this regard, ensuring food security as well as sufficient food supply would be one of the crucial aspects of policy functions in developing countries.</p>
<p><b>KEYWORDS</b></p> <p>Food security, food supply, agriculture, pandemic, outbreak</p>	

### 1. Introduction

As being a developing country, agriculture is one of the most important sectors of the economy of Uzbekistan (World Bank, 2018). Regarding the data of the State Committee of Statistics, the agriculture sector contributes 24% of the country's GDP. 55 % of the population lives in rural areas and they directly depend on agriculture production activities. Uzbekistan's agriculture sector produces sufficient food to supply the population. However, nearly 25 % live below the food poverty line (IFPRI, 2017). 20% of the population spends about 60 % of income on food consumption. The current state policy that the government strictly controls to produce cotton and wheat in the country does not allow to increase the number of other food products.

Coronavirus is showing several impacts on the economy of Uzbekistan, especially to the livelihoods of those who are relatively poor and unemployed. The Ministry of Economic Development and Poverty Reduction Reported that the current

pandemic hit the economic development of the country due to the forceful lockdown between March and July of 2020. Most of the businesses faced difficulties such as income loss, resource scarcity, etc.

As the disease began spreading, food security has become one of the most crucial factors in maintaining economic stability as well as social protection in Uzbekistan. In particular, poor households should be on the top of the list of a vulnerable portion of society. Regarding the Ministry of Finance, external state debts increased up to 3 billion US dollars because of the financial supports by several financial institutions such as World Bank, ADB, IDB. Despite the several policy reforms and actions taken by the government for overcoming the disease and empowering the healthcare system, there are foreseeable negative effects associated with food supply issues and agricultural production possibilities.

### 2. Objective

This paper aims to study issues related to food security and agricultural production during the pandemic in Uzbekistan. The main objective is to determine principal factors that may cause a shortage of agricultural production and food supply in the country.

Moreover, the study makes an attempt to provide certain policy recommendations to improve the food supply and agricultural food provision across the country.

### 3. Research methodology

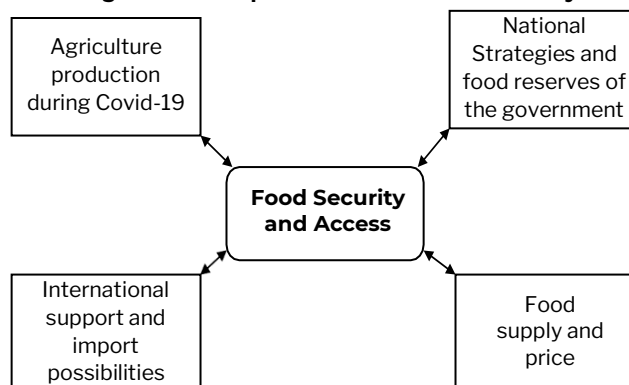
The study uses qualitative research methods for analysis. Literature review as well as empirical data is used to investigate the current situation at the country regarding food security and food provision. Research methods are observation, field notes, interviews such as telephone and face to face interviews with smallholder farmers, and traders who are food suppliers. A conceptual framework was developed to represent relationships between key concepts within the study.

### 4. Data collection

Secondary data collection made by using national reports and publications. However, there are limited publications and

research analysis regarding the effects of coronavirus on food

**Figure 1. Conceptual framework of the study**



Source: Author's creation.

supply and food provision. State institutions and Ministries provided certain reports and statistical estimations as a part of the National database. Making attempts for the collection of empirical data using observation and interview methods helped to gain certain insights into the situation. Two groups of respondents included in the data collection process that they are smallholder farmers and food suppliers. The smallholder farmers who live in rural areas and cultivate fruits and vegetables for exporting as well as for local consumption. Food suppliers can be indicated as traders who deal with importing and trading of locally produced food products. Research conducted in areas where Tashkent which is a capital city and Tashkent Region that is the largest area around the capital.

## 5. Findings and results

The National Information Agency (NIA) reports that the first strict quarantine regulations across the whole country imposed from April 1, 2020, and continued by the end of May. All kinds of movements including transport traffic and physical movement of people were strongly limited. Permission for the movement was given to those who engaged with activities such as transportation of food and products of medicine. The NIA resources indicated that demand for staple food products boomed before the quarantine regulations were put in place. As a result of this, the cases of food scarcity occurred in rural areas of the country. Furthermore, the price of certain products significantly increased.

The majority of traders as food suppliers pointed out that the price for food increased during the lockdown. The table below depicts the price change for staple food consumed by rural households.

Price changes calculated with respect to the previous month. April's prices made as compared to prices in March. Food products represented in the table are the main contributors to the daily diet of rural households in the Tashkent region. Only the main staple food products were chosen for analysis. Regarding the survey results, households spend around 50-60% of their income on purchasing these products.

Households spend more on vegetables and grains. In particular, demand for potato kept increasing during the lockdown. Lemon consumption high rocketed as compared to other sorts of fruits. This case can be explained by the fact that people began consuming lemons for treatment purposes. All listed products in the table made up 80-90% of total food expenses for each household. Especially, the contribution of meat products in the daily diet of rural households decreased significantly.

**Table 1**  
**Change in price of staple food products during the outbreak**

Food products	Price increase during the lockdown, (%)	
	One months after the lockdown (April)	Two months after the lockdown (May)
<b>Vegetables:</b>		
Potato	10%	15-20%
Carrot	5-7%	7-10%
Onion	5-10%	10%
<b>Grains:</b>		
Flour	25%-30%	25%
Rice	15%	20%
<b>Meat:</b>		
Beef	5-10%	10%
Mutton	5-7%	10%
Chicken	3-5%	5-7%
<b>Fruits:</b>		
Apple	10-15%	10%
Grapes	15-20%	20%
Lemon	70-80%	100-120%

Source: Author's creation based on the survey results.

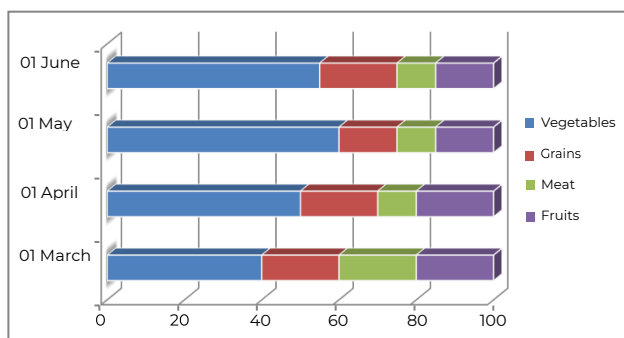
Regarding the results of the survey among traders who transport and sell food products in the local markets, there were several reasons for the food shortage and price increase during the quarantine.

Trader 1 pointed out: "We own shops that sell food products including both local production and imported goods. When the government announced quarantine settings from April 1, customers started buying relatively more food than they usually purchase. On the last day before the quarantine, our stock became nearly empty. One reason for this would be unpredictability and uncertainty of food prices and availability during a lockdown. As a supplier, we even could not be aware of the fact that what happens the next day".

Trader2: "At the beginning of the lockdown, food prices began increasing. This was because of shortage in stocks and difficulties with transportation procedures. Imported food products were also decreased because of strict border control with neighboring countries".

Consumer 1 pointed out: "At the beginning of the first quarantine period when the state-imposed lockdown across the whole country, we had a strong limitation that we could not physically reach big markets".

Consumer 5: "At the end of March when the first lockdown period started, we stopped working and did not go outside at all. We did not have adequate savings for more than a month. We had to borrow some money from our relatives. However, a strict quarantine period lasted by the end of May 2020. 90% of our spending was for only food consumption".



Source: Author's creation based on the survey results.

Figure 2 depicts the distribution of food expenses of low-income rural households. During the outbreak, low-income families spent more on vegetables, and meat consumption decreased by up to 5 percent.

There are two main factors that affected food supply and access in the period of lockdown. These factors can be highlighted as follows:

1. Food transporting issues during the lockdown. Food delivery services were not sufficient in the rural areas of the Tashkent region. Families purchase food from the local traditional markets as well as small shops in the avenues. As a result of the strong limitation of traffic at the beginning of the quarantine period, people experienced a shortage of vegetables, fruits, and grains.

2. Food supply shortage and increased price. Food prices for main staple food products increased due to certain reasons. Study results indicate that price increase happened as a result of the food supply decrease in the beginning period of the lockdown.

State food policy actions supported increasing food supply channels and allowed transport to use for food delivery services. However, unorganized transportation services and channels made it difficult to reach rural households with sufficient quality of food products. After a month of organizational procedures, the situation improved significantly. Nevertheless, there are villages where state initiatives did not arrive. Another important aspect of food security is malnutrition. The majority of rural households do not consume sufficient calories in their daily diets.

Ministry of Finance reported that government spending directed to the improvement of medical services, treatment

procedures, purchasing of sanitation and hygiene products, medical equipment, building new hospitals. Politicians push forwards the idea that the medical system should be in the first priority during the pandemic. Nonetheless, many experts argue

## 6. Conclusion and recommendations

Food security issues during the coronavirus pandemic should be one of the crucial aspects of the policy priorities of Uzbekistan. Rural households experienced difficulties due to the quarantine regime in the country. Food scarcity, increasing food prices, challenges associated with logistics can be seen as major factors affecting the livelihoods of families.

Nowadays, a food security policy should target the following challenges and seek immediate solutions:

- Provision of quality food products to the areas where food shortage and transportation scarcity.
- Investigate and determine possible crisis-affected areas during the pandemic.
- Providing financial support for unemployed and low-income families, in particular for those who live in rural areas.

the fact that food scarcity, food supply issues, and malnutrition can be the long-term effects of the economic recession as a result of coronavirus.

- Having control over the food price changes, especially for staple food products.
- Supporting food suppliers with removing barriers for their activities. Helping with import possibilities.
- Encouragement of smallholder farmers with subsidies, tax privileges, and other small businesses related to food production.

In conclusion, it can be stated that food security and agriculture production are some of the important aspects of ensuring social welfare and economic development during a coronavirus pandemic. Regarding the World Bank and FAO, developing countries may face serious social crises associated with food security. In this regard, Uzbekistan should develop strategies for improving food supply, logistics, avoiding the food scarcity issues.

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## ANALYSIS OF AGRICULTURAL PRODUCTION AS A KEY FACTOR OF ENSURING FOOD SECURITY IN UZBEKISTAN AND ITS REGIONS

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ARTICLE INFORMATION	ABSTRACT
<p><b>Received:</b> January 28, 2021  <b>Accepted:</b> February 22, 2021  <b>Volume:</b> 1  <b>Issue:</b> 13  <b>DOI:</b> <a href="https://doi.org/10.54613/001013">https://doi.org/10.54613/001013</a></p> <p><b>KEYWORDS</b></p> <p>Economic security, food security, food security indicators, agriculture, agricultural production, economic measures</p>	<p>This article discusses the state of food security factors and indicators in Uzbekistan and its regions. Relevant comments were also made on the state's participation and support in ensuring these indicators. Special attention is paid to the factors and indicators of food security. Agricultural production indicators are taken as one of the key factors in ensuring food security in the country and its regions, and these indicators were analyzed by republic and its regions. In the course of this analysis, the analysis of indicators of growth of agricultural production in the country and its regions, the structure of agricultural production was carried out. Based on the data studied, conclusions are drawn about the current state of development in terms of food security and recommendations are made on the main directions of state policy in the country and its regions.</p>

### 1. Introduction

In terms of content, the concept of "security" is defined as a complex social phenomenon that characterizes the state of protection of the vital interests of the individual, society and the state from internal and external threats. Vital interests are understood as a set of needs, the satisfaction of which reliably ensures the existence and opportunities for the progressive development of the individual, society and the state.

Food security is the ability of a territory (regional community, state, region), provided with appropriate resources, potential and guarantees, regardless of external and internal conditions, to meet the needs of the population for life-supporting food in volumes, quality and assortment necessary

### 2. Objective

The priority of the category "food security" is its determining role in achieving the necessary parameters for the provision of raw materials and food to regions, social groups of the population, households, as well as in helping to solve problems at the international level, taking into account the interconnection and interdependence of the national food system with the laws and trends in the development of the world economy.

As a result of the measures taken in recent years, the export of agricultural products in 2019 has doubled compared to 2017, more than 10 million tons of vegetables, more than 17 million tons of other agricultural products and 2.5 million tons of meat per year.

and sufficient for physical and social development of the individual, health and expanded reproduction of the population.

The content of the socio-economic aspect of food security is associated with the need to ensure the right of every individual to access safe and nutritious food and consists in the ability of the state to provide citizens with the consumption of food in accordance with accepted standards and norms. The content of the political and economic aspect of this category consists in the country's ability to mobilize resources and potential to organize the supply of food to the population mainly through its own production and thereby guarantee economic independence and political sovereignty [5].

On 9 september 2020, a resolution of the President "On measures to accelerate the development of the food industry of the republic and full provision of the population with high-quality food products" was adopted.

In accordance with the above resolution, increase the volume of processing of fruits, vegetables, meat, dairy and other agricultural products on the basis of international quality standards, introduce a system of state support for the production of local food products competitive in domestic and foreign markets; in order to further improve the provision of quality and safe food to the population, the Ministry of Agriculture has been assigned the following additional tasks. [1]

<b>1</b>	creation of conditions for mutually beneficial relations between enterprises growing (producing) fruits, vegetables, meat, dairy and other agricultural food products and enterprises processing, preparing and selling these products
<b>2</b>	development of strategies and models for the development of the food industry based on increasing the competitiveness of local food products and their diversification, efficient use of available natural and economic resources of the regions
<b>3</b>	financial and non-financial measures to support businesses processing fruits, vegetables, meat, dairy and other agricultural food products - the creation of new tools and information systems, the implementation of projects in high-performance areas
<b>4</b>	analyze, forecast the impact of private and direct foreign investment inflows on the development of the food industry and develop appropriate proposals in this regard
<b>5</b>	establish modern trade and logistics centers, promote local food products in world markets, increase their competitiveness, expand export potential and reduce imports

**Figure 1. Additional tasks of the Ministry of Agriculture in ensuring food security**

Source: Resolution of the President "On measures to accelerate the development of the food industry of the republic and full provision of the population with high-quality food products".

### 3. Research methodology

Economic security, especially food security problems are very crucial phenomenon in Uzbekistan and many foreign economies. Such problems have become increasingly relevant

### 4. Data collection

In order to study the situation in our country on this issue, it is necessary to first analyze the factors and indicators that ensure food security. Among these factors, the production of agricultural products is one of the main factors. With this in

### 5. Findings and results

According to the data for the last decade (2010-2019), significant growth rates were achieved, although no stability was observed. During this period, growth rates of agricultural production in all categories of farms averaged 4.9%, with the highest annual rate being 7.2% in 2012; in farms averaged 2.0%,

over recent years, and many foreign scientists have studied them in their works.

mind, we analyze the indicators of the state of agricultural production in Uzbekistan and its regions.

By analysing main factors of food security, we can study the economic security of the regions of the Republic of Uzbekistan and draw appropriate conclusions.

with the highest annual rate being 6.9% in 2019; in dekhkan (personal subsidiary plots) averaged 6.1%, with the highest annual rate being 8.2% in 2016; in organizations engaged in agricultural activities averaged 9.8%, with the highest annual rate being 25.7% in 2018.

**Table 1**

**Growth rates of agricultural production** (as a percentage of the previous year) [9]

	All categories of farms	Including:											
		farms	dekhkan (personal subsidiary plots)	Organizations engaged in agricultural activities	All categories of farms	farms	dekhkan (personal subsidiary plots)	Organizations engaged in agricultural activities	All categories of farms	farms	dekhkan (personal subsidiary plots)	Organizations engaged in agricultural activities	
		Total			Crop production					Livestock			
2010	106,3	104,8	107,2	106,7	105,9	104,7	108,1	101,6	106,9	108,6	106,7	110,7	
2011	106,2	103,2	107,7	113,2	104,9	102,9	107,9	105,0	108,0	110,2	107,5	119,3	
2012	107,2	106,2	107,7	109,8	107,1	106,0	108,4	113,7	107,4	110,6	107,3	107,2	
2013	106,6	104,4	107,7	108,1	106,1	104,2	108,9	101,5	107,3	108,3	107,1	112,6	
2014	106,3	103,2	107,6	112,4	105,9	102,8	109,4	118,4	106,7	108,4	106,6	108,7	
2015	106,1	103,5	107,4	105,7	105,5	103,3	108,2	103,6	106,9	105,7	106,9	107,1	
2016	106,3	102,5	108,2	101,1	105,7	102,3	110,2	90,8	107,0	106,2	107,0	108,5	
2017	101,0	92,5	104,5	104,8	98,2	92,2	104,6	110,2	104,1	96,7	104,5	101,7	
2018	100,2	93,1	102,3	125,7	95,8	90,5	99,8	135,5	105,7	137,5	104,0	118,9	
2019	102,7	106,9	100,9	110,7	103,7	106,5	100,3	121,5	101,7	110,9	101,3	101,2	

The average growth rates of agricultural production in crop production averaged in all categories of farms averaged 3.9%, with the highest annual rate being 7.1% in 2012; in farms averaged 1.5%, with the highest annual rate being 6.5% in 2019; in dekhkan (personal subsidiary plots) averaged 6.6%, with the highest annual rate being 10.2% in 2016; in organizations engaged in agricultural activities averaged 10.2%, with the highest annual rate being 35.5% in 2018. The average growth

rates of agricultural production in livestock averaged in all categories of farms averaged 6.2%, with the highest annual rate being 8.0% in 2011; in farms averaged 10.3%, with the highest annual rate being 37.5% in 2018; in dekhkan (personal subsidiary plots) averaged 5.9%, with the highest annual rate being 7.5% in 2011; in organizations engaged in agricultural activities averaged 9.6%, with the highest annual rate being 19.3% in 2011.

**Table 2**

**Growth rates of agricultural production by region** (as a percentage of the previous year) [9]

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Republic of Uzbekistan</b>	<b>106,3</b>	<b>106,2</b>	<b>107,2</b>	<b>106,6</b>	<b>106,3</b>	<b>106,1</b>	<b>106,3</b>	<b>101,0</b>	<b>100,2</b>	<b>102,7</b>
Republic of Karakalpakstan	121,3	94,9	119,3	103,5	106,6	109,8	108,3	103,1	100,6	106,7
regions:										
Andijan	108,0	108,9	107,8	107,1	106,9	106,3	106,4	99,9	106,3	103,6
Bukhara	107,6	107,1	106,3	106,6	106,7	107,1	108,4	103,5	102,9	104,6
Jizzakh	106,4	106,2	106,9	107,0	106,3	106,7	106,3	103,5	99,7	104,6
Kashkadarya	107,0	104,9	107,1	107,4	106,0	106,1	106,5	103,3	96,5	101,9
Navoi	105,9	108,3	106,2	106,9	105,9	106,6	106,1	103,3	102,1	102,3
Namangan	105,8	107,5	107,2	107,9	108,0	106,3	107,4	103,3	102,2	102,9
Samarkand	107,0	108,0	106,6	107,0	106,8	107,1	108,4	100,4	94,1	102,4
Surkhandarya	105,2	108,8	108,0	106,9	106,6	106,3	104,7	104,5	97,2	105,3
Syrdarya	105,6	105,5	108,9	106,0	106,0	105,5	105,8	93,0	96,5	101,7
Tashkent	102,9	103,7	104,1	103,3	104,1	103,3	101,9	96,9	98,8	93,6
Fergana	106,1	107,7	106,0	107,0	106,1	105,7	105,7	97,1	109,7	104,5
Khorezm	102,5	100,3	110,3	109,7	106,2	105,5	107,0	101,4	98,0	105,4

According to the data for the last decade (2010-2019), significant growth rates were achieved, although no stability was observed. During this period, growth rates of agricultural production averaged 4.9%, with the highest annual rate being

7.2% in 2012. The average GRP growth rates of agricultural production were the following: Republic of Karakalpakstan – 7.4%, Andijan – 6.1%, Bukhara – 6.1%, Jizzakh – 5.4%, Kashkadarya – 4.7%, Navoi – 5.4%, Namangan – 5.9%,

Samarkand – 4.8%, Surkhandarya – 5.3%, Syrdarya – 3.4%, Tashkent – 1.2%, Fergana – 5.5%, Khorezm – 4.6%. The highest

rate was observed in Republic of Karakalpakstan, and the lowest in Tashkent.

Table 3

Structure of agricultural production (in percentage) [9]

	All categories of farms	including:								
		farms	dekhkan (personal subsidiary plots)	Organizations engaged in agricultural activities	farms	dekhkan (personal subsidiary plots)	Organizations engaged in agricultural activities	farms	dekhkan (personal subsidiary plots)	Organizations engaged in agricultural activities
		Total			Crop production			Livestock		
2010	100	36,3	61,6	2,1	59,1	39,4	1,5	3,9	93,1	3,0
2011	100	34,7	63,0	2,3	57,8	40,6	1,6	3,9	93,0	3,1
2012	100	33,0	64,6	2,4	56,8	41,4	1,8	4,0	92,8	3,2
2013	100	32,1	65,5	2,4	55,5	42,9	1,6	4,1	92,7	3,2
2014	100	30,1	67,5	2,4	53,4	44,8	1,8	4,1	92,8	3,1
2015	100	30,7	66,9	2,4	52,0	46,2	1,8	4,0	92,9	3,1
2016	100	29,7	68,0	2,3	52,0	46,4	1,6	3,9	92,9	3,2
2017	100	29,3	68,4	2,3	49,2	49,1	1,7	3,7	93,1	3,2
2018	100	26,0	71,2	2,8	45,3	52,2	2,5	4,6	92,3	3,1
2019	100	26,9	70,1	3,0	48,7	48,4	2,9	5,0	91,9	3,1

According to the data for the last decade (2010-2019), structure of agricultural production was consisted of three mainly categories: farms, dekhkan (personal subsidiary plots), organizations engaged in agricultural activities. The highest rates of shares in agricultural production were following: in total agricultural production – farms highest rate 36.3% in 2010; dekhkan (personal subsidiary plots) highest rate 71.2% in 2018; organizations engaged in agricultural activities highest rate

highest rate 3.0% in 2019; in crop production -farms highest rate 59.1% in 2010; dekhkan (personal subsidiary plots) highest rate 49.1% in 2017; organizations engaged in agricultural activities highest rate highest rate 2.9% in 2019; in livestock – farms highest rate 5.0% in 2010; dekhkan (personal subsidiary plots) highest rate 93.1% in 2010 and 2019; organizations engaged in agricultural activities highest rate highest rate 3.2% in 2012, 2013, 2016 and 2017.

## 6. Conclusion and recommendations

Ensuring food security is carried out through the implementation of a number of conditions, the most important of which include:

- sustainable development of agro-industrial production with the aim of forming balanced state and regional resources of raw materials and food, as well as the export potential of the agro-industrial complex;

- ensuring an increase in the level and quality of life of the population, creating conditions for obtaining income sufficient for the consumption of food products according to medical standards, as well as reducing the share of food expenditures in the household budget to 35%;

- creation of a reserve of foreign exchange resources necessary for the import of missing food and raw materials, including at the expense of the proceeds from the export;

- implementation of a set of organizational and economic measures to maintain a stable level of self-sufficiency in the country with food raw materials and the development of import-substituting industries.

Conceptually, the strategic goal of food security is the formation of such a state of the economy in which, regardless of the conjuncture of world markets, stable provision of the population with food in the amount corresponding to scientifically based parameters (supply) is guaranteed, conditions are created to maintain the consumption of food at the level of medical standards, allowing to maintain the processes of expanded reproduction of the population.

At the national level, food security is ensured under certain conditions, the most important of which are:

- the ability of the food system to produce, import, provide storage and promotion of food products to the end consumer in the volumes necessary to meet the rational (scientifically grounded) needs of all social groups of the population (potential physical availability of food);

- equality of all social groups in the consumption of a quantitatively sufficient, balanced range of food products that

meet the accepted standards of nutritional value and quality (economic opportunity to purchase food);

- consumption of high-quality products and in quantities sufficient for a rational diet in terms of energy value and balanced for the most important life-supporting elements (nutritional quality);

- maximum autonomy and economic independence of the national food system, its adaptability to fluctuations in the international market conditions (food independence), subject to the rational use of production potential and active foreign economic activity;

- the ability of the food security system to minimize the impact of unfavorable natural and climatic conditions of production on the supply of the population of all regions of the country (reliable access to food);

- balanced development of the national food system in the mode of expanded reproduction in all its aspects (sustainable development): production, social, environmental.

Achieving such parameters of food security is possible on the basis of stable internal and external sources of food and raw materials, the availability of appropriate reserve funds, which implies the solution of the following tasks:

- creation of stable conditions for socio-economic development;

- implementation of an effective agricultural policy;

- implementation of a rational policy in the field of employment of the population;

- ensuring equal opportunities for subjects of all forms of business;

- organization of adequate food supplies in accordance with the needs of the population;

- ensuring a stable and intensive organization of agricultural production;

- carrying out active foreign economic activity;

- optimization of export-import flows;
- the use of the advantages of the international and interregional division of labor in the agricultural production system;
- implementation of a set of measures to promote investment, attract investors to the agricultural sector;
- innovative development of the agro-industrial complex, assistance in the introduction of advanced technologies and programs in the field of production, storage and processing of raw materials and food;
- improving the mechanism for identifying and preventing food security threats. The interests of the state in the agri-food sector include:
  - ✓ ensuring the required level of own production of products;
  - ✓ creation of an appropriate material and technical base for agriculture, as well as food and processing industries;
  - ✓ renewal and replenishment of the state food reserve, regardless of the impact of external and internal negative factors;
  - ✓ compliance of the quality of produced and sold food products with state standards of quality and food safety;
  - ✓ ensuring the necessary living wage, a decent level and

high quality of healthy life of the population;

- ✓ creation of an effective management system for the agricultural sector at all levels;
- ✓ maintaining the achieved volume and expanding the production of competitive food products with an export orientation;
- ✓ ensuring a unified scientific and technological policy in the food complex;
- ✓ exercising state control of the food market based on national interests.

By establishing appropriate links between the structural blocks and the governing indicators, the main goal of the food security system is being implemented - protection from internal and external threats to the vital interests of the population for the continuous quantitative and qualitative provision of food. At the same time, the elements of the model should contain not only the parameters characterizing food security, but also the circumstances that determine the stability of agricultural production in dynamics, so that at any stage of the functioning of the system there is an opportunity to assess its critical limit.

In this case, the mechanism for realizing the food security model will be a system of organizational, economic and legal measures that ensure the balanced functioning of food markets and the prevention of external and internal threats.

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## REVIEW OF LITERATURE: NONFORMAL WAYS OF SCHOOLING

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ARTICLE INFORMATION	ABSTRACT
<p><b>Received:</b> November 24, 2021  <b>Accepted:</b> February 19, 2021  <b>Volume:</b> 1  <b>Issue:</b> 14  <b>DOI:</b> <a href="https://doi.org/10.54613/001014">https://doi.org/10.54613/001014</a></p> <hr/> <p><b>KEYWORDS</b></p> <p>Forms of learning, schooling, informal learning, nonformal learning, self-learning, student-centered learning</p>	<p>The literature review begins with a brief overview on forms of learning. Then, I present how I use and define the term nonformal learning in my work. Next, I present findings from an analysis of studies pertaining to nonformal learning settings. Finally, I explain how my work contributes to the field of nonformal learning.</p>

### Overview of forms of learning.

According to some scholars, learning consists of three forms: formal, informal, and nonformal (Farrow, de los Arcos, Pitt, & Weller, 2015; Norqvist, Leffler, & Jahnke, 2016; Rogoff, Callanan, Gutiérrez, & Erickson, 2016; Thaman, 2013). The definitions of these three types are derived from different sources including historical documents (Coombs, 1968; Coombs & Ahmed, 1974; Etling, 1993; Scribner & Cole, 1973), policy reports

(Cedefop, 2016; Harris, Breier, & Wihak, 2011; Harris & Wihak, 2018; Norqvist, Leffler, & Jahnke, 2016; OECD, 2010; Lockhart, 2016; UNESCO, 2014; Werquin, 2010), and current research (Aberg, 2016; Cameron & Harrison, 2012; Colardyn & Bjornavold, 2004;

Schugurensky, 2000; Thaman, 2013; White & Lorenzi, 2016). To differentiate these three forms of learning, scholars (e.g., Colardyn & Bjornavold, 2004; Eraut, 2000; Farrow et al., 2015; Schugurensky, 2000; Tuomainen, 2014) have recommended considering factors such as who determines what, where, and when of learning. Although different definitions exist for formal, informal, and nonformal learning, scholars and policy report documents provide the following definitions of the three terms.

The first type of learning is formal learning (Etling, 1993; Thaman, 2013). Formal learning is structured in terms of learning objectives, learning times, and learning support

(Aberg, 2016). Coombs (1968), Rogers (2019), Thaman (2013) and Werquin (2010) defined formal learning as structured, planned, proposed through national curriculum, and school-based learning that takes place in a formal education system. Eaton (2010) defined formal learning as continuous and intentional learning that occurs within an organized and structured context, leading to recognized diplomas. Thaman (2013) defined formal learning as organized and “worthwhile learning” as in schools (p. 99). For example, elementary schools, secondary schools, academic colleges, and universities are considered sites for formal learning (Rogers, 2004).

The second type of learning is informal learning (Etling, 1993; Thaman, 2013). Informal learning can be intentional but, in most cases, it is described as unintentional and noninstitutionalized; learning can happen anytime, anywhere, and by anyone (Coombs, 1968; Rogoff, Callanan, Gutiérrez, & Erickson, 2016; Thaman, 2013). Such learning does not lead to recognized certifications or diplomas. Informal learning is a process whereby a learner acquires values, skills, and knowledge from daily experiences and activities related to work, family, or leisure (Eaton, 2010; Gross & Rutland, 2017;

### Using and defining nonformal learning.

Thaman, 2013). Tough (2002) was one of the first scholars in 1967 to begin using the notion of informal learning while working with adults in Canada. Tough defined informal learning as a “very normal, very natural human learning activity . . . so invisible that people just do not seem to be aware of their own learning” (Tough, 2002, p. 2). Similarly, Aberg (2016) agreed with Tough (2002), defining informal learning as self-teaching or self-learning and “self-directed learning” (Tough, 2002, p. 2) that places learning decisions, such as what, when, and how to learn, in the hands of learners. Coombs (1968) and Eaton (2010) referred to informal learning as the truly lifelong process whereby individuals acquire skills, attitudes, and knowledge from daily experience and resources in their environment such as from family or friends, from work, marketplace, or the library. Examples of informal learning include learning from extracurricular activities, peers or family members, field trips, and learning languages from native speakers (Eaton, 2010; Jumani, Rahman, & Bibi, 2011).

The third type of learning is nonformal learning or learning somewhere between formal and informal learning (Etling, 1993; Thaman, 2013). Nonformal learning is planned and structured or organized in terms of learning times, objectives, support, and sustained education activities embedded in and planned outside formal educational institutions but not leading to certification or a diploma (Aberg, 2016; Colardyn & Bjornavold, 2004; Rogers, 2005; Thaman, 2013; Tough, 2002; Wals, Mochizuki, & Leicht, 2017). These researchers additionally describe nonformal learning as intentional, from the learner’s perspective (Colardyn & Bjornavold, 2004), and as providing alternative learning opportunities to those who have no access to formal education or who need specific life skills and knowledge to conquer different obstacles

(Cedefop, 2014; Etling, 1993; Eraut, 2000; Khaddage, Müller, & Flintoff, 2016; Thaman, 1992; Tuomainen, 2014). Coombs and Ahmed (1974) defined nonformal learning as “organized, systematic, educational activity carried on outside the framework of the formal system” (p.

8). In addition, nonformal learning takes place in different situations and environments (Coombs & Ahmed, 1974; Thaman, 2013). It is student-centered, voluntary, purposeful, but more flexible and available for anyone. Examples of nonformal learning include adult literacy programs, occupational skill trainings, online tutorials, language skill programs, disciplinary after school projects, fitness classes, family planning, cooperatives, tutoring, or professional and vocational programs organized by non-profit organizations (Rogers, 2005).



I focus on *nonformal learning* in my work. I use the non-hyphenated term *nonformal* in my study. Etling (1993) determined that use of a hyphen affects the meaning of the word. According to the Oxford Dictionary (1998), “non-” is a prefix representing the Latin adverb “nōn,” meaning “not, by no means, not a” (Suffolk, 1998, p. 775), usually indicating negation, refusal, absence of, reverse of, or opposition to formal learning. *Nonformal learning* with a hyphen (e.g., *non-formal*) represents opposition to formal learning. In accordance with previous scholars such as Aberg (2016), Etling (1993), Eraut (2000), and Farrow et al. (2015) spelled *nonformal learning* without a hyphen to indicate that *nonformal learning* is not the opposite of formal learning, but an alternative or complement to formal learning (Etling, 1993). Thus, I use the non-hyphenated *nonformal* to specify my intended meaning.

As a result of careful examination of studies (Aberg, 2016; Khaddage, 2016; Rogers, 2004; Thaman, 2013; Tuomainen, 2014) and official documents (Buckler & Creech, 2014;

Cedefop, 2000; 2014; Etling, 1993; Eraut, 2000; Norqvist, Leffler, and Jahnke, 2016; UNESCO;

2005), and based on my experience in the WLCP, I define nonformal learning as follows: *Nonformal learning* is prearranged and semi-structured learning that happens in a program within an institution. Such learning is voluntary, self-directed, and self-engaged worthwhile learning. It does not lead to recognized certifications or diplomas; however, it is guided by a teacher or facilitator.

#### **Findings of studies pertaining to nonformal learning.**

I synthesized research findings across 18 empirical studies pertaining to adults learning in nonformal settings (see Appendix A for search procedures and analyses of reviewed studies). The following three questions guided my review: (1) *What themes were common across studies with respect to nonformal learning settings?* (2) *What are key findings in the research regarding nonformal learning settings?* (3)

#### **The consequences of learning in nonformal settings.**

This category, the consequences of learning in nonformal settings, is an umbrella for the studies that focused on different types of skills and knowledge adults developed in nonformal settings. Adults showed development of unique skills, abilities, and knowledge through the use of a) *communication skills* (Jumani &

Fazal-ur-Rahman, 2011; Mirzaee & Hasrati, 2014; Tuomainen, 2014), b) *social skills* (Aberg, 2016; Andersson & Andersson, 2011; Cameron & Harrison, 2012; Norqvist & Leffler, 2017;

Rawat, Bouchon, & Nair, 2015; Tai, Benedict, Canny, Haines, & Molloy, 2017), c) *digital skills*

(Berger & Croll, 2012; Farrow et al. 2015; Kok, 2014; Perez-Sanagustin, Hernandez-Leo,

Santos, Delgado Kloos, & Blat, 2014), and d) *basic literacy skills* (Jumani & Fazal-ur-Rahman, 2011; Krupar, Horvatek, & Byun, 2017; Ngaka, Openjuru, & Mazur, 2012; White & Lorenzi, 2016).

The studies used various frameworks within both qualitative and quantitative investigations. For example, Andersson and Andersson (2011) and Kok (2014) framed their studies within a sociocultural framework and used ethnographic and qualitative methods, such as case studies, whereas Aberg (2016) and Farrow et al. (2015) grounded their research within popular education and used both qualitative and quantitative methods to analyze data. Of the studies reviewed in this subsection, only Andersson and Andersson (2011) and Kok (2014) described adult students' experiences using the case study design in a nonformal setting. The remaining studies used quantitative or mixed methods to explore adult students' experiences in various nonformal settings. In what follows, I describe studies related to communication skills.

I focus on *nonformal learning* in my work. I use the non-hyphenated term *nonformal* in my study. Etling (1993) determined that use of a hyphen affects the meaning of the word. According to the Oxford Dictionary (1998), “non-” is a prefix representing the Latin adverb “nōn,” meaning “not, by no means, not a” (Suffolk, 1998, p. 775), usually indicating negation, refusal, absence of, reverse of, or opposition to formal learning. *Nonformal learning* with a hyphen (e.g., *non-formal*) represents opposition to formal learning. In accordance with previous scholars such as Aberg (2016), Etling (1993), Eraut (2000), and Farrow et al. (2015) spelled *nonformal learning* without a hyphen to indicate that *nonformal learning* is not the opposite of formal learning, but an alternative or complement to formal learning (Etling, 1993). Thus, I use the non-hyphenated *nonformal* to specify my intended meaning.

As a result of careful examination of studies (Aberg, 2016; Khaddage, 2016; Rogers, 2004; Thaman, 2013; Tuomainen, 2014) and official documents (Buckler & Creech, 2014;

Cedefop, 2000; 2014; Etling, 1993; Eraut, 2000; Norqvist, Leffler, and Jahnke, 2016; UNESCO;

2005), and based on my experience in the WLCP, I define nonformal learning as follows: *Nonformal learning* is prearranged and semi-structured learning that happens in a program within an institution. Such learning is voluntary, self-directed, and self-engaged worthwhile learning. It does not lead to recognized certifications or diplomas; however, it is guided by a teacher or facilitator.

*What are the gaps in the studies with respect to nonformal learning settings?* I discerned three themes which contained various ideas or topics related to adult students joining nonformal learning contexts. The three themes are: the consequences of learning in nonformal settings; the ways that adults learned in nonformal settings; and, the reasons adults studied in nonformal settings. I describe each theme below.

Next, I discuss studies focused on social skills. Then, I describe studies related to digital skills.

Finally, I discuss studies focused on basic skills.

*Studies that focus on communication skills.* Each of these studies (Jumani & Fazal-ur-Rahman, 2011; Mirzaee & Hasrati, 2014; Tuomainen, 2014) focused primarily on communication skills within a nonformal setting. The communication skills discussed dealt primarily with learners' abilities to communicate within their disciplines in nonformal settings. For example, Mirzaee and Hasrati (2014) conducted a qualitative study using interviews to explore the role of written feedback to create a space for nonformal learning for English as a foreign language (EFL) students “within context of schooling in general” (p. 557). Although, this context is similar to formal learning, researchers referred to the learning space as a nonformal context under peer-learning void of grades. Working with five Finnish students, Tuomainen (2014) conducted mixed methods research to examine skills students acquired while learning Business English in a nonformal learning environment such as an English for Specific

Purposes course (ESP). The researchers found that this course, which had no tests and no grades

(the *exemption examination system*), helped students acquire communication skills at the Finland Language Center. The exemption examination system is defined as an open project assignment where students had to submit a project on what they learned. Similarly, Jumani and Fazal-ur-Rahman (2011) conducted mixed methods research on the need for promoting literacy in nonformal settings. The researchers interviewed 620 parents and students in 120 Punjabi schools to explore the role of communication. Researchers found positive outcomes

related to communication skills. For example, students learned how to develop thoughts and get ready for college interviews.

Researchers in all three studies found positive outcomes that helped participants learn communication skills in nonformal settings. For example, in all three studies, students participated in active mutual engagement to develop communication skills in nonformal settings.

*Studies that focus on social skills.* Six studies focused on social skills. Social skills refer to social behaviors and the ability to engage in social activities within different societies. The six studies focused on adult students' behaviors in various societies and cultures, specifically emphasizing behaviors that made communication more effective and efficient. Researchers used various qualitative and quantitative methods. For example, Aberg (2016) and Cameron and

Harrison (2012) employed quantitative methods using ANOVA to analyze data. Cameron and Harrison (2012) surveyed 172 participants as they examined social norms within a labor market program. Significant results deemed group participation vital in learning social skills in a nonformal learning setting. Participants working in the fields of management and commerce self-reported positive effects associated with learning and handling social skills in three different settings. Similarly, Aberg (2016) focused on the examination of the social dimension of 258 adults age 65 and older regarding participation, making friends, well-being, and self-perception in nonformal *Swedish Circles*. *Swedish Circle* is defined as a community center where older people interact and learn from each other through participation in social activities. The results were significant. The author found that *Swedish Circles* are beneficial; participants gained social skills and avoided social isolation and loneliness by getting to know one another through participation in circle activities.

Andersson and Andersson (2011), Rawat et al. (2015), and Tai et al. (2017), conducted qualitative studies to understand how adults initiate learning in nonformal settings. These three case studies focused on the engagement of learners within various societies, and researchers sought to explore how participants developed cultural awareness. For example, Tai and his colleagues (2017) focused on understanding how adult students use social skills in nonformal *clinical learning practices* through observations by and interviews with their supervisors. The students were not evaluated for the purpose of assigning a grade. Instead, the goal of this setting was for students to gain experiences. Findings showed that engaging in peer-assisted learning and peer observation, within the clinics, helped students critically examine the notions of good practice and good feedback. In addition, students reported that they learned efficiently when educators were serving as facilitators to guide and mediate social learning.

Using sociocultural theory to analyze data, Andersson and Andersson's (2011) case study interviewed Somali refugees participating in a Swedish adult basic education context. These Somali refugees shared their struggles with understanding the Swedish government before joining the center. The research showed that the refugees developed cross-cultural understandings and felt comfortable with establishing relations and communication as they shared their culture and learned about Swedish societal norms. For example, in this nonformal setting, refugees learned how to create Swedish dialogue to effectively engage in communication, assimilate culturally with Swedish officials, and bring deeper awareness of Swedish, as well as, Somali societies. In like manner, Rawat, Bouchon, and Nair (2015) participants attended a training to develop social skills helpful in starting a new business. The researchers found that participants learned how to solve complex problems within Thai society through innovative learning processes involving social skills.

#### **The ways that adults learned in nonformal settings.**

Studies of the ways that adults learned in nonformal settings included a) *using social media* (Jumani & Fazal-ur-Rahman, 2011; Perez-Senagustin et al., 2014; and Kok, 2014), b) *sharing life experiences* (Andersson and Andersson, 2011; Cameron & Harrison, 2012; Ngaka et al., 2012; Norqvist &

All six of the studies in this sub-section point readers toward trends regarding specific aspects of social skills applicable to nonformal settings. Participants interacted positively in nonformal contexts. For example, in all six studies, adult students learned how to create dialogue for specific situations and assimilate culturally with government officials within a specific society. Although these six studies differentiated nonformal learning from other types of learning, researchers did not conduct deeper analyses of adult students' experiences related to the social skills discussed.

*Studies that focus on digital skills.* Four studies focused on digital skills. Digital skills refer to the ability to use online tools such as social media, blogs, and online social training platforms, as well as the creation of digital programs using technology. These four studies used both qualitative and quantitative methods to explore the importance of online tools in developing digital skills in a nonformal setting. For example, Kok's (2014) case study focused on examining the ways participants used digital skills to collaborate and make meaning in a nonformal setting. The results showed that participants learned about new forums and social media blogs to build a network community and digital interaction. Observing their own behavioral patterns, participants gained a shared understanding via social media. Although participants learned how to acquire online tools to communicate through online forums and built spaces designed to get to know new participants, the researchers did not report about adult students' experiences with social media blogs or new forums.

In a similar way, using cross-case analysis and frequency analysis, Farrow et al. (2014) and Perez-Sanagustin et al. (2014) examined how adult students initiated learning to incorporate technology into their activities in a nonformal setting. The researchers found that participants learned to use apps, smartphones, and social media that helped them navigate special activities on campus. Participants used nonformal digital educational resources to help them better understand concepts learned in class. Although researchers found positive aspects of using nonformal digital skills, they did not explore students' perspectives of the value of using such apps. Likewise, Berger and Croll (2012) found that during basic structured internet training, participants learned how to use internet skills to communicate digitally, write emails, browse on the Internet, and search for terms related to hardware. However, researchers did not report on participants' perceptions of their experiences.

*Studies that focus on basic literacy skills.* Five studies focused on basic literacy skills. Basic literacy skills refer to reading, learning about numeracy, writing, and learning about basic computer and technical skills (Arikawei et al., 2017). Researchers provided both descriptive statistical results and descriptive qualitative accounts of participants learning in nonformal settings (Arikawei et al., 2017; Jumani & Fazal-ur-Rahman, 2011; Krupar et al., 2017; Ngaka et al., 2012; White & Lorenzi, 2016). The researchers in all five studies found that nonformal settings positively impacted the development of literacy awareness and other basic literacy skills.

For example, Arikawei et al. (2017), Jumani and Fazal-ur-Rahman (2011), and Krupar et al. (2017), used descriptive statistics to examine adult basic literacy skills learning. The researchers focused on demographics and other variables to analyze the data. The results of these three studies showed that adults who attend nonformal settings show significant learning of basic literacy skills. For example, adult students developed higher numeracy scores in nonformal settings. Finally, using qualitative methods Ngaka et al. (2012) and White and Lorenzi (2016) found positive effects, such as enhanced creativity, in participants' writings.

Leffler, 2017), c) *engaging in interpersonal interactions such as peer to peer and student to teacher* (Aberg, 2016; Berger & Croll, 2012; Mirzaee & Hasrati, 2014; Rawat et al., 2015; White & Lorenzi, 2016), and

d) *engaging in self-learning* (Farrow et al., 2015; Krupar, Horvatek, & Byun, 2017; Tai et al., 2017; Tuomainen, 2014). Overall, studies in this category emphasized personal and digital experiences in a unique context. I begin this subsection by describing studies related to adults learning via social media. Second, I present studies focused on adults learning through shared life experiences. Next, I describe studies related to adults learning through interpersonal interaction. Finally, I discuss studies focused on adults learning through self-learning.

*Adult learning via social media.* These studies (Jumani & Fazal-ur-Rahman, 2011; Kok, 2014; and Perez-Senagustin et al., 2014) explored adults' purposeful use of technology and social media in nonformal settings. In Kok's (2014) quantitative case study, participants were employees of International Business Machines (IBM). These researchers found that these employees created nonformal online communities where they participated in the exchange of ideas using social media such as Facebook, instant messaging, blogs, and wikis. In Jumani and Fazal-ur-Rahman (2011) and Perez-Senagustin et al. (2014), researchers found that adults learned better when they used media tools such as smartphones, Bluetooth, and technologies what were of interest to them. Through interactive ways of learning, participants provided feedback via apps and online platforms. In addition, students reported that they preferred the blended learning approach of using online educational materials with traditional place-based inclass instruction (Tochon, 2017).

*Adult learning through shared life experiences.* Adults learning through shared life experiences in nonformal settings were illustrated by Andersson and Andersson (2011), Cameron and Harrison (2012), Ngaka et al. (2012), and Norqvist and Leffler (2017). Both Ngaka et al.

(2012) and Norqvist and Leffler (2017) used the case study approach with interviews and focus groups to learn about their informants' experiences. They found that adults experienced higher levels of learning when they used experience-based learning. For example, participants documented their experiences and shared with each other, they kept blogs, used photos, and social media to reflect on what they experienced. Similarly, Andersson and Andersson (2011) found that participants learned about Swedish society when they compared their experiences in both Somali and Swedish societies. Although Cameron and Harrison (2012) conducted quantitative research, they reported similar findings related to adults learning through shared life experiences. For example, when employing statistical analysis, 84% of participants reported that they learned effectively using skills drawn from their life experiences

*Learning through interpersonal interaction.* A focus on adults learning in nonformal settings through interpersonal

#### **The reasons adults studied in nonformal settings.**

Studies that focused on reasons adults studied in nonformal settings included *employment, social or cultural interaction, and personal edification*. Seven of the studies focused on employment (Arikawei et al., 2017; Berger & Croll, 2012; Kok, 2014; Krupar et al., 2017; Ngaka et al., 2012; Norqvist & Leffler, 2017; and Rawat et al., 2015). Four of the studies provided rich descriptions of social and cultural interaction (Andersson & Andersson, 2011; Cameron & Harrison, 2012; Mirzaee & Hasrati,

2014; Tai et al., 2017). The remaining four studies described adults' personal edification (Aberg, 2016; Farrow et al., 2015; Perez-Sanagustin, 2014; White & Lorenzi, 2016). Interestingly, 15 of the 18 reviewed studies fit within this category. In the subsections below I describe first, studies related to employment. Second, I present studies focused on social or cultural interaction.

Finally, I provide studies focused on personal edification.

*Employment.* Seven of the studies in this category examined the purpose of learning different skills to improve life quality through employment (Arikawei et al., 2017; Berger & Croll, 2012; Kok, 2014; Krupar et al., 2017; Ngaka et al., 2012; Norqvist & Leffler, 2017; Rawat et al., 2015). Five studies in this category used qualitative approaches such as interviews and

interaction such as peer-to-peer interaction was evident in the following five studies: Aberg (2016), Berger and Croll (2012), Mirzaee and Hasrati (2014), Rawat et al. (2015), and White and Lorenzi (2016). examined adults' interpersonal interactions in nonformal settings. Aberg (2016) and Berger and Croll (2012) found that participants were satisfied attending circles (activities where adults interacted and learned from each other) and trainings that helped them improve their peer-to-peer interaction and build networks. For example, participants learned from each other by asking questions and showing how to navigate social platforms such as blogs and Facebook.

Mirzaee and Hasrati (2014) examined how formative feedback in a nonformal setting helped improve master's program students' academic writing in a foreign language course in Iran. The authors found that through inter student communication and interaction, participants learned how to react to written feedback. Students were able to provide feedback to each other and, by so doing, scaffold one another's learning. In a similar vein, Rawat et al. (2015), conducted a case study to examine nonformal learners' successes as they engaged in projects involving student and teacher interactions and communication technology. Finally, using both quantitative and qualitative methods, White and Lorenzi (2016) studied the ways participants developed creative writing skills through student and teacher interaction in an Irish non-profit center. Researchers found that participants were creative when the teacher and student had built an effective relationship and when the learning environment was meaningful to the learners.

*Adult learning through self-learning.* Four of the studies examined how adults learned various skills in nonformal settings in a manner best described as self-learning (i.e., independent learning through such venues as tutorials) (Tai et al., 2017; Farrow et al., 2015; Krupar et al., 2017, and Tuomainen, 2014). Tai et al. (2017) and Tuomainen (2014), through surveys and interviews, identified participants' self-learning and self-examination skills. Participants independently self-assessed their own learning and learned from tutorials. Using data from the International Assessment of Adult Competencies Survey, Krupar and his colleagues (2017) found that adult immigrants in Canada improved their learning when they independently acquired basic skills in a nonformal setting. Finally, Farrow and colleagues (2015) focused on how adults using MOOCs, or Massive Open Online Courses, learned new skills. Researchers found that participants were satisfied and effectively mastered content when they used these online tutorials. Although participants gave positive feedback, they reported difficulties with using some of the online resources without their teacher's help.

observations to collect and analyze data. Berger and Croll (2012), Kok (2014), Norqvist and Leffler (2017), Rawat et al. (2015), and Ngaka et al. (2012) found that participants' main reasons to join nonformal settings were to prepare for the job market or get promoted. Rawat et al. (2015) and Ngaka et al. (2012) found that their participants from Thailand and Uganda learned how to use basic financial skills including investing and saving to start their own businesses, thereby, to help their families obtain economic stability. Similarly, Kok (2014) and Norqvist and Leffler (2017) found that participants joined nonformal settings to improve digital skills and other work skills in an after-work program. Interestingly, in both studies, the findings showed that nonformal programs helped participants gain social skills, be marketable, and apply for jobs.

In a similar vein, Krupar et al. (2017) examined first-generation immigrants in Canada and how a nonformal learning setting assisted them in developing job related skills. The authors found that 61%, of those studied, benefited from participating in on-the-job trainings that taught basic job skills that eventually helped with placement in a skilled workplace (Krupar et al., 2017). Finally, Berger and Croll (2012) examined Russian adult immigrants who joined a nonformal setting to learn basic internet skills, like the sending and receiving of

emails, necessary in most jobs. These low-income females and disabled elderly people were highly motivated to achieve relevant skills to ensure job success.

Studies by Arikawei et al. (2017) and Krupar et al. (2017) were quantitative in nature and researchers used descriptive statistics to analyze their data. The variables included gender, age, and participants' reasons to join nonformal settings. Arikawei et al. (2017) surveyed 232 adult women learners and facilitators of a nonformal vocational program in Bayela, Nigeria.

Researchers reported that participants found learning basic literacy and numeracy skills essential in building sustainable work environments and obtaining employment. While obtaining home management skills that could help them attain jobs, these nonformal programs, neglected the teaching of entrepreneurial skills that are important when applying for jobs.

*Social or cultural interaction.* Four studies comprised the subcategory of social or cultural interaction (Andersson & Andersson, 2011; Cameron & Harrison, 2012; Mirzaee & Hasrati, 2014; Tai et al., 2017). Social and cultural interactions included learning about specific cultural competencies or socially accepted practices related to politeness, food, relationships, etc. Andersson and Andersson (2011), Mirzaee and Hasrati (2014), and Tai et al. (2017) used qualitative approaches to examine inter-student interactions and cross-cultural understandings in nonformal settings. Mirzaee and Hasrati (2014), interviewed five graduate students to understand the role of written feedback to create a space for nonformal learning "within context of schooling in general" (p. 557). Students reported that graduate level writing in nonformal contexts was different from writing for formal classes.

Along the same line, Andersson and Andersson (2011) found that participating Somali refugees learned about Swedish cultures and developed a deeper awareness of that society. Cameron and Harrison (2012) and Tai et al. (2017) conducted an exploratory study to examine adult interaction and engagement in nonformal contexts. The findings revealed participants, through peer-to-peer interactions, learned socially accepted norms and developed social skills that helped them successfully engage in various settings.

Finally, in two studies, Aberg (2016) and White and Lorenzi (2016) focused on how and why different nonformal settings were important to participants. Both studies surmised that

#### **Contribution of my study to the field of nonformal setting.**

In this section, I first present the key findings and emerged themes from reviewed studies. Then, I discuss how my study fills a gap in the literature pertaining to the nonformal learning field.

*The key findings and emerged themes.* Research reviewed for this study examined learners' experiences within different nonformal settings that occurred both in and outside the United States employing quantitative, qualitative, and mixed methods approaches (Aberg, 2016;

Andersson & Andersson, 2011; Arikawei et al., 2017; Cameron & Harrison, 2012; Farrow et al. 2015; Berger & Croll, 2012; Tai et al., 2017). Although the research in this field is not yet extensive (Aberg, 2016; Andersson & Andersson, 2005; Jumani et al., 2011), there are strong indications that nonformal settings positively affect student learning. For example, in nonformal settings learners experienced positive emotions as they interacted with each other and effectively practiced and learned different skills (Krupar et al., 2017; Mirzaee & Hasrati, 2014; Ngaka et al., 2012). Specifically, studies showed that in general, digital skills including social media, and digital tools, such as, apps and smartphones, helped participants collaborate to build a network community (Berger & Croll, 2012; Farrow et al. 2015; Kok, 2014; Perez-Sanagustin et al. 2014).

The following three themes emerged from this literature review: (1) the consequences of learning in nonformal settings; (2) the ways that adults learn in nonformal settings; and (3) the reasons adult students study in nonformal settings. The first theme, *the consequences of learning in nonformal settings*, showed that adult students learned communication, social, digital, and basic skills that are necessary for the enhancement

participants were personally interested in social and cultural interaction in the learning environment. Aberg's (2016) case study focused on a *circles* activity where adults interacted by asking questions about each other's daily lives. Similarly, White and Lorenzi (2016) reported that students benefited from participating in a nonformal intensive creative writing program that focused on providing a cozy atmosphere and creative ideas for writers. Researchers in both studies found that participants attended nonformal settings for their personal well-being, to build social networks, and to find cozy spaces to promote successful creative writing.

*Personal edification.* Personal edification in learning various skills in different nonformal settings was illustrated by Aberg (2016), Farrow et al. (2015), Perez-Sanagustin et al. (2014), and White and Lorenzi, (2016). Personal edification refers to adult's personal interest in constructing or building knowledge. Each of these studies focused on exploring the reasons adults decided to learn in nonformal settings. Farrow et al. (2015) surveyed adults from the United States, the United Kingdom, Brazil, and Canada. As a result of this comparative study, the researchers found participants had different reasons to use nonformal settings to educate themselves. Adults preferred reading blogs related to their interests, taking notes while reading, writing blogs, and discussing both in person and online the content of their focus or area of interest. Participants explored online resources using different apps to develop technology awareness.

Similarly, Perez-Sanagustin et al. (2014) used a case study methodology to explore students' abilities to use technology such as smartphones for both in class and outside of class activities. The researchers found that students joined the class because they wanted to improve their digital skills to support their learning. Participants reported that they improved their learning when they were actively aware of the technology they were using. In addition, students found activities were meaningful because they developed blended learning skills. For example, using both paper and digital maps, students worked on a task to explore the campus and

Barcelona. Participants used *Bluetooth* to connect with their peers and teachers and provide their reflections. Students reported they enjoyed sharing their interests while doing meaningful activities in a nonformal setting.

of their lives (Aberg, 2016; Andersson & Andersson, 2011; Arikawei et al., 2017; Berger & Croll, 2012; Cameron & Harrison, 2012;

Farrow et al. 2015; Jumani & Fazal-ur-Rahman, 2011; Kok, 2014; Krupar et al., 2017; Mirzaee & Hasrati, 2014; Ngaka et al., 2012; Norqvist & Leffler, 2017; Perez-Sanagustin et al., 2014; Rawat, Bouchon, & Nair, 2015; Tai et al., 2017; Tuomainen, 2014; White & Lorenzi, 2016).

The second theme, *the ways adults learned in nonformal settings*, determined that they learned through interacting via social media, sharing life experiences, engaging in peer-to-peer and student-teacher interpersonal interactions, and engaging in self-learning (Aberg, 2016;

Andersson & Andersson, 2011; Berger & Croll, 2012; Cameron & Harrison, 2012; Farrow et al.,

2015; Jumani & Fazal-ur-Rahman, 2011; Perez-Sanagustin et al., 2014; Kok, 2014; Krupar et al., 2017; Mirzaee & Hasrati, 2014; Ngaka et al., 2012; Norqvist & Leffler, 2017; Rawat et al., 2015; Tai et al., 2017; Tuomainen, 2014; and White & Lorenzi, 2016).

The third theme, *reasons adult students study in nonformal settings*, revealed that they study in nonformal settings to improve their quality of life via employment, social or cultural interaction, and personal edification (Aberg, 2016; Andersson & Andersson, 2011; Arikawei et al., 2017; Berger & Croll, 2012; Cameron & Harrison, 2012; Farrow et al., 2015; Kok, 2014;

Krupar et al., 2017; Mirzaee & Hasrati, 2014; Ngaka et al., 2012; Norqvist & Leffler, 2017; Perez-Sanagustin, 2014; Rawat et al., 2015; Tai et al., 2017; White & Lorenzi, 2016).

**How my study fills a gap in the literature pertaining to nonformal learning.** First, although there are many documents, reviews, and reports on informal and nonformal settings, I could not locate studies on nonformal settings similar to the WLCP focused on adult student learning and experiences. The studies I found, were conducted by researchers, government institutions, and international organizations. Although there are studies focused on learning languages and cultures informal through summer study abroad experiences and of professional development workshops, I could not locate studies that focused specifically on adult students' learning and experiences in nonformal learning settings. Through the review of literature, identified two gaps that I address in my study. The first gap relates to adult students' learning in nonformal settings. The second gap relates to adult students' experiences in nonformal settings.

In the following sub-section, I address each gap in the field.

**First gap: Adult student learning in nonformal settings.** Although I reviewed many studies, I was unable to locate research that addressed adult students' learning relative to unique conceptual content pertaining to world languages and cultures. Instead, the content taught and learned in these studies was medicine (Tai et al., 2017), English for specific purposes (Mirzaee & Hasrati, 2014; Tuomainen, 2014; White & Lorenzi, 2016), adult basic education (Andersson & Andersson, 2011; Arikawei et al., 2017; Cameron & Harrison, 2012; Jumani et al., 2011; Krupar et al., 2017; Ngaka et al., 2012; Norqvist & Leffler 2017), e-learning and technology (Berger & Croll, 2012; Farrow et al., 2015; Kok, 2014; Peffer et al. 2013; Perez-Sanagustin et al., 2014), and psychology (Aberg, 2016); Tourism (Rawat et al., 2015). Consequently, this study promises to make a unique contribution to the field of studies with respect to adult students' learning knowledge of world languages and cultures in nonformal settings.

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## COGNITIVE AND PRAGMATIC FEATURES OF LANGUAGE UNITS REPRESENTING FOOD

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ARTICLE INFORMATION	ABSTRACT
<p><b>Received:</b> January 20, 2021  <b>Accepted:</b> February 22, 2021  <b>Volume:</b> 1  <b>Issue:</b> 15  <b>DOI:</b> <a href="https://doi.org/10.54613/001015">https://doi.org/10.54613/001015</a></p> <hr/> <p><b>KEYWORDS</b></p> <p>Gluttonic discourse, verbal level, semantic level, stylistic means, written gluttonic discourse</p>	<p>Food is traditionally considered not only a source of energy that keeps us alive and our body functioning in the correct way. It can also affect our mood greatly and on a more general level it can indicate our preferences, attitude on health and nature. Food can easily identify a person's social status and culture. Traditions connected with food and certain products are strongly associated with religion, travelings, traditions, our attitude towards food makes us different from many other species. Food in all its elements (products, etiquette, preparation, customs, etc) is by all means, culture specific as it is formed by people and conditioned by the surroundings and all the elements of culture formed being formed through centuries and affected by neighbouring territories, contacts. It is agreed that many cultures a both common and different in what we call food. Today, we can observe two parallel tendencies: people try to maintain culturally specific food customs and simultaneously they also modify them so food customs become either more internationalized or blended (including elements of various cuisines). The world of food becomes truly multicultural. The article discusses linguistic peculiarities of gluttonic discourse, both in its oral and written forms.</p>

### 1. Introduction

All types of identity to some extent are connected with the idea of food or some certain products or ways of their preparation. We all think that we are unique and it is, as well, food, that makes us different: "We eat this. They eat that."

The way you drink your tea: either with lemon or varenje, ice cold or hot, spiced, only at a certain time of the day, with special pastry only. Our tea traditions will uncover your nationality. Speaking about the trends in food culture we can notice interconnection and interdependence of local and globalized cuisine which becomes a must in a range of countries. Culinary customs of various regions are adopted and adapted so the dishes become available (in terms of habits) for a vast majority of residents. Regional cuisine is widely a widely recognised cultural phenomena. Here we can speak about two extremes - food being a unified and globalised issue and food, being a strictly local phenomena. The middle position, that is diversity of food experiences happens greatly due to globalization processes.

Interest in the field of culture-food-cuisine correlation appears in the works of anthropologists and culturologists in the 19th century. Scholars study food habits across the globe. National cuisine is viewed as a part of cultural heritage. In 2003, UNESCO adopted special convention (i.e. set of rules, regulations, practices and approaches) with the aim to save "exemplars of the intangible heritage of humanity - practices, traditions, and cultural expressions - on a global register" including national cuisines, as in DeSoucey, Elliott, and Schmutz (2019).

Food can be referred to a specific sign system consisting of hierarchical signs that have some definite cultural meaning. Cuisine as a culture's foods and styles of cooking can be called a special sign system that combines cultural dominants linked by the idea of consumption. Being a sign system and a cultural element, cuisine is in the center of scientific interest of various disciplines: cultural studies, communication, semiotics, sociology and linguistics. E.g. Stereotyping can be based on food greatly. We strongly associate England with 5 o'clock tea and oatmeal. Germany provokes food associations with beer, sauerkraut and sausages. French people are thought to be frog-eaters, etc. Other associations can be found in Kudla (2016).

Food-related borrowings are discussed in Matsumoto and Britain (2019).

Other scholars offer such terms as: "gastronomic discourse" Golovnickaya (2007); Olyanich (2003), "restaurant discourse" Davis (2009). We should notice that the most popular term in contemporary linguistics works is gluttonic discourse. Still, analysing Scopus database and investigating the usage of the terms in 2015-2020 in areas "Arts and Humanities" and "Social Studies" (the closest study areas) we see that the notion "gastronomic discourse" is used in 13 publications, "culinary-gastronomic discourse" (mostly written in three words) is traced in three publications, whereas "restaurant discourse" is the most frequent with 59 search results.

To study extra lingual, pragmatic, socio-cultural, compositional, stylistic and other peculiarities of cuisine or gastronomic culture, scholars apply to various definitions of a discourse. Olyanich (2004) 384 implements the term "gastronomic discourse" referring it to "a special type of communication related to the state of food resources and the processes of their processing and consumption". Later the same author defines this type of discourse as gluttonic. The scholar defines "gluttonic discourse" as a specific kind of mass- and information communication, which characterizes the whole system of culinary process consisting of the following stages: food processing, preparation of food for cooking process, cooking process itself and food consumption (Ibid.). But suggested stages do not fully embrace all the structural elements of a cultural cuisine.

Multilingual gluttonic texts provide a wide field for linguistic and cultural research, due to the fact that the gluttonic discourse, like any cultural cuisine have some universal and some culturally specific features. The cultural cuisine reflects unique food ingredients, culinary traditions, values, gastronomic taboos and etiquette. These differences explain issues of both intercultural communication and translation process.

Describing peculiarities of gluttonic discourse. Olyanich (2004) uses the term gluttonim as an element of this type of communication, which role is to specify linguocultural and

ethno-cultural features of nominations related to food preparation and consuming.

Gluttonic discourse can be viewed as a special type of verbal-social discourse in conjunction with socio-cultural, religious-ethical, and linguistic-philosophical properties, the purpose of which is to achieve "gluttonic communication". Verbal signs in gluttonic discourse are represented by lexemes nominating ingredients, etiquette phrases during the process of eating itself (Leontovich, 2016). Gluttonims can be identified and studied in various recipes, menus, rules of gastronomic behaviour, rituals and taboos. As cultural cuisine represents a definite culture being its important component, gluttonic discourse can be defined as a sign system in which "cultural icons, national self-identification, personal identification and subjective attitude (taste), tender characteristics and social (class) characteristics are concentrated" (Ibid., p. 50). Ermakova, Gaidukova, Sopova, Shekhovtseva, and Razdabarina (2018) and Ermakova (2011) state that the gluttonic discourse is a complex communicative phenomenon that correlates with the linguistic reflection of the physiological needs of the human body in the field of food preferences.

In everyday social communication Gluttonic discourse is one of the most common among all the other types of discourses. The range of gluttonic texts of various genres gives a rich field for linguistic research. Discourse connected with all spheres of food - as a cultural, cooking and communicative phenomena can be traced in a wide set of scientific papers (ex.: Sedykh, Lukin, Georgieva, Puiu, & Nikonov, 2019). The process of glutton communication includes an extensive system of interrelated language signs that have a gastronomic orientation: linguistic signs of food, tools, actions, states connected with food making, preparing and eating. All these signs have a verbal form that can be observed and analyzed with the help of various methods.

One of the by-side aspects when studying the discourse of this type, which is underestimated in oral gluttonic discourse and overviewed in Matwick and Matwick (2019) are bloopers, which are the moments that interfere with the current stage declining from the plot by misspoken, mispronounced or incorrectly stressed words. Here can be traced the concepts of sociolinguistics which are successfully exploited by linguists - face, backstage and frontstage as introduced by Goffman. The paper, which is mentioned above, analyzes bloopers of five

## 2. Problem Statement

The discourse of various types and methods of their analysis are under investigation in modern linguistics. Mostly, it is connected with dynamic development of the language and lexical and-semantic changes which are constantly occurring in the system of every type of discourse. Being popularized not only by everyday needs but by mass culture as well, gluttonic discourse is aimed not only on formal information (mere information), but on communication, self-presentation as well (or mostly?). Thus the current transformation of food/eating-connected practices is most evident in everyday spheres.

## 3. Research Questions

The basic and evident issues of the study are: what are the main definitions of gluttonic discourse? Is there interrelation of notions of the same or semi-same field (i.e. gluttonic discourse vs gastronomic discourse vs restaurant discourse vs cooking discourse, etc)? Can verbal and oral forms of the discourse discussed be studied together? Does the national/traditional

## 4. Purpose of the Study

The key purpose of both practical and theoretical research is to clarify the definition and characteristics of a gluttonic discourse; to find and analyse linguistic (stylistic, semantic, syntactical) means of representation oral and written forms of the discourse studied and to identify frequent and/or

## 5. Research Methods

The research methods of this project help to realize the main purpose of the study: discursy and contextual analysis, cognitive analysis, including the analysis of concepts, structural,

most popular American food shows. Another paradigm of gluttonic discourse study can be found in Chen and Eriksson (2019) where gluttonic discourse is viewed as a means of storytelling. Healthy and ethical eating habits make the trend of the 21 century, which is analysed in Eriksson and Machin (2020).

The level of morphology introduces how products are represented and implemented into the culinary discourse of consumers. The morphemes make words, like cooking procedures turn products into dishes. When one basic product or ingredient is taken, under the influence of cooking procedures it creates a different result. Culinary instrumentalities play a key role in the transformation of a product into a certain dish. So, the constituents of culinary discourse are in certain relations, like units of meaning. Each culinary action has its own meaning (ex.: adding of any kind of sweetener like honey, sugar or raisins to bread, pasta, or crust changes it out of the nutritional and ordinary dish into the realm of the final sweet, a festive dessert, some delicacy or even a holiday extraordinary food).

On the syntactical level of gluttonic grammar (the aim of which is to give meaning to the lexicon and its various morphological elements) we can study the meal that manages the dishes determining their logical sequence, successful combinations, and reciprocal compatibility. Just as in any literature creation, a short story or a novel, where does take part in the narrative, the meat dish or grain dish is described according to the principles of cuisine in the cultural aspect and requires of different social classes.

The main subjects in the syntactical organisation of the meal (ex. fruits may precede, accompany, or follow the main dish; some dressings can change the nature and quality of the main dish) define the order of the accompanying dishes. The choice of dishes and their ingredients are related not only with economic reasons, such as the availability of various items and their prices, but also reflect cultural taboos and restrictions.

And finally, we can speak about gastronomic rhetoric which describes the applicability of utterances to the arguments and outcomes we are about to create. In the context of the gluttonic discourse, it indicates the way the food is cooked, served, and eaten. Here we can compare fast food and slow food traditions; eating in silence or having some banquet with a loud accompaniment.

Another aspect of interest in globalisation and glocalisation of common practices (gluttonic discourse being included into the category). So some culture-specific and common to all cultures linguistic trends are to be partially discussed. Being formed in both oral and written forms, factual information is embroidered with linguistic and extralinguistic means adding to expressivity and personal fulfillment. The study of the mentioned means is of great interest as in a given culture and language both common and specific features can be pointed out.

cuisine changes the way gluttonic discourse is represented? If yes, to what extent? What are the specific stylistic, lexical and semantic means of verbalisation gluttonic discourse? Having analysed gluttonic discourse as a certain type of verbal and social communication as presented in works and latest research, the above questions will be answered.

productive 387strategies as represented in the study the linguistic peculiarities of the gluttonic discourse in its oral and written forms; to define the most productive stylistic and semantic means of that discourse.

pragmatic and semantic analysis, linguistic-personal, structural-semantic, linguistic-pragmatic analysis. On a more general level common scientific methods of analysis and synthesis are applied. Analysis is necessary stage of cognition, making it possible to study the parts of the whole, to reveal relationships



common to all parts, and thereby point out the features of the

## 6. Findings

The research of various scientific papers devoted to the study of the gluttonic discourse give the authors of this paper an ability to define gluttonic discourse as a specific kind of communication, that comprises food nomination, food processing, preparation of food for cooking process, cooking process itself and food consumption in conjunction with socio-cultural, religious-ethical, and linguistic- philosophical properties the purpose of which is to achieve gluttonic communication.

The authors of this paper are mostly focused on verbal characteristics of oral and written gluttonic discourse. Valuable theoretical additions to the study can be found in Olyanich (2003), Leer (2019). Scripted communication, not normally reflecting peculiarities of a linguistic personality is described in Chan and Chandra-Sagaran (2019).

The verbal-semantic language level is characterized by the bearer's eagerness to find appropriate words, create and understand texts, handle linguistic norms. On this language level one can find stylistic devices: phonetical, lexical and syntactical mostly.

On the verbal-semantic language level one can trace certain stereotypical language frames and speech standards. Through them the casual, every-day command of the language is seen. The psychological aspect of the language is also clearly revealed through the stylistic organization of the speech. The gluttonic discourse fully demonstrates all these speech variabilities.

Having analyzed much of the oral and written gluttonic discourse, we can observe that there is a certain set of stylistic devices that occur more often than others. On the phonetical level one can find a lot of exclamations, showing strong emotions of chefs and cooks. Very often these emotions are shown through graphon. The most common types are: capitalization (*INCREDIBLE!*), hyphenation (*dis-gus-ting*), multiplication (*aaawesome*). Combined variants can also be met: *TTTAS-TY*. Graphon is also represented through deliberate violation of writing norms: *'Udiotsandwichrightthere'*, which shows how highly emotional the speech of the chef is. In this example we come across a euphemism. Written gluttonic discourse (e.g. food blogs) can be further traced in Hsiao (2019).

On the lexical level we come across gluttonims, which are the names of the signs of food and its components. Their semantic structure contains the signs, indicating the food origin, the process of cooking, including methods, the place of cooking, kitchen utensils, serving of dishes. The gluttonims are nationally and culturally specified.

The last example is a pretty case of epiphora, the semantic weight is on the final word. Syntactical parallelism is commonly traced on the sentence level of the gluttonic discourse. We have come across many epiphoras and anaphoras, which accentuate the key words and the persistence of the cooks' speech through them: *"Being a chef is the best job in the world. Being a chef never seems like a job, it becomes a true passion. Being assertive and somewhat really firm has to be backed up with being fair r Chain repetitions can also be frequently met: "Yeah. It's table seven, yeah it's all in the lift, yeah the other two stakes have been up and down like f\*\*\*ing a bee tip Missy's knickers, serve it, please!".* When speakers experience stress and tension, they are apt to use catch repetitions: *"Show! Show how to cook a muscle". Right, okay right, so show; Show you how to cook a muscle".* The development of the oral gluttonic discourse is a vivid process, a process "on airs", so, we come across language economy. The speech of chefs and cooks is rapid, fast, they deliberately omit links, shorten words. Elliptical and one-member sentences are common: *"Quickly!", "Got it?".* Exclamatory and question marks show the high emotional state of the speakers. Language economy is exploited when describing culinary processes: *"Cream the butter and sugar until pale and fluffy".* Here we have an example of the anacoluthon construction.

On the syntactic level of the language we come across

structure of the phenomenon being a whole.

praising and compliments. That is how chefs stimulate their cooks to work better, to achieve better results: *"thank god a beautiful apple pie the flavour" \V the flavour amazing".* During culinary master classes chefs and cooks use praise as the motivational aspect of communication for students (people, who attend classes to learn how to cook). These master classes always start with the assuring that one can do the same as famous chefs. The reaction of the attendees is usually a positive one: smiles, thanks and tears of happiness.

The gluttonic discourse abounds in phraseological units. *"Who drinks beer, thinks beer"; "In for a penny, in for a pound".* Sometimes, phraseological units are violated: *'T17/r these crocodile tears?'* (when something goes wrong). Generally speaking, linguistic analyses of translated gluttonic texts show wrong choices of terms and not the best variants of adaptations that result in the loss of cultural references and mistranslations. More than that, used in isolation some terms are insufficient to guarantee understanding of fluent texts. Specific phraseology is also essential for verbal texts (Rebecchi & da Silva, 2017). Further on the article discusses the role of phraseology in recipes. On the level of supra-phrasal unit the gluttonic discourse is characterized by irony, based on the discrepancy of what is being said and what is really meant. It creates a humorous effect, for the audience to perceive what is said positively. Very often irony occurs hand in hand with personification, for example: *"My grant could do better"* - a favourite phrase of Gordon Ramsay. At times irony may turn into sarcasm, carrying out a negative, offensive connotation: *"How clever you areV* (an address of the chef to the cooks). In the second season of "Hell's Kitchen" relational tension grows and sarcastic remarks make 12% more than in the first season. Quite often irony touches upon the societal or political context: *"This cake is so dark and rich; a Kardashians wants to marry it"; "This dish is so unprepared Russia is calling it the Olympics".* A famous chef and showman Gordon Ramsay states that irony helps to make the kitchen atmosphere non-standard and creative. He also thinks that it gives birth to a special "kitchen language". To understand this "kitchen irony" one has to be aware of the world events. Irony is frequently rendered through allusions:

*"This soup is so watery. It stopped the drought in California*

*"This fish is so raw, he's still finding nemo*

*"Thepork is so raw, it's still singing HakunaMatata".*

*"This pizza is so disgusting, if you take it to Italy you 'll get arrested.*

*"The chicken is so frozen. It just asked me "Do you want to build a snowman?"*

The popularity of modern culinary shows is highly dependent on the oratory aspect of the language. Stylistic devices make the gluttonic discourse alive, exciting for the recipients. During castings, producers look for those chefs, who are not just perfect cooks but are brilliant communicators. "The kitchen language" is the nucleus of the culinary discourse and demands much more further research.

The texts of culinary recipes are common for our everyday life but as the type of text they are less researched. They belong to different functional styles: scientific style (cookery books); publicistic style (articles with culinary recipes); colloquial style (everyday conversations connected with culinary themes); belles-lettres style (novels).

As for the functional approach, the main functions are: to advertise, to inform, to impress, to entertain. To influence the reader's feelings and make him try a dish, the following verbal means are used: exclamations, rhetoric questions, nominalism, impersonal and passive constructions, present and past participles.

Being studied on different levels, various peculiarities can be traced. E.g. Cesiri (2019), applied various methods to the study of culinary concepts, this research shows that gluttonic texts that appear before recipes is the manifestation of the unique culinary cooking style of this or that chef and the

cooking crew.

## 7. Conclusion

The current research represents the linguistic peculiarities of the gluttonic discourse in its oral and written forms. Productive means of the gluttonic discourse are: stylistic and semantic. Modern culinary blogs and TV-shows fully illustrate the verbal peculiarities of the gluttonic discourse.

The aim of the research is to find out the linguistic dominants (which are subdivided into corresponding groups) within the researched topic, to point out stylistic and semantic peculiarities of oral and written forms of the gluttonic discourse is achieved. The modern gluttonic discourse is generally viewed as a system of culinary processes: the set stages of food processing, preparation of food for the cooking process, the notion of the cooking process itself, and the would-be food consumption. These constituents are culturally-specific.

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## AHOLI DAROMADLARINI OSHIRISHNING USTUVOR YO'NALISHLARI

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MAQOLA HAQIDA	ANNOTATSIYA
<b>Qabul qilindi:</b> 10-dekabr, 2021-yil <b>Tasdiqlandi:</b> 23-aprel, 2021-yil <b>Jurnal soni:</b> 1 <b>Maqola raqami:</b> 16 <b>DOI:</b> <a href="https://doi.org/10.54613/001016">https://doi.org/10.54613/001016</a>	Mazkur maqolada aholi daromadlarini oshirishning nazariy va amaliy asoslari tadqiq etilgan bo'lib, hozirgi kundagi mavjud muammolar va istiqboldagi amalga oshirilishi lozim bo'lgan taklif va tavsiyalar ishlab chiqilgan.
<b>KALIT SO'ZLAR</b>	
aholi daromadlari, kambag'allik, qashshoqlik, Jini indeksi, Lorens egri chizig'i	

Iqtisodiyotni diversifikatsiyalash sharoitida xususiy sektorni kengaytirish, tadbirkorlikni jadal sur'atlar bilan rivojlantirish, umuman biznes uchun qulay muhit yaratish va uning kafolatlarini mustahkamlash - muhim ustuvor yo'nalishlardan biri hisoblanadi. Mustaqillikning ilk yillarida Prezidentimiz tomonidan belgilab berilgan iqtisodiyotni rivojlantirishning ustuvor yo'nalishlari bugungi kunga kelib o'zining ijobiy natijalarini bermoqda.

Respublikamizda amalga oshirilayotgan iqtisodiy islohotlarning tub negizida aholini ijtimoiy himoya qilish, qilingan mehnatiga yarasha taqdirlash masalasi yotadi.

Shu maqsadda qabul qilingan 2017-2021 yillarda O'zbekiston Respublikasini rivojlantirishning beshta ustuvor yo'nalishi bo'yicha Harakatlar strategiyasining "Ijtimoiy sohani rivojlantirishning ustuvor yo'nalishlari" da belgilab quyilgan "Aholi bandligi va real daromadlarini izchil oshirish, jumladan aholining real pul daromadlarini va xarid qobiliyatini oshirish, kam ta'minlangan oilalar sonini va aholining daromadlari bo'yicha farqlanish darajasini yanada kamaytirish" yo'nalishi bo'yicha olib borilishi lozim bo'lgan ustuvor vazifalar muhim ahamiyat kasb etmoqda.

O'zbekiston Respublikasi Prezidenti Sh. Mirziyoev tomonidan Oliy majlisga murojaatnomasida ta'kidlab o'tganlaridek, "Xalqimizning hayot darajasini yuksaltirish uchun mehnatga munosib haq to'lash tizimini shakllantirish va aholi real daromadlarini oshirishimiz zarur.

Eng kam oylik ish haqi miqdorini belgilash tartibini qayta ko'rib chiqish, soliq va boshqa to'lovlarning eng kam ish haqi miqdori bilan bog'liq bo'lishiga barham berish kerak."

Xo'jalik yuritishning hozirgi sharoitida mehnatga haq to'lash, ijtimoiy qo'llab-quvvatlash va xodimlarni himoya qilish sohasidagi davlatning ko'plab vazifalari bevosita korxonalariga berilgan. Mehnatga haq to'lashning shakllari, tizimlari va miqdorini, mehnat natijasiga qarab rag'batlantirishni korxonalar mustaqil o'zlari belgilaydi.

Inson o'z ehtiyojlarini qondirish uchun moddiy ne'matlar yaratish ekan, ularni ishlab chiqarish uchun moddiy resurslardan tashqari bevosita inson o'z mehnatini sarflaydi. Faoliyat jarayonida yangi mahsulot yaratilib, inson ehtiyojlarini qondirishga xizmat qiladi. Iste'molchilarning asosiy daromad manbalari ish haqi bo'lganligi sababli, tovarlarga bo'lgan talab va taklif, ular bahosi bevosita ish xaqiga bog'liq bo'ladi. Korxonaning ishlab chiqarish-xo'jalik faoliyati jonli mehnatni iste'mol qilish bilan birga yuz beradi. Mehnat jarayonida xar bir xodimning bajargan ishi, tayyorlagan mahsuloti, iste'molchilarga ko'rsatgan xizmatlari uchun sarflangan mehnatiga haq to'lash miqdorini asoslash hamda aniqlashni talab qiladigan o'zaro munosabatlar vujudga keladi.

Mamlakatimizda olib borilayotgan islohotlarning tub maqsadi aholining turmush farovonligini oshirish hisoblanadi.

Ushbu masalalarni hal etish borasida buxgalteriya sohasida ham ijobiy ishlar amalga oshirilmoqda, xususan inson mehnat qilar ekan uning hisobini to'g'ri tashkil etish va yuritish, to'lovlarni hamda ajratmalarni o'z vaqtida olib borishni taqozo etadi.

Shuning uchun ham ish haqi fondini tashkil etish, ish haqi hisobidagi muammolar hamda ish haqi hisobi ustidan nazoratni amalga oshirish ishlovchilar uchun ham, ish beruvchilar uchun ham hamisha dolzarb bo'lib kelgan. Bu esa tadqiqot ishi mavzusining dolzarb ekanligini belgilab beradi.

O'zbekiston Respublikasi Prezidenti Sh. Mirziyoevning Birlashgan Millatlar Tashkiloti Bosh Assambleyasining 75-sessiyasidagi nutqida **Jahonning turli nuqtalaridagi notinchlik xukm surayotgani, ekologik ofatlar va ayniqsa, pandemiya sharoitida qashshoqlik va kambag'allikni global muammoga aylantirib borayotganini albatta tashvishli holat[1]** ekanligini alohida ta'kidlab o'tdilar.

Qolaversa, Prezidentimizning 2020 yil 24 yanvardagi Oliy Majlisga yo'llagan Murojaatnomasida **kambag'allikni qisqartirish ustuvor vazifalardan biri sifatida belgilandi. Murojaatnomada ta'kidlaganidek: «Hududlarda, ayniqsa, qishloqlarda aholining aksariyat qismi yetarli daromad manbaiga ega emasligi sir emas. Har qanday mamlakatda bo'lgani kabi bizda ham kam ta'minlangan aholi qatlamlari mavjud. Turli hisob-kitoblarga ko'ra, ular taxminan 12-15 foizni tashkil etadi. Bu o'rinda gap kichkina raqamlar emas, balki aholimizning 4-5 millionlik vakillari haqida bormoqda. Bu ularning bir kunlik daromadi 10-13 ming so'mdan oshmayapti, degani.** Yoki bir oilada mashina ham, chorva ham bo'lishi mumkin, lekin bir kishi og'ir kasal bo'lsa, oila daromadining kamida 70 foizi uni davolatishga ketadi. Xo'sh bunday oilani o'ziga to'q deyish mumkinmi? Prezident sifatida meni odamlarimizning ovqatlanishi, davolanishi, bolalarini o'qitishi, kiyintirishi kabi hayotiy ehtiyojlari nima bo'layapti, degan savol har kuni qiynaydi. Kambag'allikni kamaytirish - bu aholida tadbirkorlik ruhini uyg'otish, insonning ichki kuch-quvvati va salohiyatini to'liq ro'yobga chiqarish, yangi ish o'rinlari yaratish bo'yicha kompleks iqtisodiy, ijtimoiy siyosatni amalga oshirish, demakdir»[2].

Hozirgi kunda kambag'al oilaning shaxsiy kompyuter bilan ta'minlanganligi Respublikadagi o'rtacha oiladan 12 barobarga, shaxsiy mashina bilan - 11 barobarga, konditsioner bilan - 8 barobarga, changyutgich bilan - 4 barobarga, kir yuvish mashinalari bilan - 4 barobarga, muzlatgich bilan - 2 barobarga, televizor va uyali aloqa vositalari bilan - 1,5 barobarga kamligi kuzatiladi

Shunday qilib, O'zbekistondagi kambag'allikning yanada aniq tasvirini unga qarshi kurash bo'yicha asosiy chora-tadbirlar va tavsialarning mazmunini belgilaydi. Ushbu sohada olib borilgan tadqiqotlar natijalariga ko'ra, kam ta'minlangan oila 7 kishidan iborat bo'lib, oila boshlig'ining o'rtacha yoshi 50 yoshdan yuqori va u oliy ma'lumotga ega emas. Jumladan, 11% kamta'minlangan oilaning boshlig'i ishsiz, 93% holatlarda esa oliy ma'lumotga ega emas va faqat 24% o'rta maxsus ma'lumotga ega. Kamta'minlangan uy xo'jaliklarining 43% doimiy ish joyiga ega emas. 93% markaziy isitish tizimiga, 96% markaziy kanalizatsiya tizimiga va 66% markaziy suv ta'minotiga ulanmagan[4].

O'zbekistonda mazkur kategoriyaga nisbatan yondashuvning yuzaga kelishi va unga doir islohotlarni amalga oshirish juda muhim masala. Chunki shu paytgacha unga, umuman, e'tibor berilmagan, raqamlar ochiqdanmagan edi. Shu ma'noda, Prezidentimizning 2020 yil 26 martdagi "Iqtisodiyotni rivojlantirish va kambag'allikni qisqartirishga oid davlat siyosatini tubdan yangilash chora-tadbirlari to'g'risida"gi Farmoni bilan bu borada ko'plab vazifalar belgilab berildi hamda kambag'allikni qisqartirish bo'yicha yangi yo'nalishlar shakllantirildi. Xususan, Iqtisodiyot va sanoat vazirligi Iqtisodiy taraqqiyot va kambag'allikni qisqartirish vazirligi qilib qayta tashkil etilishi ushbu yo'nalishdagi islohotlarning yangi bosqichini boshlab berdi.

Bu borada xalqaro tashkilotlar allaqachon o'z harakatlarini boshlab yubordilar. Misol uchun Birlashgan Millatlar Tashkiloti tomonidan

2015 yilning 25 sentabrida barqaror rivojlanishni ta'minlash, kambag'allik muamosini bartaraf etish, insonlarning erkin yashash va tabiat resurslaridan foydalanishda tengsizlikka barham berish, ochlik va boshpanasizlikni oldini olish, atrof-muhitni toza saqlash va kelajak avlodlarga bus-butun holda ne'matlardan bahramand bo'lishlikni ta'minlash maqsadida **"2030 yilga qadar barqaror rivojlanish dasturi"** 193 davlat tomonidan ma'qullanib qabul qilingan edi.

Ushbu muhim hujjat barqaror rivojlanishni ta'minlashga xizmat qiladigan 17 ta bosh maqsad, 169 ta maqsadli vazifa va 230 ta ko'rsatkichni qamrab olgan bo'lib, kelajakda sayyoramizda istiqomat qilayotgan aholining o'tkir muammolar sirasiga kiradigan **qashshoqlik va ochlikka barham berish, to'yib ovqat yemaslikni oldini olish, iqlim o'zgarishlariga dosh berish orqali inklyuziv o'sishni ta'minlash, tabiiy resurslardan oqilona foydalanish** va boshqa shu kabi muammolarni o'z ichiga qamrab oladi.

Avvalambor aholi daromadlari qanday turlarga va tarkibga bo'linishini izohlab o'tsak. Aholining turmush darajasini, tovar sotib olish imkoniyatini belgilovchi daromad bu aholining real pul daromad hisoblanadi. Real pul daromad bu aholinig pirovard daromadiga shaxsiy ehtiyojlarini qondirish uchun sotib olinishi mumkin bo'lgan iste'mol tovarlar va bozor xizmatlarining miqdorini va jang'arilish uchun ajratilgan miqdorini bildiradi. Demak, aniqroq qilib aytadigan bo'lsak, aholining real daromadlari viloyatga chetdan keltirilgan va shu bilan birga viloyat korxonalarini tomonidan ishlab chiqarilgan tovarlar va xizmatlarni aholi tomonidan sotib olish imkoniyatini bildiradi. Aholi daromadlarini viloyat korxonalarini tomonidan ishlab chiqarilgan tovarlar va xizmatlarini sotib olishga qancha ko'p sarflasa bu korxonalarining iqtisodiy holati va imkoniyatlari shuncha yuqori bo'ladi, YaHM shuncha oshadi.

Jumladan, aholining shaxsiy daromadlari deyilganda inson tomonidan pul va natura shaklida olinadigan, uning tomonidan turmushning muayyan darajasini ta'minlash uchun foydalaniladigan mablag' tushuniladi.

Omillar nazariyasiga muvofiq asosiy ishlab chiqarish omillari quyidagilardir:

- tabiiy boyliklar (yer va tabiiy boyliklar);
- investitsiya boyliklari;
- mehnat;
- tadbirkorlik faoliyati.

Aholi daromadlari turli ijtimoiy guruhlar bo'yicha differensiyalanishi tabiiydir. Iqtisodchi olimlar buning sabablari quyidagilardan iborat, deb hisoblaydilar:

- odamlar bir-birlaridan aqliy, jismoniy va boshqa xususiyatlari bilan ajralib turishlari;
- mulkka va merosga egalik qilish;
- yangidan yaratilgan qiymat (yangi daromad taqsimlanishida differensiyalanish);
- mehnat bozorida kamsitilish (teng mehnat uchun teng haq to'lanmasligi);
- inflyatsiya darajasi;
- pinxona iqtisodiyotning mavjudligi;
- soliqqa tortishda adolat prinsiplarining buzilishi.

Iqtisodiyotda daromadlar differensiyalanishini aniqlashning bir qancha usullari mavjud. Ulardan eng asosiysi Lorens egri chizig'i hisoblanadi. Unga ko'ra, butun aholi besh guruh (kvintelga) bo'linadi. Ya'ni har bir kvintelga aholining 20,0 % to'g'ri keladi. Agar butun aholi teng miqdorda daromadga ega bo'lsa, aholining 20,0 % ga daromadning 20,0 % to'g'ri keladi. Ammo amaliyotda bunday bo'lishi qiyin. Odatda aholining kambag'al qismi daromadning 5,0-0,6 % ga ega bo'lgani holda boylarga esa uning 40,0-45,0 % to'g'ri keladi. Shuning uchun Lorens chizig'i daromadlarning aholi o'rtasida amalda taqsimlanishini aks ettiradi.

Odatda, yalpi ichki mahsulot o'sishi yuqori bo'lgan davlatlar kambag'allikni kamaytirishda ham katta yutuqlarga erishmoqda. Biroq, dunyo taraqqiyoti tarixida ko'plab teskari misollarni topish mumkin. Buning sabablari turli xil iqtisodchilar tomonidan turli yo'llar bilan izohlanadi. Masalan, ba'zi mamlakatlarda (Kolumbiya va Marokash) ushbu vaziyatning sababi iqtisodiy o'sishga parallel ravishda o'sib borayotgan daromadlar tengsizligining ta'siri bo'lishi mumkin (Kolumbiyada faol iqtisodiy o'sish davrida Jini indeksi 51,3dan 58,3gacha ko'tarilgan). Boshqa davlatlar (Filippin) uchun davlat muassasalarining ish sifati pastligi va boshqa institutsional omillar ko'rsatilgan (masalan, Filippinda davlat muassasalarining sifati 1998 yildagi 3,3 dan 2006 yilda 2,5 gacha pasaygan).

Binobarin, iqtisodchilar iqtisodiy o'sishning samaralari avtomatik ravishda aholining barcha qatlamlariga ta'sir qilishi cheklanganligi tufayli davlatning qayta taqsimlash rolini hisobga olishga undaydilar. Shunday qilib, davlat aralashuvi ish bilan ta'minlash, soliqqa tortishning progressiv turi, ijtimoiy xarajatlar va eng kam ish haqi siyosatiga yo'naltirilgan tarkibiy islohotlarni rag'batlantirish kabilarni o'z ichiga olishi lozim[4].

Yuqorida ta'kidlab o'tilgan vazifalarni bajarish borasida biz quyidagilarni amalga oshirishni maqsadga muvofiq deb hisoblaymiz:

- nodavlat-notijorat tashkilotlar bilan hamkorlikda odamlarimizni tadbirkorlikka o'qitishning eng ilg'or dasturlarini ishlab chiqish va kasbga o'qitishda nodavlat tashkilotlarning faolligini kuchaytirish;
- ishga joylashishga muhtoj shaxslarga kasbiy tayyorgarlik, qayta tayyorlash va malaka oshirish tizimini kengaytirish, bozor ehtiyojlarini hisobga olgan holda, maqbul shart-sharoitlarni yaratishga yo'naltirilgan choralar ko'rish;
- kambag'allik holatida yoki chegarasida yashayotgan aholi qatlamini kambag'allikdan chiqarish uchun ajratilayotgan imtiyozli kreditlardan va aholi tomoqalaridan maqsadli, samarali foydalanishda mikroklaster tuzilmalarini yaratish maqsadga muvofiq hisoblanadi. Buning uchun issiqxonalar qurish, chorvachilik yo'nalishlarida imtiyozli kredit olganlarni va tomoqasida mahsulot yetishtiruvchilarni ko'chat, chorva mollari, ularning ozuqasini yetkazib beruvchi, xizmat ko'rsatuvchi, tadbirkorlik ko'nikmalarini oshirishga ko'maklashuvchi tashkilotlar bilan bog'lovchi tuzilmalarni yaratish lozim.
- davlat tomonidan oila hajmini hisobga olgan holda moliyaviy ko'maklashish bo'yicha investitsiyaviy dasturlar ishlab chiqish;
- aholining kam ta'minlangan qatlamlari uchun kreditlashning yengillashtirilgan tartiblarini joriy etish
- xududlarda aholini tadbirkorlik ko'nikmalarini shakllantirishga ko'maklashuvchi o'qitish markazlarini tashkil etish hamda an'anaviy va zamonaviy ishchi kasblarga qayta tayyorlash;
- o'zini-o'zi band qilgan fuqarolarni davlat tomonidan rag'batlantirish kafolatlarini joriy etish;

- xodimlarni mehnat jarayonida ijtimoiy muhofaza qilish kafolatlarini yaratish;
- elektron platformalarni rivojlantirish asosida ish beruvchi, onlayn birjalar va xodimlar o'rtasidagi uch tomonlama munosabatlarga yo'naltirilgan masofaviy ish bilan bandlik tizimi takomillashtirish;
- raqamli iqtisodiyotga o'tish sharoitida nogironlar, farzandlarini parvarish qilayotgan ayollar, talaba yoshlarni ish bilan band qilishda virtual ish joylarini yaratishni rag'batlantirish;
- yangi samarali ish joylari tashkil etishni moliyaviy rag'batlantirishga yo'naltirilgan hududiy jamg'armalar tashkil etish;
- qishloq joylarida doimiy ish o'rinlari tashkil etuvchi tadbirkorlik sub'ektlarini kreditlar bilan qo'llab-quvvatlash uchun tijorat banklarining kredit liniyalarini yanada ko'paytirish;
- hududlarda kichik sanoat zonalarini qurish aholini ish bilan ta'minlashning eng asosiy drayveri hisoblanadi;
- mehnat bozorida raqobatbardosh bo'lmagan xotin-qizlarni ish bilan kafolatlash maqsadida davlat-xususiy sheriklik shartlari asosida korxonalar, «Xotin-qizlar tadbirkorlik markazlari»ni tashkil etish ayollar tadbirkorligini, ayniqsa kasanachilik va hunarmandchiligini rivojlantirish;
- davlat tomonidan maqsadli subsidiyalar ajratish orqali aholi o'rtasida tadbirkorlikni rivojlantirish va natijada aholi daromadlarini oshirish;

- mehnat unumdorligining oshishi aholi daromadlarining oshishiga ta'sirini tahlil qilish, ya'ni korxonalar va tashkilotlarda mehnat unumdorligini hisoblash metodologiya va usullarini ishlab chiqishni takomillashtirish zarur;

- shuningdek, mehnat unumdorligini oshishini aholi daromadlarining oshishiga ta'sirini baholash bo'yicha xalqaro reyting va indekslar bilan ishlash chora-tadbirlarini o'tkazish maqsadga muvofiq deb hisoblaymiz.

Xulosa qilib shuni aytish mumkinki, bugungi kunda Prezidentimiz tashabbusi bilan O'zbekistonda kambag'allikni kamaytirish muammosi davlat siyosati darajasiga ko'tarildi. Bu muammo mamlakatdagi islohotlarning eng og'ir yo'nalishi ekanligini ta'kidlagan holda uni kamaytirish uchun butun millat birlashishi zarur. Xalqimiz farovonligiga erishish, nochor oilalarga doimiy daromad manbai yaratishda faol ishtirok etish bu boradagi islohotlarni jadallashtirishga yordam beradi. Bu mas'uliyatli vazifa eng avvalo olimlar zimmasiga tushishini unutmazlik kerak. Fikrimizcha, mazkur yo'nalishda oliy ta'lim muassasalarida ilmiy izlanishlar olib borishni yo'lga qo'yish vaqti allaqachon keldi. Bu borada biz jahon tajribasini o'rganishimiz kerak. O'shanda Prezidentimiz ta'kidlagan metodologiyani yaratish va hayotga tatbiq qilish imkoniyatiga ega bo'lamiz.

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**KOKAND UNIVERSITY  
HERALD**

**ВЕСТНИК КОКАНДСКОГО  
УНИВЕРСИТЕТА**

**1 / 2021**

**ISBN: 2181-1695**

Bosishga ruxsat etildi 2021-yil 20-dekabr.  
Qog‘oz bichimi 60x84 1/8 «Libre Franklin, Montserrat»  
garniturasida. Shartli bosma tabog‘i 5. Adadi 20 nusxa.  
Buyurtma rakami № . Baxosi shartnoma asosida.  
“Innovatsion rivojlanish nashriyot-matbaa uyi”  
bosmaxonasida  
chop etildi.