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## FRUITS AND VEGETABLES SECTOR OF KHOREZM, UZBEKISTAN: CHALLENGES AND PERSPECTIVES

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**Abstract.** Recently many industrial sectors in Uzbekistan have been steadily developing. However, in remote regions, like Khorezm, the development of industry, especially agro-processing industry remains slow. Fruits and vegetables sector can be the main factor for the development of the regional economy in the condition of natural resource scarcity. This paper describes the development of fruits and vegetables sector in the Khorezm region over the last two decades. Moreover, the SWOT analysis and assessment potentials of the fruits and vegetables value chain in development of the regional economy are reviewed in the current paper.

**Key words:** fruits and vegetables, agro-processing, regional economy, SWOT analysis

### INTRODUCTION

Uzbekistan is a doubly landlocked country, covering 447,000 square kilometers, and with more than 30 million inhabitants it has the largest population among Central Asian countries. After achieving its independence in 1991, Uzbekistan started reforms for transition from a command economy to market economy. During the Soviet period, Uzbekistan was fully agrarian country, and presently after two decades of reforms, the country has become an industrial developing country and largest exporter of industrial production in Central Asia.

In the framework of the industrialization reforms, the agro-processing sector has been developing throughout

the country, except few regions like Khorezm. Khorezm is located in the lower reaches of the Amu Darya river in north-west of Uzbekistan, covering 680,000 ha of land, roughly 270,000 ha of which are used for irrigated agriculture (Bobojonov and Lamers, 2008), the regional arable land comprises about 6% of the national arable land (MAWR..., 2012). The economy of the region heavily depends on agriculture, according to Statistical Department of Khorezm (2012), the sector gives more than 36% of regional GDP and employs about 40% of regional labour, 66% of the population are rural. The large contribution of rural population, lack of natural resources in the region requires the development of agro-processing industry. Taking into account the state control over the cotton and wheat production, the fruits and vegetables sector can be important source for development of regional economy. Moreover, the region has favourable climatic conditions for cultivating of fruits and vegetables. Fruits and vegetables occupy more than 10% of all arable land area in the region (MAWR, 2012) and half of the total produce of fruits and vegetables in the region is enough to satisfy the respective domestic demand (Rudenko, 2008). These factors show the great potential for agro-processing development in Khorezm.

The main objective of this paper is to analysis fruits and vegetables value chain, to evaluate the potentials

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of the sector and the impact of the last government reforms. The current work can help to work out development strategy in the condition of the market economy.

## RESULTS AND DISCUSSION

### Description of the map for fruit and vegetable value chain in Khorezm

Fruits and vegetables (F&V) sector can play a strategic role in pro-poor growth strategies, particularly in developing countries. Development of the sector can provide new outlets for agricultural production, increase farmers' income and provide a more stable outlet for agricultural production. In general, the sector presents valuable opportunities and benefits for developing countries, in terms of the overall processes of industrialization and economic development, export performance, food safety.

Analysis of F&V value chain (F&VVC) in Uzbekistan is different than value chain of cotton and wheat, which usually farms produce according to the state procurement system. F&V markets in Uzbekistan were liberalized in the early 1990s (Spoor, 2006), and the main selling places for these products consider local markets or bazaars, which are very widespread in the country, and in each district there are several bazaars, where agricultural products can be freely sold (Nurmetov et al., 2014). The F&VVC in Uzbekistan was described by Rudenko (2008), and according to that description

the value chain starts from input supply to farms for agricultural output (Figure 1). Unlike cotton and wheat producer, the F&V farms don't have state subsidies for inputs, like fuel, fertilizer, water and etc. Farmers can sell produced fresh fruits and vegetables to processing enterprises, wholesalers or directly to households at the local fresh markets. Processing companies sell processed products in domestic markets, including bazaars and grocery stores. Moreover, processing companies export part of their products, mostly to Kazakhstan and Russia. Lately several large private farms have been also actively participating in processing of the fruits and vegetables. This became possible due to the support of state-commercial banks for purchasing small processing technologies. Private farms and wholesalers with special licence can export fresh fruits and vegetables to external markets.

### Fruits and vegetables production trends

The Uzbek government agricultural reforms, which started in 1991, have been positively affecting the development of the F&V sector. During the last two decades, there were great changes in the sector of the Khorezm region. F&V fields during that time, almost doubled and achieved about 34 thousand hectares in 2012 (Figure 2). In contrast to Uzbekistan, where F&V fields increased because of reducing of the cotton fields, in Khorezm the land area under F&V increased because of decreasing of the fodder crop areas. During the period F&V output

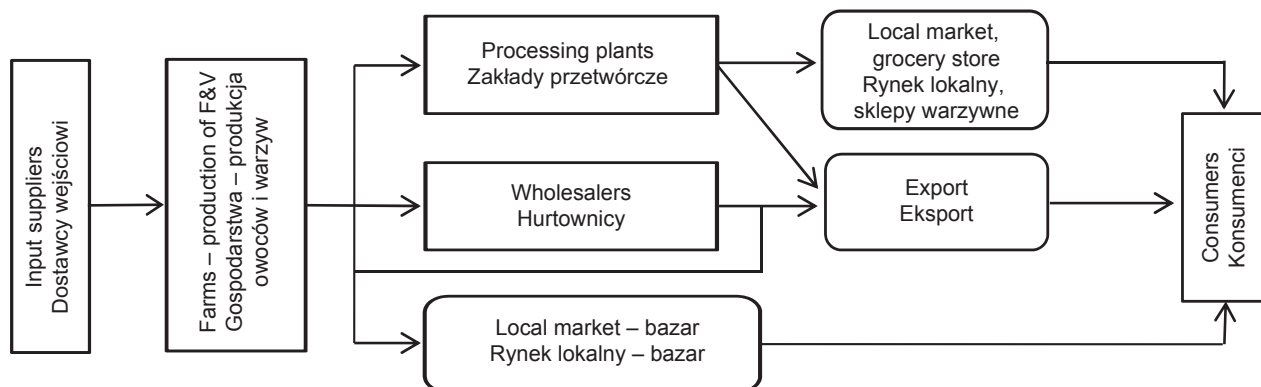


Fig. 1. Map of F&VVC in Khorezm, Uzbekistan

Source: updated from Rudenko, 2008

Rys. 1. Schemat łańcucha wartości w sektorze warzyw i owoców w Chorezm, Uzbekistan

Źródło: uaktualnione za: Rudenko, 2008

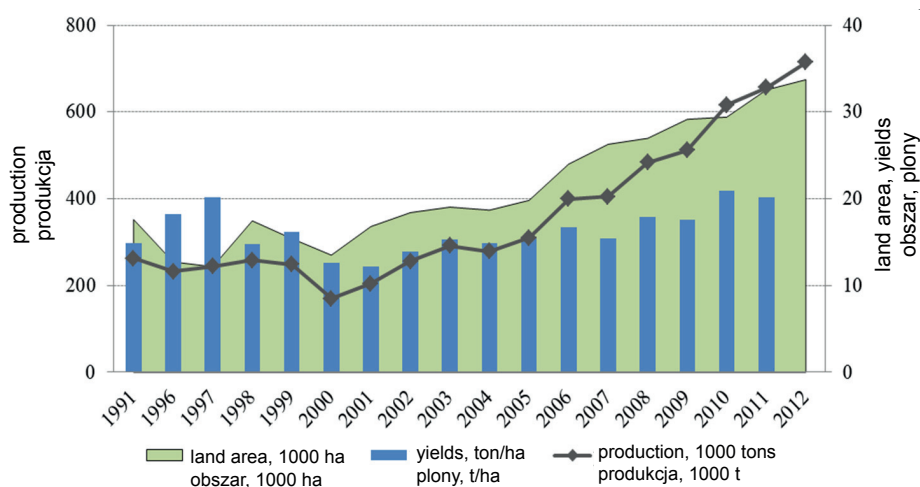


Fig. 2. F&V production trends in Khorezm, 1991-2012

Source: own elaboration based on data OblStat, 2012

Rys. 2. Trendy produkcyjne w sektorze owoców i warzyw w Chorezm, w latach 1991–2012

Źródło: opracowanie własne na podstawie danych OblStat, 2012.

increased less than 3 times and reached more than 700 thousand tons in 2012, while the yields increased by about 50%, while worsening the land quality due to land degradation and water scarcity problems. Strong droughts during 2000–2001 caused a dramatical decrease of agricultural production, which led to declining of regional economy and rural population's livelihood.

The share of Khorezm in total F&V production of Uzbekistan is about 6% (Uzstat, 2012). This small contribution related to small land area of the region and strong specialization in cotton production as compared to other regions of the country. Khorezm has a sufficient opportunity and capacity to cultivate far greater volumes of F&V. Furthermore, the following official data from Department of Agriculture and Water Resources (2009) show the high profitability of fruits and vegetables than main agricultural crops in the conditions of Khorezm: vegetables 33%, grapes and fruits about 40% respectively, watermelon and rice more than 50%, wheat around 20% and cotton 3%. The high water-intensiveness of rice and weakness of watermelon against insects strongly restrict their cultivation. In spite of the lowest profitability, cotton covers half of the agricultural crop area in the region. It is because regional economy heavily depends on cotton, which actually gives all hard currency income and serves as a raw-material for processing industry in the region. Furthermore, cotton

sector saved its good production infrastructure, coordination and many supporting state programs.

## OVERVIEW OF THE FRUITS AND VEGETABLES PROCESSING SECTOR

Besides the capability of the fields to grow F&V, also special knowledge needed for their production, such as the needs for storage, processing and transport, and the size and location of the potential markets must be further researched before production is taken up in large areas. Further processing of certain F&V in Khorezm is very promising, and it might increase the job offer in the region (Kohlschmitt et al., 2007). F&V are usually processed into a variety of products such as juices and concentrates, tomato-paste, canned and dehydrated products, jams, wines and etc.

Currently, F&V processing does not play a considerable role in the regional economy. The sectors are not developed because of the lack of regulations, coordination, cooperation and investment. At present, only 15% of F&V grown in Uzbekistan receive any degree of processing (Uzstat, 2012), and industry insiders estimate that a considerable portion of the output is being wasted. Processing of F&V in Khorezm amounts to only about 6% (Uzstat, 2012). However, in the last decade there has been a stable rise in processing dynamics (Figure 3).

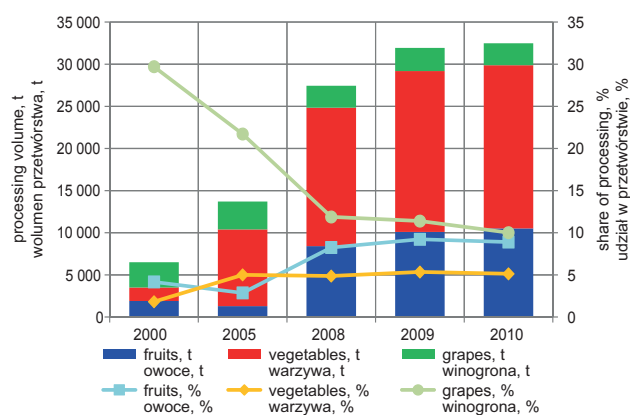


Fig. 3. F&V in Khorezm for the period of 2000-2010

Source: MFERIT, 2011.

Rys. 3. Sektor owoców i warzyw w Chorezm w latach 2000–2010

Źródło: MFERIT, 2011.

During 2000–2010, processing of fruits increased from 1900 to 10520 tons (5 times), processing of vegetables increased from 1600 to 19600 tons (12 times). The current increase was possible due to creating of new production capacities and re-functioning of old existing processing enterprises. But, processing of grapes during this period decreased to about 400 tons (13%). The main reason for the decline is associated with import of similar processed products from other regions of Uzbekistan, where the sector is more developed due to the active attraction of foreign investments.

In spite of increasing of the F&V processing volume, the production capacity usage is still lower. Currently, processing capacity usage for fruits and vegetables is on the average 30%, and for grapes about 60%. There are some processing enterprises whose capacity utilization is much lower, around 10%. Maximum capacity utilization by processing enterprises is about 60% (MFERIT, 2011). None of the processing enterprises is functioning efficiently to survive or to get favourable profit for modernization of their production capacities and for encouragement of their own staff, which can provide for improving quality and competitiveness. Based on these data, we can say that F&V processing enterprises of Khorezm are currently operating below optimal capacity.

Processors of F&V perceive their products as having a comparative advantage due to low output prices, moderate quality and good taste. However, they experience

many problems concerning technological update and raw-material supply. In condition of high competition in markets significance of new technology is irreplaceable. Provision with modern technology is better in winery production, stable sales in the local market and opportunities for investment are observed. In fruits and vegetables processing there are enterprises which that are canneries and their situation is worse; the enterprises face difficulties in modernization of their production technologies. In turn the existing equipment and products do not meet the International Standards and are not competitive. Moreover, continuing inefficient production does not allow to save up money for purchasing new equipment.

There are few cannery enterprises with more modern production technologies. Similarly to other processing enterprises they also have problems with packaging materials, like cardboard containers, glass jars and bottles, metal cans. Some of these packaging materials produced in Uzbekistan are actually not satisfying all demands of processing enterprises in the country and are not all with high quality. Import of packaging materials is expensive and conversion of national currency into foreign currency to buy these materials takes time.

### Export trends of the sector

The fruits and vegetables consumption and processing excesses are available for export. It gives farmers and agro-firms high incomes. Analysis shows that during the last decade, the F&V export dynamics in Khorezm has been unstable (Figure 4). According to State Statistical Committee, the total F&V export during 2000-2010 decreased from 4560 tons up to 3000 tons (declining by about 33%). Especially, decreasing of export volume is huge for grapes, its export decreased from 2600 tons up to 40 tons during the decade. Vegetables export increased 4 times and reached more than 2600 tons. Export of all types of the F&V decreased very sharply in 2001, also during the next years such lower export trends were fixed. The main reason for such a dramatic decrease related to drought seasons. Also, the similar situation repeated during the next drought season – in 2008, F&V export was very low. In 2010, the export volume increased very sharply and reached to 3000 tons. During the 2001–2009, the share of exported F&V in gross F&V production varied between 0.1–0.3%, 0.6% in 2010, and about 2.5% in 2000. These numbers show that F&V export in Khorezm was significantly

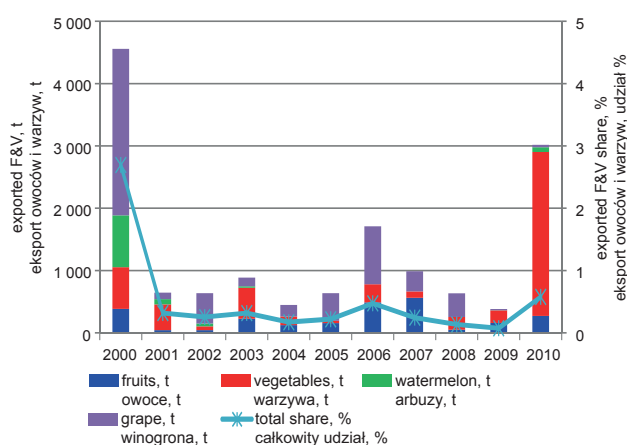


Fig. 4. F&V export dynamics in Khorezm, 2000–2010

Source: own elaboration based on Uzstat, 2010.

Rys. 4. Dynamika eksportu owoców i warzyw w Chorem, 2000–2010

Źródło: opracowanie własne na podstawie Uzstat, 2010.

lower than F&V export at the country level, where average about 8–10% of F&V exports abroad. It is important to indicate that the share of F&V output of Khorezm in F&V output of Uzbekistan is about 6%, but export share is remaining very low. The current situation again proves the weakness and inefficiency of export infrastructure of the region.

In Uzbekistan, the contribution of processed food products export in total food product export exceeds by 10%. But, regional export of processed products remains one of the lowest among the regions. In some years the Khorezm region did not export processed

F&V. During the last decade maximum processed F&V export were realised in 2001 (86 thousand USD), and in the period of 2008–2010 the processed F&V were not exported (Uzstat, 2012). This situation combined with a lack of modern production and packaging technologies, underdeveloped infrastructure and markets, as well as low competitiveness of the products.

## ASSESSMENT OF THE SECTOR'S POTENTIAL

### Processed fruits and vegetables export potential

According to the calculations (Table 1) based on annual production dynamics and population growth, the annual excess F&V after consumption should be equal to 404.5 thousand tons or 60% of the gross output, excess grapes from consumption should be equal to about 9.5 thousand tons or 30.5% of gross grape output. Current processing capacities of Khorezm are able to process only 24.1% of F&V and 46.7% of grapes, which remain after consumption. This processing potential can be realisable only in this case, when other activities of the production chain, like stable raw material supply, production system, packaging material provision, marketing research, transporting system operate efficiently. In practice, taking account of the present inefficiency of the regional fruits and vegetables processing enterprises achieving full capacity utilization is very difficult.

### Fresh fruits and vegetables export potential

Data from table 1 show that after processing and consumption, 312 thousand tons of F&V might be exported.

Table 1. Processing potential in Khorezm, 2011

Tabela 1. Potencjał przetwórstwa w Chorem, rok 2011

Name of product Nazwa produktu	Total production Produkcja całkowita (1000 kg)	Consumption Spożycie (1000 kg)	Excess product Nadmiar produkcji (1000 kg)	Processed Przetwórstwo (1000 kg)	Processing capacity use Wykorzystanie zdolności przetwórczej (%)	Processing potential Potencjał przetwórstwa (%)
Fruit, vegetable Owoce, warzywa	673 777	269 329	404 448	29 880	30.6	24.1
Grapes Winogrona	31 336	21 782	9 554	2 608	58.4	46.7

Source: own calculations based on MFERIT, 2011

Źródło: obliczenia własne na podstawie danych MFERIT, 2011

**Table 2.** Fresh fruits and vegetables export potential of Khorezm, 2011

**Tabela 2.** Potencjał eksportu świeżych owoców i warzyw w Chorezm, rok 2011

Name of products Nazwa produktu	Excess product Nadmiar produktów (t)*	Potential product losses Potencjalne straty produktu (t)**	Export potential Potencjał eksportowy (t)	Average export price Średnia cena eksportowa (USD/kg)	Potential revenue Potencjalny przychód (mln USD)	Share in total regional export Udział w całkowitym eksporcie regionalnym (%)
Fruit & vegetable Owoce i warzywa	311 889.3	46 783.4	265 105.9	1.15	304.8	210.3

\*Excess F&V after consumption and processing (100% capacity use). \*\*Product loss (15%)

Source: own calculations.

\*Nadmiar owoców i warzyw pozostały po spożyciu i przetworzeniu (100% wykorzystanie). \*\*Strata produktu (15%).

Źródło: obliczenia własne.

For calculation of real export volume, it is necessary to take into account the product losses in the process of delivering to final consumers. At present time, the official data of product delivery losses are not available for Khorezm and that is why we used official data from international practice. The volume of products losses is different and usually depends on infrastructure, location of markets and other factors. For example, the American Food Marketing Institute estimates that about 8-10% of total “perishable” food, that is F&V is wasted before it reaches consumers (The Economist, 2008), although some estimates for Europe also amount to 5–10% (van Uffelen et al., 2004). But, in Khorezm storage, transporting systems and logistics of these “perishable” F&V are not developed as in these countries, especially when we deal with foreign markets. It means the losses

can probably be higher and for calculation we can use a higher level of losses than the above mentioned indicators – 15%. According to the data from Ministry for Foreign Economic Relations, Investment and Trade (MFERIT, 2011), the average export price of F&V from Khorezm estimated about 1.15 USD per kg. Carrying out the calculations based on these data it can be assumed that export revenue from fresh F&V export can reach up to 304.8 mln. USD or 210.3% of the current gross regional export (145 mln. USD). Successful realisation of export potential will increase the contribution of the regional fresh F&V export in the country level from less than 1% up to 8.5%.

**Table 3.** SWOT analysis of the F&V sector in Khorezm

**Tabela 3.** Analiza SWOT sektora owoców i warzyw w Chorezm

Strengths – Mocne strony		Weaknesses – Słabe strony	
1		2	
Abundant fruits and vegetables for further processing. Obfitość owoców i warzyw do dalszego przetwarzania.		Unstable supply of gas and electricity to the production lines of agro-processors. Brak stabilności dostaw gazu i elektryczności do linii produkcyjnych w przetwórstwie.	
Lower cost of main inputs, including fruits and vegetables, energy. Niższy koszt głównych nakładów, włącznie z owocami i warzywami oraz energią.		Lack of auxiliary inputs, such as packaging and labels. Brak elementów pomocniczych, takich jak opakowania i etykiety.	

1	2
Favourable climatic conditions for growing fruits and vegetables. Warunki klimatyczne sprzyjające uprawie owoców i warzyw.	Lack of quality control and market research. Brak kontroli jakości i badań rynkowych.
High profitability of the fruits and vegetables sector. Duże zyski w branży owoców i warzyw.	Low availability of adequate infrastructural facilities and storage capacity. Słaba dostępność odpowiednich zasobów infrastruktury i brak możliwości przechowywania.
High tax benefits for investors and exporters. Duże korzyści podatkowe dla inwestorów i eksporterów.	Inefficient linkage between R&D and production chains Brak odpowiedniego powiązania między sektorem badawczo-rozwojowym a łańcuchami produkcyjnymi.
Opportunities – Możliwości	Threats – Zagrożenia
High value added production will increase the income of agricultural producers. Wysoka wartość dodana produkcji zwiększy dochód producentów z branży rolniczej.	High inventory carrying cost and high packaging cost. Duże koszty przechowywania zapasów i koszty pakowania.
Large production base offering a vast potential for agro- processing activities. Duża baza produkcyjna stanowi ogromny potencjał dla działalności w branży przetwórstwa żywności.	Possible natural disasters, particularly seasonal droughts. Potencjalne katastrofy naturalne, szczególnie susze sezonowe.
Economic growth of potential importer countries and increased demand for food will enhance export potential of the region. Wzrost gospodarczy krajów – potencjalnych importerów i wzrost popytu na żywność zwiększą potencjał eksportowy regionu.	Lack of national strategy to prepare for the risks and mitigation. Brak narodowej strategii minimalizowania ryzyka.
Economic relations with developed countries can help to receive advanced technologies. Stosunki gospodarcze z krajami rozwiniętymi ułatwią pozyskanie zaawansowanej technologii.	Lack of effective transport links to the potential world food markets. Brak efektywnych połączeń transportowych z potencjalnymi rynkami żywnościowymi na całym świecie.
Implementation of tax benefits will help to get access to new export markets via attracting large foreign companies. Zapewnienie korzyści podatkowych ułatwi dostęp do nowych rynków eksportowych dzięki przyciągnięciu dużych przedsiębiorstw zagranicznych.	Low local demand for processed fruits and vegetables. Niewielkie lokalne zapotrzebowanie na przetwarzane owoce i warzywa.
Improving of the attractiveness of rural areas through the development of infrastructure will boost transfer business in rural areas. Wzrost atrakcyjności obszarów wiejskich dzięki rozwojowi infrastruktury zaktywizuje działalność biznesową.	Difficulties with implementation of quality control in the processing sector. Trudności z wdrożeniem kontroli jakości w sektorze przetwórstwa.
	Supply of main raw material (fruits and vegetables) considered unreliable due to inefficient contracting system. Mało rzetelne dostawy głównego surowca (owoców i warzyw) z powodu nieefektywnego systemu kontraktacji.



## CONCLUSION AND RECOMMENDATIONS

Significance of fruits and vegetables sector can be seen in its potentials for creating new workplaces, poverty reduction and increasing of rural population's income. Realization of this potential requires several concrete measures from the government and from all participants of the sector to solve the existing problems and achieve sustainability. Here the role of the government is invaluable; it must create a new efficient infrastructure, efficient coordination and cooperation in the sector, suitable financing structures, efficient R&D and centralized marketing research centres. Inefficiency of previous strategies consists in their inflexibility to market changes, as well as market changes very fast in condition of globalization.

Supposed priority plans of the government should be oriented to the followings:

- Industrial upgrading of processing capacities in the F&VVC via attracting investments, or introducing new processing and storage technologies, so that the end products are of higher quality and with higher value added;
- Building marketing capacities, concerning finding the markets and compliance to international standards;
- Improvement of attractiveness of the sector for foreign investments which can activate introducing new processing, packaging, storage technologies and transporting system;
- Minimize product losses, maximum value, achieve high quality standards, keep processing costs low, efficient and reliable raw material supply and localization sub-programs for organising the production of packaging materials;
- Development of cooperation between participants of the sectors – farms, processors, marketing firms, research organizations.

Furthermore, while working out priority plans should base on market conditions, flexibility of strategy, interests and offers of all actors of the sector. Strong state control cannot always provide efficiency, and sometime it may lead to negative consequences for participants of the sector. Government should organise convenient conditions for better functioning of principles of the market economy.

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## SEKTOR OWOCÓW I WARZYW W REGIONIE CHOREZM W UZBEKISTANIE: WYZWANIA I PERSPEKTYWY

**Streszczenie.** W ostatnim czasie obserwuje się ciągły rozwój wielu sektorów przemysłowych w Uzbekistanie. Jednak w niektórych oddalonych regionach, takich jak Chorezm, rozwój przemysłu, zwłaszcza w branży przetwórstwa w rolnictwie, jest nadal powolny. W warunkach niedostatku zasobów naturalnych głównym czynnikiem rozwoju gospodarki w tym regionie może być sektor owoców i warzyw. W artykule opisano rozwój tego sektora w regionie Chorezm, jaki zaobserwowano w ciągu ostatnich dwóch dekad. Przedstawiono również analizę SWOT i oszacowano potencjał łańcucha wartości w branży owocowo-warzywnej dla rozwoju gospodarki regionalnej.

**Słowa kluczowe:** owoce i warzywa, przetwórstwo w rolnictwie, gospodarka regionalna, analiza SWOT

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