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*ЛОГІСТИКА ТА ВИРОБНИЧИЙ ПОТЕНЦІАЛ ГАЛУЗІ ОВОЧІВНИЦТВА ПІВДЕННОГО РЕГІОНУ УКРАЇНИ*

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## Introduction

Food security of Ukraine is an integral part of the national security of the state, a factor for preserving its sovereignty, an essential component of demographic policy and life support system, as well as a prerequisite for maintaining health and high quality of life of the country's population. Agriculture occupies a special place in the Ukrainian economy, since it plays a leading role in ensuring the country's food security; it is an important supplier of raw materials for industry, the export of agricultural products forms foreign exchange earnings, especially necessary in the context of the country's debt crisis.

Vegetable production is a component of Ukraine's agrofood production, and the United Nations Food and Agriculture Organization (FAO) has recognized Ukraine as a promising global donor of food, including vegetables.

Today, one of the most important problems both in Ukraine and in the world is maintaining a balanced diet of people. It should be noted that in recent years, per capita consumption of vegetables has increased. With the general trend towards an increase in consumption, there is a significant reduction in the country's population. It should be noted that the specifics of the formation of the consumption level in the context of regions are different. The highest level of consumption of vegetables is in Kherson, Cherkasy and Kirovohrad regions. In general, from the southern to northern regions and to the west, it decreases. Significant changes are observed in certain years and in certain regions, i.e., there are features in the formation of regional markets for vegetable products.

## 9.1. Trends in the development of the vegetable growing industry in Kherson region

Kherson region is one of the most powerful regions of Ukraine in terms of production of vegetable products. It is characterized by the most favorable natural and climatic conditions for growing vegetable crops in open and protected fields (Fig. 1).


**Fig.1. Formation of industrial zones for growing vegetables**

*Source: made by the author based on the data from the General Board of Statistics in Kherson region [11]*

Today, vegetable growing in Kherson region is a deeply specialized industry that is developing on an industrial basis using modern industrial technologies. But today there is a "small horticulture" in some farms, where the areas under vegetables do not exceed 5-10 hectares and only in some farms they reach 50 hectares or more.

Among the vegetable crops in Kherson region, the most important are tomatoes, cabbage, onions, sweet peppers and eggplants. Kherson watermelons and tomatoes are known far beyond the region, they are a quality mark and a kind of visiting card of the region [1, 2]. The areas under vegetables made 41.1 thousand hectares in 2019 as compared to 22.3 thousand hectares in 1990. The main crops grown in the region are tomatoes (32%), cabbage (11.7%), cucumbers (7.3%), onions (11.4%) and garden carrots (7.1%) (Fig. 2).

Kherson region ranks first in Ukraine in the production of vegetables, which makes 13.6% of the gross harvest of vegetables in Ukraine in 2019. In the current year, 1320 thousand tons were harvested, production of vegetables increased 3.1 times (423.4 thousand tons) as compared to 1990 (Fig. 3). Among the listed vegetable crops tomatoes are harvested at most - 677.6 thousand tons (51.3%). The main areas of vegetable growing are Gola Prystan, Oleshky and Kakhovka.

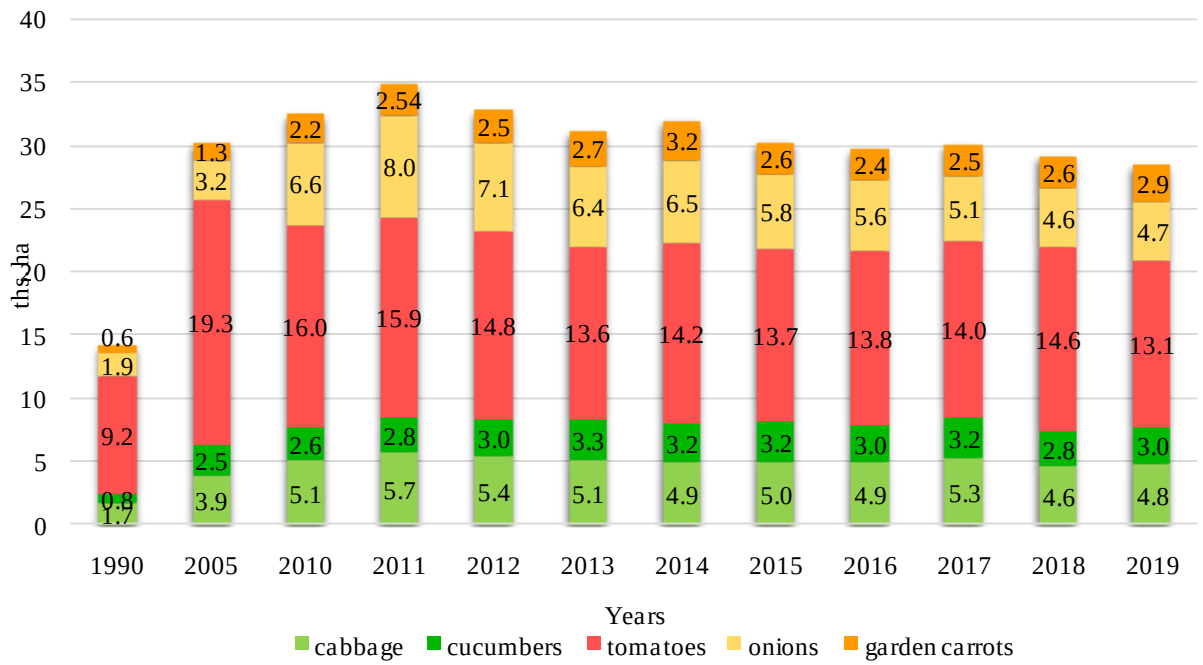


**Fig.2. Areas under vegetable crops in Kherson region, ths. ha**

*Source: made by the author based on the data from the General Board of Statistics in Kherson region [11]*

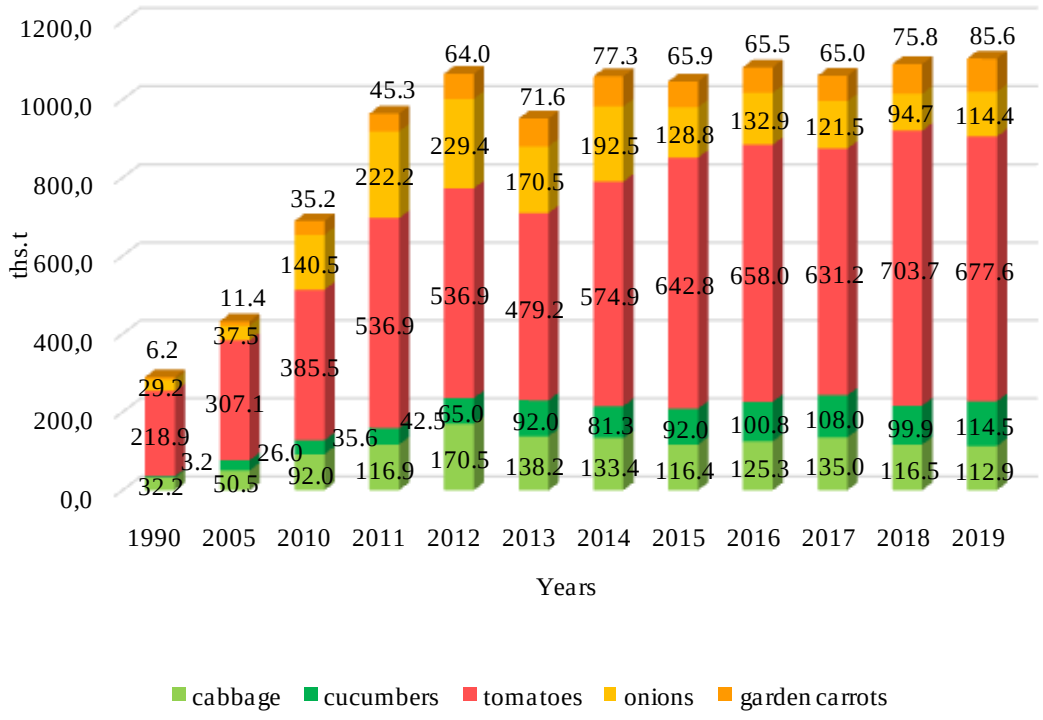


**Fig.3. Gross harvest of vegetables in Kherson region, thousand tons**

*Source: made by the author based on the data from the General Board of Statistics in Kherson region [11]*

The potential of the vegetable industry in the region was formed under the influence of a number of natural and climatic, socio-economic and infrastructural factors. The frost-free period lasts in the region 200 days on average, and the growing season - 230 days, there are 230 – 240 sunny days, which creates advantages for growing crops with a long growing season, or 2 - 3 crops during the year. Along with chernozems, especially in areas where vegetable production is concentrated, soils that are easily cultivated predominate.

In the domestic vegetable growing, sufficiently high technologies are already operating in many crops. The use of the latest progressive technologies in the growing of vegetables contributes to a significant increase in production and the receipt of guaranteed income.

One of these technologies is drip irrigation. Domestic farms first encountered the T-Tape drip system in the late 1990s of last century. According to this method, water together with nutrients is supplied to plants in drops and is evenly distributed in the soil. This system preserves the structure of the soil as much as possible, rationally consumes water and fertilizers and does not moisten its surface and the surface of plants. This system is used in the growing of tomatoes, onions, peppers, cucumbers and other crops in the South of Ukraine, in particular in Kherson region. It contributes to the development of processing enterprises here, saturation of urban markets with fresh vegetables, and also satisfies the needs of other regions of Ukraine for such products for fresh consumption and provision of processing enterprises [3].

The study of areas, production volumes and yields of major vegetable crops (Table 1) shows that producers of Kherson region produce more than 30% of tomatoes, 10% of cucumbers, 10% of onions, 9% of garden carrots and 7% of cabbage from the gross production of these crops in Ukraine.

Use of intensive technologies and effective methods of watering allow producers in Kherson region to get higher yields of vegetable crops than the average indicators in Ukraine. Thus, the yield of cucumbers is almost two times higher, of tomatoes and garden carrots - 1.5 times, onions - 1.2 times, cabbage - at the level of all-Ukrainian indicators. There is a tendency for the growth of production volumes of vegetable crops for the studied period that are not traditional for the southern region. Thus, the gross production of cucumbers and cabbage increased almost 4 times, garden carrots - 6 times. In our opinion, these trends are due to the use of productive seeds, innovative combined technologies and irrigation in the production.

**Table 1**

**Dynamics of production of the main types of vegetable products in Kherson region**

| Indicators | Years | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2000 | 2010 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Cucumbers and pickling cucumbers | | | | | | | | |
| Harvested area, ths. ha | 2.4 | 2.7 | 3.2 | 3.3 | 3.1 | 3.2 | 2.8 | 3.0 |
| % to the area in Ukraine | 3.8 | 5.2 | 6.2 | 6.5 | 6.2 | 6.3 | 5.7 | 5.8 |
| Gross harvest, ths. t | 24.6 | 47.0 | 81.3 | 92.0 | 100.8 | 108.0 | 100.0 | 114.5 |
| % to the volume in Ukraine | 3.5 | 5.5 | 8.6 | 9.6 | 10.6 | 12.0 | 10.2 | 11.0 |
| Yield in Ukraine, dt/ha | 113.1 | 166.3 | 181.5 | 189.3 | 189.3 | 176.9 | 197.5 | 197.5 |
| Yield in Kherson region, dt/ha | 101.5 | 171.9 | 250.9 | 283.4 | 329.7 | 332.8 | 358.3 | 382.4 |
| Tomatoes | | | | | | | | |
| Harvested area, ths. ha | 16.3 | 16.2 | 14.2 | 13.7 | 13.8 | 14.0 | 14.6 | 13.1 |
| % to the area in Ukraine | 15.2 | 19.4 | 17.9 | 18.2 | 18.6 | 18.8 | 20.0 | 18.0 |
| Gross harvest, ths. t | 233.6 | 404.3 | 574.9 | 642.8 | 658.0 | 634.0 | 703.7 | 677.6 |
| % to the volume in Ukraine | 20.7 | 22.2 | 26.8 | 28.3 | 29.5 | 28.0 | 30.3 | 30.4 |
| Yield in Ukraine, dt/ha | 105.3 | 218.2 | 270.8 | 301.5 | 299.3 | 303.4 | 316.5 | 304.5 |
| Yield in Kherson region, dt/ha | 143.4 | 249.9 | 404.5 | 468.6 | 457.7 | 453.1 | 480.5 | 517.8 |
| Cabbage | | | | | | | | |
| Harvested area, ths. ha | 4.0 | 5.1 | 4.9 | 5.0 | 4.9 | 5.3 | 4.6 | 4.8 |
| % to the area in Ukraine | 4.6 | 7.0 | 6.9 | 7.1 | 7.1 | 7.8 | 7.2 | 7.1 |
| Gross harvest, ths. t | 33.2 | 92.0 | 133.4 | 116.4 | 125.2 | 135.0 | 116.5 | 112.9 |
| % to the volume in Ukraine | 3.0 | 6.0 | 7.1 | 6.9 | 7.4 | 7.8 | 7.0 | 6.4 |
| Yield in Ukraine, dt/ha | 127.6 | 208.3 | 263.5 | 238.9 | 245.0 | 254.6 | 261.4 | 261.0 |
| Yield in Kherson region, dt/ha | 84.1 | 179.1 | 270.4 | 232.3 | 253.4 | 254.8 | 253.0 | 229.9 |
| Garden carrots | | | | | | | | |
| Harvested area, ths. ha | 1.2 | 2.2 | 3.2 | 2.6 | 2.4 | 2.5 | 2.6 | 2.9 |
| % to the area in Ukraine | 2.9 | 5.0 | 7.3 | 6.1 | 5.6 | 5.9 | 6.0 | 6.7 |
| Gross harvest, ths. t | 13.5 | 35.2 | 77.3 | 65.9 | 65.5 | 66.7 | 75.8 | 85.6 |
| % to the volume in Ukraine | 2.7 | 4.9 | 8.7 | 8.0 | 7.5 | 7.9 | 9.0 | 9.8 |
| Yield in Ukraine, dt/ha | 121.0 | 161.9 | 203.3 | 192.4 | 202.8 | 195.4 | 197.2 | 201.3 |
| Yield in Kherson region, dt/ha | 114.5 | 163.1 | 242.5 | 252.5 | 269.4 | 264.5 | 290.4 | 285.1 |
| Bulb onion | | | | | | | | |
| Harvested area, ths. ha | 3.3 | 6.6 | 7.0 | 5.9 | 5.5 | 5.2 | 4.6 | 4.7 |
| % to the area in Ukraine | 5.1 | 11.1 | 11.9 | 10.6 | 10.0 | 9.5 | 8.8 | 8.7 |
| Gross harvest, ths. t | 31.9 | 140.6 | 192.5 | 128.8 | 133.0 | 121.8 | 94.7 | 114.4 |
| % to the volume in Ukraine | 5.7 | 15.5 | 17.4 | 13.5 | 13.1 | 12.5 | 10.7 | 11.5 |
| Yield in Ukraine, dt/ha | 87.3 | 152.4 | 188.5 | 171.3 | 184.1 | 177.8 | 167.8 | 184.6 |
| Yield in Kherson region, dt/ha | 96.9 | 213.1 | 275.2 | 219.9 | 238.1 | 236.2 | 204.3 | 242.6 |

*Source: calculated by the author based on the date from the General Board of Statistics in Kherson region [11]*

## 9.2. Role of logistics and marketing in vegetable growing

Modern logistics has become not only a tool for transportation, storage and

distribution of vegetables, but also formed in the worldview and philosophy of globalization. The results of marketing research for 2010-2019 showed that the appearance of a multi-stage intermediary link (multiple resale of goods by structures) on the market led to a retail over-pricing and a reduction in the range of potential consumers. Thus, in 2019, the producers of the southern region of Ukraine offered the first harvest at a price of 15-17 UAH/kg (0.5-0.56 €/kg), this price level is unprecedentedly high, and after the passage of products through the intermediary chain to the final consumer of Kyiv, it was 25-35 UAH/kg, or 2 times higher. For comparison, a year ago greenhouse and ground tomatoes were offered at least 2.5-3 times cheaper on Shuvar, the largest wholesale agricultural market in Western Ukraine [4]. So the intermediary forms the economy of the industry, not the state. But it must also be borne in mind that the price is highly dependent on the variety.

The infrastructure of the wholesale market will allow for a clearer distribution of agricultural and food products, improvement of the quality of products, optimization (through centralization and more efficient organization) of entering into of agreements, loading, unloading, and other logistic procedures [5].

In Kherson region, the first steps have been taken to create agricultural service cooperatives, which are formed and created at the regional level with horizontal integration (at the village council where the production of 10-15 thousand tons of fruits and vegetables is concentrated). This makes it possible to unite small producers during formation of large batches of vegetable products; to create the necessary infrastructure: weighing facilities, warehouses with primary finishing of products (cooling, packaging, labeling); to form a common pricing policy, cooperation under contracts (agreements) bypassing intermediary structures; to ensure reliable accounting of production and sales [6,7]. In the future, this will make it possible to move to the formation of regional production and sales cooperatives, which will ensure not only sales but also production (by varieties, maturity), organization of material support (fertilizers, plant protection products, fuels and lubricants), management of vegetable-seed industry [8].

The logical continuation of horizontal integration processes is the development of vertically integrated structures – incorporations (associations) of agricultural, processing enterprises and production infrastructure, created joint stock companies with the preserved status of the legal entity, which regulate relations on the basis of contractual obligations; holding agro-industrial companies, which include enterprises, agro-industrial financial groups, which have strong financial structures investing and crediting the production activities of an agro-industrial formation. Examples of such formations may be Chumak Company and Agrofusion Holding. Unlike Chumak, the

latter provides loans to farms in the form of material resources. Agrofusion has its own fields, equipment and provides its own entire cycle from production to processing and sale of products.

The use of regional logistics centers allows reducing crop losses during transportation and sale to 35%, reducing the selling price by 5-10 times in the autumn-winter period through the use of industrial collectors for product storage. Such centers perform the function of smoothing the peak growth of prices and provide the market with vegetable products in the autumn-winter period, making it more accessible to the end consumer. The creation of distribution centers (logistics centers) for wholesale trade will allow concentrating a large number of agricultural products on one territory, and the presence of such market infrastructure elements as storage facilities, equipment for product processing, quality control services, customs services, financial, insurance companies or their departments, transport enterprises, sanitary services will contribute to bringing products to consumers at the lowest cost [9].

Analysis of foreign experience of logistics management processes in the agricultural sector allows to state that for the purpose of complete satisfaction of consumers and increase of gross domestic product it is necessary: - restructure all entities in the logistics chain in the agricultural sector according to the global regulations; -formation and functioning of the program of development of logistics in the agricultural sector according to already existing principles used in the world countries; - creation of modern logistics infrastructure; - providing a logistics process management system based on the use of information technologies [10].

Today, modern business requires a wider implementation of the latest scientific developments and management methods in the management of logistics processes. To obtain the expected result, it is necessary to create such a management structure that would include all the necessary principles of logistics using modern marketing approaches. The basis for such changes should undoubtedly be an information logistics system capable of managing processes both at the regional and the national levels.

**Conclusion**

Study of the results of the vegetable industry in Kherson region indicates that the volume of vegetable production by various types of agricultural producers has increased in recent years, with almost unchanged arable land under these vegetable crops. Kherson region ranks first among the regions of Ukraine in terms of vegetable production, the share of which is about 14% of the national volume. The lion's share of vegetable production falls on areas with a developed network of irrigation systems.

To provide the domestic consumption market with fresh vegetable products and to export them abroad, it became necessary to create a transport and logistics complex, the function of which is to generate demand for vegetable products, to optimize transport flows, handling operations, to control and guarantee product quality, and to form wholesale batches for sales, to stabilize pricing policy in the vegetable market. In the future, such complexes will be able to fulfill the role of a customer for volumes of vegetable products on a contract basis.

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