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SWEET POTATO: A PROMISING CROP FOR FOOD SECURITY AND FORAGE

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Abstract. *The article provides a brief overview of the state of sweet potato crop production in the world. Analysis of primary sources indicates the importance of this culture in solving the global food crisis and solving food security problems related to climate change and global warming. Recent research and publications indicate that the sweet potato cultivation is very widespread in the world, especially on the continents of Asia and Africa, and plays a crucial role in the diet of the local population, due to its important dietary and nutritional properties that rival regular potatoes. Numerous studies, including those carried out at the molecular level, testify to the prospects of growing this crop, thanks to its high tolerance to abiotic stresses, in particular, drought. The purpose of our article was to analyze the trends in sweet potato production in the world. We utilized methods of analyzing primary sources and statistical data from the UN Food and Agriculture Organization, as well as synthesizing international scientific sources. The analysis of statistical data showed that at the global level, the top ten producers of sweet potatoes include countries located on the Asian and African continents, as well as the United States of America, which is the largest producer on the American continent. In Europe, the production of sweet potatoes was not practiced, but in recent years there has been an increased interest in this culture both among scientists and in the production spheres. Different trends in sweet potato production development on different continents have been established. While there has been a trend of decreasing production in Asian countries over the past thirty years, African countries have shown a consistent increase in production. These differences between the two continents are likely related to internal factors within each country, which require further research.*

Key words: *sweet potato, food security, production, forage, climate change*

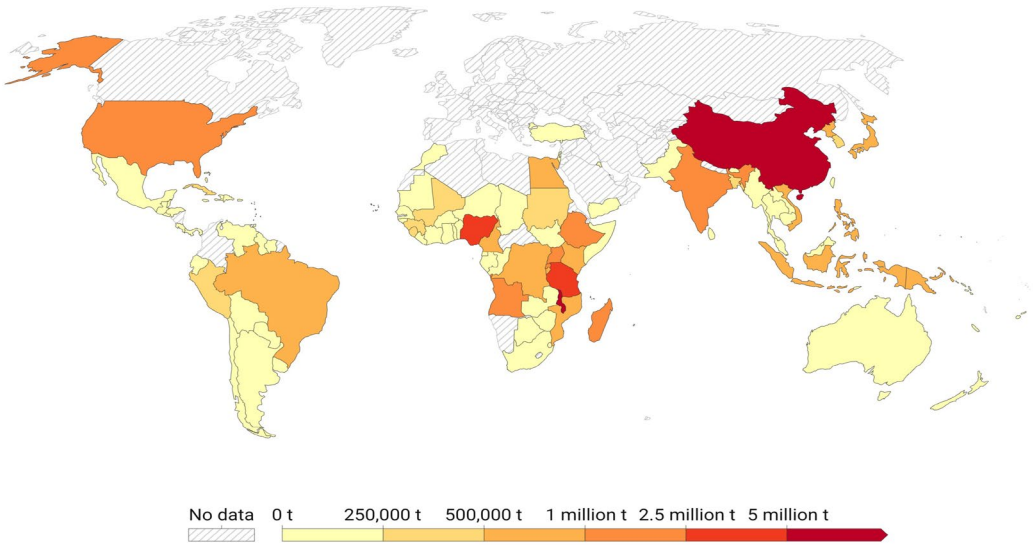
Formulation of the problem.

An important task that currently faces the world society, and particularly each country, is ensuring the population has access to sufficient, high-quality, and nutritious food. Climate change and global warming pose serious threats to agriculture, the

development of which largely depends on climatic factors. Therefore, there is an urgent need to cultivate agricultural crops that can most effectively utilize water resources for growth under changing climatic conditions.

Analysis of recent research and publications.

Sweet potato (*Ipomoea batatas (L.) Lam.*) is a perennial herbaceous plant of the Birch family (*Convolvulaceae*), *Solanales* order. Originally from Central America. The culture is very widespread in the world due to its nutritional and forage characteristics (map 1). Sweet potato cultivation is of great food importance, with production estimated at more than 92 million tonnes in 2022 [3]. Sweet potato is gaining interest among consumers in European Union countries due to its dietary properties and organoleptic characteristics such as taste, color, and aroma. Therefore, the culture is also grown in countries with a temperate climate as an annual plant for obtaining root tubers [2; 5; 8; 9; 10].



Map 1. Sweet potato production in world, ton. (2022)

Source: FAO (2023) [3]

There are two types of roots: absorptive and reserve. The absorptive roots are abundant and much branched, while the reserve or tuberous roots may be rounded, oblong, fusiform or elongated. The color of the periderm in tuberous roots varies from white to purple, and the reserve parenchyma (or pulp) can be white, yellow, orange, or purple [5].

The reserve root of the sweet potato is a food product with a significant energy value, about 120 kcal/100 g. Its main nutrient is carbohydrates (28 g/100 g), of which about 30% is sugar, and the rest is starch 15%. There is practically no fat in it, and the percentage of cholesterol is zero. Although sweet potatoes has low protein content (1-3g/100g), they are very rich in fiber (2.7g/100g) [5; 10].

In some countries of Asia and Africa, this culture has long occupied an important place as a food product of the local population. In developing countries, sweet potatoes are introduced into production with the assistance of international projects and programs on food and nutrition security and adaptation to climate change [1; 6]. Sweet potatoes are the object of numerous scientific studies, including at the molecular level, conducted at the international level and prove that this culture is promising, considering its tolerance to some abiotic stresses, in particular, drought [4; 8; 10; 13; 14].

Other studies indicate that sweet potato also has several advantages over other economically important crops, making it successfully used to address the global food crisis, especially in the conditions of extensive agriculture in developing countries [1; 5; 7; 8; 11; 12].

Setting objectives.

Due to the increased demand in Europe for the sweet potato culture in the market and its nutritional and organoleptic characteristics, our goal was to investigate the place of this culture and the development of its production in the world. Primary sources and statistical data of the Food and Agricultural Organization of the United Nations, a synthesis of international scientific sources were used for the analysis.

Presenting main material.

At the global level, the continents of Asia and Africa, followed by the Americas (chart 1), are among the largest producers of sweet potatoes. According to FAO statistics, in 2022 the ten largest producing countries in the world were: on the continent of Asia: China, India, Indonesia and Vietnam; on the African continent: Malawi, Nigeria, Tanzania, Uganda and Rwanda, while the United States of America led in production on the American continent (table 1).

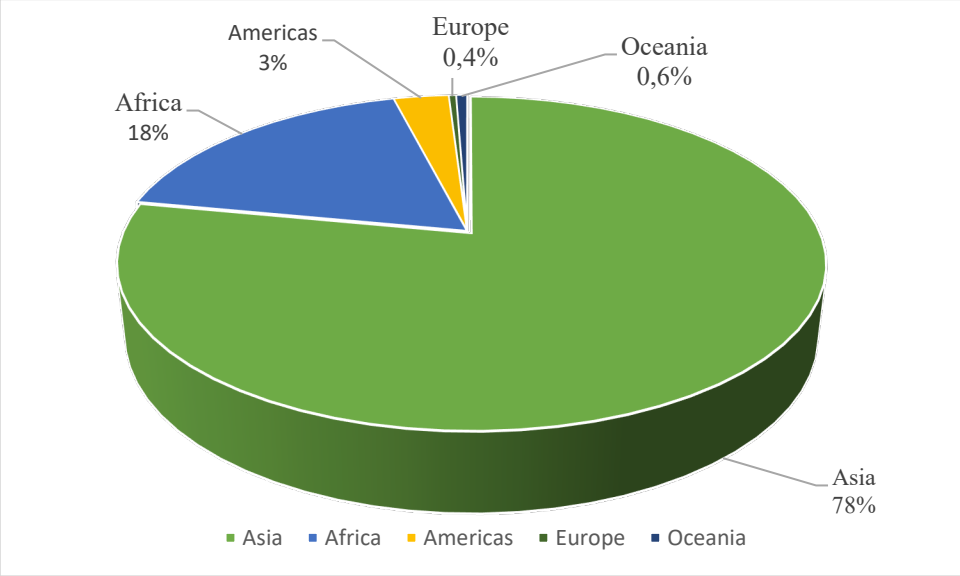


Chart 1. Production share of Sweet potatoes by region, %

Source: FAO (2023) [3]

Table 1 - Sweet potato largest producers countries in the world, (1961 – 2022)

Continents/ countries	Yield, t				Absolute change, t	Relative change, %
	1961	%	2022	%		
Asia	**91 071 060,00**	**100**	**52 711 464,00**	**100**	**- 38 359 596,00**	**- 42**
China	74 020 000,00	81,3	46 604 010,00	88,4	- 27 415 990,00	- 37
India	1 261 000,00	1,4	1 184 000,00	2,2	- 77 000,00	- 6
Indonesia	2 463 700,00	2,7	875 000,00	1,7	- 1 588 700,00	- 64
Viet Nam	1 226 000,00	1,3	976 122,25	1,9	- 249 877,75	- 20
Africa	**3 280 871,00**	**100**	**29 530 154,00**	**100**	**+ 26 249 283,00**	**+ 800**
Malawi	4 209 699,00*	-	8 051 118,00	27,3	+ 3 841 419,00	+ 91
Nigeria	149 000,00	4,5	4 011 035,00	13,6	+ 3 862 035,00	+ 2 592
URTanzania	215 000,00	6,6	4 259 619,50	14,4	+ 4 044 619,50	+ 1 881
Uganda	495 000,00	15,1	1 337 511,80	2,5	+ 842 511,80	+ 170
Rwanda	452 000,00	13,8	1 372 745,20	2,6	+ 920 745,20	+ 204
Americas	**3 285 438,00**	**100**	**3 239 922,00**	**100**	**- 45 516,00**	**- 1**
USA	654 483,00	19,9	1 176 483,00	36,0	+ 522 000,00	+ 80

Source: Prepared by the autors based on [3]

* *Production refers to 2014*

If compared with other regions of the world, the production of sweet potatoes on the European continent is not very developed, although in recent years there has been a tendency to increase the cultivated area and encourage producers to breed it. The main producing countries in Europe are considered to be Spain, Portugal, Italy and Greece [2; 5; 8].

As shown in the table, the area of sweet potatoes in Asia shows a tendency to decrease, to the greatest extent this tendency is observed in the countries of Indonesia (64%) and China (37) and to a lesser extent in Vietnam (20%) and India (6%). According to researchers, this trend can be explained by the transfer of areas to other crops, which are more profitable due to market support.

The reduction in crop area can also be explained by the increase in its productivity, which was observed in all periods [7], since, as the data show, various research institutes in these countries focused on researching this crop precisely because of its resistance to abiotic stress [6; 7; 12; 13; 14].

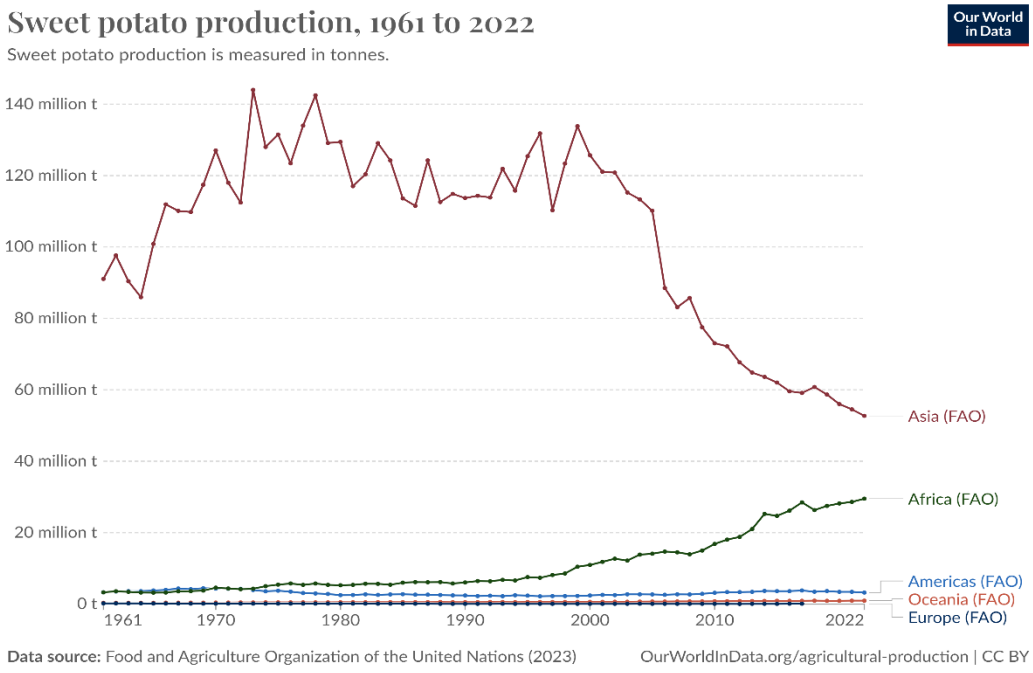


Chart. 2. Sweet potato production in the period 1961-2022, ton.

Source: FAO (2023) [3]

On the African continent, on the contrary, there has been a steady increase in the production of sweet potatoes over four decades (chart 2). This is facilitated by cooperation with the International Potato Center (CIP), which conducts out its research activities in more than 20 countries in Africa, Asia and Latin America. The center specializes in organizing its work in agro-industrial systems of potatoes, sweet potatoes and other root crops [1].

Conclusions.

As can be seen from studies conducted at different levels and in different countries, the production of sweet potatoes in the world is growing at an increasing pace and a trend towards promising cultivation is visible, as it does not require a lot of resources and can provide relatively high profits. Introduction of sweet potato production by Ukrainian farmers is an attractive prospect. Especially for producers who do not have enough resources and are constantly searching for profitable crops to grow

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