

РОЗДІЛ 9. СТАТИСТИКА

STATISTICAL STUDY OF THE DYNAMICS OF SUNFLOWER PRODUCTION:
NEW REALITIES AND CHALLENGES OF THE TIMEСТАТИСТИЧНЕ ДОСЛІДЖЕННЯ ДИНАМІКИ ВИРОБНИЦТВА СОНЯШНИКУ:
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This article delves into a meticulous examination of the sunflower production dynamics in Ukraine, scrutinizing the evolving landscape and confronting challenges in the contemporary era. The analysis encompasses a broad spectrum, including shifts in production practices, market trends, economic ramifications, environmental considerations, and the influence of global factors. With a focus on the new realities and challenges faced by the Ukrainian sunflower industry, the article aims to provide nuanced insights into the opportunities and obstacles within the context of a dynamically changing agricultural and geopolitical backdrop. Sunflower, a pivotal crop in Ukraine, holds significance both domestically and internationally, serving as a lucrative avenue for agricultural enterprises. Internationally, Ukraine emerges as a leading contributor to sunflower oil production, with profound implications for global vegetable oil markets. The article navigates through these intricacies, shedding light on the industry's role, challenges posed by geopolitical events like the Russia-Ukraine conflict, and the consequential economic impacts. As Ukraine grapples with damages to its agricultural sector, particularly in sunflower production, the article outlines the extensive recovery and reconstruction needs, providing a comprehensive strategy for revitalizing the industry. This research contributes to a deeper understanding of the Ukrainian sunflower industry's current state and its resilience amid complex challenges.

Key words: sunflower oil, sunflower seeds, agriculture, production, international trade, export, import, GDP, trade agreement, monetary damages, recovery needs.

Ця стаття присвячена детальному аналізу динаміки виробництва соняшнику в Україні, розглядаючи еволюцію практик виробництва, ринкові тенденції, економічні наслідки, екологічні аспекти та вплив глобальних факторів в сучасному світі. Аналіз охоплює широкий спектр аспектів, включаючи зміни в практиках виробництва, тенденції ринку, економічні наслідки, екологічні загрози та вплив глобальних чинників. З фокусом на нових реаліях та викликах, з якими стикається українська галузь соняшникового виробництва, стаття спрямована на надання докладних уявлень про можливості та труднощі в контексті постійних змін аграрного та геополітичного фону. Соняшник, ключова культура в Україні, відіграє значущу роль як на внутрішньому, так і на міжнародному ринках, створюючи вигідні можливості для аграрних підприємств. На міжнародному рівні Україна виступає одним із провідних виробників соняшникової олії, маючи вагомий вплив на глобальні ринки рослинних олій. Стаття докладно розглядає ці складнощі, розкриваючи роль галузі, виклики, що виникають у зв'язку із геополітичними подіями, такими як війна з Росією, та наслідки для економіки від руйнування соняшникового виробництва України, які в контексті втрат та збитків сягають \$40,2 млрд, непрямі втрати вже перевищили \$2,5 млрд. За даними служби статистики України соняшник займає 64% від загальної посівної площі всіх промислових культур у 2022 році і є експортованою культурою в 89% від усіх вироблених товарів, оскільки країна є одним з найбільших експортерів цього продукту. Через війну, руйнування сільськогосподарської та транспортної інфраструктури Україна може втратити 40% своєї потужності з виробництва соняшникової олії. Великі витрати на доставку вантажів та блокада портів суттєво ускладнили транспортування соняшникової олії до експортних терміналів. Для відновлення галузі і забезпечення її економічної ефективності необхідно залучити кошти в обсязі \$29,7 млрд на квітень 2023 року. Стаття висвітлює стійкість української галузі соняшникового виробництва в умовах складнощів та надає план відновлення, підкреслюючи важливість цієї галузі для економіки України та її значущість на світовому ринку.

Ключові слова: соняшникова олія, насіння соняшнику, сільське господарство, виробництво, міжнародна торгівля, експорт, імпорт, ВВП, торгова угода, зрешові збитки, потреби відновлення.

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General problem statement and its connection with important scientific or practical tasks.

The production dynamics of sunflower in Ukraine, while showing remarkable growth and potential, are not without their challenges and complexities. In the context of a rapidly changing agricultural and geopolitical landscape, it is crucial to address several key issues that have far-reaching implications for both the scientific community and practical stakeholders. One of the primary economic tasks is to analyze the resilience of Ukraine's agricultural sector, particularly sunflower production, in the face of economic

shocks, price fluctuations, and market dynamics [12]. Understanding how the sector can adapt and remain economically stable is crucial. Addressing the economic implications of sunflower production is a practical task. Given its significant contribution to Ukraine's GDP, it is important to ensure that the sector remains stable, and that the country diversifies its exports to reduce dependence on a single commodity.

Analysis of recent studies and publications.

Recent studies and publications provide valuable insights into the dynamics of sunflower production

in Ukraine, offering a comprehensive understanding of the challenges and opportunities faced by the industry. Petrenko et al. [7] cover the role of sunflower crops in the Ukrainian economy as well as cultivation peculiarities. Additionally, Hamulczuk et al. [4] find that integration between Ukraine and the European Union simplify sunflower oil pricing and trading processes between the partners. Furthermore, we based our analysis on statistical data collected by United States Department of Agriculture [1], World Bank [11], State Statistics of Ukraine [9], and Index Mundi [5]. Finally, we rely on data reviewed by KSE Agricenter [11] on damages to sunflower crops industry as well as recovery needs and strategies.

Formulation of aims of the article. The aim of the research is to comprehensively analyze the sunflower production dynamics in Ukraine, focusing on the new realities and challenges of the current time. This analysis will encompass various aspects of sunflower production, including but not limited to, the evolution of production practices, market trends, economic implications, environmental considerations, and the impact of global factors. By examining these dynamics, the article seeks to provide insights into the opportunities and obstacles faced by the Ukrainian sunflower industry and contribute to a deeper understanding of its current state within the context of changing agricultural and geopolitical landscapes.

Statement of basic material. Sunflower, a highly sought-after agricultural crop in Ukraine, plays a pivotal role in both the domestic and international markets. It presents an avenue for agricultural enterprises to achieve substantial profits. Sunflower seeds serve as a valuable food product and find widespread application in numerous branches of the processing industry [7, p. 111].

Internationally, sunflower oil is the fourth most produced oil, which accounts for 9% of major vegetable oils produced worldwide. The top three

sunflower oil producers include Ukraine (4.33 Mt, 29%), Russia (3.57 Mt, 24%), and the EU (3.19 Mt, 21.4%), which sum up to 75% of the global market share, with Ukraine being a leading producer [1, p. 12]. Sunflower, safflower, and cottonseed oils constitute 9.4% of Ukraine's total exports, which are approximately 3.2% of the nominal gross domestic product (GDP) [8].

Regarding exports, Ukraine is estimated to have earned \$5.6 billion from sunflower oil. Major importers of Ukrainian sunflower goods are India (40%), the EU (30%), and China (11%) (Figure 1).

Interestingly, Ukraine covers 90% of the EU sunflower oil demand. Key factors driving this number include competitive pricing on Ukrainian agricultural commodities, geographical proximity, high-quality standards, and EU-Ukraine Association agreements which significantly simplified the trade relationships between partners. Moreover, Hamulczuk et al. [4] found that time-varying integration of Ukrainian sunflower oil market with the EU significantly strengthened the relationship between commodity prices between trader partners. Hamulczuk et al. [4] prove there exists a long-run equilibrium relationship between the Ukrainian sunflower oil prices and the EU prices, which confirms strong trade integration between partners.

Relying on data from the State Statistics Service of Ukraine, sunflower seeds accounted for 64% of the total planted area of all industrial crops in 2022 (Figure 2).

However, with the escalation of the war in February 2022 between Russia and Ukraine, the biggest producers and exporters of sunflower goods are significantly negatively affected which is detrimental to the global economy. In numbers, Ukraine may have lost 40% of its sunflower oil production capacity due to Russia damaging agricultural and transport infrastructure [1, p. 6]. In total, the

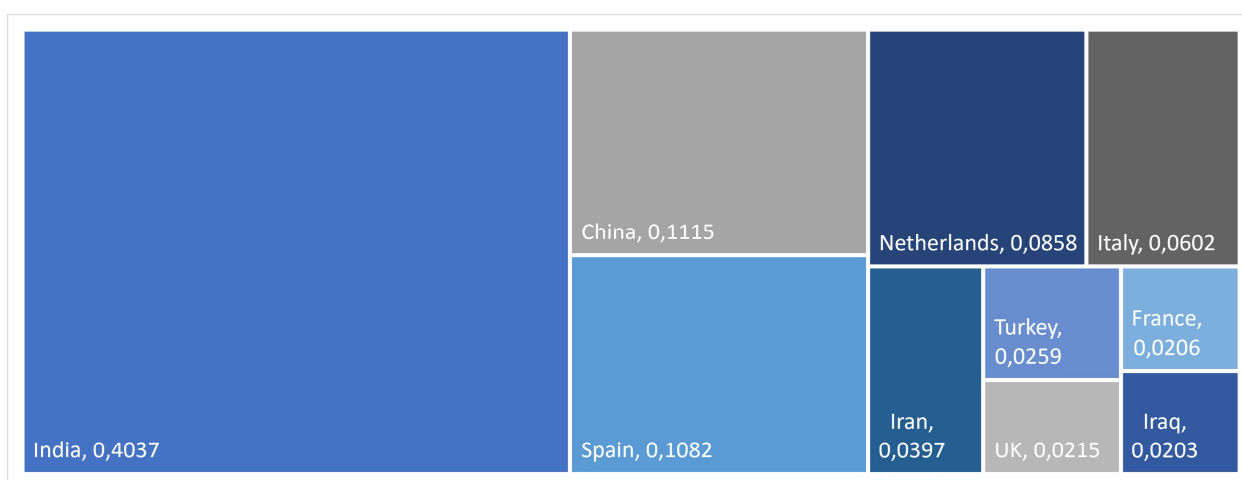


Figure 1. Top 10 importers of Sunflower Oil from Ukraine in 2021

Sources: [2]

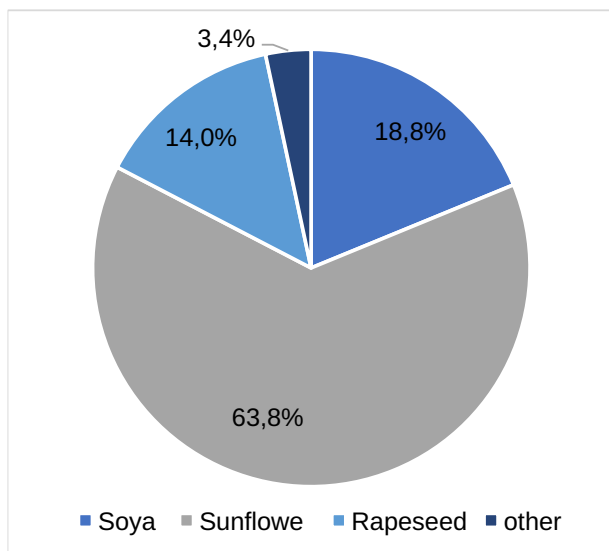


Figure 2. Planted area of industrial crops in Ukraine by type in 2022

Sources: [9]

Ukrainian agricultural sector faced \$40.2 billion in damages as of April 2023, of which \$8.7 billion in direct damages and \$31.5 billion in indirect damages (including lowered production, logistics disruptions, price fluctuations, and opportunity costs) [11, p. 2]. The direct damages to sunflower crops have already surpassed \$2.5 billion [11, p. 21].

Figure 3 shows the dynamics of sunflower seed oil production as well as consumption in Ukraine by a specific year. On average, Ukraine has been consuming around 11% of the total amount produced, which means the remaining 89% of sunflower goods are export-oriented, as the country is one of its largest exporters. Ukraine faced a sunflower crop decline of 15% in the 2020/2021 season caused

by dry conditions in the Kirovohrad, Kharkiv, and Dnipropetrovsk regions, which affected vegetation and lowered crop yields. Such a downturn was also exacerbated by supply chain disruptions because of the COVID-19 crisis.

Since the beginning of the war, the European Union had to rely on domestic production which caused falling demand for Ukrainian sunflower oil. As a result, in late July 2022 wholesale price for Ukraine's refined sunflower oil decreased to 1.44 \$/kg (the stable price was 1.8 \$/kg during the summer period in 2022) [6]. Moreover, transporting sunflower oil from production facilities to export terminals became challenging due to logistics disruptions caused by major ports blockade by Russia. According to Grygorenko [3], in some cases, the costs of cargo delivery increased 4–5 times. Due to the transshipment of mostly agricultural products through Polish ports, Poland managed to increase the cargo volume by 68.2% in major ports in Gdansk in 2022 (Table 1).

Table 1

Increase in cargo volumes in major Polish ports in percentage by year

| Port | Growth in 2022 | Growth in first half of 2023 |
|----------------------|----------------|------------------------------|
| Gdansk | 68.2% | 36% |
| Gdynia | 28.2% | 10% |
| Szczecin-Świnoujście | 36.8% | 3.5% |

Sources: [3]

However, the Ukrainian sunflower seed (and agricultural in general) industry is facing significant challenges ahead. As of April 2023, recovery and reconstruction needs account for \$29.7 billion [11, p. 13]. That includes a multi-step strategy

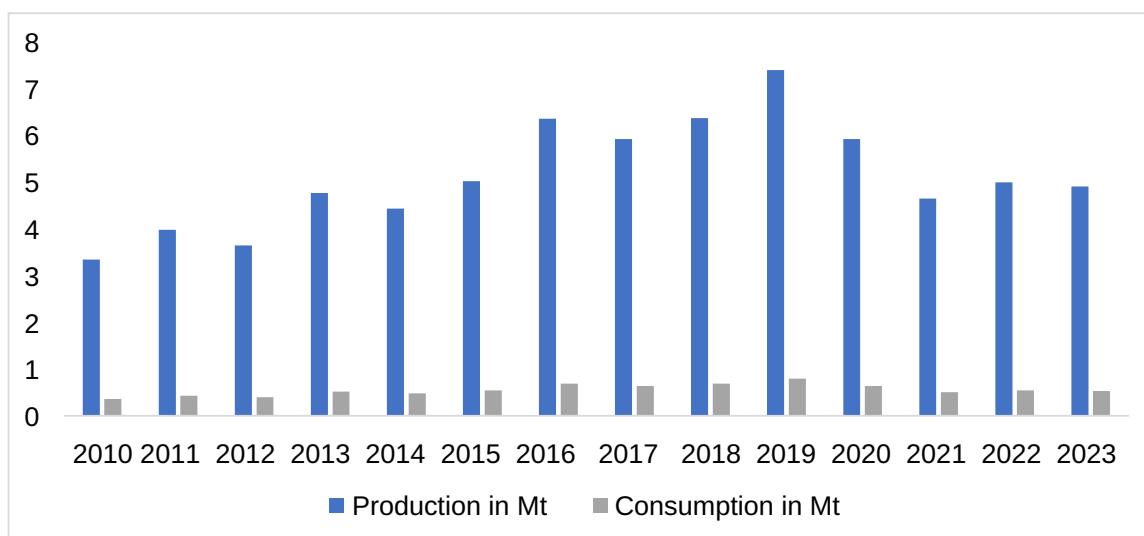


Figure 3. Ukraine Sunflower seed Oil Production and Consumption in Metric tonnes by year

Sources: [5; 2]

(discussed by von Cramon-Taubadel and Oleg Nivievskiy [10]):

– Needs assessment: Ukrainian farmers plant 9 million hectares of land, however, due to invasion, the country managed to secure only half of the plan. Estimations of the extent of damages and losses incurred up to this point would serve as a foundation for evaluating the necessary resources if the conflict were to conclude, allowing for prompt commencement of the reconstruction process.

– Reconstruction: the replacement and repair of destroyed and damaged assets including harvesting area as well as machinery.

– Recovery: subsidies to farmers to enable the production process and enhance volumes. Significant fiscal spending will be required to stimulate the agricultural sector.

– Modernization: using the opportunity to not only recover the losses but to modernize the saved equipment to meet high production standards and maintain high safety of farmers.

Conclusions. The article provides an in-depth exploration of the sunflower production dynamics in Ukraine, shedding light on the industry's pivotal role in both domestic and global markets. Sunflower cultivation is a cornerstone for Ukrainian agricultural enterprises, offering substantial profits and serving as a valuable raw material for various processing industries. Internationally, sunflower oil ranks as the fourth most produced vegetable oil, with Ukraine emerging as a significant contributor, producing 29 % of the world's sunflower oil. The European Union stands as a key importer of Ukrainian sunflower products, with Ukraine covering a remarkable 90 % of the EU's sunflower oil demand. This strong trade relationship is underpinned by competitive pricing, geographic proximity, stringent quality standards, and the facilitative impact of EU-Ukraine Association agreements.

The article underscores the ramifications of the Russia-Ukraine conflict on the sunflower industry. The war has resulted in significant damage to agricultural and transport infrastructure, potentially causing a 40% reduction in Ukraine's sunflower oil production capacity. The agricultural sector has suffered an estimated \$40.2 billion in damages, with both direct and indirect losses. Considering these challenges, the article highlights the extensive recovery and reconstruction needs, totaling \$29.7 billion as of April 2023. This multifaceted strategy includes needs assessment, reconstruction, recovery, and modernization, offering a comprehensive approach to rebuilding the sunflower industry and re-establishing

its economic vitality. The article encapsulates the resilience of the Ukrainian sunflower industry in the face of adversity and presents a roadmap for its recovery, emphasizing the importance of this sector in Ukraine's economy and its significance in the global market.

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