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THE ROLE OF WILD PLANT PROCESSING COMPANIES IN ENHANCING UKRAINE'S EXPORT POTENTIAL

Summary. *The relevance of the study is stipulated by the need to strengthen Ukraine's export potential through the development of local processing of wild-growing raw materials in the context of military destabilization and logistical constraints. The purpose of the article is to comprehensively study the role of processing companies in the formation of added value, taking into account international requirements and principles of sustainable environmental management. The research methodology is based on the analysis of trade statistics, regulatory framework, company cases, and the use of logical-structural and comparative methods. The results of the study show the impact of processing on export growth, employment, and regional diversification. The findings confirm the need for clustering, certification support, and modernization. Prospects are related to the development of economic models and digital tools.*

Key words: *wild raw materials, rural employment, local development, organic certification, cooperation, natural resources, post-conflict economy.*

Statement of the problem. In today's globalized market of plant raw materials, the development of the processing sector focused on wild medicinal and aromatic plants is of particular importance. Ukraine, with its rich floral diversity and large areas of natural lands, has a significant potential to strengthen

its position in the international market by developing export-oriented enterprises specializing in the processing of wild-growing products. At the same time, this potential remains largely untapped due to a number of structural, technological, and institutional barriers.

The issue of effective involvement of wild plant processing companies in export processes requires a comprehensive scientific understanding given its close connection with the current challenges of rural development, diversification of the agricultural sector, and the formation of a sustainable model of natural resource use. Processing enterprises are a key link in the value chain, ensuring the transformation of raw materials into competitive products that meet the requirements of international markets in terms of quality, traceability and environmental friendliness. Given the growing demand for natural ingredients with proven origin, especially in the EU pharmaceutical, cosmetic and food industries, the role of such companies goes beyond purely production functions and becomes strategically important for positioning Ukraine as a reliable supplier of organic and wild-grown products.

The scientific interest in this issue is driven by the need to identify effective mechanisms to stimulate investment in processing infrastructure, improve logistics, harmonize technical regulations with EU standards, and develop tools to support small-scale harvesters, who are the primary link in the wild-growth raw material value chain. From a practical point of view, the study of this topic at allows us to formulate recommendations for optimizing Ukraine's export strategy in the segment of wild resources, taking into account not only economic but also socio-environmental aspects of sustainable nature management.

Analysis of recent research and publications. The analysis of current research on the role of wild plant processing companies in increasing Ukraine's export potential allows us to identify four leading content areas.

The first area covers the strategic importance of processing wild-growth raw materials as a factor of value creation and integration into global supply

chains. In the work of A. Putintsev, O. Klymenko, S. Mala and others, it is substantiated that social and environmental responsibility of business, in particular in the field of wild products processing, contributes to the growth of export capacity of enterprises [1]. S. Melnyk, Z. Ravlinko, N. Petrukha and others found that the introduction of sustainable development management practices enhances the role of local resources in shaping the export profile of the national economy [2]. The study by L. Heiko and A. Martyniuk outlines the prospects of processing enterprises specializing in wild-growing raw materials as drivers of value added and employment growth [3]. Further research should be focused on modeling the economy of processing clusters, taking into account logistics and technological parameters.

The second area concerns regulatory and organizational barriers that hinder the development of the processing industry in the context of foreign economic activity. T. V. Mirzoieva and N. M. Tkach note that the lack of a clear policy on trade in medicinal wild-growing raw materials and the instability of the regulatory environment make long-term export planning impossible [4]. In her own separate work, T. V. Mirzoeva emphasizes the limited financial and organizational resources at the level of processing enterprises that operate without proper institutional support [5]. I. Deynega, M. Lukianyk, V. Rubel emphasize the importance of a marketing policy adapted to the conditions of the international organic market, in which products from wild resources require confirmed certification [6]. L.O.Boyko analyzes the economic feasibility of specializing enterprises in the processing of wild plants in comparison with other types of agricultural products, justifying their higher profitability in the context of supporting export orientation [7]. Further research should pay attention to the creation of pilot mechanisms for public-private partnerships in the field of certification and export of wild products.

The third area focuses on the analysis of the real state of production and the potential of the domestic market for wild plant processing. N. I. Palianychko, S.

Y. Olkhovych, O. V. Krokhtyak provide a quantitative assessment of the production base of medicinal plant raw materials in Ukraine and emphasize the need to expand it through the cooperation of small enterprises [8]. R.A. Vozhegova, P. V. Lykhovid, I. M. Bilyaeva prove that there is an untapped production and technological potential that can be activated through the modernization of primary processing in the regions of collection [9]. A. Rozhkova and J. Olentsova draw attention to the need to adapt business models for processing to the specifics of the wild market, where environmental and seasonal factors play an important role [10]. Further research should focus on the development of specialized production lines for the processing of wild plants, taking into account the pharmacological and food standards of importing countries.

The fourth area covers the ethical, environmental and ethnobotanical aspects of the responsible use of wild resources. C. Schindler, E. Heral, E. Drinkwater and others emphasize the importance of introducing traceability systems for the origin of wild raw materials, which is a critical condition for entering certified international markets [11]. Y. Ivanyo and S. Petrova model decision-making in the processing of wild products based on expert opinions, demonstrating the possibility of combining traditional knowledge and digital technologies [12]. A. Pieroni and R. Sõukand emphasize the value of local environmental practices, which are an integral part of cultural heritage and can be translated into an ethical export format [13]. The development of approaches to the verification of traditional knowledge as an element of intangible capital of processing companies is promising.

Despite the existing research on the export potential of Ukraine's agricultural sector, a number of important aspects related to the processing of wild-grown raw materials remain poorly understood. This primarily concerns the structure of exports in terms of value added, the impact of processing enterprises on the local economy, and the integration of small producers into international

supply chains. The limited empirical base on certification practices, logistical challenges, and cluster interaction in this area hinders the full development of effective management decisions. There is also a lack of systematic analysis of the barriers that hinder the development of export-oriented processing, particularly in the context of regulatory and environmental responsibility.

The proposed study aims to fill these gaps through a comprehensive analysis of export dynamics and structure, technological level of processing companies, effects on rural communities, and existing barriers. The use of generalized cases of Ukrainian enterprises, logical and structural analysis of the regulatory framework, and systematization of implemented certification practices allows not only to deepen the understanding of the problem, but also to outline applied ways to solve it. This provides the basis for the formation of sound strategies for modernizing the industry with a focus on sustainable export development.

The purpose of the article: The purpose of the article is to provide a comprehensive study of the role of wild plant processing companies in shaping Ukraine's export potential, taking into account the current requirements of the international market, logistical challenges and the needs of sustainable environmental management.

To achieve this goal, the following tasks have been set:

1. Analyze the dynamics and structure of wild plant exports, taking into account the share of processed products and their impact on value added, employment and the regional economy.
2. To assess the technological level and organizational model of domestic processing enterprises in terms of compliance with international quality standards and certification.
3. To identify systemic barriers to the development of export-oriented processing and to substantiate the directions of its modernization, clustering and integration of small producers into global supply chains.

Summary of the main material. The Ukrainian sector of harvesting and exporting wild plants is a stable element of the agrarian economy with a clear focus on foreign markets, primarily the European Union. An important role in this process is played by companies engaged in the harvesting and primary or deep processing of plant raw materials for further sale as finished or semi-finished products. In this context, processing should be understood not only as mechanical drying or grinding operations, but also as technologically more complex processes such as extraction, distillation, standardization of components, blending, etc. that increase the added value of the product and ensure its compliance with pharmacopoeial and organic requirements of importers. The degree of development of this area determines the ability of a country to go beyond the raw material export model and form a sustainable presence in international value chains. To analyze the actual state of affairs, it is advisable to consider the dynamics and structure of exports of products from wild plants in recent years (Table 1).

Table 1

Dynamics of exports of wild plant products from Ukraine (2006-2023)

Year	Volume, thousand tons	Cost, mln USD	Share of recycled products*
2006	2,02	3,33	8 %
2011	3,77	7,98	12 %
2017	3,73	7,23	10 %
2019	6,00	16,00	14 %
2023	5,02	19,78	17 %

** The share is estimated by the share of extracts, essential oils and phytopreparations in the total export structure (items 1302, 3301 of the Ukrainian Classification of Goods for Foreign Economic Activity)*

Source: compiled by the author on the basis of [14; 15; 16]

The table shows an overall increase in the volume of wildlife exports from Ukraine, both in physical and value terms. At the same time, there has been a gradual but still slow increase in the share of processed products, which has less than doubled over the past 17 years. This ratio indicates that most companies involved in exports operate within the raw materials segment, mainly limited to harvesting, drying and packaging of raw materials without their deeper technological transformation. This model allows them to maintain export volumes, but at the same time reduces their quality value and makes them vulnerable to price fluctuations for low-processed products. While the international market is increasingly demanding standardized phytoproducts with proven origin and stable composition of active ingredients, Ukrainian companies only partially meet these demands due to limited processing infrastructure and high costs of certification according to GMP [17], ISO [18] or EU Organic [19] standards.

Thus, despite the positive dynamics of overall exports, the structure of supply indicates a limited level of added value generated domestically. This creates a window of opportunity for processing companies that have the technical and organizational resources to move to a model of production of finished products from wild-grown raw materials that can meet the most demanding requirements of foreign markets.

In the European and global demand for herbal ingredients, not only the botanical origin of raw materials but also the technological ability of the manufacturer to prove the stability of physical and chemical parameters, microbiological safety, and traceability of the entire supply chain are becoming increasingly important. In this context, Ukrainian companies are focused on aligning their processes with the requirements of Regulation (EU) 2018/848 on organic production [20], the ISO 22000 food safety management system [18], HACCP principles [21], and GMP [17]. The combination of technological modernization and formalized certification procedures determines their ability to

compete in the pharmaceutical, cosmetics, and functional food markets, where the key procurement criteria are internationally recognized certificates, standardized batches, and digital traceability (Table 2).

Table 2

Organizational and technological state of wild raw material processing enterprises in Ukraine

Evaluation parameter	Typical characteristics of the sector	Compliance with international requirements
Recycling rate	Drying, calibration, and packaging dominate; deep processing (extraction, distillation) is sporadic	Partial: only a few producers provide deep processing
Quality control	In-house laboratories are predominantly at large plants; the rest rely on third-party testing	Limited: regular chemical and microbiological monitoring is carried out only by GMP-certified companies
Traceability of raw materials	Procurement through networks of small suppliers without a centralized IT system	Low: digital magazines and QR tracking is implemented in several export clusters
Technical equipment	Batch dryers, sieve sorting and basic packaging lines; high-vacuum concentrators are rare	Partial: only enterprises with long-term contracts have modernized lines

Source: compiled by the author on the basis of [3; 4; 9; 10; 11; 12]

The parameters shown in the table indicate that export batches with high added value are formed by those companies that have integrated certification schemes and invested in specialized equipment. For example, Lictravy (Zhytomyr) has GMP-certified extraction shops and sells standardized herbal products to the markets of Poland and the Czech Republic [22]. Aroma Fields (Kyiv region) carries out a full cycle "from field to essential oil", confirmed by COSMOS Organic, and supplies hydrolates to France [23]. Zhivana Organics (Lviv region) is one of the most successful examples of Ukrainian enterprises that

combine the processing of wild-grown raw materials with international quality standards. The company specializes in dried organic herbs, berries, and phytomedicines, exporting its products to Germany, France, Italy, and the United States. All raw materials are sourced from certified eco-zones in the Carpathians and Podillia, and production meets the requirements of EU Organic [19], ISO 22000 [16], and HACCP [21].

The key feature is the implemented traceability system: each batch is marked with a QR code with data on origin, processing and analysis. The company has low-temperature drying, optical sorting and its own laboratory to monitor microbiological indicators. Through a combination of technological modernization and international certification, Zhivana Organics is positioned not as a raw material supplier, but as a producer of high-quality ingredients for the EU pharmaceutical and food sectors [24].

Ecorod (Organic Original brand, Kyiv) combines cold-pressed oils with standardized packaging and is certified by EU Organic [19] and USDA NOP [25]. Herbatica (Kyiv) operates as a logistics hub that accumulates more than 50 items of medicinal raw materials, half of which are certified organic, providing contract exports to Germany, France, and Italy [26]. These examples demonstrate that consistent implementation of international standards, combined with technological modernization, is a determining factor in the competitiveness of Ukrainian processors of wild plant materials.

The processing of wild-grown medicinal plant material plays an important role in stimulating socio-economic activity in rural communities, especially in the context of destabilization of the national market due to military operations. In contrast to the procurement and supply of raw materials without added value, local processing creates stable economic effects that remain within the community: jobs, services, income from contract land use and vocational training. The involvement of local households in the process of not only collection, but also sorting, drying, packaging, and logistics services helps to maintain a basic level

of economic activity, preserve labor potential, and create an entrepreneurial environment around the processing centers. These effects are manifested in several key areas (Table 3).

Table 3

Main directions of impact of the wild raw materials processing sector on the rural economy

Direction of influence	Implementation mechanisms	Results for the community
Creating added value	Processing of raw materials on site, export under own brand	Development of new services, revenue growth
Permanent employment	Laboratories, packaging, quality control, logistics	Reducing migration, stabilizing female employment
Seasonal employment	Networks of procurers and sorters	Activation of youth and elderly residents in the "summer" period
Agricultural diversification	Supporting the cultivation of medicinal crops instead of monocultures	Resilience to climate and price risks
Resilience in a crisis environment	Jobs in the rear regions	Mitigating the economic downturn during the war

Source: compiled by the author based on [2; 6; 7; 8; 9; 13]

After the full-scale invasion of 2022, the plant-based processing sector, unlike many heavy industries, retained relative mobility. In 2024, according to estimates by human resources platforms, the processing of food and phytoproducts accounted for up to 22% of new vacancies in the real economy, which provided employment in the western and partially central regions, where the vast majority of processing enterprises are concentrated [27]. On a local scale, each medium-sized enterprise creates 6-8 permanent jobs in logistics, packaging, and quality control, and employs up to 40-60 seasonal pickers for every 100 tons of processed products [28].

Another positive effect is agrarian diversification. According to field studies, about 5-12% of the area in farms involved in cooperation with processors

is being reoriented from traditional cereals to essential oil, spice or medicinal crops such as thyme, lemon balm, mint, and echinacea. This increases the ecological sustainability of soils, reduces dependence on intensive technologies, and reduces sensitivity to fluctuations in world grain prices [29].

For example, the development of the wild-growth processing sector has a stabilizing effect on rural communities, which is especially important in times of war, energy crisis, and changing logistics routes. Its support can be a strategic tool in the process of post-war restoration of territories with natural resource potential.

The development of export-oriented processing of wild-growing raw materials in Ukraine faces a number of interrelated barriers that form systemic constraints to scaling and long-term planning. One of the key factors is the infrastructural fragmentation of the procurement network, which is based mainly on the seasonal work of informal suppliers, the lack of standardized logistics routes, and the lack of equipped pre-processing points in remote areas. This makes it difficult to comply with temperature and microbiological control in the field, which is critical when working with delicate medicinal species and export certification [3].

Regulatory barriers are primarily manifested in the absence of an adapted legal framework that would define the requirements for the circulation of wild-grown raw materials as a separate product category. Regulation (EU) 2018/848 [20], which is mandatory for exports to the EU, requires traceability of origin and preservation of the natural environment of harvesting, but Ukrainian legislation lacks mechanisms and guidelines to confirm compliance with these requirements in the field. The absence of a unified register of wild collection sites, as well as difficulties in obtaining permits for collection from the forest fund, lead to high transaction costs and legal uncertainty for companies seeking to operate legally [4].

Environmental constraints are not only related to the risks of excessive extraction of raw materials from natural ecosystems, but also to the need to

comply with international standards for resource recovery, minimization of anthropogenic impact, and local community participation in biodiversity conservation. For certified supplies of wild-grown products, it is critical to have a confirmed absence of contamination (pesticides, heavy metals), but a significant part of Ukrainian forests is not covered by regular monitoring, which complicates the process of confirming the safety of origin [8; 11].

Financial barriers remain one of the most significant for SMEs. Obtaining EU Organic [19], GMP [17], or ISO 22000 [18] certificates requires significant costs for audits, equipment upgrades, staff training, and documentation, while most government support programs cover only agricultural production, not wildcrafted raw materials processing. Bank lending instruments are hardly adapted to the cyclical seasonality of the industry, and venture capital or cooperative models of support are still the exception rather than the norm. As a result, a significant number of potential participants in international trade are limited to basic operations and do not bring their products to a level that allows them to obtain a price premium and sustainable contracts [1; 6].

In order to increase the export capacity of Ukrainian enterprises engaged in the processing of wild-growing medicinal and herbal raw materials, it is advisable to develop a set of measures focused on technological modernization, institutional support and integration into global value chains. First and foremost, it is necessary to target the upgrade of processing facilities with a focus on the introduction of energy-efficient drying equipment, modern distillers, extraction and filtration lines, as well as automated sorting and packaging systems. This will allow the companies not only to improve the quality of their finished products but also to meet the technological specifications of importers in the pharmaceutical, food and cosmetic sectors.

An important area is to stimulate international certification - EU Organic [19], GMP [17], ISO 22000 [18], HACCP [21] - through mechanisms of partial cost compensation, tax burden reduction, or inclusion of relevant services in

government and donor support programs for agro-processing. Small businesses can be involved in such processes through cooperative platforms or associations that accumulate the necessary resources for joint audits, documentation, and logistical support of export consignments. Particular attention should be paid to creating training modules for employees and middle managers aimed at mastering the requirements of traceability standards and procedures.

It is also advisable to develop geographically integrated cluster models that bring together harvesters, processors, logistics operators, and agrochemical analysis centers within the same region. Such models help reduce transaction costs, standardize quality approaches, and increase foreign buyers' confidence in Ukrainian suppliers. Clusters based on existing procurement and processing hubs in the Carpathian region, Polissia, and Western Podillia, where a number of certified enterprises with export history already operate, are particularly promising.

At the same time, tools should be developed to integrate small producers into international supply chains, in particular through the creation of digital platforms that would accumulate information on available raw materials, certificates, harvesting and logistics conditions. Such solutions would reduce information barriers for traders and facilitate the search for reliable counterparties on the Ukrainian side. It is also recommended to intensify cooperation with international technical assistance projects (e.g., SIPPO [30], GIZ [31], ITC [32]) that have experience in supporting the export of wild products from Eastern European countries.

In general, the strategic enhancement of the export capacity of the wild-growth processing sector requires a comprehensive approach that combines infrastructure modernization, access to certification procedures, clustering, and digitalization of interaction between all chain participants. Such an approach will allow Ukrainian companies not only to increase exports but also to strengthen

Ukraine's reputation as a stable supplier of products with proven origin, high quality and environmental responsibility.

Conclusions. The study found that wild plant material processing enterprises play a key role in the formation of Ukraine's export value added. They ensure that products comply with international quality standards (EU Organic, ISO 22000, GMP, HACCP), contribute to the geographical expansion of export supplies, and boost the development of rural communities through job creation and cooperation.

The main barriers to the development of export-oriented processing include fragmented infrastructure, regulatory uncertainty in the field of wild harvesting, limited access to certification, financial difficulties for SMEs, and poor integration of small producers into international supply chains.

The proposed recommendations include modernization of processing facilities, development of cluster models in regions with high natural potential, stimulation of certification activity through international support programs (SIPPO, GIZ, ITC), and introduction of digital traceability tools.

Prospects for further research include economic modeling of the impact of the processing sector on the sustainability of local economies, as well as analyzing the effectiveness of government policy on certification and export support for wild products.

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