

Analysis of Medicinal Plants Cultivation in Ukraine on Sustainable Development Principles

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Abstract

Medicinal plants have always served people, primarily for the treatment of various diseases. In parallel with the development of human civilization, medicinal herb growth is evolving simultaneously. First of all, it involves the cultivation of medicinal plants, which is socially significant, economically viable, and export-oriented area of production world over. However, in some countries, particularly in Ukraine, this industry is in its infancy and needs consistent action for its development. This article reveals the socio-economic significance of medicinal plants being grown, some advantages and disadvantages of cultivated medicinal plants compared to wild relatives, the main restraining factors of its development, and comparison of key problems and opportunities for effective development of the industry in the future in Ukraine through using SWOT analysis. In particular, the article develops a scale for determining the levels of strengths and weaknesses, and a scale for assessing the importance of external opportunities and threats. It also presents a strengths and weaknesses of medicinal plants in Ukraine, and potential external opportunities and threats.

Keywords

Medicinal herbs; Cultivation of medicinal plants; SWOT analysis



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Introduction

The use of the plants' healing properties is associated with the development of human civilization, science and industry. The study and development of medicinal plants have contributed to numerous expeditions of researchers, the development of trade relations and travel, and exchange of plants between different countries. A diversity of medicinal plants in different countries evolved in accordance with climatic conditions, with the diverse composition of the local ethnography and ethnobotany. The arsenal of medicinal plants in Europe has expanded significantly due to the acclimatization of valuable plants having tropical and sub-tropical origin, the development of their production and breeding processes. The relevance of the medicinal properties of plants will never vanish, and the demand for them will constantly grow.

It is worth mentioning that medicinal plants and raw materials originating from medicinal plants are used in many sectors, such as:

- the pharmaceutical industry producing drugs and medicines.
- the veterinary medicine and zootechnics treating ailments of the animals and used to stimulate physiological processes. Products from this sector increase milk yield if added to the animal feed, obtain better quality fur from sheep and fur animals, and prevent diseases.
- the beekeeping wherein plants act as unique base to make varieties of honey having medicinal properties.
- the fibre industry as the raw material is used in the textile industry.
- the food industry wherein plants act as spices, flavour enhancers, flavourings in both pure and processed form.
- the production of perfumes and cosmetics (creams, gels, shampoos, perfumes, eau de toilette, lotions, varnishes, balms, etc.).
- the pulp and paper industry use plants as a raw material in the production of paper, cardboard, insulation boards.
- the fuel industry use plants as biomass for producing biofuel.
- the chemical industry use plants both in the production of household chemicals and as a source of carbon for the production of sorbents.
- the vegetable cultivation and horticulture plantations use medicinal plants as means of increasing yields and protecting plantations from pests, fungi and insects.
- the decorative segment of landscaping.
- the green tourism and recreational activities (herbal tea, etc. are offered to tourists and vacationers).

Although medicinal plants are used as raw materials in many industries and agriculture, it is the pharmaceutical industry that is the largest processor of medicinal plants. Therefore, medicinal plants are placed at the juncture of agricultural and pharmaceutical production. In this article, the prerequisites of sustainable herbs production are studied. In the agricultural sector, there is the cultivation of medicinal plants and the production of raw materials, whereas processing of raw materials is largely done in the field of pharmaceuticals to produce drugs. In Ukraine, more than 45% of drugs produced by the chemical and pharmaceutical industry are made from herbal raw materials, and these drugs are used for the prevention and treatment of cardiovascular diseases, liver diseases, gastrointestinal tract ailments. For the manufacture of number of pharmaceuticals, the raw material is wild medicinal plants, which, in many cases, are used without special processing (Zhelaga and Bezpala, 2011).

A vast potential of the pharmaceutical market all over the world makes it attractive for economic investment, and the medicinal plant industry, which is part of the pharmaceutical industry, acts as a foundation for pharmaceutical industry. There are more than 20 capable companies and enterprises in Ukrainian marketing herbal medicines. Demand for medicinal plants, including essential oils and spices, in Ukraine has grown rapidly during recent decades because of the increasing interests at the local, national and international levels, especially through the pharmaceutical industry in Western Europe. Simultaneously, the integration

of Ukrainian economy into the world economy and the process of globalization strengthens the potential of Ukrainian medicinal plants and opens its access to new markets.

The products of medicinal plants are heterogeneous in terms of ingredients, consumer qualities and pre-final materials. These are green medicinal plants and herbs, medicinal plant raw materials, medicinal teas, essential oils, hydrolats, etc. In addition, pharmaceutical companies produce a wide range of drugs based on plant materials, including extracts, tinctures, syrups, powders, pills, solutions for injection, aerosols, drops, granules, and substances. This study has found an interesting arena wherein herbal materials are used in the production of pillows. The consumers are now actively buying pillows filled with juniper, mint, chamomile, sage, etc.

In recent years, medicinal plant products are penetrating new market segments in the form of plant components of healthy food and disease preventive measures. One of the trends in the modern market of medicinal plants is having popular ready-made products made from medicinal raw materials. The products like aroma candles, healing teas and various detox items for a healthy lifestyle are popular in different countries. Existing data show that, in different regions of the world, the market of medicinal plant products is growing on an average 3-4 times faster than the growth rate of national economies in the same regions. Increase in trade, which in some cases reaches 20%, means that the market size of medicinal plant products and its processing doubles every 4-5 years.

Review of Literature

Scientists from all continents have studied the production of medicinal plants. The vast majority of publications related to the development of the market of medicinal plants reveal the trends in this field in Asia and Africa. For example, Dzoyem, Tshikalange and Kuete (2013) in their study noted that the cultivation of medicinal plants is an integral part of African civilization. Scientists focus on trends in the production and sale of medicinal plants in African markets.

Review of the medicinal plants market in Asian countries shows that its development is accompanied by problems identically inherent in Ukrainian medicinal plant cultivation. Thus, Astutik, Pretzsch and Kimengsi (2019) noted that the technologies of medicinal plant production are quite diverse; knowledge in this area is not systematized; and very little research is devoted to the problems of commercialization of medicinal plants. In this regard, it is logical to analyze the supply chain of products based on medicinal plants in India (Chhabra and Chain, 2018).

In Ukraine, little attention is paid to medicinal plant cultivation, although its development in theoretical and practical dimensions is being studied by some scientists. For example, Nykytyuk (2016), in his study of the medicinal plants market focuses on its characteristics found that Ukrainian market of medicinal plants at this stage of development is not saturated and demand significantly exceeds supply. At the same time, Ukraine has extremely favourable natural conditions for cultivation of medicinal plants and production is gradually developing. Thus, Tkachova (2018) provides information that since 2012 a good practice of cultivation and collection of medicinal plants (GACP) in Ukraine has been introduced. It can be considered as a significant shift in the development of this field. Drebot and Solohub (2018), while analyzing the world experience of medicinal plants, have concluded that the Ukrainian sphere of medicinal plants production has significant prospects given global trends and the ever-growing demand for medicinal plants in the world.

In general, the significant socio-economic importance of medicinal plants in today's contexts is determined by a number of factors, such as:

- 1) The industry produces not only products for end users, but also raw materials for other industries. It follows that the development of number of other sectors of the national economy depends on how

developed medicinal crop production will be, how efficiently the enterprise-producers of medicinal plant production will function.

- 2) In today's world, mankind has realized that a significant part of synthetic potent drugs has undesirable dangerous side effects, while the chemical nature of medicinal plants allows drugs based on them to easily integrate into human biochemical processes and rationally combine them with each other and with synthetic drugs.
- 3) High profitability of medicinal plant products, primarily due to the constant demand of the population for drugs and various products made from plant materials, encourage the entrepreneurs to invest in this sector.
- 4) Affordability of medicines from medicinal raw materials is a positively factor.
- 5) The attitude of the Ukrainian population towards natural medicines is positive; thanks to the vast experience of folk medicine and centuries-old traditions forming a favourable attitude of consumers to the products of medicinal plants.

Although the market for medicinal plants in Ukraine is growing slowly with a upward momentum, more and more farmers are cultivating medicinal plants and more and more intermediaries are procuring medicinal plant raw materials, which are collected by the population (Mirzoieva, 2020). Favourable natural and climatic conditions and fertile soils potentially allow Ukrainian farmers to grow medicinal plants with a high content of active substances, which significantly increases the competitiveness of medicinal plants of Ukrainian origin in foreign markets. Despite this and the significant socio-economic importance of medicinal plants in contemporary world, as it was evidenced by previous studies by authors in Ukraine, this segment is still in its infancy. The supply does not meet demand for medicinal plants; the range of producers is narrow and fragmented; the activities of enterprises engaged in the cultivation of medicinal plants and its processing are accompanied by a number of problems. In this reference, there is a need for in-depth research on the development of medicinal plants, and to outline the prospects for its development, and to do a systematic work to optimize the production of medicinal plants.

Materials and Methods

To outline the prospects for the development of medicinal plant cultivation in Ukraine, SWOT analysis has been used as the main research method, which is often used within the framework of strategic planning. In particular, in order to strengthen the business strategy, the most effective tool is SWOT analysis (Oles, 2015; Mirzoieva and Vasylenko, 2018).

The result of the SWOT analysis may be a system of possible actions aimed at strengthening the competitive position of the enterprise or industry in the market. Within the framework of this study, a SWOT analysis of the field of medicinal plant cultivation in general has been carried out. First of all, a scale of influence, weight and relevance of one or another factor on the development of the industry was developed (Tables 1, 2).

Thus, the elements with a score of three points are considered the most influential, and the elements with a score of 1 the least significant.

Based on the developed scale for determining the level of relevance of strengths and weaknesses and a scale for assessing the importance of external opportunities and threats, and by taking into account a number of identified problems hindering the development of medicinal plants in Ukraine, a qualitative analysis of internal and external factors affecting industry development was performed.

Table 1: Scale for determining the level of relevance of strengths and weaknesses

Score (grade)	Level of relevance	
	Strengths	Weaknesses
3	Significant advantage (unique characteristics, specific to a particular enterprise or industry)	Catastrophic trait (characteristic that can lead to cessation of activity or development)
2	Strong (the characteristic contributes to the activity of the enterprise or the development of the industry, but there is another enterprise or industry where this side is stronger)	Weak (characteristic inhibits activity or development, but there is another enterprise or industry where this side is even weaker)
1	Quite strong (somewhat simplifies the activity, but weaker than it can be)	Rather weak (somewhat complicated activity, but to a greater extent than in other enterprises or industries)

Table 2: Scale for assessing the importance of external opportunities and threats

Score (grade)	Level of relevance	
	Opportunities	Threats
3	Very strong, provides strategically important support	Very strong, achieving goals is almost impossible
2	Moderately facilitates the achievement of goals	Moderately hinders the achievement of goals
1	Almost does not affect	Almost does not affect

Results and Discussion

Mankind has been using wild medicinal plants intensively for many years, as a result of which natural resources on the planet are rapidly declining. For example, in Europe, North America and Asia, the demand for wild medicinal plants has increased annually by 8-15% in recent decades, while there is a limit below which the reproductive capacity of plants decreases irreversibly. According to a conservative estimate by a number of scientists, the current loss of plant species is 100-1000 times higher than the expected rate of natural extinction, and humanity is losing at least one potential herbal medicine every 2 years (Chen *et al.*, 2016). According to the World Conservation Union (IUCN) and the World Wide Fund for Nature (WWF), 50,000 to 80,000 species of flowering plants are used for medicinal purposes in the world (Chen *et al.*, 2016). At the same time, about 15,000 species are currently threatened with extinction due to overuse, and 20% of wild resources of medicinal herbs are almost depleted due to increasing consumption and population growth. Accelerated loss of medicinal plant species and habitat destruction is taking place all over the world, especially in China, India, Kenya, Nepal, Tanzania (Chen *et al.*, 2016).

As the resources of wild ecosystems, in particular the wild medicinal plants, are reduced due to over-harvesting, the price of plant raw materials increases accordingly. Thus, it is economically feasible to stabilize prices and restore the resources of medicinal plants through their cultivation, which has a number of advantages, some of which are summarized and presented in table 3.

In addition, when cultivating medicinal plants, there is a possibility:

- a) of planned specified quality characteristics controlled by adjusting agronomic measures;
- b) of optimal territorial location and planning of volume productions;
- c) of impact on the ecological biodiversity of wild species (Shvets, 2012).

Table 3: Some advantages and disadvantages of cultivated medicinal plants, compared with wild ones

	Characteristics	
	Advantages	Disadvantages
Cultural species	Their cultivation - reduces the load on rare species and on those that are endangered; - allows to maintain standardization and improve genotypes; - allows to produce homogeneous raw materials; - guarantees constant deliveries of medicinal plant raw materials; - provides relatively stable volumes of products and prices for a longer period.	Their cultivation - requires significant investment before and during cultivation; - narrows the genetic diversity in the gene pool of wild populations; - may cause genetic contamination of wild relatives, in the case of re-introduced plants; - is characterized by the lack of successful methods of growing some species.
Wild resources	- open access resource without initial investments; - natural resource that does not contain pesticides; - In many cases, the wild resource is more efficient.	- resources of wild plants are becoming increasingly scarce due to increased harvesting, and uncontrolled harvesting leads to the extinction of ecotypes and species; - there is a fairly high risk of falsification; - there is no inventory of wild resources and effective methods of their management.

Source: Gubanyov (2008); Mirzoieva (2020); Nikityuk and Sologub (2016)

Thus, although the production of medicinal plant raw materials by collecting wildflowers is less expensive, wild medicinal plants are an exhaustible resource; their procurement does not allow optimizing the use of labour, fixed and working capital, characterized by uncontrolled quantitative and qualitative characteristics (Orlov, 2021). The cultivation of medicinal plants on an industrial scale contributes to a more rational and efficient use of all tangible and intangible production resources, given the basis of production of medicinal plants – agricultural land. In addition, medicinal plants can be grown both on unproductive lands and in arid climates owing to the drought resistance of a number of medicinal crops (e.g., sage, wormwood, lavender, etc.) (Pochupailo, 2019).

Moreover, the cultivation of medicinal plants can help preserve the diversity of medicinal plants, allow producing homogeneous raw materials from which we can get standardized products, identify species, improve quality control, and increase the prospects for genetic improvement. It should be noted that, recently in Ukraine, the authorities are beginning to pay attention to non-traditional and niche areas of agricultural production, which include medicinal crops. In particular, the Ministry of Economic Development, Trade and Agriculture presented a project of state support for agriculture for 2021-2023, which plans new areas of support, such as crop insurance, development of beekeeping and organic production (Ministry of Economy, 2020).

Nevertheless, analysis of the development of Ukrainian medicinal crop production revealed number of major shortcomings, such as:

- shortage of quality certified medicinal plant raw materials that meet the requirements of the modern pharmaceutical industry;
- low level of competitiveness of domestic producers of various types of medicinal plant raw materials in both domestic and foreign markets;
- wear and tear of technological equipment and shortage of production capacity for some types of processing of medicinal plant raw materials;

- undeveloped infrastructure for storage, transportation and logistics of products made from medicinal raw materials;
- it is not always sufficient to comply with environmental and sanitary requirements in the industrial zones of organizations engaged in the processing of medicinal raw materials;
- lack of production technologies for high-quality raw materials based on modern biotechnology;
- lack of steps by the state to register medicinal plant protection products and lack of state subsidies for medicinal plant production, as is the case in other countries (Nykytyuk and Sologub, 2016).

The lack of state support for medicinal plant producers plays an extremely negative role. For example, in neighboring Poland, prices for medicinal plants fluctuate less intensely, although production also depends on weather conditions. But the Polish producers are protected by the State – in any case, they will receive subsidies from the State (Mentel and Hajduk-Stelmachowicz, 2020).

In turn, the lack of a clear pricing policy also hinders the development of the Ukrainian medicinal plant industry. Prices for medicinal raw materials and drugs based on them depend on weather conditions, on the trends of processing enterprises, on the world market of medicinal plants. Restraining factor in the development of medicinal plant cultivation is that the market for medicinal herbs is arranged in a fundamentally different way comparing to the food crops market. Thus, this market is mostly chaotic. There are only a limited number of crops with stable demand and relatively stable prices, and such crops are valerian (*Valeriana officinalis*), mint (*Mentha piperita*), calendula (*Calendula officinalis*), linden (*Tilia platyphyllos*), hawthorn (*Crataegus monogyna*), motherwort (*Leonurus cardiaca*), chamomile (*Matricaria recutita*, *Chamaemelum nobile*), lavender (*Lavandula spica* L.) and many others. For all other crops, the prices and demand fluctuate greatly. One year, the demand for thyme (*Thymus vulgaris* L.), for example, can be very high (for example, due to the fashion for thyme tea), and, the next year, the demand may fall at times.

Additionally, to the specific problems inherent in the field of medicinal plant cultivation, its development is influenced by a number of general national problems. Thus, the impoverishment of the population, which affects the development of most sectors of the Ukrainian economy, leads to a decrease in consumption of medicinal plant raw materials by processing enterprises and entails a decrease in consumption of medicinal plants. For example, giant factories such as the Zhytomyr plant “Liktravy”, part of the Martin Bauer companies group (head office in Germany), recorded a threefold drop in raw material procurement in 2017 compared to 2014. This was due to the declining purchasing power of Ukrainian consumers, and, at the same time, the price of final products has increased three times.

One of the main problems hindering the development of the medicinal plant industry is the fact that growing medicinal plants is a very risky business. In addition to the risks of crop failure, medicinal plant producers in Ukraine face a number of market risks: they lack in reliable market information on demand and prices; in most cases there is no guaranteed market; intermediaries often transfer price risks to manufacturers. The fact that this type of activity also causes certain risks and, therefore, reliable cultivation technologies are not yet fully developed. In particular, in Ukraine, there is an obvious need for the development of technologies related to cultivation, collection, storage, transportation and quality control. Similarly, the State lacks organizations to provide marketing support to medicinal plant producers, insufficient cooperation between various institutions, and a low level of coordination between market participants (Pysarenko *et al.*, 2019).

Another significant problem is that most Ukrainian producers and harvesters of medicinal plants are not aware of the strategy of sustainable development, its goals and the goals of regenerative agriculture. As a rule, they are primarily interested in higher incomes in the short term (Dunets *et al.*, 2020).

At the same time, despite the presence of a whole set of problems that is an obstacle to the development of Ukrainian medicinal plant cultivation, positive changes in the industry have been revealed. Thus, Nykytyuk (2016) highlights the main advantages of the medicinal plant industry:

- 1) Low market saturation in Ukraine, together with the fact that there is a great variety of medicinal plants. The domestic entrepreneurs are not yet able to meet all consumer needs. This fact can be considered as a significant potential for manufacturers.
- 2) Constantly growing demand for medicines and various products made from medicinal plants.
- 3) The possibility of highly profitable production, even without significant investment, if we focus on the collection of wild medicinal plants.
- 4) Relatively high incomes, which provide opportunity to processing of natural raw materials.

The factors, such as favourable natural conditions for cultivation of medicinal plants also work for the attractiveness of Ukrainian medicinal plant cultivation, the ability to produce environmentally friendly raw materials of plant origin, availability of scientific potential focused on the development of innovative pharmaceuticals based on plant raw materials, technologies for processing plant raw materials, and the presence of modern high-tech pharmaceutical companies, are extremely important given the close relationship between the pharmaceutical industry and medicinal plants (Nykytyuk, 2016).

Gubanyov (2008) singles out a set of potential advantages of the medicinal plant industry, which in the future should include the availability of infrastructure with machinery, dryers, root washing equipment, storage facilities, etc. that would provide optimal technological threshold to the plant cultivation and postharvest processing. The gross output of medicinal raw materials depends on the proper capacity and productivity of the equipment, and drying units are necessary due to the fact that drying of medicinal raw materials under direct sunlight is not allowed. However, we cannot ignore the fact that drying medicinal raw materials in dryers with liquid fuel dramatically increases the cost of products. Therefore, at the present stage, there is a need to introduce equipment for drying medicinal raw materials more actively, which will run on alternative fuels (straw, sawdust and other organic waste). Working on the development of a strategy for the development of medicinal plant cultivation, one cannot ignore the need to create the infrastructure of the industry with appropriate equipment, dryers, other equipment, and warehouses.

The identified problems of medicinal plant cultivation in Ukraine, the main problems and competitive advantages of the industry, and their relevance in order to make an objective assessment are presented in table 4.

Table 4a: Reflecting the relevance of the strengths and weaknesses of the medicinal plant industry in Ukraine

<i>Strengths</i>	<i>Relevance</i>	<i>Weaknesses</i>	<i>Relevance</i>
Marketing			
Availability of internal and external consumers	3	Imperfect network of sale channels of final products and raw materials; instability of demand in terms of individual crops	2
Constant growth of demand from foreign consumers	3	Dominance of intermediary structures	2
A wide range of applications of medicinal plant products	2	Dominance of intermediary structures	2
The possibility of expanding the range and volume of production of medicinal plant raw materials		Weak level of marketing organization in most enterprises in the industry	2
Production			
	3	Lack of sufficient necessary specialized equipment for growing, harvesting,	2

Launched a process to improve the quality of medicinal plant raw materials and the final product		primary and deep processing of medicinal plants	
		Significant dependence of medicinal plant production on weather and climatic conditions	3
		Significant complexity of production processes	2
		Lack of qualitative seed material	2
		Lack of a list of pesticides that can be used in the process of growing medicinal plants	1
The possibility of producing exclusive, branded products based on medicinal plants of their own brands	3	Lack of the market or consumer interest	1
Industry image			
Increasing competitiveness	2	Lack of full-scale positioning of the medicinal crop industry as potentially cost-effective, promising and export-oriented	2
Scientific research work			
The presence of scientific institutions whose activities focus on the study of medicinal plants	2	Relatively low level of innovative implementations	2

Table 4b: Reflecting the relevance of the strengths and weaknesses of the medicinal plant industry in Ukraine

<i>Strengths</i>	<i>Relevance</i>	<i>Weaknesses</i>	<i>Relevance</i>
Management organization			
Availability of some successful management systems for the production of medicinal plants	2	Lack of industry development strategy, insufficient attention to the development of the industry by the state and society, lack of association to promote the specific interests of market participants	2
Integration of farms based on rural communities	2	Imperfect legislation governing the production and procurement of medicinal plants	2
The existence of formal and informal links between members of rural communities	2	Shortage of qualified specialists and specialized literature	3
The possibility of borrowing foreign experience in the development of medicinal plants in the world	2	Low level of practical training of farmers to create integration formations of cooperative and corporate types	1
Finances			
Capital investment with a high level of return	3	Dependence on creditors, high interest rates on loans, lack of government financial support programs	2

Relatively high level of profitability of medicinal plant production, a fairly high level of profitability in terms of individual species	3	Lack of funds to finance innovations	2
Staff			
The presence of fans of their business and a significant number of concerned	3	Insufficient level of professionalism of managers and qualification of employees to ensure proper product quality	2
The potential willingness of villagers to form informal associations	2	Lack of highly productive labor in rural areas	3
		The complexity of the organization of wildlife collectors	2
Technologies			
Reserves to increase production and its efficiency through the use of modern technologies	2	Significant technological backwardness of production processes in most cases	2
Borrowing fairly simple technologies of agricultural production and adapting them to the requirements of medicinal crops	3	Application in the production process of obsolete technologies and equipment	2
		High energy consumption of production and processing processes, which is primarily due to the need to dry vegetable raw materials	2

Conclusion

Reflecting the relevance of the strengths and weaknesses of the medicinal plant industry in Ukraine (Tables 4a, 4b) allowed to draw the following conclusions. First, at the present stage of development, Ukrainian field of medicinal plant cultivation has more weaknesses than strengths. However, the strengths, which the authors found a little less than the weaknesses, are quite significant. In particular, within the framework of this study, 18 main current strengths of Ukrainian medicinal plant cultivation, the total grade of which was 42 points, were identified and systematized. As for the weaknesses of medicinal plant cultivation at this stage of development in Ukraine, it is believed that there are 23 with a total grade of 47 in accordance with the developed scale for determining the level of relevance of strengths and weaknesses. Given the results obtained, the Ukrainian branch of medicinal plant cultivation has more disadvantages than advantages. At the same time, despite the existing obstacles and taking into account a number of significant strengths, it has significant preconditions for effective development. This opinion was also confirmed by the analysis of the potential of the Ukrainian medicinal plant industry and threats to it (Table 5). Even more, the long-term analysis showed that in the future, under certain favourable conditions, medicinal plant cultivation in Ukraine will have more opportunities than threats.

Table 5: Reflection of external opportunities urgency and threats of the medicinal plant growing field in Ukraine for the future (compiled by the authors)

<i>Opportunities</i>	<i>Score</i>	<i>Threats</i>	<i>Score</i>
Strengthening state support for the industry	3	Deterioration of the macroeconomic situation in the country	2

Further development of integration associations	2	Possible restrictions on the export of medicinal plant raw materials	2
Creation of public organizations on a partnership basis	2	Increased competition from other countries and further import dependence in terms of a number of medicinal crops	2
Intensification of selection work in research institutions	3	Further lack of state support for medicinal plant producers	2
Improvement of cultivation technologies	3	Deterioration of the ecological situation in the state or its separate regions	2
Attracting of foreign capital	3		
Introduction of advisory and consulting activities	2		

Assessing the importance of external opportunities and threats, the cultivation of medicinal plants is characterized by the characteristic features of agricultural production. Thus, industrial production is mainly influenced by internal economic factors that can be measured, taken into account and managed. In contrast to industries, where the quality and quantity of products mainly depends on a number of internal economic factors, e.g. structure of production, technologies and methods of production, agricultural production in general and medicinal crops in particular, are significantly affected by external factors such as climatic, environmental, and geopolitical, etc.

It is also important that the presented promising opportunities in the field of medicinal plant cultivation are more significant than the possible threats. In this case, it is considered appropriate to highlight that:

- combination of identified and presented weaknesses and threats as existing limitations of strategic development of the medicinal plant cultivation industry in Ukraine;
- combination of strengths and threats should be considered as potential strategic advantages; and
- combination of opportunities and weaknesses can be applied to internal transformations of the industry.

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Authors' Declarations and Essential Ethical Compliances

Authors' Contributions (in accordance with ICMJE criteria for authorship)

<i>Contribution</i>	<i>Author 1</i>	<i>Author 2</i>	<i>Author 3</i>
Conceived and designed the research or analysis	Yes	Yes	Yes
Collected the data	Yes	Yes	Yes
Contributed to data analysis & interpretation	Yes	Yes	Yes
Wrote the article/paper	Yes	Yes	Yes
Editing of the article/paper	Yes	Yes	Yes
Supervision	Yes	No	No
Project Administration	Yes	No	No
Funding Acquisition	No	No	No
Overall Contribution Proportion (%)	60	20	20

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