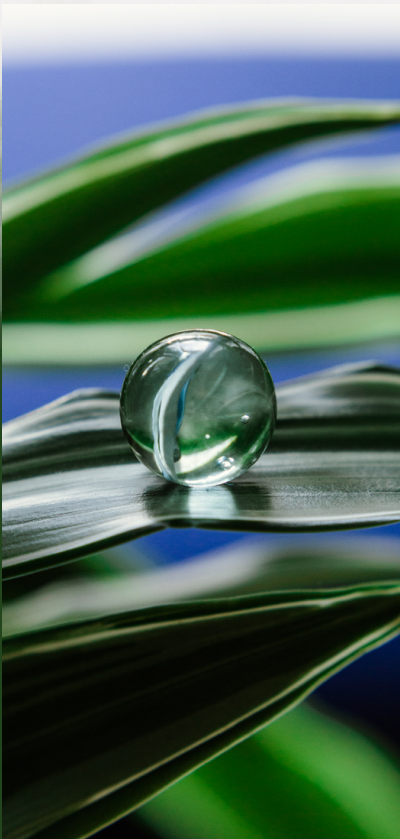


ECOLOGY, BIOTECHNOLOGY, AGRICULTURE AND FORESTRY

IN THE 21ST CENTURY

PROBLEMS AND SOLUTIONS



EDITED BY
S. STANKEVYCH, O. MANDYCH

**ECOLOGY, BIOTECHNOLOGY, AGRICULTURE
AND FORESTRY IN THE 21ST CENTURY:
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Tallinn

Teadmus

2024

UDC 502:504:630:631:338

Ecology, Biotechnology, Agriculture and Forestry in the 21st century: problems and solutions. Monograph. Edited by S. Stankevych, O. Mandych. – Tallinn: Teadmus OÜ, 2024. 370 p.

ISBN 978-9916-9969-9-7

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The monograph is a collection of the results of scientists' achievements obtained directly in real conditions. The authors are recognized specialists in their fields, as well as young scientists and graduate students of Ukraine. The studies are conceptually grouped in sections: biotechnology, ecology, agriculture, forestry, sustainable development of the economy and the principles of effective agribusiness. The monograph will be of interest to specialists in biotechnology, ecology, breeding, plant protection, agrochemistry, soil science, forestry, agribusiness, etc., researchers, teachers, graduate students and students of specialized specialties of higher educational institutions, as well as everyone who is interested in sustainable development in the agricultural sphere and Green Deal Implementation strategies.

Keywords: sustainable development, modern technologies, agricultural production, biotechnology, ecology, plant protection, forestry, agribusiness.

ISBN 978-9916-9969-9-7

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**MANAGEMENT OF EFFICIENT PRODUCTION AND SALES
OF AGRICULTURAL PRODUCTS: THEORETICAL AND
METHODOLOGICAL FOUNDATIONS AND INNOVATION
VECTOR**

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Management of the efficient production and sale of agricultural products in agricultural enterprises involves a system of measures aimed at ensuring the fulfilment of contractual obligations to sell products, as well as the creation of the necessary funds for on-farm use (sales to employees, seed and fodder fixed and insurance funds, catering, assistance funds, etc [1-4].

Crop production, as a complex industry, consists of several branches: grain production, beet growing, potato growing, vegetable growing, horticulture, viticulture, etc. The task of farms engaged in growing crops and having the most favorable soil, climatic and economic conditions for this purpose is to rationally use production potential through the introduction of intensive technologies, scientific forms of production and labor organisation, the whole range of achievements of scientific and technological progress in order to ensure the production of high-quality products in quantities that provide the population with food and industry with raw materials at standard labor and cost. Ukrainian grain has always been one of the most competitive products on both the domestic and global markets. At the same time, grain production is a powerful source of productive livestock, including meat, milk, and egg production. Grain is also used to make alcohol, beer, medicines, and a number of other products. Grain waste is widely used in various industries, construction, organic

fertilizer production, and to replenish the country's fuel balance. This issue has not escaped our attention, which is the purpose of this thesis.

The main focus is on organizing the use of land through the implementation of a scientific farming system that intensifies production and meets the soil and climatic conditions of the enterprise in order to obtain the largest amount of high-quality products with the available production potential and with minimal total costs per unit.

The main ways to manage the efficient production and sale of agricultural products and reduce total costs per unit are: a scientifically based system of farming in accordance with natural, climatic and economic conditions, taking into account future development; creation of a strong material and technical base in accordance with the volume and structure of production, a system of machines to ensure comprehensive mechanization of production processes, transfer of production to an industrial basis; development of rations for each crop; and development of a system of nutrition. An important link in this system is the use of a scientifically based system of soil fertilization for each crop in accordance with climatic factors, soil properties, nutrient reserves, and the varietal composition of the crops grown. In addition, the efficiency of the crop production system depends on the organization of land use, the correct justification of the structure of sown areas and a set of organizational, economic and agrotechnical measures for the use of production.

The main task of agriculture is to ensure intensive development and increase the efficiency of all its branches in order to increase production and improve the quality of products, to better meet the needs of the population for food and industry for raw materials. Among the strategic directions for further reforming and improving the efficiency of agriculture is the proper and rational use of the main means of production in agriculture - land. The adoption of the Land Code of Ukraine on October 25, 2001, provides an opportunity to include land in economic turnover, and this allows for more efficient use of land and resource potential by attracting investors. The process of building an open, competitive market-type agricultural economy in Ukraine, integrated into the global economic system, has become irreversible, bringing agricultural production closer to the level of economically developed countries. Management as a concept of market management is aimed at improving the organization of management of individual enterprises. Modern trends in the development of society are based on fundamentally new models and means of designing, organizing and joint operational management of production and business processes

based on the creation and continuous improvement of information computer technologies.

In order to improve economic relations in the field of crop production, increase its production and commodity resources, the Presidential Decree "On Urgent Measures to Stimulate Production and Development of the Grain Market" of June 29, 2000, defined measures to introduce a mechanism for pledge purchases of grain at pledge prices during the season of increasing supply after harvest, and the procedure for financing such operations. To implement the provisions of the Decree, the Government approved the Regulation on the implementation of the mechanism of pledge purchases of grain from agricultural producers and the methodology for determining pledge prices. However, the issue of financial support for pledge operations remained unresolved. The mechanism for mitigating undesirable fluctuations in market conditions was not properly tested, as it was not applied [5].

Crop production in Ukraine has traditionally been one of the strategic sectors of development not only for agriculture, but also for the entire national economic complex. Along with the sugar beet and oil and fat subcomplexes, grain farming is one of the main priorities for the development of the agri-food sector of the country's economy and is an important source of profitability for agricultural businesses. All this is due to the presence of favorable soil and climatic conditions for growing cereals and legumes, the original high agricultural skills of the hardworking Ukrainian peasantry, and Ukraine's favorable economic and political location on the European continent [6].

Grain is the basis of agricultural production. Grain crops account for more than half of the sown area in agricultural enterprises and farms. However, the share of the grain industry in labor costs is much smaller. Cereals have become relatively low-labor intensive, highly mechanized crops, and thus relatively extensive production. The focus on the predominant development of commodity grain production exacerbates the problem of employment in the large Ukrainian countryside. At the same time, the increase in grain production promotes the development of livestock production, which can employ many workers.

Total agricultural output in all categories of farms in January 2010 increased by 5.4% compared to January 2009, including 12.7% in agricultural enterprises and 0.3% in households.

In January 2010, farms of all categories sold 266 thousand tons of livestock and poultry for slaughter (in live weight), up 0.9% compared to

January 2009, produced 575 thousand tons of milk (down 1.7%) and 1116 million eggs (up 2.9%). Agricultural enterprises increased sales of livestock and poultry for slaughter by 8.0%, milk production by 4.2%, and egg production by 4.3%. At the same time, households reduced their production of meat (by 3.6%), milk (by 3.7%), and eggs (by 0.8%). The share of households in total production of these livestock products in January 2010 was 58%, 74% and 27%, respectively. As of February 1, 2010, the total number of cattle was estimated at 4.9 million heads (4.6% less than as of February 1, 2009), including 2.7 million cows (4.2% less), 7.6 million pigs (16.4% more), 1.9 million sheep and goats (4.9% more), and 183.2 million poultry of all kinds (7.3% more).

As of February 1, 2010, agricultural enterprises (except for small ones) engaged in livestock farming had 2.7 million tons of feed of all kinds available, which is 15.6% less than as of February 1, 2009, including 1.1 million tons of concentrated feed (23.1% less). The company consumed 6.2 cwt of feed per head of cattle, including 2.6 cwt of concentrated feed (8.0 cwt and 3.7 cwt as of February 1, 2009).

In January 2010, average selling prices of agricultural products by agricultural enterprises in all sales areas increased by 31% compared to January 2009, including 71% for crops and 16% for livestock. In January 2010, compared to December 2009, average selling prices for agricultural products increased by 3%, including crops by 9% and livestock by 0.1%.

As of February 1, 2010, agricultural enterprises (except for small ones) and grain storage and processing companies had 15.1 million tons of grain on hand (20% less than February 1, 2009), including 6.6 million tons of wheat, 3.6 million tons of barley, 3.2 million tons of corn, and 0.7 million tons of rye. Agricultural enterprises directly stored 7.3 million tons of grain (25% less), including 2.7 million tons of wheat, 1.9 million tons of barley, 1.5 million tons of corn, and 0.2 million tons of rye. Grain storage and grain processing enterprises had 7.8 million tons of grain (14% less), including 5.3 million tons (11% less).

The stocks of sunflower seeds amounted to 3.6 million tons, of which 1.3 million tons were stored directly in agricultural enterprises (except for small ones) and 2.3 million tons in enterprises engaged in its processing and storage. In Ukraine, pledge prices are the minimum prices guaranteed by the state, which should ensure the reimbursement of the projected standard cost of grain, the minimum profit necessary for simple reproduction [7-9].

The question of who should pay the loan fees for the use of the loan for the secured purchase of grain remains a matter of debate. It should be

noted that in the US, they are paid by the commodity producer, but there the loan fee is 5-7%, while in Ukraine, even with benefits, it is 4-5 times higher than for US farmers. So, under such conditions, the state should compensate for the loan payment (when the commodity producer takes back the grain pledged for sale). Otherwise, the mechanism of pledged grain purchases will not be introduced into market practice in our country, which is what we are seeing so far [10,11].

The Program "Grain of Ukraine 2001-2004" approved by the Cabinet of Ministers of Ukraine on November 27, 2000, was of utmost importance, as it aimed to ensure a gradual increase in gross grain production to 40 million tons by 2004. Ukraine, as you know, has received more than 40 million tons of grain 12 times in the last 25 years, i.e., on average every other year, and in 1989 and 1990, 51.2 and 51 million tons respectively. With the production of 40 million tons of grain, it is possible to fully meet the state's need to create consumption funds and seed resources, to replenish the feed base for the development of livestock industries with sufficient concentrates, and to allocate up to 5.5-6.5 million tons annually for exports [11].

The experience of 2001-2002 proved the effectiveness of the targeted grain program, even with limited resources and loans. Measures were taken to make agriculture more flexible and, at the same time, to pursue a regional policy on the structure and volume of grain production. It was the policy of expanding grain acreage that was a decisive factor in the increase in gross harvest in 2002. In 2003-2004, the development of the grain sector was carried out in accordance with the government program adopted for that period. In addition, there were favorable external factors, such as a decline in wheat production in the United States and some other countries and a certain shortage of wheat on the market. This made it favorable for global prices for this type of grain to rise. However, the high economic expectations of direct producers proved to be in vain. Instead of a market-based approach and the implementation of at least some government regulation measures, Ukraine's harvest was replaced by euphoria and endless reporting on the harvest of another million tons of grain. Agricultural enterprises earned a total of UAH 1.8 billion in profits, with a 43% profitability rate.

Starting in the second half of 2002, state regulation of production in the grain market began to take on a systematic and comprehensive character, with the legislative and legal framework being improved and government decisions made to implement these legislative provisions.

In July 2002. In July 2002, Rada of Ukraine adopted the Law "On Grain and the Grain Market in Ukraine", which was aimed at: ensuring food security of the country; formation of investment, credit, tax and customs policies favorable to the grain market; optimization of the structure and efficiency of grain production taking into account the potential of natural and climatic conditions and market infrastructure; ensuring the functioning of the grain market on the basis of a combination of free competition and state regulation in order to balance the interests of economic entities.

The implementation of the measures envisaged by the Law is now being put into practice. In pursuance of the Law, on February 7, 2003, the Cabinet of Ministers of Ukraine adopted Resolution No. 164 "On Pledge Operations with Grain". This Resolution defines: the procedure for conducting pledge transactions with grain; the procedure for settlements under pledge transactions and for storage of pledged grain that has become the property of the state; establishes the procedure for attracting bank loans secured by pledge transactions with grain and the procedure for holding a tender to determine the State Agent for securing pledge purchases of grain [12].

Improving the competitiveness of grain production is the most important issue facing Ukraine's agricultural policy today. Insufficient efficiency, stability and competitiveness of grain production creates obstacles to the formation of a full-fledged domestic market for grain and its processed products and makes it impossible for Ukraine to expand its participation in foreign markets. The solution to this problem has a pronounced regional character, as each region of Ukraine has recently been increasingly responsible for the grain harvest.

Entrepreneurial activity is carried out in the presence of certain relations adequate to its essence, which is competition. It is this competition that is one of the driving forces behind the development of the economic system [3].

The issue of competition and product competitiveness is the most relevant and most studied by both domestic and foreign scholars. The issue of competition and product competitiveness is the most relevant and most researched by both domestic and foreign scientists. Some of them are: A. Smith, P. Heine, S.L. Brew, K.R. McConnell [13], S.V. Mochny [14], G.I. Bashnyanina [15] and many others. Further improvement of the competitiveness of agricultural products is essential for increasing the efficiency of agricultural production and innovative development. At the same time, competitiveness in a market economy is becoming particularly important as a result of the openness of our economy and growing

competition in the market.

The main indicators that characterize the level of competitiveness of products are their quality characteristics, cost, and selling price.

Product quality indicators as components of its competitiveness provide the manufacturer with competitive advantages and are the main criterion for the buyer. This is especially important in connection with the expansion of the introduction of new energy-saving technologies for the production of agricultural products, the quality of which in Ukraine, according to research, is significantly deteriorating [16, 17].

One of the peculiarities of the formation of competitive relations in agriculture is that it has a significant risk in its development [18]. Here, in addition to social factors of increasing labor productivity, it is necessary to take into account natural factors.

The growing insolvency of business entities and the population in our country, the loss of labor motivation to produce high-quality products, increase labor productivity and production efficiency have resulted in a decrease in the level of competitiveness of agricultural products. To address this and to ensure the competitiveness of domestic products, it is necessary to develop financial, credit, tax and pricing policies in agricultural production, stimulate the development of enterprises with different forms of ownership and management, develop market infrastructure, improve the efficiency of marketing and management services, provide producers with reliable market information and advertising, improve antitrust legislation on the formation of market relations and the development of competition.

In order to strengthen the competitiveness of domestic products, the following measures should be taken: to ensure the priority development of agro-industrial production with agriculture as the basic sector of the economy, to create conditions for stabilizing and increasing agricultural production; to impose a moratorium on food imports, especially those whose production in our country has already been stopped or is in the process of being stopped; to economic mechanism of management in the agro-industrial complex; to set prices for agricultural products that would not only reimburse the costs incurred for their production, but also provide a certain amount of profit for expanded reproduction; to limit the number of intermediaries from among commercial structures engaged in the sale of agricultural products and the provision of its producers with material and technical resources; to introduce state support for all production entities regardless of the form of management. It should be aimed at achieving parity of incomes of rural "commodity producers with the incomes of

workers in other sectors of the national economy; establish a system of benefits that stimulate purchase subsidies for certain types of agricultural products, reduce tax pressure on farmers; introduce a mechanism for reducing interest rates on loans; restore integration processes of agriculture with processing and trade service organizations, ensure parity conditions for their functioning; restore the work of large specialized [19,20].

According to international practice, successful functioning of agriculture can be achieved if the industry operates on a market basis with state support.

There are various methods and ways to assess and measure the management of efficient production and sales of an enterprise's products. A separate group of methods for assessing the management of efficient production and sales are matrix methods. They include:

1. The growth/share matrix developed by the leading consulting company Boston Consulting Group (BCG). The most competitive companies will be those that have a significant share in a rapidly growing market.

2. The matrix "industry attractiveness/competitive position" created by General Electric. According to this model, the most competitive enterprises are those that have a stronger competitive position and operate in more attractive industries.

The next approach to assessing competitiveness uses a system of indicators that reflect the efficiency of the enterprise's use of resources. The conceptual basis of this approach can be considered M. Porter's statement that competitiveness reflects the productivity of resource use, so in order to maintain competitiveness at a high level, the enterprise should take care of the most complete and efficient use of all resources at its disposal and acquired for future use. On this basis, competitiveness can be measured by determining the productivity of the use of resources, which is the greatest return, the greatest result per unit of resources spent.

Using the methodology proposed by Porter, it is proposed to use the indicator of production profitability as a measure of productivity.

A more complete assessment of competitiveness can be obtained by methods based on the theory of effective competition, according to which enterprises with the best organized production, sales and effective financial management are competitive.

The positive quality of this method is the use of indicators that allow analyzing the work of the enterprise as a whole. However, there are a number of drawbacks.

Firstly, it does not take into account the possibility of certain groups

of indicators for the final assessment of competitiveness.

Secondly, some indicators duplicate each other.

Thirdly, this method does not take into account direct indicators of product competitiveness - quality and price. The use of indirect indicators (e.g., the ratio of net profit to net sales revenue or to the net value of tangible assets) characterizes the efficiency of the organization and functioning of the sales and promotion system rather than its actual competitiveness.

There are also comprehensive approaches that can be divided into two areas: those based on individual competitiveness indicators and those that involve the development of a comprehensive competitiveness indicator.

Considering the first direction, we can distinguish between concepts based on an unsystematized and a systematized set of indicators:

- competitiveness of products and the effect of their sale;
- the ratio of the cost of products sold to their quantity for the current period;
- the ratio of profit to total cost of sales;
- the ratio of total sales to the cost of inventories;
- the ratio of total sales to the cost of unsold products;
- the ratio of accounts receivable to total sales;
- production capacity utilization;
- order backlog;
- amount of capital investments.

The disadvantage of this approach is the recommendation to limit oneself to the indicators of production and sales activities of the enterprise, without considering its financial condition.

Proposes to study the competitive position of an enterprise by comparing the enterprise whose competitiveness is analyzed with competing enterprises. In this case, the objects of assessment are: production volume; sales volume; share in the total production of this product; place in exports; assets of the enterprise; net profit; depreciation charges; long-term debt; amount of investments; deductions in the fund; rate of return on investment; average production costs; size of working capital; net profit for each type of product; assessment of the technical level of each type of product; level of competitiveness of each type of product.

This approach should be supplemented with information on absolute financial results (net profit) by the characteristic of relative profitability (profitability) of production of production assets of the entire property of the enterprise.

Thus, the positive quality of the first concept is the assessment of

competitiveness in a particular market based on a detailed study of the production, sales, financial capabilities of the enterprise, organization of management, and attractiveness of products for the consumer. However, the lack of proper systematization of the proposed indicators for studying the company's activities complicates the analysis.

The second concept is based on a systematic assessment of competitiveness. Thus propose to study the strengths and weaknesses of an enterprise with the help of a competitiveness polygon using eight main criteria: quality, price, finance, trade, after-sales service, foreign policy, pre-sales preparation, and the concept of the product on which the activity is based. This helps to determine the strengths and weaknesses of the enterprise in relation to the competitor when comparing the competitiveness polygon scheme for the objects under study.

Experts of the American Management Association M. Kastens, N. Paley recommend using checklists in the form of systematized tables as a detailed version of the study of the competitive position of the enterprise.

In this case, the following groups of indicators are used for control assessment:

1. Finance.
2. Production potential.
3. Composition of the labor force
4. Technology and research potential.
5. Organization and management.
6. Marketing.

Thus, a clear delineation of all components of competitiveness by identifying the main criteria increases the efficiency of analytical work and is the main advantage of the methodological approaches of the second concept.

However, in our opinion, the identification of competitive advantages of an enterprise in this case is not quite effective, since the above criteria are determined by means of expert assessments. This situation is largely due to the fact that some criteria include elements that are not quantified.

To summarize, it should be noted that comparing enterprises by individual indicators cannot be a sufficient basis for an objective assessment of competitive advantages. This makes it important to use comprehensive methodological approaches aimed at developing a composite indicator of competitiveness. In this direction, we can similarly distinguish two concepts based on unsystematized and systematized indicators for each competitiveness assessment criterion. The disadvantage of this approach is

the limited range of mostly absolute indicators. Thus, it would be necessary to supplement information on the number of employees with an indicator of efficiency (labor productivity). The indicators of sales and profit duplicate, respectively, the indicators of market share and profitability of production determined on their basis. Another example of this concept is the consideration of competitiveness based on two components: product competitiveness and production efficiency compared to competitors. The indicator of production competitiveness is calculated by the formula:

$$K_B = K_n * K_e,$$

where K_n is the general indicator of product competitiveness,

K_e is the index of relative efficiency.

Unlike the first, the second concept provides a systematic study of the competitive position of the enterprise.

In the researched works, competitiveness is assessed by three criteria: technical and economic condition of the enterprise, competitiveness of products and financial condition of the enterprise.

The approach under consideration does not clearly define the indicators of the technical and economic condition of the enterprise. It should be noted that determining the financial condition of an enterprise using two indicators reflecting the ratio of receivables and payables and solvency is not sufficiently correct, since it does not take into account the financial stability, profitability, business and market activity of the enterprise.

The reliability of the competitiveness assessment primarily depends on their ability to continuously scan the market, including outside the country. The absence or distortion of information about competitors' activities can create an unreasonable opinion among company managers about their advantages over competitors, lead to complacency and weakening of efforts to maintain the required level of competitive advantage. Therefore, in order to obtain correct results, it is necessary to strengthen the strategic potential of the enterprise, its ability to analyze the macroeconomic situation in the country and abroad, and its ability to analyze the economic situation in the markets of goods and services. Based on the above, let us formulate the main provisions that should be taken into account when assessing the competitiveness of an enterprise.

1. The methodology of comprehensive assessment of enterprise competitiveness is designed to identify available resources of the enterprise, assess the efficiency of use of the competitiveness potential and determine the level of its competitiveness relative to enterprises operating in the same

industry and belonging to the same product group.

2. The potential of an enterprise is a set of resources at its disposal by structural and functional elements and elements of the labor process. The functional elements of an enterprise include: production; financial; commercial; managerial;

The elements of the labor process are: means of labor; objects of labor; labor force;

3. The competitiveness of an enterprise is the real and potential ability of an enterprise to design, manufacture and sell, under certain specific conditions, products that are in higher priority demand among consumers, provided that the enterprise operates efficiently and sells them profitably in a competitive market.

4. The indicator of the level of competitiveness of an enterprise reflects the relative level of the magnitude and efficiency of the use of potential competitiveness in comparison with other enterprises (competitors) present in a given market and operating in the same industry and product group.

5. The application of this methodology in practice will allow to assess:

- the amount of potential competitiveness;
- the efficiency of using potential competitiveness;
- the relative level of competitiveness of the enterprise in comparison with competitors.

6. The assessment of the enterprise's competitiveness is carried out in accordance with four main stages: assessment of the value of the potential competitiveness of the enterprise; assessment of the efficiency of the use of the potential competitiveness of the enterprise; calculation of the index of competitiveness of the enterprise; assessment of the level of competitiveness of the enterprise;

At the beginning of the 21st century, Ukraine faced one of the main challenges of our time – managing the efficient production and sale of agricultural products and increasing the competitiveness of the national economy and its individual industries. One of the most challenging tasks is to improve the competitiveness of the agricultural sector, which remains one of the most inefficient sectors of the economy. Among the main industries that require priority attention is the grain industry, whose competitiveness has declined significantly in recent years. Therefore, the main goal of the agro-industrial complex is to increase the competitiveness of Ukrainian production, search for reserves to increase it in the context of ensuring

sustainable development of the agro-industrial complex of Ukraine and its integration into the global economy. Management of efficient production and sales of agricultural products of any economic entity (firm) consists of a number of competitive advantages that are manifested in the global market by comparing them with the corresponding indicators of foreign competitors.

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