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European Dimension of Crop Production Management at Agricultural Enterprises

Abstract

The purpose of the study is to develop methodological approaches to analytical support for the management of the production of plant products in the enterprises of the agro-industrial complex. *Methodology*. Research is based on scientific methods, among which it is advisable to highlight: analysis and synthesis, comparison, idealisation and abstraction, as well as systematisation and generalisation, economic and mathematical methods. *Results*. Directions for improving the management of crop production in terms of its analytical support are proposed, taking into account the realities of today: the choice of the European vector of development, the state of war, agribusiness in Ukraine is the driving force that ensures the efficiency of the domestic economy. Ukraine is called the breadbasket of Europe, with about 25% of the world's highly fertile chernozem soils concentrated here. Agriculture as an industry has a number of peculiarities that largely determine the results of enterprises, among them: the means of production here are living organisms – plants and animals that develop according to biological laws. Therefore, in agriculture, the operation of economic laws is closely intertwined with the operation of natural laws; the main means of production is land, which is directly related to the labour process and the production of products. *Practical implications*. The most optimal path for the development of agriculture in Ukraine is the European one, which will lead to the socio-economic success of the entire population and the economy as a whole. Having received the status of a candidate country for accession to the European Union, we are already taking the first steps in this direction. Military actions bring their own corrections, but clear actions of the government and effective management at the level of enterprises will help Ukraine to maintain its position in the world market of crop production. *Value/originality*. Directions for improving the management of the production of plant products in the part of its analytical support are proposed, taking into account the realities of today: the choice of the European vector of development, the state of war. The article substantiates the need to improve the management of the production of plant products of agricultural enterprises in terms of its analytical support, caused by the conditions of martial law, as well as the European vector of development.

Keywords

agribusiness, economic activity, management, production, crop production

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1 Introduction

Agribusiness in Ukraine is a driving force that ensures the efficiency of the domestic economy. Historically, Ukraine has been called the breadbasket of Europe, with about 25% of the world's highly fertile black earth soils concentrated here. The main agricultural crops that make Ukraine a world leader are cereals and fodder crops, including wheat, maize, barley, sunflower, sugar beet, tobacco, pulses, fruit and vegetables. According to the State Statistics Service of Ukraine, the area planted with agricultural crops will undergo a structural change in the period 2012–2021 – farmers will prefer to grow sunflowers rather than sugar beet. The area planted with fruit and berry crops has also decreased.

As a result of structural changes, Ukraine is the world's largest exporter of sunflower oil and one of the largest exporters of cereals. The volume of crop production by agricultural enterprises in Ukraine is growing every year. This indicates an increase in productivity and, as a result, a strengthening of Ukraine's position on the world market.

Since the Association Agreement was signed, agricultural exports to the European Union have increased by more than a third. According to the European Commission's monthly monitoring of agricultural trade, Ukraine is the third largest supplier of agricultural products to the EU countries, after the USA and Brazil, with exports worth €7.3 billion in 2020.

The COVID-19 pandemic has become a major shock for the world and European economy. Ukraine, together with other member countries of the World Trade Organisation, distributed a joint statement on ensuring open and predictable trade in agricultural and food products in the context of the COVID-19 pandemic.

Russian aggression against Ukraine, military actions, destruction of infrastructure, disruption of logistics, fires have definitely had a negative impact on the agricultural industry and the consequences will be felt all over the world. Therefore, the issue of managing the production of plant products by agro-enterprises is currently of crucial importance.

A large number of scientific works of such scientists as Boiko M., Garbuz O., Ivchenkova O., Maslyuk I., Lavruk O., Patuka N., Samaychyk S., Sitovska A. and many others are devoted to the diagnosis of certain issues of production management of agricultural enterprises, including crop production. Despite their thoroughness, there are no comprehensive studies that would include a detailed study of the organisational and methodological support of this topic. It is therefore necessary to examine a number of questions.

The aim of the study is to develop methodological approaches to crop production management for agribusiness enterprises.

The information base of the article is represented by scientific works of domestic and foreign scientists (Boiko, 2020; Ivchenkova, Garbuz, 2018; Maslyuk, 2019; Lavruk, 2018; Patyka, 2019; Samaychuk, 2020; Sitkovska, 2019; Barabash, 2005). The research is based on scientific methods, among which it is expedient to distinguish: analysis and synthesis, comparison, idealisation and abstraction, as well as systematisation and generalisation – in the formulation of conclusions as a result of the study.

2 The Role of Analysis in Crop Management

Agriculture as a branch has a number of characteristics that largely determine the results of enterprises, among them: the means of production here are living organisms – plants and animals that develop according to biological laws. Therefore, in agriculture, the operation of economic laws is closely intertwined with the operation of natural laws; the main means of production is land, which is directly related to the labour process and the production of products. Its qualitative and quantitative characteristics have a direct impact on the results of the business entity's activity; natural conditions have a significant impact on the activity of agricultural enterprises, and as a result it is necessary to possess a significant amount of information to reduce risks and uncertainties in the production process; for the production of agricultural products, territorial resources are used, which in turn requires a large amount of transportation of equipment, materials (seeds, fuel, fertilisers) and products (potatoes, beet, grain); in agriculture, there is a time lag between the working period and the production period; there is a time delay between the working period and the production period, the latter can be carried out only in conditions of appropriate influence of natural factors and direct participation of people; seasonality of production, which involves changes in the organisation of work, effective use of labour resources; water resources are an important component of production in agricultural enterprises, its absence in the required amount in certain regions leads to an impact on the cost of products; transport of labour requires significant energy and money costs (Ivchenkova, Garbuz, 2018).

All the above points make it possible to consider this sector as a priority in terms of investment and public support (Boiko, 2020).

In determining the prospects for the integration of Ukrainian agriculture into the world economic space, both the internal potential of domestic agriculture and the conditions and trends currently prevailing in world agricultural markets are taken into account (Patyka, 2019).

Analysis of production, sales and costs of agricultural enterprises is a necessary condition for

effective management of agricultural production, taking into account the specific features of the agro-industrial complex of enterprises.

Analysis of production and sales of agricultural products and their costs using modern information technology is based on determining the main elements of the process of researching the production, sales and costs of products to form interrelated stages of relevant analytical procedures and develop logically sound algorithms for calculating analytical indicators. On the basis of these indicators, the results of activities are summarised and evaluated, and management decisions on the further development of the agricultural enterprise are made.

The performance of agricultural enterprises depends to a large extent on production conditions. Therefore, the economic analysis begins with the study of the climatic conditions of the farm, its production orientation, the degree of intensification of production, its efficiency, financial condition, etc. It is only by taking into account the specific conditions that it is possible to objectively assess the results of the enterprise and to show ways for its further development.

The conditions of agricultural production can be divided into the following groups: natural and climatic conditions, location of the farm, economic conditions of production. Each of these groups can be characterised by an appropriate system of indicators.

The economic conditions of production, on which the results of economic activity depend, include the provision of the enterprise with land, labour, material and financial resources; the degree of specialisation and concentration of production; the degree of intensification of production.

Extended reproduction in agriculture can take two forms: extensive (by increasing the area sown); intensive (by improving the quality of the soil and making additional investments on the same area).

During the analysis it is necessary to study the level and dynamics of these indicators and to compare them with the best and the average in order to assess the achieved level of intensification and efficiency of production in the studied enterprise.

One of the main indicators characterising the activities of agricultural enterprises is the volume of agricultural production. The volume of sales depends on its size, as well as on the degree of satisfaction of the population's food needs. The volume of agricultural production also influences the level of its costs, profit, profitability, solvency and other economic indicators. Therefore, the analysis of the agricultural enterprise should begin with a study of the volume of production, especially of crop products.

The purpose of the production and sales analysis is to identify reserves for production growth, to shape the range of products sold, to increase market share while maximising production capacity, and to forecast production development.

The objects of analysis are the gross output of crop production, the production of its individual species, the size and structure of crops and crop yields.

The tasks of crop production analysis are: analysis of the dynamics and development of planned production volumes; determination of the influence of factors on the volume of crop production; identification of domestic reserves for increasing crop production; assessment of the activity of the agricultural enterprise in using opportunities for increasing production, taking into account objective and subjective factors; development of measures for exploiting identified reserves for increasing production.

The analysis of crop production is carried out at the following stages (Barabash, 2005):

1. Analysis of the dynamics and implementation of the crop production plan.
2. Assessment of the size and structure of the sown areas.
3. Analysis of yields and factors that determine their level.
4. Identification and generalisation of reserves for increasing crop production.

The analysis of the dynamics and implementation of the production plan is carried out both for individual species and in general for crop production. To assess the dynamics of crop production, it is necessary to have data on production volumes at comparable prices, as well as on the gross harvest of each crop for the last 5-10 years.

This information is used to calculate the base and chain growth rates. The dynamics of production should be presented graphically for greater clarity. The analysis of the development of the forecasted indicators of the production volume of the crop production is carried out both as a whole on the enterprise, and by separate teams and other divisions. In this case, the actual gross harvest for each crop is compared with the forecast data.

3 Factor Analysis of Changes in the Production of Agricultural Enterprises

Further analysis is needed to identify factors and causes of changes in production. The volume of crop production depends on the size and structure of sown areas, crop failures and crop yields.

Each of these first-order factors depends on a number of second-order factors. The structural and logical diagram of the factor system for analysing the volume of crop production is shown in Figure 1.

The total change in grain production is: $\Delta B3 = B3_1 - B3_0$,

including changes in:

– the size of the sown area: $\Delta B3_{S_n} = B3' - B3_0$;

– crop failure: $\Delta B3_{S_з} = B3'' - B3'$;

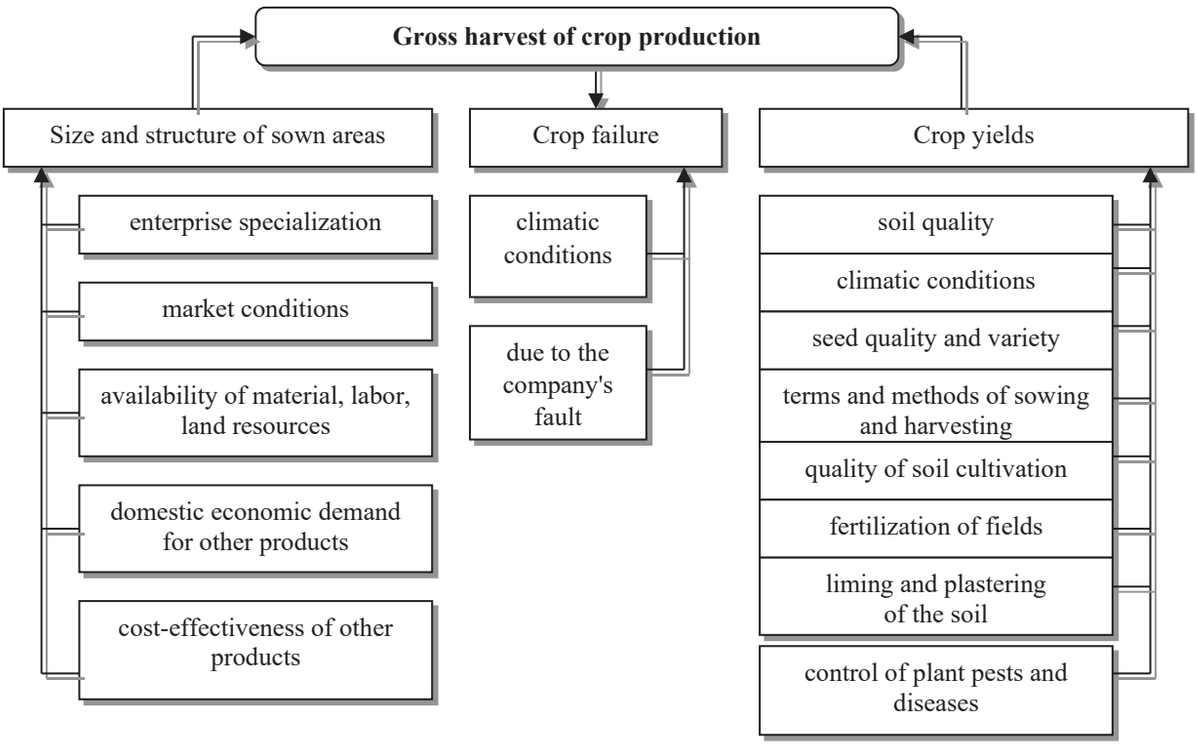

FIGURE 1 Structural and logical model of the factor system for analysing crop production
Source: developed based on data from (Lavruk, 2018; Patyka, 2019; Samaychuk, 2020; Sitkovska, 2019; Barabash, 2005; Barabash, Pashkuda, 2021)

– yi/elds: $\Delta B3_y = B3_1 - B3''$.

Assessment of the cumulative impact of factors on the change in gross grain harvest in the reporting period: $\Delta B3 = \Delta B3_{S_n} + \Delta B3_{S_z} + \Delta B3_Y$.

Similar calculations can be made for each crop. This assessment not only provides an objective view of management performance, but also identifies untapped opportunities to increase production.

Having studied the influence of factors on the volume of crop production, it is advisable to analyse the dynamics of areas sown by crop, to identify changes in the size and structure of sown areas and to give them an economic evaluation.

The effect of crop structure on yield and average yield should be calculated for all crops, not just cereals. Only in this case is the yield per hectare averaged over the last 3-5 years and the total area expressed in fodder units or value (Barabash, 2005).

The main factor determining the volume of crop production is crop yield. Yield analysis involves studying the dynamics for each crop or group of crops over a long period, assessing the degree of implementation of the yield plan, and calculating the impact of factors on changes in yield.

Factors influencing yield variation include (Barabash, 2005):

– Climatic (soil fertility, mechanical soil composition, terrain, temperature, water table, rainfall, etc.);
– economic (quantity, quality and structure of fertiliser applied to the soil, quality and timing of all field operations, quality of seed, change in varietal composition of crops, liming and plastering of soils, control of plant diseases and pests, crop rotation, etc.).

4 Formation of Reserves for Increasing the Production of Agribusiness Enterprises

During the analysis, it is necessary to study the dynamics and the implementation of the plan of all the agronomic measures, to determine the effectiveness of each of them (increase in yield by 1 quintal of fertiliser, unit of work performed, etc.) and then to calculate the impact of each measure on the yield and gross harvest. Identify and generalise reserves for increasing crop production. Identification of reserves for increasing crop production is carried out in the areas shown in Figure 2.

Possible and unused reserves for increasing the sown area are determined by analysing the use of land resources (participation in agricultural turnover of land under bushes, roads, deposits, wetlands, etc.). In order to determine the possible reserves for increasing production, the identified reserve for expanding the sown area should be multiplied by the actual yield of the crops planned to be sown in this area.

The reserve for increasing crop production is to increase the return on fertiliser, which in turn depends on the dose and quality of the fertiliser, its structure, timing and method of application to

the soil. In order to determine the reserves for increasing the payback of fertilisers in the analysis, specific measures are developed: the construction of warehouses for their preservation, the balance of fertilisers for each crop, optimising the timing of application, etc (Barabash, 2005).

Preventing losses during harvest is a very important reserve for increasing production. To determine its value, it is necessary to compare yields in areas where harvesting is carried out at the optimum time and in areas where harvesting is delayed (Barabash, 2005).

At the end of the analysis, it is necessary to summarise all the reserves identified for each type of product in physical terms and, generally for crop production, in value terms and at comparable prices.

5 Conclusions

The article substantiates the necessity of managing the production of plant products of agricultural enterprises in the conditions of martial law. The role and place of Ukraine in the world market of plant products, the dynamics of the main indicators and the consequences of their changes are studied. The main directions of the search for reserves for increasing the volume of plant production are presented.

Therefore, the best way for Ukraine to develop agriculture is the European way, which will lead to social and economic success for the entire population and the economy as a whole. Having been granted the status of a candidate country for accession to the European Union, Ukraine is already taking its first steps in this direction.

The main directions for improving the management of crop production in the part of its analytical support have been determined, which include the analysis of the implementation of the forecasted production volumes; the analysis of the influence of factors on the volume of crop production; the identification of intra-farm reserves for increasing crop production; the evaluation of the activity of the agricultural enterprise in terms of the use of opportunities for increasing production, taking into account objective and subjective factors; the development of measures for the development of the identified reserves for increasing production.

Methodical approaches to the analysis of crop production using the tools of economic and mathematical modelling are proposed, a structural-logical model of the factor system of the analysis of the volume of crop production is built; the methods of determining reserves for the growth of crop production are outlined.

Military action brings its own corrections, but clear government action and effective management at farm level will help Ukraine maintain its position in the world crop market.

The management of the production of plant products of agricultural enterprises is primarily a mechanism for increasing the efficiency of agricultural enterprises. On the basis of the analysis data, the measures aimed at developing the reserves for increasing the production of plant products revealed by the economic analysis are developed.

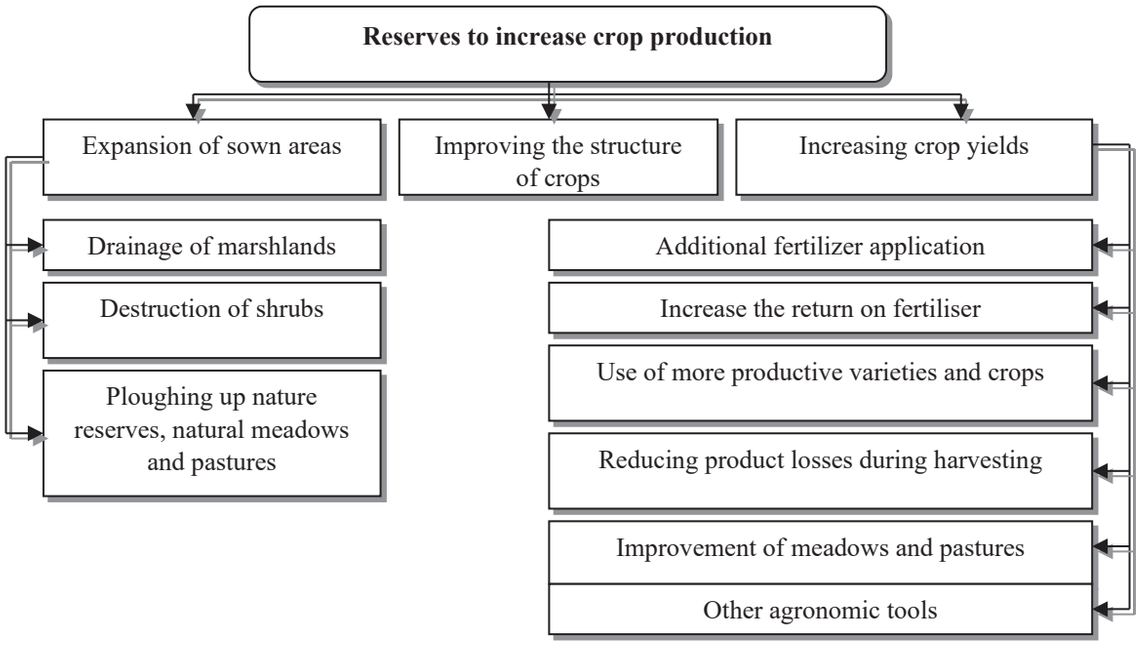

FIGURE 2 Key areas for finding reserves to increase crop production

Source: developed based on data from (Lavruk, 2018; Patyka, 2019; Samaychuk, 2020; Sitkovska, 2019; Barabash, 2005; Barabash, Pashkuda, 2021)

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