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GENERAL ECONOMIC AND TECHNOLOGICAL ASPECTS OF GARLIC CULTIVATION IN THE AGRO-TECHNICAL AND ECONOMIC CONDITIONS OF THE REPUBLIC OF MOLDOVA

ABSTRACT

The agricultural sector contribution to the evolution of the national economy of the Republic of Moldova is significant. This capacity can be further enhanced by promoting the implementation of modern and efficient agriculture, producing agricultural crops with a high economic value. In this context, the garlic crop is perfectly in line with this concept. Growing garlic in the conditions of the Republic of Moldova is a profitable business; the valuable nutritional and gustatory qualities of local garlic production offer an essential advantage in the competitive race with imported production. However, this opportunity is undermined by the low productivity level, unsatisfactory appearance, exaggerated expenses for carrying out technological operations, which significantly increase the cost of producing garlic. In order to be successful in this field, it is mandatory to develop and implement a relevant action plan that incorporates both the application of efficient financial management and the use of modern production technologies.

Key words: agriculture, production, garlic, productivity, technology.

JEL Classification: Q13; Q15; Q17; R11; R14.

1. INTRODUCTION

The efficiency of the agricultural business depends on the qualitative evolution of a group of elements, such as: determining the agricultural field with the highest economic and financial return, relevant market evaluation research and finalizing the most effective marketing actions, determining and creating the chain value, the quality of the technological production processes to be implemented. This mix of economic components is also relevant for entrepreneurial activities carried out in the agricultural sector of the Republic of Moldova.

In the last two decades, due to the transition from the quasi-planned economy model to the market economy system, the local agricultural sector has undergone extensive reforms, both administratively and technologically. Based on the following benchmarks – modernization, efficiency, profitability, quality – this economic field has managed to provide tangible results in the last five years and, at

the same time, to highlight the huge potential to be further exploited. This is due to the introduction of crops with a high economic value into the agricultural circuit, simultaneously with traditional agricultural crops. Species of perennial bacifer crops, nut crops and green vegetables are grown on more and more areas from year to year. In this order of ideas, the garlic crop has a huge potential, which needs to be capitalized upon.

2. STATE OF KNOWLEDGE

According to statistical data provided by the National Bureau of Statistics, about 2/3 of the garlic production sold on the market of the Republic of Moldova is imported. The paradox is that this crop, with favorable pedagogical and climatic conditions for development, is not properly integrated into the local agricultural circuit, and local production is significantly lower both in terms of quantity and quality. This deficiency can be removed only by cultivating garlic with the application of modern production technologies. Being a traditional crop of the given area, the production and marketing of garlic is a huge economic potential, of which local agricultural entrepreneurs are less aware. At the same time, taking into account the fact that currently, the emphasis is on the implementation of sustainable agriculture and the promotion of crops with a high benefit, garlic fits perfectly in this category.

3. MATERIAL AND METHOD

Empirical and theoretical research methods were used in the elaboration of this report and the analysis of statistical data on the evolution of areas and productivity of the garlic crop in a certain period on the territory of the Republic of Moldova was widely applied. As primary data sources, for the purpose of this research, primary documents represented by the literature (books, monographs, scientific reports and teaching materials, etc.) were used, as well as secondary documents in the form of institutional sources (statistics by field). The information provided by the National Bureau of Statistics of the Republic of Moldova and by relevant international organizations was widely used.

4. RESULTS AND DISCUSSIONS

Garlic is native to Central Asia. It has been grown for a long time in China, Japan and other regions of the Far East, being appreciated as a very valuable vegetable. Garlic is currently grown on representative areas in Europe, especially

in central and south-eastern areas, Asia and North America. For example, in Romania, garlic occupies 4% of the total area cultivated with vegetables. The spread of garlic, as well as its share in crop production is due to its nutritional value and wide use in the culinary arts, from raw consumption (bulbs or green plants), to obtaining culinary preparations, to the preparation of sausages and preserves. Its specific content in essential oils, among which the most important are organo-sulfur and phytocidal, has also imposed garlic as a raw material in the pharmaceutical industry, having vermifuge, antiseptic and appetite stimulating properties (https://www.agrimedia.ro/).

In this context, garlic has a rich chemical composition, even wider than that of onions. It contains over 26% carbohydrates, about 7% nitrogenous substances, mineral salts, 10 – 20 mg /% vitamin C, 150 mg /% essential oils that contain a large amount of phytocides with a strong bactericidal action (Patron, 1989).

In the Republic of Moldova, garlic is a widespread crop and widely used in culinary industry. According to the data provided by the National Bureau of Statistics annually, the garlic crop occupies a total area of 2.5 – 3 thousand ha on average. With an overall production of 900 tons, however, it has a self-consumption character. This is due to the concentration of garlic growing mainly on local sectors. Thus, in 2019, the area cultivated with garlic totalled 3700 ha, of which 2900 ha (78.4%) on small plots of land in the local sectors. The remaining cultivated area belongs to peasant households (https://statistica.gov.md).

There is an excessive fragmentation of land areas cultivated with garlic, and the very small areas do not even allow the implementation of modern production technologies. As a result, the productivity of this crop is very low, ranging from 20 to 30 q / ha, while the current potential of garlic varieties is 120 – 200 q / ha.

The low productivity and the short period of preservation of the local garlic production directly influence prices, which in the winter-spring period can reach up to 3 – 3.5 euros per kilogram. At the same time, the import of garlic from Romania, Ukraine, Turkey and China, at low prices, puts an extremely high pressure on the production profitability of this crop in the conditions of our country.

The production of local garlic is a profitable business only if all the recommended production technologies are provided and fulfilled. The nutritional and gustatory qualities of local garlic production confer an essential advantage in the competitive race with imported production. However, this opportunity can be achieved only in the conditions of obvious increase in productivity, obtaining significant quantities of garlic, minimizing manual operations and involving the specialized technique of bulb harvesting, which significantly reduces production costs.

The reduction in the cost of garlic production, as well as the ability to supply and deliver the requested quantities, may lead the food processing industry for crop and animal products to reorient itself towards the use of local garlic production.

In the case of farms, the cultivation of garlic can also be an economically profitable activity. Even in the situation when the harvesting operation is performed manually, the crop can be profitable, provided that the production technology is

observed, valuable seed material is used and a harvest of 80–100 q/ha is obtained. In this case, the cost of producing one kg of garlic can vary between 0.4–0.54 euros per kilogram. Taking into account the fact that the wholesale price is 0.73–1.21 euro/kg, at the productivity mentioned above, it results a profitability of 35–70%.

As previously mentioned, the average area of agricultural land occupied by local garlic is 2.5–3.5 thousand ha, of which 2/3 of the given area belongs to households and only 1/3 to specialized farms. The reluctance of agricultural enterprises to produce garlic in the conditions of our country is fueled by the following factors:

1. The quality of the seed material.

Garlic is reproduced by two methods, namely by bulbs (aerial part of the plant) and the harvest is obtained within two years and by garlic bulbs or cloves (underground part of the plant), in which case the harvest is obtained within one year.

In the first case the seed material is of higher quality, productivity increases by 20–30%, the product is less affected by diseases but requires a period of two years for production, which involves significant costs, often above the financial possibilities of small businesses.

The bulb production method is more affordable but requires large quantities of planting material (1200–1500 kg/ha), at a price of 1.5–2.0 euros/kg, which means about 2.2–2.5 thousand euros/ha. At the same time, the quality of the obtained harvest is clearly lower than in the first production method and is more often exposed to diseases and pests, which entails additional costs for phytosanitary treatment.

2. Ensuring the production process with workforce.

The maximum involvement of the workforce is attested during the harvest period, when plants are manually extracted from soil, the bulb stem is detached and collected in special bags. This operation requires limited time because prolonged exposure of bulbs to the sun leads to excessive moisture loss, causing damage to the appearance of the garlic head (ovoid bulb) manifested by detachment of the bulbs. Given the chronic shortage of labour in rural areas, ensuring the harvesting operation with the respective resources is problematic. This is basically one of the main impediments that forces local producers to give up garlic cultivation.

3. Short storage period of garlic.

The main method of garlic production practiced in Moldova is the cultivation by planting bulbs in autumn. Local agro-meteorological conditions allow the successful use of this method, the harvest being obtained at the end of next summer. But the production obtained by this method has a low storage capacity, which makes it more difficult to supply garlic on the market in the winter-spring months, when there is a deficit of local production. Spring planting of bulbs would reduce the effects of that problem, but the yields obtained by that method are smaller and lower in appearance.

4. Strong competition from importers.

The modern technologies used by producers in Turkey, China or Egypt allow for a significant cost reduction in garlic production, which, later reaching the Moldovan market, is sold at a much lower price compared to local production.

These are only some of the reasons that negatively influence the decision of local farmers to launch into the garlic production business. It is obvious that, in order to be successful in this business, it is mandatory to develop an action plan as relevant as possible from the point of view of financial management, but also to designate the most efficient production technology. At the same time, it is important to create and maintain the logistics of goods, a component that represents a system of elements and operations that allow the physical movement of goods from producer to final consumer, so as to have minimum costs and ensure the necessary quantities at the right time (Mâlcome, 1994).

In this context, in order to streamline this agricultural segment, it is appropriate to implement the garlic production technology that initially includes the stage of obtaining the seed material followed by obtaining the basic production. This method consists of two technological steps, namely:

1. Stage I – obtaining the basic seed material of superior quality. It represents the first year of vegetation and is limited to obtaining seed bulbs from bulbs collected from the aerial part of the plant. The bulbs are sown in the ground in autumn, and all the technological maintenance operations are carried out in the next year.
2. Stage II – obtaining the expected harvest. After the first vegetation year, the garlic plants enter the vegetative rest, and the bulbs already formed are not harvested, but remain in the field to extend their vegetation period in the next year. In spring, once the vegetation starts and until harvesting, all the necessary technological operations are implemented, the harvesting process is organized and carried out, the obtained production is stored and conditioned at optimal storage parameters.

This method allows a significant increase of the harvest obtained up to 100 – 120 q/ha, with a high quality of the product obtained. At the same time, the bulbs from the obtained harvest can be subsequently used as a healthy physiological seed material, useful for the simplified production method.

According to the analysis of economic indicators, performed by the collaborators of the National Institute of Economic Research in Chișinău within the State Program "*Development of new economic instruments for assessing and stimulating the competitiveness of agriculture of the Republic of Moldova for 2020–2023*" (figure – 20.80009.0807.16), the expenditures of production operations, carried out following the application of that technology, amount to 2,950.2 euros per 1 ha of land. The harvest obtained and the projected revenues for a productivity of 100 q/ha with the realization of the final product, had two different directions: first direction – wholesale (wholesale) – 80% of the total volume with the average price of 1.21 euros/kg, second direction – retail – 20% at a price of 1.95 euros/kg.

The final result of the application of the production technology with a period of two years makes it possible to obtain a net income of 13,600 euros/ha or a profitability of 6,500 euros/ha for each year of operation (Bajura and Turețchi, 2021).

5. CONCLUSIONS

The current technology of garlic cultivation in the Republic of Moldova is outdated, involves excessive consumption of financial means and production resources, facts that significantly reduce the potential of these crops. As a result, the quality of local garlic production does not meet international standards, has a high perishability level and a short marketing period. As a result, 2/3 of the demand for this crop is covered by garlic imported from China, Egypt, Iran – products of higher quality and lower price. In order to regain the local market, local garlic producers must take certain measures, including:

1. Application of modern garlic production technologies adapted to the pedological and climatic conditions of the given region;
2. Maximum automation of technological operations in order to increase efficiency and productivity and reduce production costs;
3. Implementing a relevant financial management and optimizing all production costs;
4. Elaboration and implementation of a marketing strategy and creation of the long-term value chain;
5. Creation of specialized agricultural enterprises and producer associations in order to facilitate the access of local production both on the domestic and foreign markets, etc.

These predictions are valid for all entrepreneurial activities in local agricultural sector and are basic rules that favour the adjustment of the quality of local products to the market economy standards.

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