

**STUDIES ON THE PERFORMANCE OF ROMANIAN AGRICULTURAL
ENTERPRISES AND THE PRODUCTIVITY OF AGRICULTURAL CROPS,
IN THE CONTEXT OF CLIMATE CHANGE**

-ABSTRACT-

The habilitation work entitled *"Studies on the performance of enterprises in Romanian agriculture and the productivity of agricultural crops, in the context of climate change"* aims to make a synthesis of the results of the research activity in the agricultural and economic field regarding the analysis of the enterprises active in Romanian agriculture and their performances, under the conditions of adaptation to economic, fiscal and environmental measures imposed by national and EU governments, the regulation that we carried out in the period 2009-2024.

One of the agri-environmental measures I focused on was the Farm to Fork strategy, which at the time of its introduction within the Green Deal, mentioned the transition to a resilient and nature-friendly food system, through the stability of precise targets regarding the reduction of chemical fertilizers, pesticides and antimicrobial substances. In 2021, at the level of Romanian farms and producer associations, this strategy created a shock wave, previewing the effects generated by the reduction in the use of agricultural inputs, with immediate effects on agricultural production, which could reduce competitiveness on production markets export.

Another agri-environmental measure that I focused my attention on was the one represented by the PD-04 ecoscheme "Beneficial practices for the environment applicable in arable land" and included in Romania's National Strategic Plan for the period 2023-2027. Starting from this measure, Romanian farms can establish an optimal culture plan, in terms of maintaining the profitability and profitability of agricultural businesses, but also in accordance with the preservation of ecosystems, the maintenance of biodiversity and the reduction of the negative effects caused by global warming. In this context, the research question, addressed by the farmers' associations, was how the productions and incomes of the farms will be influenced and whether the subsidy granted through this ecoscheme will be able to compensate the income losses perceived by the producers.

For this purpose, the paper is structured in chapters, each one highlighting the components of my professional activity, the research results and my future vision in the teaching and research career.

The practice of agriculture in our country is based on the conditions offered by the major productive potential, which other countries do not have. Thus, in the first part, we addressed the situation of the consumption of fertilizers and pesticides in agriculture in Romania, compared to representative countries in the EU, a particularly important aspect in the application of agricultural technologies, with a direct impact on the productivity of crops and implicitly on the profitability of farms. The fertilization system has a major impact on agricultural production for different crops, considering that at the level of the agricultural ecosystem, through the export of the main and/or secondary production, a quantity of nutrients are extracted from the ecosystem, inevitably causing a reduction in production. The specialized literature recommends determining the optimal amount of chemical fertilizers that needs to be applied, starting from determining the specific consumption of each crop, in relation to the planned productions but also taking into account the level of nutrients in the soil. It should be highlighted that any reduction in the amounts of nutrients (nitrogen, phosphorus, potassium and other micro elements) will have direct consequences on production, in the sense of reduction, regardless of the culture. On the other hand, the crop protection system, including here the weed, pathogen and pest management system, is of major interest within the framework technology for each crop, considering that, in the case of weeds and pathogens, losses caused by not applying the appropriate treatments can lead to the total compromise of crops.

The second chapter deals with the analysis-diagnostics of three vegetable farms in Romania, of different dimensions and which, in the period 2019-2022, had different crop plans, adapted to the available surfaces, they approached the technology applied to the crops differently, implicitly the quantities of fertilizers and pesticides applied to them. As a result, these farms had a different productivity and yield for the crops in the annual rotations as well as a profitability at the farm level differentiated and influenced by the applied technology as well as the own product and price policy.

According to statistics, the typology of farms in Romania shows a prevalence of the number of those specialized in field crops and mixed crops. In the framework of the study, the analyzed farms are grain, technical and oleaginous plant growers and in terms of cultivated areas, they had different sizes of approximately 60 ha, 600 ha and 3,000 ha. The data analysis revealed only a partial correlation between the cultivated area and the results obtained. From the statistical reports, the areas cultivated with wheat and corn place our country in the first positions in the European

rankings, but taking into account the productions achieved and, more than that, their yield and profitability, then the quotes given to agriculture in Romania will no longer be just as satisfying.

The analysis related to the influence of the production yield on the profitability of the crops within the three farms, highlighted that the production expenses had, in general, a negative impact on the profitability of the crops, against the background of the constant increase in the price of inputs, which increased significantly these costs. Under these conditions, farms were in a position to find efficient substitutes with lower prices to reduce production costs. Also, the production of the crops included in the crop rotation practiced by the three farms also, in general, had a negative impact on economic efficiency, being small, against the background of climate changes, which are increasingly visible, difficult to anticipate and to be controlled, which led to their quantitative and qualitative reduction. This aspect once again emphasized the need to subsidize agricultural activities, regardless of the size of the farms or the favorability of the zonal conditions, and the legislative forums in our country and the EU are recommended to establish their amount, based on the analyzes carried out in particular, at the level of farm.

The results of the study emphasized the paradigm that the agricultural production achieved by the farms under study is subject to the interaction of some major factors: the genetic potential of each crop, the local conditions and the indisputable influence of the applied technology (including here the tillage system, the fertilization system and the crop protection system).

In this context, the fertilization system has a major impact on agricultural production and crop yields, considering that, at the level of agricultural ecosystems, through the annual export of harvested productions, a significant amount of nutrients is extracted, and in the absence of periodic compensation with fertilizers, it will determine the reduction of productions in the future. The application of fertilizers must be carried out starting from the level of supply of nutrients existing in the soil and the consumption's specific to each crop, with the objective of reaching the planned level for expenses, productions, yield, income and profitability.

Thus, the direct correlation between the amount of nutrients available to plants and the level of harvested production is obvious, and any reduction in the amount of nutrients (nitrogen, phosphorus, potassium and other micro elements) will result in a reduction in production, yield and profitability of farms.