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# Analysis of Agricultural and Environmental Objectives

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***Authors' contributions***

*This work was carried out in collaboration between both authors. Author LP designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Author ASS managed the analyses of the study and the literature searches. Both authors read and approved the final manuscript.*

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## ABSTRACT

This paper aims to highlight an evolution of agriculture from the perspective of climate change mitigation with the implications set out in the Common Agricultural Policy. The technical performance of agriculture has led to the restoration of paradigms in agriculture through increased conditionality of consumption, while the environment has been exposed to variable atmospheric disturbances that pose serious dangers in the future. The purpose of this article is to make a systemic analysis of the convergence of the agricultural economy in relation to the displacement of vectors to achieve environmental conditions. In order to capitalize on the potential of the agricultural sector in net carbon sequestration on agricultural land in order to make a positive contribution to the sustainability agenda, assessments from an agricultural sustainability perspective are needed. An essential premise for the application of the methodological analysis was assessed in relation to the acceleration by the agricultural systems of the conditions imposed as cross-compliance targets, the information being extracted from the available statistical databases Eurostat, FAO, Agridata. Addressing the current context of the common agricultural policy shows that raising environmental standards for farmers has an effect on agricultural production in direct correlation with greenhouse gas emissions. Therefore, the idea of the conditionality of the sustainability of the agricultural system is outlined by the implications in the implementation of decarbonization policies of agriculture.

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## 1. INTRODUCTION

Recognizing the magnitude of the implicit effects, the EC reports have made several international calls to investigate the multiple causes of pesticide and fertilizer pollution, but what the parameters and costs are. In our paper, we gathered, on the one hand, the evolution of carbon emissions from agricultural sources in Eastern countries compared to the European Union, and on the other hand, we highlighted some aspects related to agricultural fertilizers, trying to establish a link causality from a climatic perspective. Good obligations for agriculture and the environment (GAEC), for example, have led to these criteria being met, in fact requiring farmers to support agricultural production in line with increased carbon requirements. Sustainable development is linked to the achievement of this goal, which sets a number of goals that must be achieved by current generations in order for them to remain for future generations, according to an OECD report (2021). This is a general objective of the European Union, so the role of the main farmers and decision-makers is to promote a dynamic economy, with full environmental protection in a peaceful and secure world. However, unsustainable climate trends sometimes lead to biodiversity loss, land use, lack of infrastructure links, such as irrigation, persist, but there are other challenges. As there are strong concerns in this regard in the new CAP, there is a short-term concern that urgent action is needed in this regard, while maintaining a longer-term perspective. Agriculture, the environment and the climate are all intertwined in more complex and dynamic ways than previously understood.

Agricultural methods and products have a significant impact on human and animal health and welfare, but this impact is often not well understood. The representation of all these characteristics and relationships establishes a number of new needs for agricultural statistics. All these policy areas require a solid scientific knowledge base, which is based on agricultural statistics, the knowledge of these realities being factors capable of stimulating sustainable development. However, farmers can approach climate change in a variety of ways, including agriculture, carbon sequestration, change, irrigation and water management. Recent studies on the provision of ecosystem services at the landscape level have largely focused on service packages for administrative regions or grouped areas (Queiroz et al., 2015; Mouchet et al., 2017; Quintas-Soriano et al., 2021) or unique locations (Andersson et al., 2015; Nikodinoska et al., 2018). [1] To our knowledge, there is a lack of studies that explicitly link changes in biodiversity and ecosystem services to the increasing specialization of production, despite the fact that the latter is an important link between agricultural policy and environmental outcomes (Leventon et al. al., 2017). [2] The challenge of bringing about changes in agricultural systems is both local and global. However, agricultural productivity is closely linked to possible disasters caused by climate change. Thus, efforts to adapt producers to the impact of adopting the new vision of agricultural policy are becoming more frequent and intense. The first part of the paper highlights the effects of climate change and the need to adapt climate and environmentally responsible farming practices to agricultural structures in order to reduce greenhouse gas emissions. To limit these effects between the main technological options for reducing $CO_2$ emissions and thus $CO_2$ from the atmosphere, the appropriate use of agricultural land to provide sustainable products. Policy decisions such as the Council of Agriculture Ministers (2021) have also been followed by measures to increase the quantities limited to ecosystems, compared to the general approach of the Council (progressive growth, starting at 22% in 2023 and reaching 25). % in 2025.

## 2. MATERIALS AND METHODS

The technique consists of a combination of methodologies that include an evaluation of the literature, as well as the collection and analysis of administrative data. The methodology involved a systemic investigation of databases aimed at allocating CAP funds, primarily for the replacement of pesticides with agricultural policy modalities.

The literature review is used as a cross-cutting method for the preliminary analysis of the context and the completion of the answers to the evaluation questions.

Starting from the statistics on farms and agricultural products in Romania, several specific analyzes available in the literature (on fertilizers, climate change, biodiversity and much more) were considered as terms of reference.

The literature review also includes an international context analysis and highlights the most relevant findings applicable to environmentally friendly agricultural areas, on the one hand, and the use of land that has been used as benchmarks to deepen the analysis of the context of greenhouse gases greenhouse.

In the applied methodological analysis we considered an assessment of the counterfactual impact, in which case it was useful to access and correlate the specific microdata collected from the statistical databases, provided that there are sufficient causal elements between them.

The data collection tools were based on the usefulness of the data compared to the date of access to the data sources being collected from specific annual statistical reports as well as from Eurostat, Agridata and OECD administrative data sources.

From an economic point of view, for example, nitrogen pollution in the European Union has been estimated at between € 70 billion and € 320 billion a year. (OECD 2020) [3] Nitrogen oxide and methane last longer in the atmosphere and absorb more long-wave radiation. Therefore, small amounts of methane and nitrogen oxide can have significant effects on pollution caused by climate change. Specifically, the manuscript begins with an image of the causes of biodiversity loss due to excess pesticides and fertilizers. At the heart of the paper is the idea of examining the evolution of depollution conditions with pesticides and fertilizers, as well as the application of the Anti-Pollution Directives.

The European Economic and Social Committee (EESC) acknowledges that food supply chains along the supply chain (including European farmers and fishermen, cooperatives, agri-food companies, retailers and wholesalers and other types of companies) are already working to progress in sustainability and providing consumers with healthy and sustainable products in accordance with the European Green Pact, however, in order to achieve the goals of the Sustainable Development Goals (SDGs), coherent action must be taken to mediate the interests of the environment and the beneficiaries.

In this study we highlighted that the method of simulating the diversity of fertilization methods was analyzed on development areas at the territorial level compared to the forecasted productions, taking as a barometer the rainy climate and soil characteristics.

### 2.1 The Agricultural Context and the Environment Agricol

In the context of European legislation to combat climate change and the energy transition, the aim is to increase the level of ambition to reduce emissions, increase the share of renewable energy sources, energy efficiency measures and the level of interconnection of electricity networks. In terms of the agricultural context, the economic system of sustainability creates the perception of a future benefit for the environment, with agricultural producers being obliged to comply with environmental requirements.

The interdependence between carbon sequestration in soil and climate change has led to the idea of the need to find new ways to preserve agriculture. The implementation of sustainable agricultural production can lead to an increase in soil carbon sequestration through proper land management, thus making it possible to improve its properties.

On the other hand, the sustainability of agricultural ecosystems can be applied separately, depending on the ecosystem, to give efficiency, the process being cyclical, therefore, in conditions of climate risk and the agricultural system suffers from the natural ecosystem, as noted by Aznar-Sánchez, J (2019). [4]

In order to make it more profitable to reduce carbon emissions and increase investment in this area and Decision (EU) 2015/1814 (ETS Directive) with its implementation in 2021-2030, an innovative model called the Modernization Fund was adopted at European level ( FM) which is a new financing instrument that was established by art. 10 of Directive 2003/87 / EC of the European Parliament and of the Council of 13 October 2003. [5]

Thus, the Modernization Fund encourages investment in modernizing energy systems and increasing energy efficiency, including in small-scale investment projects, in line with the Union's 2030 Energy and Climate Policy Framework and the long-term goals of the Paris Agreement. It

supports a socially just transition to a green economy, which helps to achieve the goals of the European Environment Pact. The beneficiaries of the Modernization Fund are Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia, whose GDP per capita at market prices (in euros) was less than 60% of the EU average in 2019.
It should be noted that the Modernization Fund consists of the revenues obtained by bidding on the market 2% of the total certificates allocated to Member States under the EU-ETS scheme for the period 2021-2030. Romania has allocated 11.98% of the total of 2% of the total amount of certificates allocated to Member States under the EU-ETS scheme for the period 2021-2030, which it can use to finance investments, as set out in Annex II b to Revised EU-ETS Directive.

### 2.1.1 Radiography of the agricultural system

The reduction in agricultural emissions at EU-28 level is primarily due to declining livestock numbers, improved levels of good agricultural practice, reduced use of nitrogen-based fertilizers, improved management of natural fertilizers in the soil, and the importance of the livestock sector and agricultural practices regarding biomass. The global average CO2 concentration in the atmosphere is constantly increasing. Pesticide residues in food and feed are monitored by Member States against the European Maximum Residual Limits (MRLs), and 95.5% of the 91,000 samples assessed in 2018 fell below the permitted limits. Exceedances are more frequently identified in food imported from outside the EU during annual monitoring procedures (8.3% of third country samples in 2018 contained residues in excess of permitted concentrations), but some residue problems can also be attributed to European agriculture. (3.1% of the 2018 tests).

Information on the use of pesticides is not available on a European scale. However, in accordance with Regulation (EC) No Since 2015, the Commission has been providing data on the use of agricultural crops every five years in accordance with Regulation (EC) No 1493/1999. 1185/2009 on pesticide statistics. [6]

But there is the question of the mechanisms by which pollution can be controlled by improving the use of agricultural resources and the consumption of pesticides in agriculture.

Several Member States have also introduced regulations on pesticides for environmental purposes. Best practices in pesticide application, raw material standards to be used for fertilizer production.

Cross-compliance by assessing the effectiveness of environmental protection efforts in increasing competitiveness in agriculture, the intensity of traditional practices are tools for analyzing more resilient and sustainable production systems. On the other hand, the link between cross-compliance and agricultural production is reflected in the level of soil storage, which highlighted the importance of determining soil quality and interdependence with the climate ecosystem, but how do we correlate the link between reducing emissions in agriculture and adapting to sustainable systems, time is a challenge for both small farmers and holding companies. (Fig. 1).

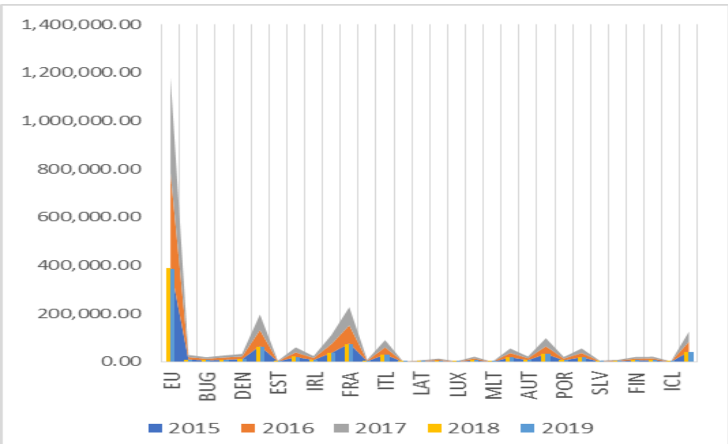


**Fig. 1. The value of the production of the agricultural branch**
*Source: Eurostat data*

Due to the unique behavior of nitrogen in the soil, strategic options assume that fertilization with this nutrient, as well as cultivation techniques that influence its dynamics in the soil, must be done so as to minimize water loss through percolation, reducing the risk of nitrate contamination of groundwater and surface. A number of countries have also made attempts to limit pollution caused by the use of fertilizers. New rules have been adopted, as well as changes to current nitrogen leakage programs. The exchange of gases between agricultural production systems and the atmosphere, on the one hand, and the atmosphere, on the other, is a hot topic of research.

Obviously, in order to develop GHG mitigation measures, it is essential to analyze and quantify the functions of indicators that may reveal why not largely a simulation of the GHG mitigation vision through a better understanding of the processes that underlying GHG emissions or emissions in agricultural systems (Fig. 2).

Among the conditions for cross-compliance have been introduced rules for the protection of permanent pastures, limited national stability for the percentage that could be shown and thus generate $CO_2$ emissions. According to the FAO, there are real estimates of population growth, which leads to a considerable increase in the demand for food, feed and renewable resources over time. The agricultural sector will face serious global challenges, including a lack of natural resources and climate change.

Agriculture must meet not only the high goals of depollution, but also the goals of efficiency and sustainability in this environment. The bottom line is that in order to reduce its impact on the environment, agriculture needs to be more efficient while increasing productivity. The use of high-quality plant protection solutions for good quality agricultural goods at low prices, with a low risk of contamination, is a crucial aspect in increasing agricultural production and reducing crop losses.

Therefore, as presented in (De Toni et al, 2021), different from the level of progress in achieving rural development is based on barriers to achieving sustainability at the local level. Global thinking, although a valuable expression of the inclusion of local strategies in achieving the decarbonisation target, all these elements must provide the effectiveness of the local agricultural system as active factors. Hence the nuance in the literature by (Olsen and & McCormick, 2018, Brayden, 2019), the fact that the agricultural policy of sustainable development in fact began at the level of the European Union as a policy of territorial cohesion and not as part of common agricultural policy [7].

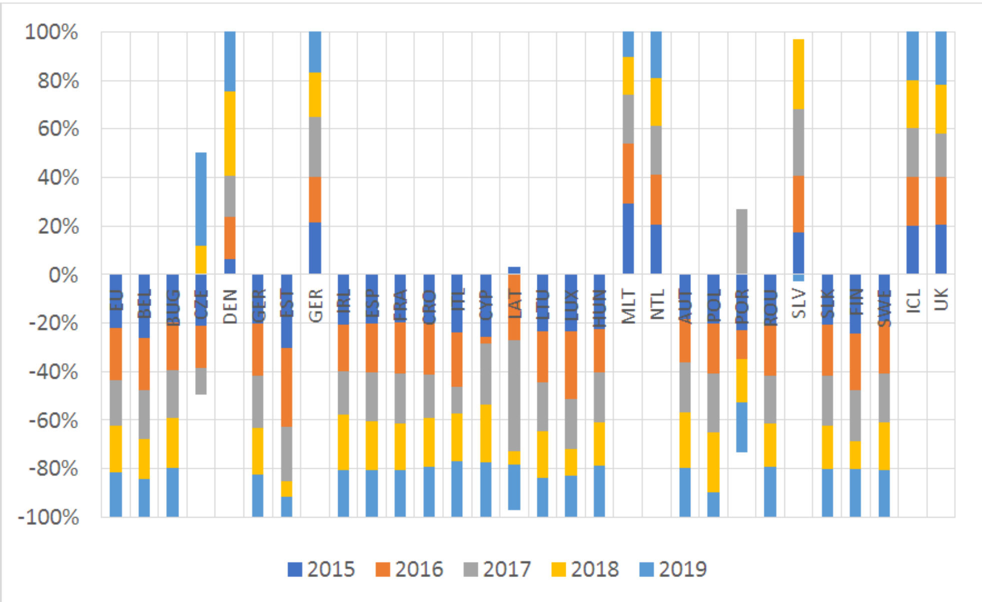


**Fig. 2. Emissions Greenhouse Gases 2015-2019**
*Source: Research of the owner of the source from Agridata-Eurostat*

On average, 35.6% of the land area in OECD member countries is used for agriculture. It serves as a globally accepted voluntary standard for pesticide management for all public and private parties involved or associated with the distribution and use of pesticides, especially where there is no national level or appropriate legislation governing pesticides under the International Code of Conduct on the distribution and use of pesticides adopted by the FAO Council. [8]

One of the concrete goals of the EU's farm-to-farm strategy to reduce pesticide use and risk by 50% is currently on the Union's agenda.

The evaluation of the effectiveness of environmental protection efforts by highlighting the trend of pesticide use is correlated with the concrete levers to reduce their use through measures to pass organic farming. Therefore, given that Romania is divided into development regions, in this paper we highlighted arable land as a priority source of agricultural production, as well as the influences of agricultural production on the development of rural areas, to see which of Romania's development areas will achieves the proposed goal the most.

## 3. RESULTS AND DISCUSSION

As highlighted in specialized studies (Leal Filho et al., 2017; Rodrigo-Comino et al., 2018; Anderson & Mammides, 2020), agricultural land abandonment has far-reaching effects on ecosystem services, such as landfilling. increased carbon, less soil erosion, better water quality and the loss of traditional cultural landscapes. The assumption of carbon sequestration in soil could be an option to mitigate climate change for agriculture by managing land and changing its use. [9] In this study, we will consider the possibility of adapting the methods used to estimate soil carbon changes.

To reduce the negative effects of climate change on agriculture, risk management tools need to be implemented to limit the negative effects of natural disasters on agricultural production. Scientists attribute the rising temperature to rising carbon dioxide and other greenhouse gases released from burning fossil fuels, deforestation, agriculture and other industrial processes. Scientists refer to this phenomenon as an enhanced greenhouse effect.

In order to have environmentally sustainable results in agriculture, constraints must limit production intensification, and land use should be managed in such a way that cultivated land limits nutrient dissipation (Henderson and Lankoski, 2020). [10]

The environmental risk associated with the use of pesticides varies significantly from one pesticide to another, based on the inherent properties of their active ingredients (toxicity, persistence and so on), as well as trends in use (volumes applied, period and method of application, sol culture and type, etc.). Measuring the actual use of pesticides would allow a more accurate assessment of the risks to different environmental compartments or to human health, based on crops and areas.

The sun's heat is naturally captured by the greenhouse effect before it is released back into space. The Earth's surface remains warm and habitable as a result. Increased levels of greenhouse gases exacerbate the natural greenhouse effect, capturing even more solar heat and causing global warming. The enhanced greenhouse effects are shown in Figure 3. Greenhouse gas emissions (including international aviation, excluding LULUCF) trend, EU, 1990 - 2019). [11].

Carbon dioxide ($CO_2$), methane ($CH_4$), and nitrogen oxide ($NO_x$) are the main greenhouse gases related to agriculture ($N_2O$). Despite the fact that carbon dioxide is the most common greenhouse gas in the atmosphere, nitrogen oxide and methane have a longer lifespan in the atmosphere and absorb more long-wave radiation. As a result, even small amounts of methane and nitrogen oxide can have a large impact on global warming. Reducing pollution would be a perspective in describing the causes of biodiversity loss due to excessive use of pesticides and fertilizers.

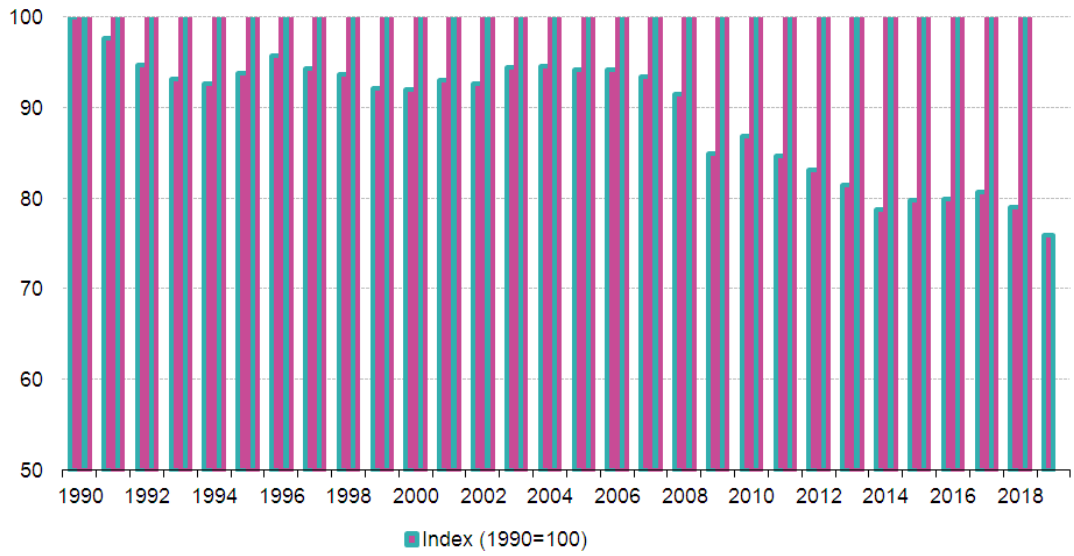


**Fig.3. Greenhouse gas emissions (including international aviation, excluding LULUCF) trend, EU, 1990 – 2019**

*Source: European Environment Agency (online data code: env_air_gge)*

**Table 1. The value of the production of the agricultural**

| Item | Northwest | Center | Northeast | South East | South-Muntenia | Bucharest-Ilfov | Southwest | West |
|---|---|---|---|---|---|---|---|---|
| The agricultural branch | 10,561 | 8930 | 13,652 | 15,256 | 16,336 | 1196 | 10,656 | 9762 |
| Crop production | 7015 | 5348 | 9092 | 11,724 | 12,428 | 606 | 8141 | 6862 |
| Animal production | 3523 | 3509 | 4475 | 3239 | 3775 | 110 | 2453 | 2819 |

*Source*: Eurostat data

The agricultural statistical research inserted in the paper comes to evaluate the decarbonization potential of agriculture from another angle. Several strategies, including: - crop rotation; - the adoption of appropriate cultivation techniques and, why not, agricultural discipline related to production efficiency, should be used to prevent the occurrence and, at the same time, to eliminate harmful organisms. This could involve the use of a variety of pesticides with different mechanisms of action. The risk methodology of our research reveals the prevalence of acts that have an impact on biodiversity and the resilience of natural capital. What we wanted to achieve was to produce a visual representation of the risks to an agricultural sector that are absorbed by sustainability in the context of climate change requirements, as well as the global consequences of these requirements, such as the continuous depletion of natural resources.

From this point of view, we have discussed why it is essential to prioritize the risks in the agricultural system when it comes to fertilizers. As a result, several factors, such as the effects of climate change, low yields associated with low selling prices, and agricultural trade, are not factors that determine fertilizer consumption, as Nicholson, F et al. [12]

On the other hand, the sustainability of agricultural ecosystems can be applied separately, depending on the ecosystem, to ensure efficiency, the process being cyclical, as Aznar -Sánchez, J. points out, in conditions of climate risk and suffering of the agricultural system from the natural ecosystem (2019) [13].

Applied research is needed in a number of areas, including the development of new technologies for climate change mitigation and adaptation, as well as improving the quality of agriculture for the success of large-scale biosphere symbiosis. Highlighting agricultural practices is not necessarily a cliché, but rather a form of biodiversity management and environmental protection.

Reducing pollution, soil degradation, greenhouse gas emissions, biodiversity and balance by improving soil fertility raises questions about how much we rely on fertilizers and how we can minimize their use while maintaining the same yield. (Swinnen, 2015). [14] In addition, strong herbicide and fertilizer dependence can degrade water quality, for example the repeated use of glyphosate has led to a variety of glyphosate-resistant weeds, which often require controlled tillage (Duke and Powles, 2008) [ 15]

Agricultural intensification practices have helped to improve yields in recent decades. This has led to far-reaching implications for shaping the ecological behavior of agricultural producers and for achieving a more environmentally responsible agri-food model in the context of the CAP's greening policy. [16]

The quantity of plant protection products, expressed as active substance, by groups, categories and classes (Table 2), in 2018 compared to 2017 was 3.8% lower. Most plant protection products were produced in the herbicide group (46.7%), followed by fungicides (40.9%), insecticides (9.1%) and other plant protection products. plants (3.3%).

In 2020, 854 plant protection products were marketed, grouped as follows: fungicides, insecticides, herbicides and other plant protection products. The number of plant protection products sold in 2019 increased by 23.4% compared to 2018.

The market environment is an important aspect of the profitability of organic farms is the opportunity to receive higher prices at the farm gate for organically produced goods than for those produced conventionally, especially from the perspective of carbon sequestration from land use as indicated in Fig. 4.

**Table 2. Plant protection products placed on the market (2019-2020) by development regions**

| Macroregions / development region | Number of products (2019 | Number of products (2020) |
|---|---|---|
| Total | 692 | 854 |
| MACROREGION ONE | 586 | 709 |
| NORTHWEST | 507 | 603 |
| CENTER | 507 | 572 |
| MACROREGION TWO | 596 | 696 |
| NORTH - EAST | 500 | 570 |
| SOUTH EAST | 549 | 624 |
| THREE MACROREGION | 612 | 725 |
| SOUTH - MUNTENIA | 590 | 679 |
| BUCHAREST - ILFOV | 472 | 525 |
| MACROREGION FOUR | 594 | 653 |
| SOUTH - WEST OLTENIA | 473 | 488 |
| WEST | 515 | 563 |

*Source:INSSE time 2019)*

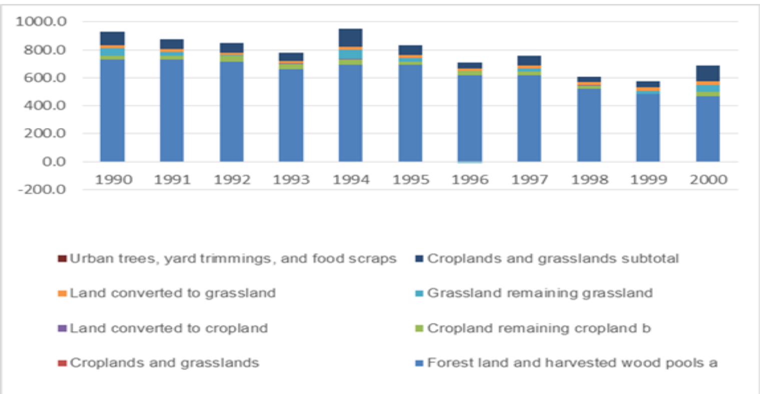


**Fig. 4. Carbon sequestration from land use**
*Source: European Commission, Eurostat data*

Very recent research has produced a dietary supplement that inhibits methane production in the cow's gut, reducing methane production by up to 30% (Mulhollem, 2015), but reducing emissions from animal production is generally difficult. In contrast, emissions can be offset within the same production systems through the use of rotational grazing practices that increase carbon in the soil (Machmuller et al., 2015). One conclusion is that the reduction or slowdown in the growth of world animal production would also reduce the amount of methane produced in agriculture, but it is contingent. [17]

Although some of the carbon in the soil comes from mineral sources, the vast majority comes from plants. As plants grow and die, they leave behind carbon-based organic compounds in various soil sizes and chemical compositions. Under the right conditions, the soil fauna metabolizes their compounds, incorporating some of their carbon into new chemical compounds inside their own biomass, while the rest breathe into the atmosphere as CO2 or excrete it back into the soil. This continuous movement of carbon through the soil trophic network means that carbon is constantly changing shapes in the soil as it is incorporated into new organisms or transformed into various compounds.

Soil scientists classify carbon into general categories or pools based on how long carbon remains in the soil, a figure often referred to as "average residence time."

However, recent research has shown that new varieties have also required large amounts of chemical fertilizers and pesticides to produce high yields, raising concerns about the costs and potentially harmful effects on the environment.

The aim is to reduce GHG emissions from the agricultural sector, which clearly shows that environmental sustainability is achieved.

However, we must keep in mind that the use of pesticides is partly influenced by the economy (the most profitable crops are the most economically viable to treat) and partly by the local soil and climatic conditions that cause vulnerability to pest infestation. The type of agriculture (conventional or organic) is very important as a causal factor. Figure 5 shows an assessment of the consumption of plant protection products placed on the market (2011-2021).

Measuring the actual use of pesticides would allow a more accurate assessment of the risks to different environmental compartments or to human health, based on crops and areas. The overall need for fertilizers is expected to continue to grow, as projected. If climate change is to blame, these figures suggest an increase in the use of phosphate as a fertilizer. As an external element, the demand for phosphate rocks is considered to be closely related to the need for use in agriculture. Farmers have invested in expanding agricultural land (only 6% have significantly increased their agricultural area, 10% in part, while 13% have not made such investments), but the economic viability of farms has increased, following the NRDP interventions, for a significant number of beneficiaries (78%), because in many cases they reduced production costs by using innovative processes. (Fig. 6).

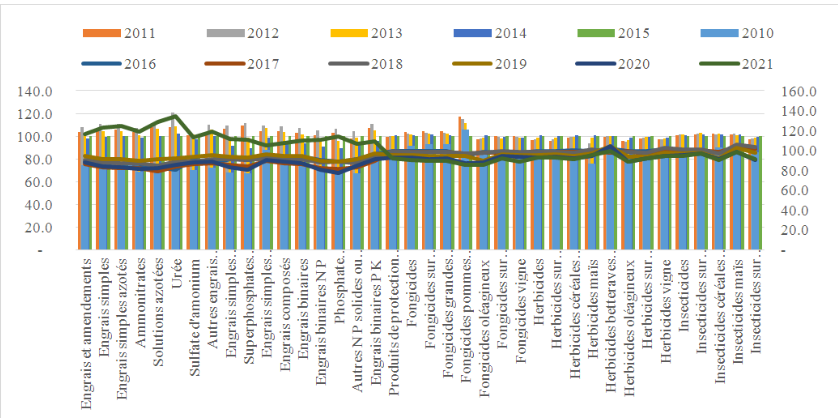


**Fig. 5. Plant protection products placed on the market (2011-2021)**
*Source:: Own research data from  Eurostat data Agridata*

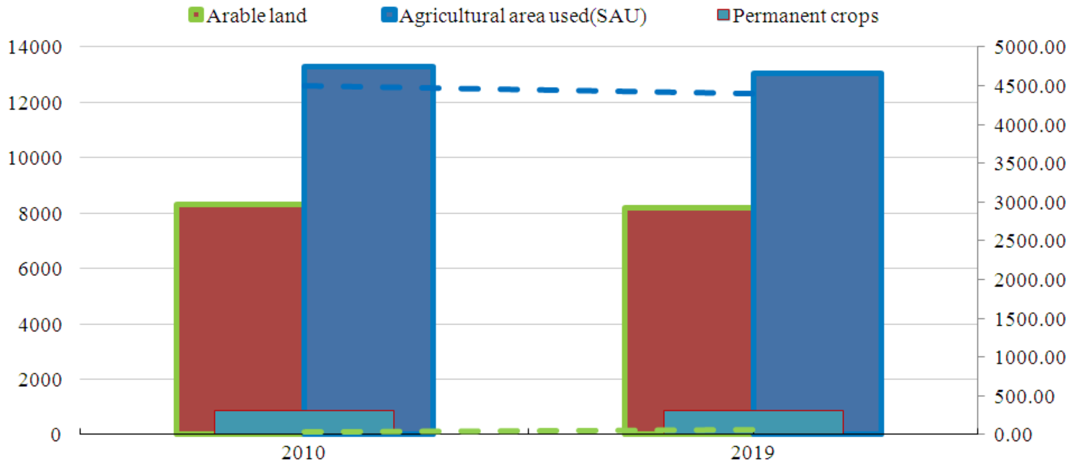


**Fig. 6. Protection products applied in arable land,SAU, permanent crops**

*Source : Own research data from  Eurostat data Agridata*

The impact of biodiversity and human health on the excessive use of pesticides and fertilizers is obviously a cause that requires a thorough investigation. It is found that the use of pesticides is increasing more than in proportion to the intensification of agriculture. It has been estimated that, on average, for every 1% increase in crop production per hectare, there is a 1.8% increase in pesticide consumption per hectare (Schreinemachers and Tipraqsa 2018). [18]

In addition to finding ways to protect soil carbon from microbial attack by chemicals and protective products, manufacturers can simply change the balance of soil carbon by increasing the amount and chemical complexity of carbon inputs to compensate for losses due to microbial respiration.

However, weather and climate disasters are becoming more frequent and severe as a result of climate change (IPCC, 2012) [19] Due to the climate sensitivity of agriculture, the sector is already adversely affected by the deterioration and destruction of agricultural infrastructure and losses in crop, animal, forestry, fishing and aquaculture production (FAO, 2016). Pests and diseases of plants and animals are also expected to increase due to climate change, extreme weather events and seasonal variability and already have an impact on the sector, food security and livelihoods, the economic sustainability system creates the perception of a more environmentally beneficial future, with agricultural producers having to comply with environmental requirements.

But what are the costs of sustainability and if this is the key, between economic and financial sustainability are part of the problems of farmers and their profit.

Regulation (EC) no. Regulation (EC) No 1.107 / 2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/11 and 91/414 / EEC to reduce pesticide dependence, protect human health and potential risks associated with the use of pesticides and the achievement of sustainable use of pesticides are among the objectives of Regulation (EC) No 882/2004. Regulation (EC) No 1.107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing on the market of integrated pest control using non-chemical alternatives to pesticides is encouraged in order to reduce its hazards and impact on human health and the environment.

Greenhouse gases have different abilities to retain heat in the atmosphere, known as global warming potential, which is expressed in units of carbon dioxide (CO2e) equivalent. In the IFSM, each unit of nitrous oxide is equivalent to 298 units of $CO_2$ and each unit of methane is equivalent to 25 units of CO2 (IPCC, 2007).

For example, the carbon footprint of the milk product is determined as the net amount of all greenhouse gas emissions converted into $CO_2$ units divided by the energy-corrected milk produced (Rotz et al., 2010). The term "impact" includes both positive and negative effects on agriculture. Food production is an integral part of the survival of civilization and carefully done agriculture can beautify the landscape and protect the surrounding natural resources (Cederberg and Mattsson, 2000). [20].

Farm characteristics for which agricultural soils are usually seized on an annual basis and range from 0.4 to 1.2 gigatons per year (Gt / year) (Lal, 2004). [21].

Some are more optimistic, including Kell (2011, 2012) who argues that by improving root growth in crops, carbon storage in the soil could equalize anthropogenic emissions over the next 40 years. However, we must keep in mind that the use of pesticides is influenced by a variety of factors, including the economy (the most profitable crops are the most economically viable to treat), as well as local soil and soil characteristics climate that contributes to the sensitivity to insect infestation. Very important as a causal factor is the type of conventional or organic agriculture as shown in Fig. 7.

Although organic farming is a decarbonisation target of agriculture through the efficient use of natural resources, it has been on an upward trend between 2015 and 2020, countries such as Austria have increased their organic production from 20.00% to 25.33% time for four years in a row. , Lithuania and Sweden with over 20 percent of production, Italy accounting for 15 percent of production in 2020, and Romania with 2.86 percent of organic production in 2020 (Fig. 8).

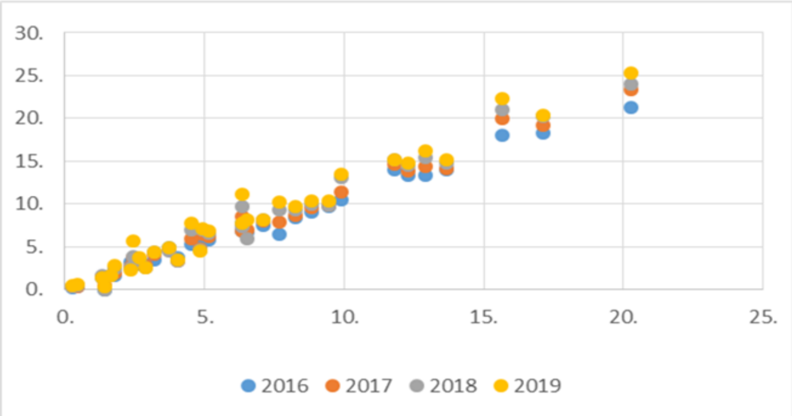


**Fig. 7. Organic farms**
*Source: European Commission, Eurostat data*

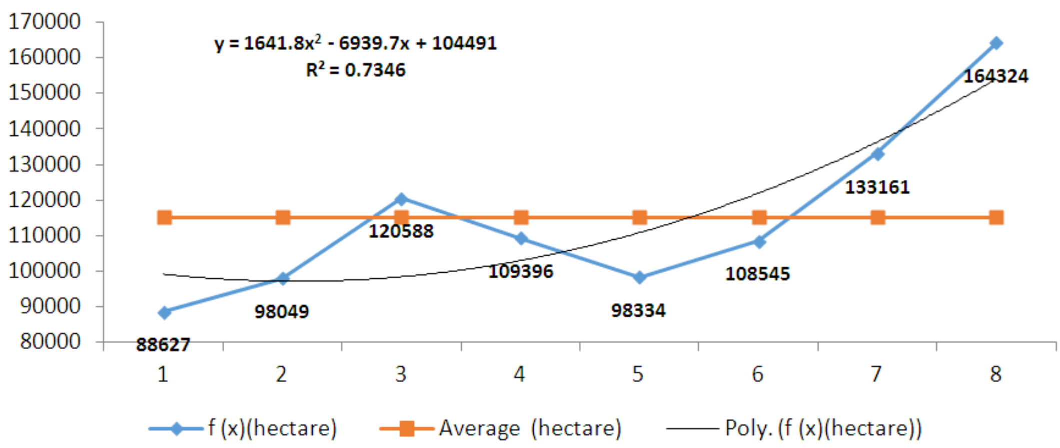


**Fig. 8. Simulation Full conversion to organic farming (hectares), 2012-2020**
*Source Own research data from Eurostat data*

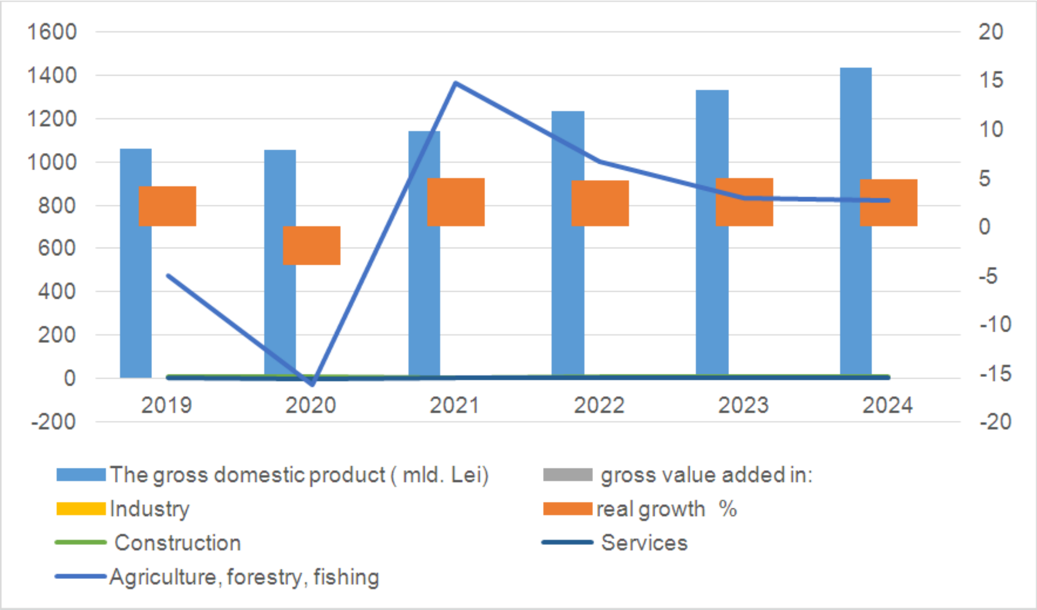


**Fig. 9. Projection of the main macroeconomic indicators**
*Source Own research data from the National Forecast Institute*

Another distinct phenomenon in the regime of agricultural lands is occupied by the destination of the lands.

About 10-30% of total $CO_2$ emissions are the result of emissions from the use of agricultural land, but highlighting the causal relationship between their causes is difficult to predict because it involves the effects of fertilization and improper land management practices.

Through support methods in the conversion to organic farming methods, we also find progress such as biodiversity protection. Maintaining braided levers maintains soil fertility and functionality, reducing water pollution and improving water management, reducing carbon dioxide emissions and ensuring animal welfare and increasing the added value of agricultural production.

The organically cultivated areas and the areas in conversion in Romania must meet all the production standards provided in Regulation (EC) no. 834/2007, with detailed application rules presented in Regulation (EC) no. Regulation (EC) no. Commission Regulation (EC) No 889/2008. One of the EU's indicators of sustainable development is the area occupied by organic farming.

Romania is one of the countries that practices organic farming. In the period 2012-2020, the area in organic farming decreased by an average of 6,939.7 hectares per year.

According to public information Eurostat, we estimated by Figure 9 the projection of economic indicators as a target on the Agricola forecast, a progressive increase resulted, starting with 22% in 2023 and reaching 25% in 2025.

Stimulus market impact and organic prices are often higher than assistance payments (Offermann and Nieberg, 2009). [22] The CAP approach, for example, has led to a significant reduction in conventional ones. In combination with EC subsidies for organic farming Regulation 2078/92, producer prices have increased the relative competitiveness of organic farming. Among the most comprehensive attempts to estimate the global potential for GHG reduction in agriculture is the work done by the IPCC Task Force on Mitigation (Smith et al., 2008). It uses an extensive database of studies on carbon sequestration and the potential for GHG mitigation of a variety of agricultural practices and ecological recovery on currently cultivated organic soils (ie wetlands). In a further analysis that established according to Smith et al. (2008) estimates a total technical potential of 5500-6000 Mt $CO_2$ equivalent per year between now and 2030, 89% of this figure being derived from low $CO_2$ emissions from the soil. The transition to sustainable food systems, especially organic farms, will open up new options for farmers and operators along the food supply chain, resulting in healthier food and lower environmental costs. Soil phosphorus levels tend to be set in EU crop-producing regions.

## 4. CONCLUSION

The most notable aspect of the current calculation of climate policy efforts is that resources must be used efficiently towards more environmentally friendly, therefore environmentally friendly, projects. At the same time, Lynch et. al (2021) emphasizes the huge role that agriculture plays in climate change mitigation, the link with strategies and mitigation capacity being closely linked to the reduction of greenhouse gas and ammonia emissions and adaptation to climate change in forestry. As highlighted in specialized studies (Leal Filho et al., 2017; Rodrigo-Comino et al., 2018; Anderson & Mammides, 2020), agricultural land abandonment has far-reaching effects on ecosystem services, such as landfilling. increased carbon, less soil erosion, better water quality and the loss of traditional cultural landscapes. The assumption of carbon sequestration in soil could be an option to mitigate climate change for agriculture. [23-25].

An inevitable consequence is the need for an innovation-friendly framework to support manufacturers through those levers and customized solutions in their transition to more sustainable business practices is again emphasized. Thus, it is demonstrated once again that environmental alignment is an important part of the CAP package and that the full responsibility of farmers for complying with environmental conditions is transferred. Targets for the efficiency of an increasingly sustainable agriculture are set with the adaptation of climate and environmental requirements.

Our results show that there is no single type of farm that simultaneously maximizes food production, pasture biodiversity and landscape opening, while minimizing GHG emissions. However, there is considerable potential to manage trade-offs between food production and these environmental variables.

Barriers to innovation must include the entire economic chain from a sustainable, resource-efficient supply, as well as depollution solutions as efficient entry points to greater sustainability. The European Commission (EC) should also introduce measures to support the accessibility of healthy and sustainable food. Because it is emphasized that sustainability is based on three main pillars: economic, environmental and social, we believe that the interference between them must be shaped as a living interdependence between the poles and not at the level of a generic strategy.

In the current circumstances, the interconditionality between benefits and costs must be kept in balance when achieving the objectives is to reduce pollution. We believe that the interference between them must be outlined as a living interdependence between the poles and not at the level of a generic strategy.

This could be controlled by measures to reduce pesticides and replace chemical fertilizers by switching to sustainable products and production, why not reduce these costs by the environmental benefits of such allocations, as indicated by Popescu et al (2021) will be reduced even compared to the initial costs. [26] The targets for the efficiency of an increasingly sustainable agriculture are being created with the adaptation of climate and environmental requirements, for the development of the agricultural sector in all respects. The analysis indicates that an increase in sustainability goals is a lever for efficiency and not just a condition of agricultural policy, but the convergence levers of the CAP vision turn reality into necessity.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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