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Evolutions, trends, challenges and projections in the field of agricultural economics

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Abstract. Emphasizing the links between soil and water quality, food production, biodiversity and carbon sequestration have attracted many scientific commentaries, and our proposal for a holistic approach to causal relationships in proportion to achieving soil quality and conservation goals reconciles soil productivity and sustainability. Thus, the present research highlights the evolution but also the relevant challenges in agricultural productivity as a result of adaptation to climate change and presents an analysis on the application of a new systemic concept in direct relation to the need for adaptation. The development of a more responsible conceptual framework in agricultural systems to mitigate the impact of undesirable results can be an active connecting factor as a step in the evolution of a sustainable production farm. The relevance of this study lies in the interconnectivity of measures to adapt to climate change in agricultural systems in soil treatment to reduce greenhouse gas emissions. The data sources form a symbiosis between forecasts and developments related to the vision of the CAP in addressing the two themes environment and soil that should confirm in our opinion the same standard.
Keywords: *soil, environmental, carbon emissions, conservation*

Introduction

Union policy is consistent with regard to the conservation, protection and improvement of the quality of the environment, the protection of human health, the prudent and rational use of natural resources, promoting measures at international level to deal with global environmental problems and, in particular, combating climate change. Knowledge of soil carbon content, as well as other key soil characteristics, is the starting point for every soil manager to make decisions about proper and sustainable soil management practices.

Soil degradation, but also its causes and impact, can be cross-border. Soils play a major role in the nutrient, carbon and water cycle, and these processes are clearly not constrained by physical and political boundaries. While half of the carbon stocks in the soil are in Sweden, Finland and the United Kingdom, the flows have a much wider and transboundary impact on the climate. The EU is the world's second largest emitter of greenhouse gases from drained peatlands, with 99% of these emissions being caused by 16 out of 28 Member States, where peat is mainly present.

In 2016, 72.7% of EU agri-food products were traded between Member States. Globally, 3.2 billion people are directly affected by degraded soil. Polluted soils not only cause a loss of biodiversity, but also reduce soil productivity and fertility and can have an impact on human health through direct inhalation exposure, skin contact, ingestion or indirect exposure through food intake of contaminated food or drinking water.

Whereas global food demand is projected to double by 2050 and will require increased world food production amid pressure on natural resources as climate change has a major impact on agricultural activities, for example by reducing crops, due to the lack of water affecting local agricultural activities in the poorest countries; I. whereas the proportion of deforested land and the resources used for the production of animal feed, meat and biomass for biofuels has increased, which has made a significant contribution to global speculation in agricultural commodities, C 285 E / 70 Official Journal of the European Union European Parliament 21.10.2010 EN Thursday, 26 November 2009 amid pressure on natural resources as climate change has a major impact on agricultural activities, for example by reducing harvests due to lack of water affecting local agricultural activities in the poorest countries; I. whereas the proportion of deforested land and the resources used for the production of animal feed, meat and biomass for biofuels has increased, which has made a significant contribution to global speculation in agricultural commodities, C 285 E / 70 Official Journal of the European Union European Parliament 21.10.2010 EN Thursday, 26 November 2009 amid pressure on natural resources as climate change has a major impact on agricultural activities, for example by reducing harvests due to lack of water affecting local agricultural activities in the poorest countries; I. whereas the proportion of deforested land and the resources used for the production of animal feed, meat and biomass for biofuels has increased, which has made a significant contribution to global speculation in agricultural commodities, C 285 E / 70 Official Journal of the European Union European Parliament 21.10.2010 EN Thursday, 26 November 2009

The development of the world economy has some of the biggest effects in changing the view of consumption when it comes to food. Consumers no longer go to the first manufacturer, covering a distance of time until it, but they know who they are addressing, they choose to buy and consume a certain product they want, using a direct access path to satisfy this desire. .

In an age where consumption cannot be measured only as an economic indicator, the way in which an agricultural product is sold to us attracts interest depending on the recipient to whom it is addressed.

The receiver knows that he is chosen to be presented with an agricultural product, for example given the real situation of the COVID 19 pandemic, large agricultural producers but also small producers with production farms by categories of vegetables, fruits and fruits were forced to address the consumer with all products packaged, sealed, as a sign of concern to sell fresh and clean products to consumers.

Hence the question of how these product packaging measures will be reflected in the packaging collection system.

The role of the producer is reversed to ensure those packages that maintain the quality of packaged products in phytosanitary conditions according to the regulated norms, but also to calculate how much they have to invest in agricultural production packaging products insofar as this processing is not fully outsourced.

The health of the land has an effect on the health of agricultural production.

Sustainable consumption at the farm gate leads, in some cases, to accumulating surpluses, putting effort on storage space and, for high perishability, increasing food losses.

A system cannot be maintained for long periods of time if every year we lose soil by erosion and do not use substances that are harmful to the environment, in our case pesticides.

We recognize nature as an extremely complex ecosystem and look at agricultural systems in the same way. Thus, we realize that if we change one element - we inevitably affect the others as well. sustainable development means combining long-term business success with environmental protection and social responsibility.

Only high-tech agriculture, which preserves and improves soil fertility and its productive potential, is able to ensure the sustainability of cropping systems and protect the quality of the environment.

In the same consistency of ideas, fertilization is one of the main technological levers for preserving and / or restoring soil fertility, by permanently renewing the natural fund of chemical and organic substances necessary for plant growth and development.

Nitrogen fulfills essential functions in plant physiology, being indispensable in having an overwhelming role in crop productivity and the quality of agricultural products and the environment, increasing the number and weight of fruits, crop productivity increases plant protein content.
Abundant and unilateral nutrition with nitrogen prolongs the vegetation period of crops, reduces the resistance of plants to frost, worsens the quality of soils and surface and deep waters.
Phosphorus is one of the essential elements of life, the only one capable of capturing and providing the energy needed in metabolic processes, being essential in the formation of the seeds of the future harvest.
Potassium is essential for the growth and development of plants because it intervenes in the synthesis of chlorophyll, from an agronomic point of view it increases disease resistance.

1.1. Decreased soil fertility
Studies conducted by the specialist in soil science, environment have shown that there is no palm of cultivated land that does not suffer more or less due to a phenomenon, an excess of acidification treatment, decrease in humus content chemical pollution.

This situation can be aggravated by the cultivation of the land by ear as well as the expansion of agricultural systems then abandoned, the disappearance of villages
In fact, the problem arises in the reduction of biodiversity, pollution with nitrates, phosphorus, organic substances, surface and deep water and soils. a contemporary phenomenon, with very few exceptions we eat what the agricultural producer offers us.
Indicators for sustainable agriculture. Cultivate sustainably with respect for the land. Here are some pointers that we take into account. We use the resources we have, we adapt, and we base our decisions on them. We do not apply standard recipes - we apply recipes suitable for our situation. To support this demand, agriculture must develop sustainably and investment in European agricultural production must be increased to meet it.

In general, sustainability involves controlling the use of resources and not increasing public awareness and confidence about the benefits and safety of using plant protection products but also protecting the environment and natural habitat by recommending new, advanced and sustainable solutions. protection of agricultural crops.

2. LITERATURE REVIEW

Innovation and research in the agricultural system in general and in particular in the area of crop protection, is a neuralgic point in continuous ascent. The aim is to conserve resources, being primary in maintaining healthy crops, and secondly to provide high quality food, in order to maintain a competitive agricultural economy. What is the role of pesticides in providing affordable food and increasing global economies?

A key element in integrated pest management, pesticides are essential for the development of a sustainable and productive agriculture. pesticides is the monitoring of local products of plant origin (vegetables, fruits and cereals), in terms of compliance with applicable law, regarding the use of plant protection products and compliance with Regulation (EC) no. 396/2005, regarding the content of pesticide residues applied to or from food products and food of plant origin for animals, with subsequent modifications and completions.

In that regard, it must be borne in mind that, according to the third paragraph of Article 288 TFEU, 'the Directive shall be binding on the Member State to which it is addressed as regards the result to be achieved, leaving to the national authorities the competence as to form and means'. In the light of the foregoing considerations, it is necessary to examine whether or not the imposition of conduct monitoring the monitoring of pesticide residues at State level precludes the application of the general arrangements in accordance with the provisions of Commission Directive (EU) 2019/782 of 15 May 2019. amending Directive 2009/128 / EC of the European Parliament and of the Council as regards the establishment of harmonized risk indicators, in order to: a) reduce dependence on the use of pesticides; b) reducing the risks and effects of pesticide use on human health and the environment; c) promoting integrated pest management and alternative approaches and techniques, such as alternative non-chemical methods for pesticides; d) the calculation of harmonized risk indicators measuring the progress made in achieving those objectives, enabling risk management and reporting at national level,

Taking into account the assurance of entry into force by September 5, 2019 at the latest, according to the provisions of art. 2 para. (1) of Directive (EU) 2019/782, leads to: a) harm to human health and the environment through the use of plant protection products; b) damage to crops and the environment through the use of plant protection products by unauthorized persons; c) maintaining dependence on pesticide use, improving the governance of European soil resources to ensure healthy and productive soils for a safe food world and to support other essential ecosystem services.

This will be done by building awareness-raising actions and contributing to capacity building, harmonization of methods, measurements and indicators for sustainable management and protection of soil resources.

2.1. Organic farming, soil health and climatechange

Many management practices used in organic farming (e.g., minimal tillage, return of crop residues to the soil, use of cover crops and rotations, and better integration of nitrogen-fixing legumes) increase biologically available MOS and the beneficial activities of soil microbes and invertebrates, improves the physical properties of the soil, reduces the potential for disease and increases plant health.

Carbon dioxide is a greenhouse gas, and rising levels in the atmosphere are responsible for climate change. Organic farming has the potential to help mitigate the negative impact of climate change by capturing atmospheric carbon in the soil. Some evidence has shown that organic farming systems capture up to 450 kg more atmospheric carbon per hectare per year through CO2 bound in the SOM. A synthesis of 15 years of research reveals an increase in organic carbon in the soil surface (+ 25%), microbial biomass (+ 32%) and activity (+ 34%) and a change in microbial communities with the conversion from plowing to plowing. reduced tillage. Additional application of composted manure increased SOC by 6% compared to the application of pure sludge with low impact on soil microbes.

The overall results of the study indicated that COS stocks were 3.5 tonnes per hectare higher in organic farming systems than in non-organic systems. However, the differences observed in the stock of SOC in organic and non-organic agriculture seem to be mainly influenced by the practices of mixed agriculture, ie animal husbandry plus crop production, which is characterized by the recycling of organic matter through manure and legumes. fodder in crop rotation. These measures are intrinsic to organic farming, but can, in principle, be applied to any system of agricultural production.

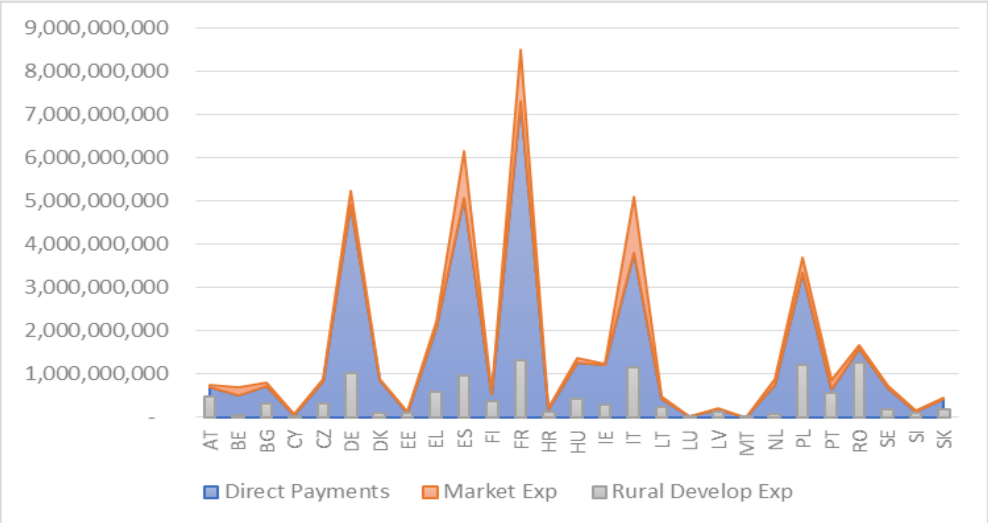

Figure 1. CAP funding across EU-27 (2014-2017) in%
Source: databased from AGRIDATA - European Commission

In the methodology for determining carbon stocks, taking into account the study of subsidies and the impact of agricultural activities on agricultural holdings compared to production as shown above, we also considered the analysis of stocks by climate, soil type, degree of agricultural activities per ha , soil works. In the case of the IPCC methodol-ogy [15] we used the calculation rule of the soil carbon stocks, for the reference use of the CSR land, as well as the real use of the CSA land from the activity of the vegetation on the ground (cultivated per ha) as well as above the ground. (realized production)

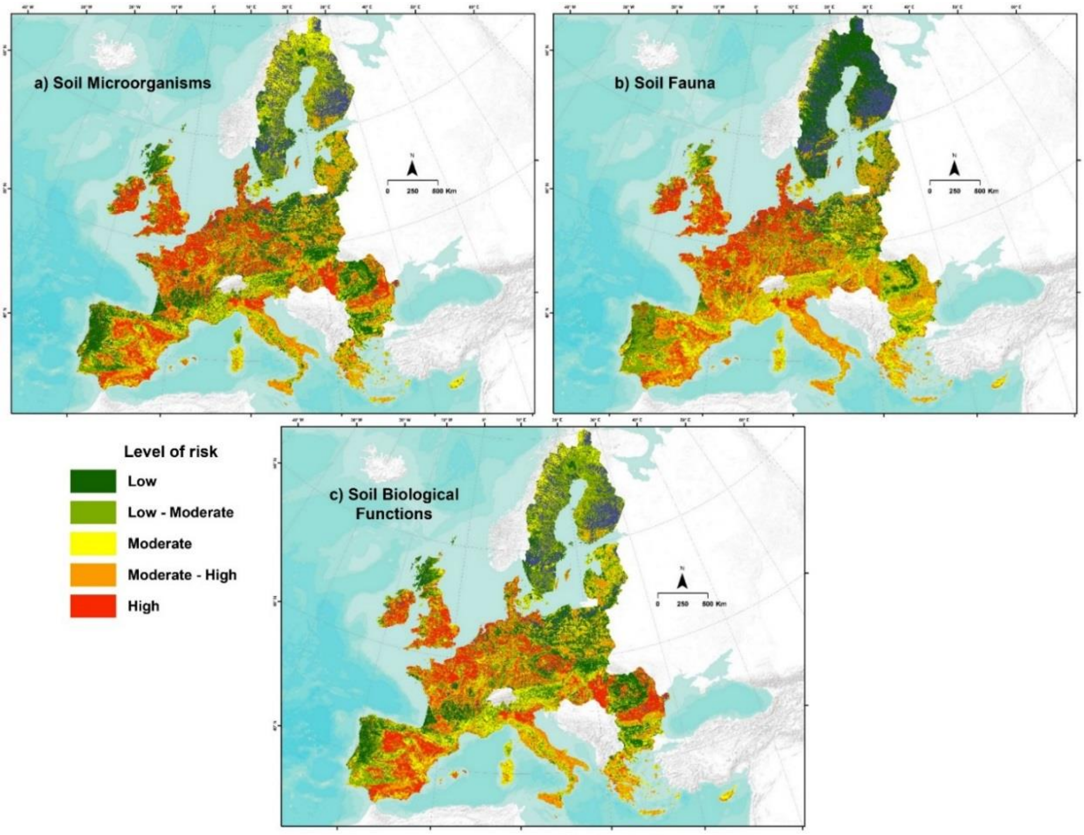

Figure 2. Map of the level of risk for soil biodiversity

In the implementation of its Biodiversity and Farm to Fork Strategies and to reverse soil, water and air pollution and biodiversity loss, the Commission will take additional actions to reduce the overall use and risk of chemical pesticides by 50%, the use of more hazardous pesticides by 50% and the sale of antimicrobials by 50% by 2030. It will also act to reduce nutrient losses by at least 50%, while ensuring that there is no deterioration in soil fertility. All this will support the development of alternative and more environmentally friendly agricultural practices that would reduce soil pollution and foster soil sustainable management in agriculture.

3. Method

The researches that will be carried out within this theme will focus on the description of factors through which to exploit the decarbonisation potential of agriculture and to promote an environmentally responsible agricultural model. The counterfactual impact assessment method will be applied at the level of micro-data specific to those instruments relevant to this field of smart specialization, for which the methodological conditions are met, in order to allow quantification of the extent to which a particular funding instrument produces the desired effect. The analysis of the information collected is guided by the theoretical assumptions developed in the initial phase in order to make progress in reducing greenhouse gas emissions in agriculture, foreshadowing a development of the theory of change in the sense that the obligations of adaptation to climatic conditions will generate the adaptation of agricultural systems. Thus, in the analysis, the pattern of change identified on an empirical basis will be compared with the pattern anticipated by theoretical hypotheses (pattern matching).

$$CSi = SOC + CVEG \times A$$

where

CSi = amount of carbon per unit area associated with land use
SOC = amount of organic carbon in the soil) measured as mass of carbon per hectare
CVEG = soil organic carbon stock (measured as mass of carbon per hectare)
A = coefficient of the area in question (measured as number of hectares per unit area

$$SOC = SOCST \times FLU \times FMG \times FI \tag{1}$$

where:

SOCST = the standard amount of organic carbon in the soil in the 0-30 cm layer at the surface of the land (measured as mass of carbon per hectare);

FLU = land use factor reflecting the difference between the amount of organic carbon in the soil associated with the type of land use, compared to the standard amount of organic carbon in the soil;

FMG = the management factor that reflects the difference between the amount of organic carbon in the soil associated with the management practices in principle, compared to the standard amount of organic carbon in the soil;

FI = input factor reflecting the difference between the amount of organic carbon in the soil associated with different levels of carbon inputs to the soil compared to the standard amount of organic carbon in the soil

Factors is in Table 7.1 Annex V to Directive 2009/28 for agricultural land clay soils with low activity, land use, full / low / medium / high plowing with fertilizer / without fer-tilizer, we will have

$$SOC1a = 63 \times 0.8 \times 1 \times 0.95 = 47.88$$
$$SOC2a = 63 \times 0.8 \times 1 \times 1 = 50.4$$
$$SOC3a = 63 \times 0.8 \times 1 \times 1.37 = 69.04$$
$$SOC4a = 63 \times 0.8 \times 1 \times 1.04 = 52.42$$

Then: CVEG = CBM + CDOM

with CDOM the value 0 may be used, except in wooded areas with a crown of more than 30% - excluding forest plantations

CBM = CAGB + CBGB; CAGB = BAGB ×CFB; CBGB = BBGB × CFB

for agricultural land, perennial crops and forest plantations, the value for BAGB = weight of live biomass above ground (measured as mass of dry matter per hectare); BBGB represents the average weight of living biomass in the soil during the production cycle. For CFB the value of 0.47 is used, it results

$$CS1 = 47.88 + 0.47\ (BAGB + BBGB) \times A$$

Results

Public interest in healthy food, protection from disease and cultural interest in parks, natural habitats and wildlife, broadens to the whole society the stakeholders with an interest in healthy soils and their sustainable management.

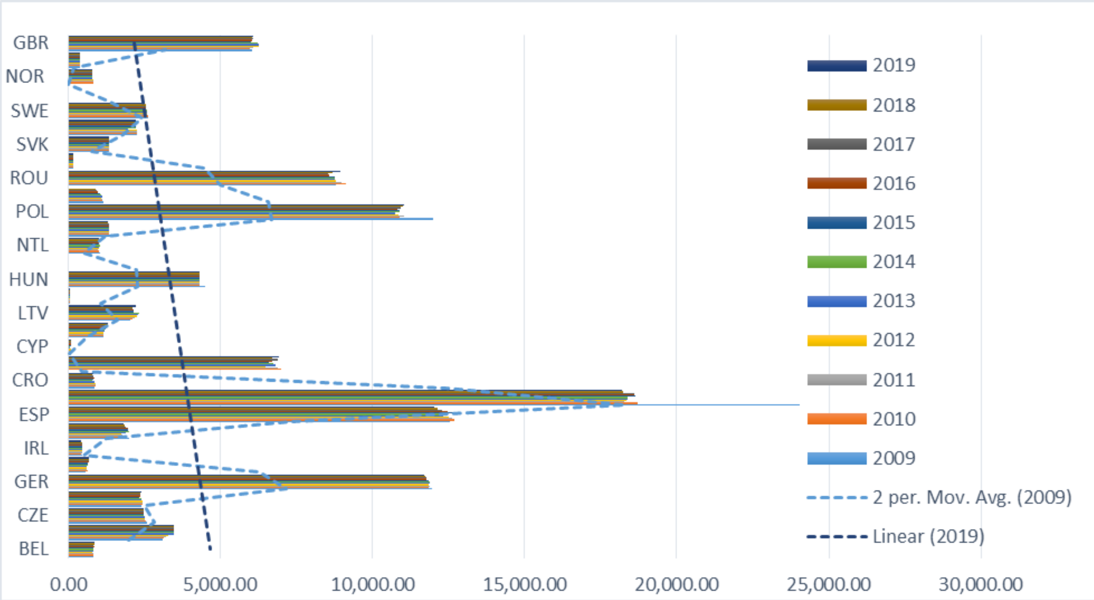

Figure 3. Crops Structure of production.
Source Eurostat data

Climate benefits in five promising areas: restoration and re-humidification of peat, agroforestry, maintenance and development of organic soil carbon (SOC) on mineral soils, SOC management on grasslands and carbon audit on animal farms. It also explored how a widespread adoption of carbon agriculture can be triggered in the EU. The study concludes that results-based carbon cultivation can make a significant contribution to the EU's efforts to address climate change, with benefits in terms of carbon capture and storage and other side benefits, such as increased biodiversity and ecosystem conservation. In order to develop and adapt the CAP measures to support efforts to mitigate and adapt to climate change at European level, action against climate change has been included in one of the three new main objectives of the CAP, as follows: sustainable food production; sustainable management of natural resources and climate action; and balanced territorial development. These three objectives cover the entire CAP, both Pillar 1 and Pillar 2, which means that climate action has become a target for both pillars for the first time (Figure 3) and balanced territorial development.

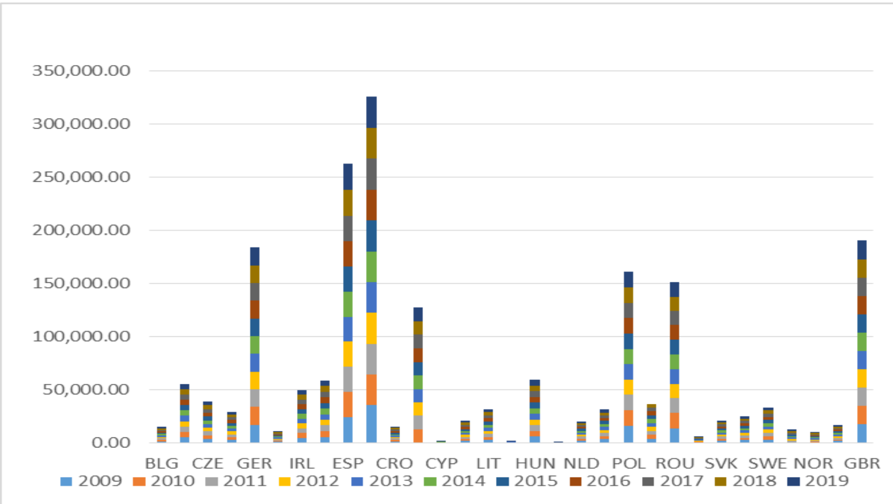

Figure 4. Utilized agricultural area by categories
Source Eurostat data

Climate-friendly land use and management practices, including investment in climate action, as well as capacity building are supported by a mix of mandatory and voluntary instruments. To ensure ecological sustainability in agriculture, constraints must limit the intensification of production and land use should be managed so that cultivated land limits the dissipation of nutrients (Henderson and Lankoski, 2020). (Figure 4)

Soils and land play an important role in the circular economy, as they store mineral materials, but also provide renewable and bio-based resources. Their role in closing biogeochemical cycles for water, nutrients and carbon is crucial. As the formation of topsoil and the recovery of land and soil quality are extremely slow processes, soils can be considered essentially non-renewable resources. Therefore, the sustainable recovery and reuse of land and soil is necessary to ensure the future provision of natural resources and services for a growing global population. The circular economy provides a framework for the management of natural capital, including land and soil, mineral resources, fossil fuels,

Table 1. EU Climate targets, part of the Climate and Energy Framework for now, next 10 year

2020 Climate	**2030 Climate before**	**2030 Climate after**
20% cut in GHG emissions (from 90's levels)	40% cut in GHG (from 90's levels)	55% cut in GHG (from 90's levels)

Source: EU Energy, Climate change, Environment

Greenhouse gas emissions from fertilizer use are one of the main sources of non-CO2 emissions in agriculture and should therefore be a top priority in reducing GHGs.

Thanks to innovative agriculture, even the application of fertilizer can be adjusted so that it fits almost perfectly with the needs of crops in space and time. But what are the costs as time that represents sustainability as a notion of time is a test of forecast that we will qualify by research based on individual parameters. The quantity and quality of fertilizer can be aligned with plant phenology, input and output mineral flows and administered at the right time, place and depth. In this way, the amount of fertilizer can be reduced and, at the same time, avoiding the leakage and leakage of unabsorbed minerals.

Nitrogen fixing plants included in crop rotation or in the production system (grass mixtures) are a biological substitute for nitrogen fertilizer by using atmospheric nitrogen (N2) as a source and making it available to the plant. Environmental benefits include reduced nitrate leaching, increased food sources for pollinators, greater structural diversity of agricultural land, and improved soil fertility.

Table 2. Impact indicators

Common wheat and spelled		Grain maize and corn-cob-mix		Barley		Rye and winter cereal mixtures (olive)		Oats	
French	30.0	Romania	24.9	French	24.7	Germany	37.4	Poland	17.7
Germany	17.4	French	18.5	Germany	20.9	Poland	30.9	Finland	16.8
Poland	8.4	Hungary	11.8	Spain	13.3	Denmark	10.3	Spain	11.6
Romania	7.8	Italy	8.9	Denmark	6.6	Spain	3.7	Sweden	9.6
Bulgaria	4.6	Spain	6.0	Poland	6.1	Sweden	2.6	Germany	7.5
Others	31.8	Others	29.9	Others	28.5	Others	15.2	Others	36.8

Source: Eurostat data

As can be seen in Table 2, there are large reports between countries such as France and Germany compared to others in production, which assumes that the productivity related to greenhouse gas emissions would be in the same proportion, but the ratios are not in the same consensus. in organic production, so the higher the productivity, the more the ratio of adaptation to climate change is apparently more beneficial and not the other way around.

Conclusions

And yet agriculture as a science has always been a key branch in the development of any society in the economy. The beginnings of agronomic development date back to 1934 and were later found in the science of the practical application of the study of wintering. But, given the magnitude of the impact and the complex effects of agriculture, we can say that the implications have a withdrawal effect being in close interdependence decreases, for example, low hay production, leads to lack of feed, improper application of sowing leads to costs high and low production.

Soil loss / degradation is considered a source of emissions that contribute to climate change. Consequently, carbon sequestration payments would be opportunities for farmers to benefit from the emerging carbon market. The new Soil Strategy should highlight that the climate and biodiversity crisis is competing and has the same solutions: good agricultural practices that focus on preventive and restorative measures such as organic farming, agroforestry, regenerative agriculture or agroecology, mixed crop farming, precision agriculture, low pollution. In terms of soil restoration, protection is better and more cost-effective than remediation.The aim is to revise the CAP to ensure coherence with the future Soil Strategy, but also to establish good agricultural practices and ensure their coherence with other EU policies. There was therefore a consensus that the 4 in 1000 initiative is not feasible, that carbon cultivation is not necessarily sustainable and only humus certificates are relevant to the climate, leading to the need for the CAP to encourage humus accumulation and soil fertility. One document included a proposal for the successful implementation of a soil directive, by identifying existing measures, collecting them and generating a comprehensive soil framework that would bring consistency and improve implementation without increasing the number of mandatory obligations legal view.

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