

Original Research
Article

Agricultural culture between perspectives and production trends of adaptation to climate change

ABSTRACT

Research seeks to extract a set of factors that can lead to the natural imbalance of plants. The development of an agricultural crop offers a new way on the general perception between need and consumption, the intersection being governed by the general cyclical and regenerative purpose in symbiosis with the environment. Thus, the change of environment generates direct effects in terms of production, farmers adapting production to the response of crops to climate, especially on plant protection, taking into account the effects of climate change. Environmental protection and sustainable management of natural resources, vulnerabilities related to fertilizer application techniques are current individualized concerns in the development of areas. The excessive and intrusive development generated by mega-tourism, causes degradation of the environment and society and the reorientation of methods applied to plant protection to protect the biosphere has returned today. Climate change involves the reduction of greenhouse gas emissions and the adaptation of agricultural systems and, in our opinion, these are closely linked to the use of different types of plant protection. The plant-soil interdependence in agricultural practice is also highlighted in the paper. Thus, we found that the products (chemicals) that are used to control diseases in agricultural crops are growing in the highlighted agricultural areas. This research uses the theories of eco-philosophy, the role of research and studies has shown an important factor in reducing the carbon footprint can be highlighted from the perspective of the production load and implicitly of plant protection products used. The novelty of this research is the combination of local wisdom and culture and inherited value as progressive tools for the application of a plant protection system in response to the pressure of diseases and pests. During the research we highlighted values that contribute to the development of the agricultural sector as part of the economy, the investigation of the psychological impact of the climate being a factor not to be neglected in agricultural techniques.

Keywords: environmental; agricultural; pollution; climate change.

1. INTRODUCTION

We found that the products (chemicals) that are used to control diseases in agricultural crops grow in agricultural areas highlighted especially fungicides. The amount of fungicides sold in solid form in 2019 increased compared to the previous year by 5.7%. One of the main objectives in the field of agriculture is to maintain a low level of green-house gas emissions

from the agricultural sector. The emergence of modern agriculture in the 60's with harmful pesticides and chemical fertilizers, caused danger to the field eco-system.

Given that the green revolution began in Mexico between the 1950s and the late 1960s, this term identifies a set of technology transfers that took place between the 1950s and the late 1960s and led to a dramatic increase in agricultural production at worldwide, especially in the developing world. [1]

The increase was mainly due to new varieties of wheat and rice with high yields. However, new varieties have required large amounts of chemical fertilizers and pesticides to produce their high yields, raising concerns about costs and potentially harmful effects on the environment. Poor farmers, unable to afford agrochemicals, often harvested even smaller crops with these grains than with older stems, which were better adapted to local conditions and had some resistance to pests and diseases. The Common Agricultural Policy (CAP) supports the Nitrates Directive through direct assistance and rural development measures. For example, also called the Haber-Bosch process, it was possible to produce ammonia and therefore fertilizers on an industrial scale. The process was developed by Fritz Haber and later modified to become an industrial process by Carl Bosch. (1927) [2]

Not to stop research into the infestation of recent climate change is at the same time engaging in vision and targeting in limiting losses due to pollution problems, as climate change determines the adaptation of pest control mechanisms. The pressure on the climate is reflected as a boomerang affecting the plant-soil-water triangle. Our investigation adapts the philosophical techniques in the interaction between these symbols at a psychological level, the climatic stress being a not negligible factor in our opinion. As Jean Tirole (2014) argued, research is largely a matter of motivation and passion and it is essential for us to continue to investigate some details of this axiom by offering new working hypotheses for generations. [3]

In Bentham defined as the "fundamental axiom" of his philosophy the principle that "it is the greatest happiness of the greatest number that is the measure of right and wrong."

He also became known as a leading animal rights advocate. Although he was strongly in favor of extending individual legal rights, he opposed the idea of natural law and natural rights as "divine". [4]

Being contemporary with Bentham, the German philosopher Immanuel Kant brings several rules, and these become a "powerful ethical tool" (Johnson, 2012, p.25).[5]

Bentham, an animal rights advocate, argued and believed that the ability to suffer, not the ability to reason, should be the landmark or what he called the "insurmountable line." This creates the premises for a similar approach in other fields, even in agriculture, plants, vegetables, the fruits of the earth being the resource of daily food and if the plants are not "happy" they are stressed by needs such as water, pests, etc. does not mean that there is no stress of plants, plant diseases being diverse, but the cry of plants is not heard even if they wither, and if the philosopher manages to transpose the suffering of animals and plants as we could synthesize.

2. MATERIAL AND METHODS

We strongly believe that in the agricultural system there have been movements to deepen the mechanics of production from the role of fertilizers for crop maintenance, but our projection calls into question the fact that once climate change risk reports include the Spoor index precisely because of the reporting point new in relation to climate. Climate change has inevitably led to the onset of deep tectonic movement, which has altered sea levels in many areas soil if not even on the ground, the one modified in terms of climate change. Crops capture a large amount of CO₂ each year, which in turn generates a large amount of CO₂, which is excellent for the climate. The role of this research transposes this direct relationship between agricultural production as a major key to concerted greenhouse gas emissions. The sustainability of production in fact indicates an improvement in emissions over time. The collection of data from the reference year 2011 is based on Regulation (EC) no. 1185/2009 on pesticide statistics, which established a common framework for the systematic production of Community statistics on sales and use of those pesticides that are plant protection products. [11]

The main quantitative methods taken into account in the impact assessment referred to the method of counterfactual assessment, based on a Sphor simulation indicator indicated in formal (1), of the effects used by protection products in weed eradication in agriculture [12]

$$Spor = P^1 + CSAU + \sum_{k^1}^n \frac{E^1}{t} \quad (1)$$

n = number of periods for which data was collected in a given t ,

k_1 = extension coefficient to a number of measurements

C_{SAU} = effective density C at the value SAU (per ha) in Kg/m^3 C_{SAU}

P = soil nutrient power measured as a coefficient of weight C in mass, qualified as an index measured progressively at A surface area at depth, $a_1=0-10 \text{ cm}^3$, $a_2=0-30 \text{ cm}^3$, $a_3= 0-40 \text{ cm}^3$

E^1 = item independent of the atmospheric pressure variable that determines the humidity

$Spho_r$ = Increased absorption of C in the soil at variable atmospheric pressure

2.1 Analysis of Development Areas in Romania

The Most agricultural soils contain too little natural nitrogen available to meet growing requirements during the growing season. Agricultural use of nitrates in organic and chemical fertilizers is a major source of water pollution in Europe. Consumption of mineral fertilizers first fell sharply in the early 1990 and stabilized over the last four years in the EU-15, but in all 27 Member States nitrate consumption increased by 6%. Reducing the risk of contamination of soil, air, and surface water reduces this stress created by nature.

Finding those techniques suitable for nature but also for plants makes the farmer a true creator, nature is not an obstacle, it only needs to be helped, once the land is prepared, 20 - 30 tons of manure / ha are applied, once every 3-4 years and fertilizers per phosphorus and potassium base, in the amount of 40 - 60 kg active substance / ha. Lately, animal husbandry has been close to "ZERO" manure is just a resource difficult for farmers to accept as fertilizer and the emphasis is exclusively on fertilization with chemical fertilizers.

In Romania, autumn cereals rank 2nd in area, after corn cultivation. Thus, if the grass weeds affect only a part of the agricultural area of the country, the annual and perennial dicot weeds affect the straw cereal crops on the entire territory of Romania. As indicated in Figure 1 there are constant values in statistical reproductions from year to year, large differences existing in the increase of onion and tomato production in France, Spain, Norway these values indicating a market demand, and not necessarily yield increases by using plant protection products.

2019 2018 Linear(2018)

35050 35,000

30050 30,000

25050 25,000

20050 20,000

15050 15,000

10050 10,000

5050 5,000

50 0

When we plan to obtain top yields and resort to an intensive technology with additional investments in seed quality assurance, soil preparation, fertilization, then the infection pressure of pathogens increases proportionally, and to avoid

crop losses, the application of 2 to 3 fungicide treatments. The timing of application of fungicides is recommended to adapt to the evolution of pathogens and climatic conditions in that year.

But how important is the geographical area in which these practices become effective and what risks occur in sloping geographical areas where these fertilization measures must be adapted by arranging multifunctional protection areas, recognized as an integral part of agricultural areas or plots, because they maintain the ecological balance and contribute to the conservation of biodiversity: increasing the number of species, pollinating insects, predatory insects and other non-target organisms, providing corridors for wildlife, reducing leaks and risks of pollution with phytosanitary products from adjacent water sources agricultural fields, while avoiding the phenomenon of soil erosion. [6]

The integration in rural space of the multifunctional protection areas are a major component of the local landscape, through an important role for the protection of natural resources, such as water and soil, biodiversity conservation in order to obtain a sustainable and competitive agricultural production. The different types of multifunctional protection areas between agricultural plots can be grass strips, strips of wild flowers as a source of pollen and nectar for pollinating insects or bird seeds. There are also those protection areas with the role of natural barrier, such as forest curtains - hedges, ditches. The interaction between this natural barrier and the adjacent protection zone can be a source of biodiversity.

Climate change facing large commercial farms is different from subsistence, which is very small. Climate change is expected to affect farmers in the southern and southeastern region of Romania, in general and individually. A farm by using good soil pH management practices can bring alternative benefits, such as improving the environment and stormwater management by creating protection zones such as those in Figure 2.

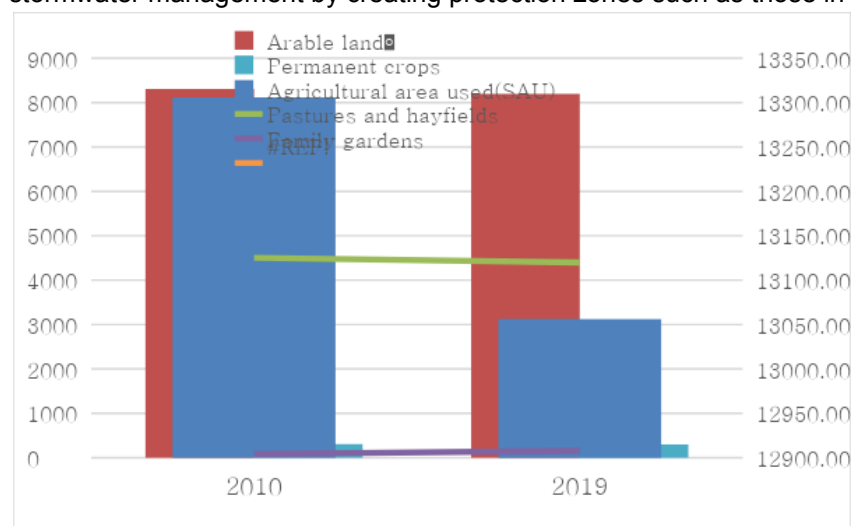


Figure 2. Multifunctional protection zones

Source MADR

Protection zones established in accordance with the provisions of the national legislation in force are a good solution to reduce the risk of water contamination with plant protection products, but also to conserve biodiversity.

The role of multifunctional protection zones is:

- a) to significantly increase biodiversity;
- b) the increase of production yields as a result of better pollination;
- c) active and become habitats for small mammals and birds; Consequently, protection zones are measures to ensure the protection of soil and water.

Figure 3 shows an increase in the various cereals that common wheat and spelled, corn maize and corncobmix, barley, others compared to 2019 when the increase was the maximum exist again an upward trend on these products, in the context of the new vision of The constant growth of the CAP shows that although the environmental requirements have been tightened, the farmers have not attracted the aggressive reduction of the productions adequate.

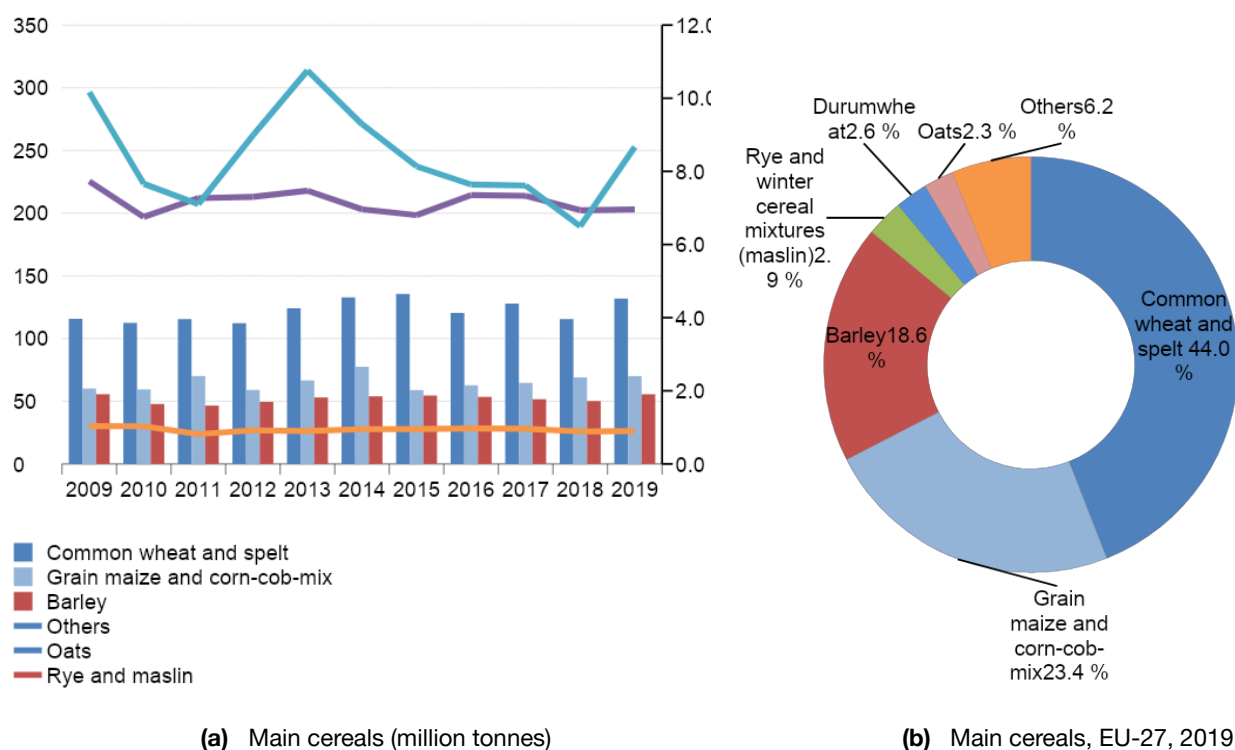


Figure 3. Production of main cereals, EU-27, 2009-2019
Source owner recherché from Agridata-Eurostat

Fertilizer manufacturing, grain drying and grain transport, for example, all result in indirect emissions of many greenhouse gases. In another case, indirect emissions are related to the manufacture of machinery and construction materials used in agriculture. From the perspective of the analysis of agricultural systems, impediments to soil C secretion have been the focus of many researches, but how climate change changes the way fertilization is still sought here. For two years, crop rotation is key to reducing emissions.

3. RESULTS AND DISCUSSION

In terms of the agricultural context, 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. Among the objectives of Regulation (EC) no. 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 EEC Directive 91/414 / EEC to reduce pesticide dependence, protection of human health and risks potential associated with the use of pesticides to achieve sustainable use of pesticides. [7]

To reduce risks and their effects on human health and the environment, including, integrated pest management through non-chemical technical approaches to pesticides is promoted. For example EU consumption at 2020 level assessment looks at input components, fertilizers and soil improvers, phytosanitary products, seeds and propagating material as shown in Table 1 according to Eurostat, Economic Accounts for Agriculture (values at real basic price), the decreasing influences were a response to consumer demand at the analyzed level.

Table 1 Agricultural input in UE

Input components	2017million EUR	2018 milion EUR	2019 milion EUR	2018/2017	2018/2018
Fertilisers and soil improvers	14 486	14 133	14 070	-2.4%	-0.4%
Plant protection products	10 651	10 433	10 149	-2.0%	-2.7%
Seeds and planting stock	11 119	10 974	10 984	-1.3%	0.1%

Source: Eurostat, Economic Accounts for Agriculture (values at real basic price)

The International Treaty on Plant Genetic Resources for Food and Agriculture (2004) and the Global Strategy for Plant Conservation (2011-2020) adopted by the Convention on Biological Diversity in 2002 emphasized the need for efficient conservation of plant genetic resources for food and agriculture as a means of counteracting the current rate of biodiversity loss at global, regional, national and local levels. [8]

It is vital to improve agricultural systems that make efficient use of nutrients, increasing not only the amount of carbon in the soil, but also the biodiversity and resilience of agriculture even to climate change. As a rule, carbon stocks in agricultural soils can be increased by adapting certain agricultural activities. Research also shows that carbon shock absorbers are just as important as reducing emissions. Maintaining and further improving the natural absorbents of soils, agricultural land and coastal wetlands are essential. The consumption of pesticides according to the latest provided by Eurostat is worrying and, therefore, our guidelines must also include alternative methods of reducing pesticide consumption by switching to organic fertilizers, and here we are talking about pages that should not be neglected.

4. CONCLUSION

Although legislation has been adopted at EU level over time to ensure the sustainable use of pesticides, there are still many implementation gaps at Member State level, and farmers argue that replacing pesticides is a difficult and costly task and that there are no alternatives to the immediate replacement of these plant protection products. Following an assessment by the Commission [COM (2017) 587 final], aimed at investigating alternatives to integrated pest control on agricultural land, the assessment was carried out in relation to crop types and practices.[9]

The goal of reducing pesticide dependence for a wide range of crops, alternative methods that can replace chemical pesticides was to change agricultural practices, using crop rotation whenever possible, followed by the introduction of resilient and resistant plant varieties, where appropriate, the use of beneficial insects, the use of alternative pesticides, etc.

Thus, according to the evaluation, there is a tendency for alternative practices used in agriculture should be differentiated and adapted to local conditions in order to increase the effectiveness with which the instruments under the CAP promote methods among farmers. The instruments provided for the post-2020 CAP in the sense of adapting the "green architecture" within it, in order to encourage farmers to apply the principles based on nature.

The results of a recent assessment by the Commission (COM (2017) 587) since the change in agricultural practices, using crop rotation whenever possible, followed by the introduction of resilient and resistant plant varieties, a set of tools that will contain effective pest control measures to help farmers deal with pest resistance and increase the autonomy of agricultural production factors so that they can choose measures better adapted to their own agronomic and economic situations. This will make it possible to achieve the sustainable use of pesticides, in accordance with the objectives of Directive 2009/128 / The availability of the characteristics observed before the intervention with plant protection products takes place, gives the advantage that this method does not require the estimation of complex data structures, but only aggregated data. A counterfactual impact was needed to apply the evaluation methodology to collect specific micro-data at the level of fertilizer statistical tools used in the production of straw applications at the level of 2020.

Following the evaluation we highlighted the context of persistence and the emergence of new invasive weeds, requires the use of plant protection products and in the analysis of the SpH index our searches managed to capture the fact that the margin of error is negligible in the last 5 years increased consumption of plant protection products.

This balance cannot be limited only to the disruptive growth of climate change as a determining factor, the method of micro-data analysis in databases cannot generate absolute variations attributing the increase of control risks against pests based on statistics related to productivity growth. Or the constant link can be attributed to the increase in yield in relation to the increase being the result of appropriate treatments applied by fertilizers and plant protection products, depending on the observation of these harmful symptoms.

The first effect of the CAP, characterized by increased flexibility, created the possibility for Member States to design their own individual program adapted to rural development for 2014-2020 in accordance with EU regulations no. 1303, 1305 and 1306/2013 (E.P., 2020). [13-14]

These permanent monitoring by the scientific elite as well as by the EU authorities in linking the transition to decarbonization of agriculture have the effect of monitoring the economic vulnerability of farms (Volkov et al., 2019). [15]

Although the implementation of the Directive on the sustainable use of pesticides (COM (2017) 587 final) states that integrated pest management is one of the cornerstones of the directive and the Commission has therefore considered it to be of particular concern. - thanks to the fact that Member States have not yet set clear targets and have not ensured their implementation, not even with regard to the wider use of land management techniques such as crop rotation. These tools could confirm whether the aim of: Integrated pest management as specified in the Directive, according to Aznar-Sánchez, J. A (2019) the re-reduction of dependence on pesticide use, is achieved. [16]

Although Regulation (EU) no. 1305/2013 of 17 December provides for several measures in this regard, they are insufficient or ineffective, not producing the expected results in terms of maintaining the population in rural areas. [17]

In particular, effective measures may be supported in accordance with: Pesticides and other environmental pollutants severely affect human well-being and the nature of promoting and stimulating research in public laboratories, research centers and academia, in the field of pest control in public areas and in agriculture, avoiding the use of herbicides; Consolidation and promotion of integrated protection and production measures in agriculture, in order to avoid the use of herbicides.

The disappearance of pollinators is one of the main ecological crises in recent years and this is attributed to climate disturbances. According to the scientific environment, it is estimated that about 35% of world crops depend to some extent on pollination by insects and pollinating birds. Several studies on all continents show that pollinating insects and birds are seriously threatened with extinction due to the indiscriminate use of herbicides and pesticides in agriculture. Increasing factor productivity in agriculture, appropriate structural changes as argued by (DeBoe, 2020) indicate the emphasis on those factors considered determinants in agricultural resilience. [18]

The scale of sustainability objectives in the agri-food system along with efficiency and resilience has opened up unique opportunities to identify new mechanisms for efficiency and resilience of agriculture in line with the OECD. [19]

The prevention of the occurrence and at the same time the elimination of harmful organisms should be achieved or supported by several methods and, in particular, by: - crop rotation; - the use of appropriate cultivation techniques, why not an agricultural discipline related to production efficiency. This could include the use of several pesticides with different modes of action. The risk approach in our research shows the preponderance of actions that affect biodiversity and the resilience of natural capital. EC. Obstacles to adoption and field application will also be identified in the ongoing project. [10]

REFERENCES

1. The Green Revolution refers to the application of science and technology to increase crop yields and agricultural productivity
,<https://www.thoughtco.com/green-revolution-overview-1434948#:~:text=The%20term%20Green%20Revolution%20refers%20to%20the%20renovation,number%20of%20calories%20produced%20per%20acre%20of%20agriculture.>
2. Harrison (1995) , pp. 85–88. nRoberts, Roberts & Bisson 2016, p. 307.
3. Jean Tirole — Ökonomie-Nobelpreisträger 2014. Jean Tirole — winner of the Nobel Prize for economics 2014.<https://link.springer.com/article/10.1007/s10273-014-1767-6>
4. Bentham, J.,(2010), Oxford Dictionary of National Biography (online ed.). Oxford University Press. doi:10.1093/ref:odnb/2153. (Subscription or UK public library membership required.)up to: a b "UCL Academic Figures". Archived from the original on 18 December 2010.

5. David W Johnson published Johnson, D .W., & Johnson, R. T. (2012). Restorative justice in the classroom: Necessary roles of cooperative context
https://www.researchgate.net/publication/260596682_Johnson_D_W_Johnson_R_T_2012_Restorative_justice_in_the_classroom_Necessary_roles_of_cooperative_context_constructive_conflict_and_civic_values_Negotiation_and_Conflict_Management_Research_Journal_51_
6. Lynch, J.; Cain, M.; Frame, D.; Pierrehumbert, R. 2021. Agriculture's Contribution to Climate Change and Role in Mitigation Is Distinct From Predominantly Fossil CO₂-Emitting Sectors, FRONTIERS IN SUSTAINABLE FOOD SYSTEMS, Volume: 4, Article Number: 518039, DOI: 10.3389/fsufs.2020.518039.
7. Regulamentul (CE) nr. 1107/2009 al Parlamentului European și al Consiliului din 21 octombrie 2009 privind introducerea pe piață a produselor fitosanitare și de abrogare a directivelor 79/117/CEE și 91/414/CEE ale Consiliului (JO L 309, 24.11.2009, pp. 1-50) <https://eur-lex.europa.eu/legal-content/RO/TXT/?uri=LEGISSUM:sa0016>
8. The International Treaty on Plant Genetic Resources for Food and Agriculture (2004) and the Global Strategy for Plant Conservation (2011-2020) adopted by the Convention on Biological Diversity in 2002 HYPERLINK "https://ec.europa.eu/environment/pubs/pdf/biodiversity/cbd_en.pdf"
<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=LEGISSUM:I28102>
https://ec.europa.eu/environment/pubs/pdf/biodiversity/cbd_en.pdf
9. EUROPEAN COMMISSION Brussels, 10.10.2017 COM(2017) 587 final REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL On Member State National Action Plans and on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides
https://www.eumonitor.eu/9353000/1/j4nvhdscs8bljza_j9vvik7m1c3gyxp/vkicge6lwnwz
10. Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides (Text with EEA relevance)
<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0128>
11. Regulation (EC) No 1185/2009 of the European Parliament and of the Council of 25 November 2009 concerning statistics on pesticides (Text with EEA relevance)
<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009R1185>
12. Safta A.S. et al (2021) The concept of accountability through good practices in agricultural production farms Published: 11 May 2021 by MDPI in 1st International Electronic Conference on Agronomy session Sustainable and Resilient Farming Systems 10.3390/IECAG2021-10027 <https://sciforum.net/paper/view/10027>
13. Regulations (EU) No 1303/2013 and (EU) No 1305/2013 . COM (2015)701
<https://ipexl.europarl.europa.eu/IPEXL-WEB/dossier/files/download/082dbcc553c49bd20153c6fde71e0171.doc>
14. Regulation, the penalties applied under cross-compliance, the control requirements in the wine sector and the rules 20.12.2013 Official Journal of the European Union L 347/549EN (1) OJ C 191, 29.6.2012, p. 116.<https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:347:0549:0607:EN:PDF>
15. Volkov, A., Balezantis, T., <orkunas, M., Streimikiene, D., (2019). Who Benefits from CAP?. The Way the Direct Payments. System Impacts Socioeconomic Sustainability of Small Farms, Sustainability 11, <https://doi.org/10.3390/su11072112>.
16. Aznar-Sánchez, J. A., Piquer-Rodríguez, M., Velasco-Muñoz, J. F., & Manzano-Agugliaro, F. (2019). Worldwide research trends on sustainable land use in agriculture. Land Use Policy, 87, 104069.
17. REGULATION (EU) No 1305/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL. of 17 December 2013. on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013R1305>
18. Gwen DeBoe et al, (2020) Reforming Agricultural Policies Will Help to Improve Environmental Performance, EuroChoices, Volume19, Issue 1, April 2020, pp 30-35, <https://doi.org/10.1111/1746-692X.12247>
19. OECD, 2011. Managing Risk in Agriculture, Policy Assessment and Design, s.l.: OECD Publishing, https://read.oecd-ilibrary.org/agriculture-and-food/managing-risk-in-agriculture_9789264116146-en#page2