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Reorientation of Methods Applied to Plant Protection as an Effect of Climate Change †

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Abstract: The paper provides an overview of the agricultural economy in terms of agricultural development, especially in the area of plant protection, taking into account the effects of climate change. Environmental protection and sustainable management of natural resources, prioritizing an action behavior regarding vulnerabilities regarding the types of fertilizers used, favors the reorientation of methods applied to plant protection in order to protect the biosphere are part of the soil-plant-air-water equation. Climate change involves the reduction of greenhouse gas emissions and the adaptation of agricultural systems. The risks of using excessive fungicides in plant protection. Plant-soil interdependence in agricultural practice is also highlighted in the paper. One of the main objectives in the field of agriculture is to maintain a low level of greenhouse gas emissions from the agricultural sector. The role of research and studies has shown an important factor in reducing the carbon footprint per tonne of food produced from organic farming compared to conventional farming, mainly due to the abandonment of the use of chemical fertilizers and pesticides. The aim of the following research is to collect data and information on the most efficient management models that will create the premises for the production of production models that will respond in the future to the challenges of climate change, especially from the perspective of reducing greenhouse gases, depending the application of a plant protection system in response to climate change and the pressure of diseases and pests. During the research we tried to highlight aspects that, in our opinion, are important for the development of the agricultural sector as part of the economy.

Keywords: waters; pollution; nitrates; plant

1. Introduction

The 'Farm to Fork Strategy—for a fair, healthy and environmentally-friendly food system was adopted by the European Commission on 20 May 2020. The Farm to Fork Strategy aims to accelerate our transition to a sustainable food system. In the strategy, the Commission presents actions to be taken forward in line with the better regulation principles, one of which is to propose a revision of the pesticides statistics regulation to overcome data gaps and reinforce evidence-based policy making, by 2023. Eurostat is following the 'Strategy for Agricultural Statistics for 2020 and beyond' in close collaboration with the main data users and producers of agricultural statistics. Pesticide statistics are included as part this work. More background information can be found on the webpage of the Strategy.

1.1. Literature Review

The application of pesticides is strictly controlled by Community legislation since 1991 (by national legislation prior to 1991), due to their potential toxicity, often even at very low levels. Policy control measures in the EU are driven by the objectives of protecting human health and the environment (consumers, operator safety, protection of water quality and biodiversity). Only a limited number of pesticide active substances are permitted to be used in organic farming; those listed in Annex II of Commission Regulation (EC) No 889/2008 on organic production.

In 2009, the Sustainable Use Directive (Directive 2009/128/EC), the so called 'SUD', established a framework to achieve a sustainable use of pesticides by reducing the risks and impacts of pesticide use on human health and the environment and promoting the use of integrated pest management and of alternative approaches or techniques such as non-chemical alternatives to pesticides. Instructions to adopt National Action Plans, develop obligatory systems for training and education, set up a framework for equipment inspections, examine alternative pest management methods, secure water protection, and apply harmonised risk indicators are fundamental. Following up on the Sustainable Use Directive, Member States have introduced country specific measures setting objectives and timetables to reduce risks and impact of pesticide use.

In the latest Report from the Commission to the European Parliament and the Council on the implementation of the SUD, the progress towards the full implementation of the requirements are described.

1.2. Analysis of Development Areas in Romania

In the analysis we highlighted products that contain active substances, phytoprotective agents or synergistic agents, in the form in which they are presented to the user and which are intended for: —protection of plants or plant products against all harmful organisms or prevention of these organisms; —the exercise of an action on the vital processes of plants, other than a nutritional action; —ensuring the preservation of plant products, insofar as these substances or products are not subject to other legal regulations on preservatives; —destruction of parts of plants, stopping or preventing unwanted plant growth. Thus we found that products (chemicals) that are used to control diseases in agricultural crops are growing in agricultural areas highlighted especially fungicides.

The amount of fungicides sold in solid form in 2018 increased compared to the previous year by 5.7%. The distribution, in total fungicides, on macroregions is as follows: macroregion three (34.2%), macroregion one (26.3%), macroregion four (22.0%), macroregion two (17.5%). The largest quantities of fungicides in solid form were sold in the development regions of Centru (20.6%), Sud-Muntenia (17.6%) and Bucharest-Ilfov (16.6%). For products sold in liquid form, the amount of fungicides decreased by 3.0% compared to 2017.

The largest amount of fungicides was sold in macro-region three (49.2%), followed by macro-region one (26.6%), macro-region two (15.7%) and macro-region four (8.5%). By development regions, the South-Muntenia region occupies the first place (27.7%), followed by the Bucharest-Ilfov (21.5%) and Center (19.3%) regions. Thus, in determining the increase in consumption, the different climatic conditions of the regions were analyzed as possible increases in consumption and the critical level of losses by non-compliance with agricultural practices in the application of plant protection products.

2. Results

The use of pesticides plays an important role in agricultural production, ensuring less damage to weeds and crop pests and a consistent yield. However, their use can have negative effects on the environment on water quality, on terrestrial and aquatic biodiversity (persistence and toxic effects on non-target species, etc.). The Sustainable Use Directive promotes the use of integrated pest management and alternative approaches and techniques, such as non-chemical alternatives to pesticides. Integrated Pest Management (IPM) is a strategy that promotes safer and more sustainable pesticide management. IPM strategies evolve due to new emerging pests and climate change and involve crop rotation, hygiene measures to prevent the spread of pests, protection and improvement

of beneficial organisms, using appropriate cultivation, cultivation or seed techniques. Farmers need to implement IPM and give preference to non-chemical methods if they ensure satisfactory pest control. The main goal is to reduce pesticide dependence in agriculture.

Environmental contamination due to pesticides can result from drift by spraying, volatilization, surface runoff and loss of subsoil by leaching/flow. The persistence of pesticides in the environment differs greatly and is dependent on factors such as their susceptibility to attack by microorganisms and enzymes, soil temperature and water content. In the last decade, much has been done in the agricultural sector to limit the negative effects of pesticides. Organic farming is growing year by year and now covers 7.5% of the EU AU. Four million farmers have been trained in the safe use of pesticides, and the number of EU-approved non-chemicals or low-risk substances has doubled since 2009.

The abandonment of agricultural land has far-reaching effects on ecosystem services, such as increased carbon storage, lower soil erosion, better water quality, and loss of traditional cultural landscapes. These effects often result in a decline in biodiversity. Also, the lack of appropriate knowledge, as a result of problems with the farm consulting system, results in often inadequate agricultural practices, with a negative influence on biodiversity.

Even the relatively low yields of feed production, largely determined by improper pasture management, lead to erosion and loss of biodiversity.

In the context of climate change, there is a need for a new activity in the agricultural field, which means using natural resources and good practice models to provide observation systems, information management understanding, modeling and analysis of environmental phenomena for evaluation, exploitation and management natural resources (water soil, climate).

2.1. Subsection

2.2. Figures, Tables and Schemes

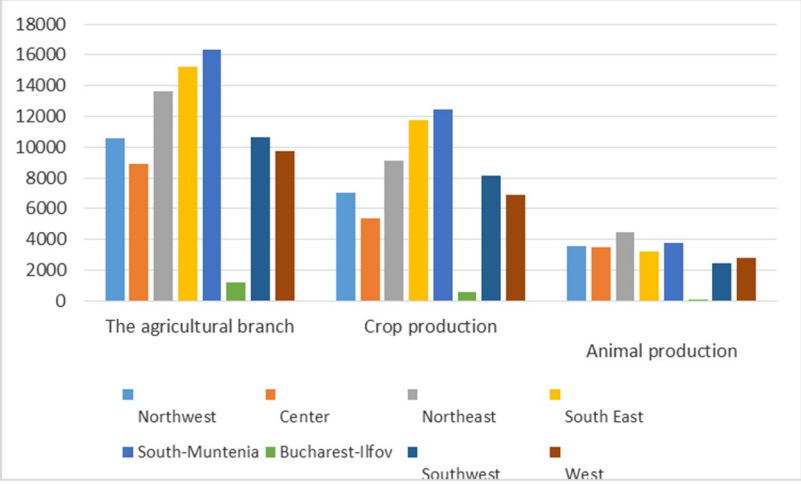

Figure 1. The value of the production of the agricultural branch.

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

	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 Insse 2018.

3. Discussion

The 2013 reform of the common agricultural policy (CAP) introduced an ecological ("greening") direct payment scheme. It should be noted that the aim was to further improve the sustainable management of agricultural-related natural resources through payments for climate-friendly and environmentally friendly agricultural practices. Therefore, in addition to crop diversification and the maintenance of permanent pastures, greening requires farmers to reserve 5% of their arable land for areas of ecological interest (ZIE). Many valuable habitats and the biodiversity they maintain are based on agricultural systems. However, efforts to protect this biodiversity are not recognized as they are not reflected in farmers' prices for their products. Although biodiversity depends on the existence of appropriate management practices, these practices have changed over time due to competitive pressures, leading to increasing specialization and intensification of production in certain areas and the abandonment of soil cultivation in certain areas. others.

4. Materials and Methods

The data collection from reference year 2011 onwards is based on Regulation (EC) No 1185/2009 concerning statistics on pesticides, which established a common framework for the systematic production of Community statistics on sales and use of those pesticides which are plant protection products.

5. Conclusions

All this has put pressure on biodiversity, had detrimental effects on soil, water and climate, and also jeopardized the long-term productive potential of the agricultural sector. Thus, as a priority in these conditions of "chaos" amplified by climate change, there is a need once again for the resettlement of efforts in the systematization of agricultural production processes. And where can we start except from the reorientation of the techniques of using plant protection products. In fact, this issue will not expire until good practices are intertwined in good faith in the correct use of fertilizers, self-control is needed to avoid unwanted consequences of pollution and destabilization of the biosphere largely affected by climate today.

Author Contributions: Regulation (EC) No 1185/2009, National Action Plans.

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Conflicts of Interest: The authors declare no conflict of interest.

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