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SUSTAINABILITY OF BULGARIAN GRAIN PRODUCTION IN THE CONTEXT OF THE EUROPEAN GREEN DEAL

A B S T R A C T

of the dissertation submitted for the award of the educational and scientific degree “Doctor” of scientific speciality “Economics and management (Agriculture)” in professional direction 3.8. Economics

Scientific supervisor:

Prof. Dimo Atanasov, PhD

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The dissertation was discussed and allowed to be defended at a meeting on ……., held on …….

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1) ……

2) ……

3) ……

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5) ……

The dissertation is structured as follows: abbreviations used, introduction, exposition in 4 (four) chapters, conclusion and bibliography.

The dissertation has a total volume of 221 pages and contains 45 figures and 6 tables.

The cited and analysed literature includes 140 sources, of which 80 are Cyrillic, and 60 are Latin.

INTRODUCTION

Over the past two decades, grain production in the country has undergone a period of development and progress, marked by advancements in various indicators such as production, average yield, share in agricultural trade, production value, etc., thus becoming a pillar of Bulgarian agriculture. Thanks to gradual twenty-year development, till 2022, the "Grain Production" sector is relatively economically viable, competitive, and stable. However, with the onset of the new programming period of the Common Agricultural Policy 2023 – 2027, the question arises: Will this economic stability of grain production be shaken due to the ecological policies imposed by Europe in agriculture, dictated by the 2030 Agenda for Sustainable Development of the United Nations and the goals of the Green Deal? This is precisely the aim of the present dissertation – to examine the sustainability of Bulgarian grain production in the context of the parameters and requirements of the Green Deal, encompassing the conflict between achieving ecological compatibility while simultaneously preserving the economic efficiency of production and farms.

The European Commission has not yet proposed an impact assessment of the Green Deal and its Farm to Fork and Biodiversity strategies. However, several external institutions, universities and organisations have published reports on the impact and effect of the Green Deal on agriculture. Economic simulations in the reports reveal that the EU's Green Deal will lead to reduced European grain and oil production, lower incomes for farmers, higher prices for agricultural commodities, less trade and greater food insecurity.

The unfavourable combination of circumstances – increasing environmental demands on farmers, against the background of decreasing support for agriculture on a European scale, in combination with market shocks and other negative consequences of the war in Ukraine, as well as the entry of Ukrainian agricultural production on the European markets – lead in 2023 and at the beginning of 2024 to some of the most massive farmer protests in many European countries, such as Bulgaria, Germany, the Netherlands, France, Belgium, Poland, Spain, Italy, Portugal, Greece, Romania, Great Britain and others.

Interesting times lie ahead for European agriculture. It is unclear what policy path the EU will take after the European Parliament elections in June 2024 and the formation of the new European Commission. One thing is certain: the team of the EC, which is ending its mandate, leads the

greenest policies in Europe so far, managing to attract many allies to its side but also drawing the ire of some economic sectors, such as energy and agriculture.

In this sense, the topic of the present dissertation, as well as the subject of the research, not only have not lost their relevance three years after the start of the doctoral work but, with increasing sharpness and intensity, are placed on the agenda of politicians, farmers and of society as a whole, in their capacity as consumers of food and agricultural raw materials.

2. CHAPTER TWO – AIM, TASKS, MATERIALS AND METHODS OF RESEARCH

The dissertation aims to determine the possibility of achieving sustainability in Bulgarian grain production within the context of the European Green Deal while examining and addressing the conflict between achieving ecological compatibility and simultaneously maintaining the economic efficiency of production and farms.

In the preparation of this dissertation, three main tasks are set for the positioning of the Bulgarian agricultural sector and, more specifically, grain production within the ambitions and goals of ecological agricultural policies, namely:

1) Determining the sustainability of Bulgarian agriculture in its three dimensions in the context of the sustainable development goals of the UN 2030 Agenda;

2) Positioning of the "Grain production" sector in the conditions for supporting farms in the Strategic Plan, including an illustrative support plan for an "average-sized" grain-producing farm;

3) Investigating the attitudes of Bulgarian grain producers regarding:

- the challenges and difficulties they face in terms of compliance with the mandatory preconditions applied as standards for good agricultural and environmental conditions and statutory management requirements;
- the interest and willingness to participate in one-year voluntary eco schemes within the framework of the Strategic Plan;
- the achievement of the ambitious political goals of the Green Deal for agriculture.

In this way, the research tracks the positioning of ecological and climate policies regarding agriculture at a global level – through the UN 2030 Agenda, at a European level – through the

Green Deal and the Common Agricultural Policy, and at a national level – through the Strategic Plan for the development of agriculture and rural areas, while simultaneously investigating the attitudes of Bulgarian grain producers towards these policies.

The objects of the research according to the three set tasks are as follows:

1. Indicator 2.4.1 "Proportion of agricultural area under productive and sustainable agriculture" within the framework of the UN Agenda until 2030.
2. Preconditions and interventions to support grain-producing farms within the Strategic Plan for the development of agriculture and rural areas for the period 2023 – 2027.
3. Bulgarian grain-producing farms from the country's five strategically important regions for grain production.

Additional achievements of the research, outlined in the "Conclusions and Recommendations" section (Chapter Four: Achieving sustainability of grain production under the conditions of the Green Deal – mission possible), include defining an optimal production model for grain-producing farm which achieves to a significant extent a balance between economic, social, and ecological sustainability, as well as formulating recommendations to the institutional and external environment that lead to improving the sustainability of the "Grain Production" sector in the medium and long term.

When determining the sustainability of Bulgarian agriculture in the context of the Sustainable Development Goals outlined in the UN Agenda 2030, descriptive and comparative analysis is used, with statistical data extracted from Eurostat and information from the FAO utilised for political and strategic objectives. Within indicator 2.4.1 "Share of agricultural land under productive and sustainable agriculture," which serves to track progress towards target 2.4, namely: "By 2030, ensure sustainable food production systems and implement sustainable agricultural practices that increase productivity and production, help maintain ecosystems, strengthen capacity for adaptation to climate change, extreme weather, drought, floods, and other disasters, and progressively improve land and soil quality," three indicators are examined 1) Agricultural factor income per annual work unit; 2) Government support to agricultural research and development; 3) Area under organic farming. For summarising and processing the statistical data in this analysis, the Excel program was used, and for better visualisation and clarity, the statistical tables are presented graphically through line charts.

When positioning the "Grain Production" sector within the framework of farm support in the Strategic Plan, descriptive analysis is used, stepping on both European and national regulatory frameworks regarding the implementation of the Common Agricultural Policy (CAP), as well as expert and comparative methods when comparing conditions with the previous programming period. To illustrate the possible support within direct payments during the new programming period of the CAP, a hypothetical example of support for an "average-sized" grain-producing farm is presented.

When studying the attitudes of Bulgarian grain producers towards complying with ecological requirements and implementing practices favourable to climate and the environment, as well as their position and expectations regarding the ambitious strategic goals of the Green Deal, an expert method is applied. This method is based on the analysis of extensive documentation provided by the European Commission for both the Green Deal and the Common Agricultural Policy (CAP), as well as on the analysis of reactions, statements, and reports from national and European authorities and institutions, stakeholders, and farmer organisations. In addition to the expert method, statistical methods are applied for calculations based on data extracted from surveys conducted among farmers.

The study of the attitudes of the Bulgarian grain producers is carried out by filling out a survey, and the Excel program is used to summarise and process the data from the survey. Several options of the software for analysing data included in Data analysis come into use, with Excel functions being used to the greatest extent for performing variation analysis, arrangement and grouping of statistical rows, determination of the arithmetic mean, mode, median and swing for variation series, and other capabilities included in the Descriptive statistics module. The statistical tables in the study are presented graphically through line and pie charts for better visualisation and clarity.

The study is conducted through a questionnaire survey among 128 agricultural producers who are National Grain Producers Association (NGPA) members. This survey takes place from July to August 2023. The survey's timing is chosen in connection with the conclusion of the first annual campaign for outlining the supported areas and submitting the relevant applications within the framework of the new programming period of the Common Agricultural Policy (CAP) 2023 – 2027.

The questionnaire survey covers groups of grain producers from all regions of the country with

strategic importance for producing cereals and oilseeds. Specifically, the distribution by region is as follows: Southern Central region – 27 farms (21.1%); Southeastern region – 24 farms (18.8%); Northeastern region – 33 farms (25.8%); Northern Central region – 17 farms (13.3%); Northwestern region – 27 farms (21.1%). The distribution of surveyed farms is relatively balanced across the country's regions, allowing for the derivation of valid trends and conclusions for grain-producing farms from all traditional production areas.

Farmers can complete the questionnaire in a Word document or electronic form through the Google Forms platform. Out of 128 grain producers participating in the survey, 14 respondents filled out the survey in Word, and the remaining 114 took advantage of the option to fill out the survey electronically in Google Forms. The questionnaire survey is conducted anonymously, as many questions reveal sensitive information, which is a trade secret for farms in most cases.

The questions in the conducted survey amount to a total of 38, with 10 being open-ended questions and the rest offering pre-defined answer options. The questions in the questionnaire are divided into two categories:

1. Questions concerning the parameters of farms in the "Grain Production" sector – a total of 24 questions covering the economic, social, and ecological dimensions of farming. The purpose of these questions is to define the profile of the surveyed farms and to roughly determine the level of sustainability of the farms during the survey period.
2. Questions concerning the attitudes of farms in the "Grain Production" sector towards implementing ecological practices, the conditions of the new CAP, and the ambitions of the Green Deal – a total of 14 questions covering the substantive part of the study. The aim is to ascertain whether the increased ecological requirements towards the implemented agricultural policies are embraced by agricultural producers and whether the perception of economic sustainability of the farms is being compromised.

The final open-ended question in the questionnaire survey, which concerns sharing additional information or future plans regarding the farm, is taken extremely seriously and responsibly by the respondents, who freely express their concerns and hopes about their agricultural activities. In this way, additional authentic and spontaneous information is successfully gathered from grain producers. Another interesting and valuable aspect is the open-ended question regarding the

quality of the produced goods and what actions farmers would take to improve it, as respondents mainly outline ecologically oriented practices and activities in their answers.

Despite some gaps in the survey conducted among grain producers, the number of respondents and the quality of the data and information obtained are generally satisfactory. In addition, the challenges faced by the Bulgarian grain producers in relation to the observance and implementation of the "green architecture" within the framework of direct payments under the Strategic Plan were successfully analysed, and their expectations and attitudes towards achieving the goals of the Green Deal are also established.

In this regard, the questionnaire survey includes questions primarily related to the conditions for ensuring the ecological sustainability of grain-producing farms, with the ecological dimension of sustainability also covered through the analysis of the so-called "green architecture" of the CAP. On the other hand, ensuring the economic sustainability of farms in the "Grain Production" sector is thoroughly examined in the analysis of the support provided in the Strategic Plan for the Development of Agriculture and Rural Areas for the period 2023 – 2027. On the third hand, the social dimension of the sustainability of grain production would be difficult to define precisely in terms of requirements or interventions (excluding the so-called "social conditionality" in the Strategic Plan, which is set to start in 2025). Nevertheless, in public perception, the social significance of the grain production sector is determined by various factors – primarily by the role of farmers in food production and ensuring food security; by providing employment in agricultural farms and livelihoods for the population in rural areas; by improving the living standards of rural residents through the annual payment of land rents; and by providing communal assistance during disasters, emergencies, and natural anomalies.

3. CHAPTER THREE – THE BULGARIAN GRAIN PRODUCTION ON THE PATH TO ACHIEVING SUSTAINABLE DEVELOPMENT

The tasks set during the preparation of the dissertation work – to determine sustainability in its three dimensions in the context of the sustainable development goals of the United Nations 2030 Agenda; to define the conditions for support of the "Grain production" sector in the Strategic Plan; for the study of the attitudes of Bulgarian grain producers towards compliance with ecological requirements and the implementation of practices favourable to the climate and the environment, as well as their position and expectations in relation to the ambitious political goals of the Green

Deal, contribute to the positioning and awareness of the Bulgarian agricultural sector and more specifically to grain production within the ambitions and objectives of environmental policies. The analytical part of the dissertation presents the results and discusses the analyses and research conducted in the three areas mentioned.

3.1. Bulgaria on its path to achieving sustainable agricultural production in the context of the UN 2030 Agenda

The study of agriculture through the lens of the United Nations Sustainable Development Goals (SDGs) indicates the potential for achieving sustainability within the context of the Green Deal. The 2030 Agenda and its SDGs form the basis for developing specific action policies for the European Green Deal.

The Agenda's second Sustainable Development Goal is the "Zero Hunger" goal. SDG 2 aims to end hunger and malnutrition and ensure access to safe, nutritious, and sufficient food. Achieving this goal largely depends on promoting sustainable production systems and increasing investments in rural infrastructure and agricultural research and development (FAO, Sustainable Development Goals).

Within the framework of SDG 2, sub-goal 2.4 aims to ensure sustainable food production systems and implement sustainable agricultural technologies by 2030. These technologies should increase production, help maintain ecosystems, strengthen the capacity to adapt to climate change, extreme weather conditions, drought, floods, and other disasters, and progressively improve land and soil quality (FAO, SDG, Indicator 2.4.1).

The indicator that measures progress towards SDG 2, sub-target 2.4, is indicator 2.4.1 " Proportion of agricultural area under productive and sustainable agriculture." The area of productive and sustainable agriculture covers the three dimensions of sustainable production: environmental, economic and social. Land under productive and sustainable agriculture will be those holdings and associated agricultural lands that meet the sustainability criteria of the indicators selected in all three dimensions. To capture the multidimensional nature of sustainable agriculture, indicator 2.4.1 brings together disparate themes covered in 11 sub-indicators, namely land productivity, profitability, resilience, soil health, water use, fertilizer pollution risk, pesticide risk, biodiversity, food security, land tenure, decent employment (FAO, SDG, Indicator 2.4.1).

Unfortunately, the 11 multilateral sub-indicators proposed in the UN 2030 Agenda, with which to measure the proportion of the agricultural area occupied by productive and sustainable agriculture, turn out to be a difficult task to achieve in a global aspect, even for the European Union, which has one of the most developed monitoring systems. In this way, the measurement of progress under sub-target 2.4 set by the UN through indicator 2.4.1 "Proportion of agricultural area under productive and sustainable agriculture" at the European level in 2023, is reduced to monitoring just three indicators.

The dissertation examines the progress of Bulgaria and EU countries regarding sub-target 2.4 by tracking the three indicators proposed by Eurostat, which are used to monitor the strong interconnections of agricultural production with the social, economic, and environmental dimensions of sustainability, namely: Agricultural factor income per annual work unit; Government support to agricultural research and development; and Area under organic farming (EUROSTAT, Monitoring report on SDGs, 2023).

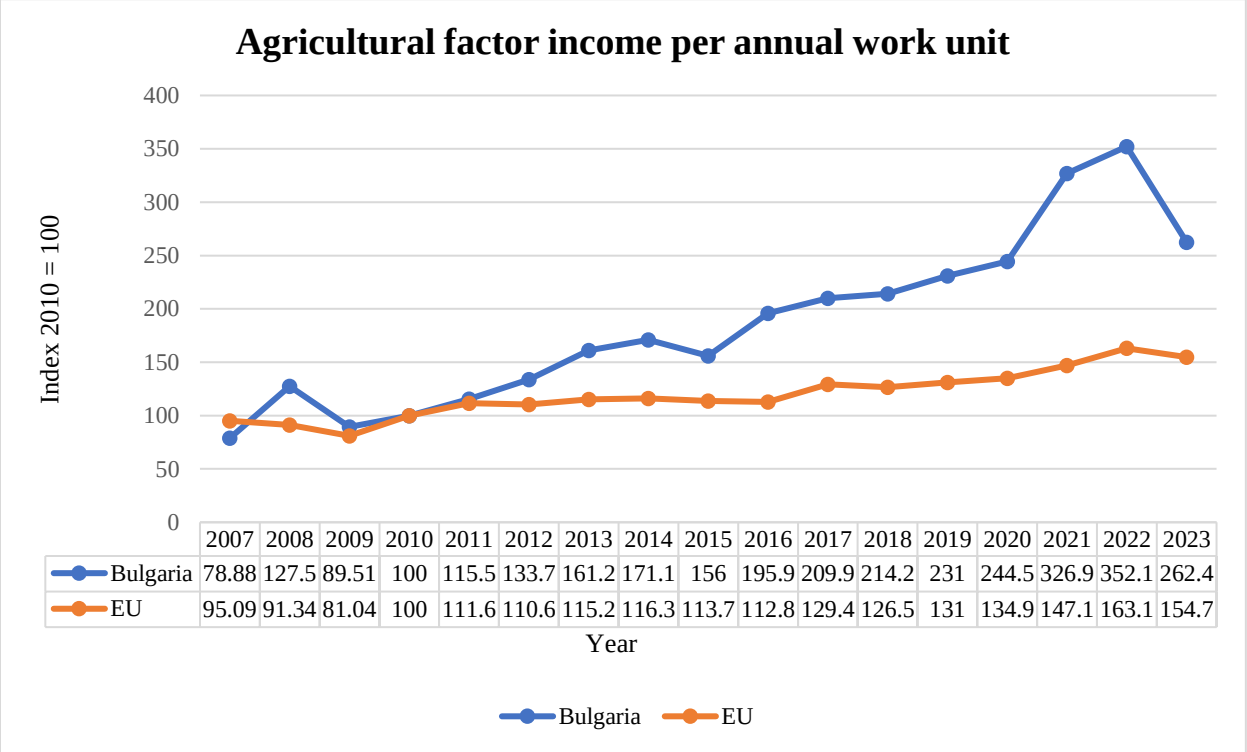
❖ 3.1.1. Indicator: Agricultural factor income per annual work unit

The indicator is a partial measure of labour productivity in agriculture.

Agricultural factor income per annual work unit (AWU) in Bulgaria has consistently increased over the period 2007 – 2021 (except for 2015) (Fig. 3.1.1). According to Popov, the tendency is not so much due to the growth of the created net value added in the sector but rather to a much greater extent due to the reduction in labour inputs (Popov, 2019). According to Ivanov et al., the increase in agricultural factor income is due to unprecedented levels of support in the sector, coming from subsidies, while labour inputs are simultaneously reduced (Ivanov et al., 2020).

In the UN 2030 Agenda for Sustainable Development, the indicator "Agricultural factor income per AWU" observed at the European level largely covers the measurement of the economic dimension of sustainability within indicator 2.4.1 "Proportion of agricultural area under productive and sustainable agriculture." In this sense, it can be concluded that Bulgarian agriculture until 2022 has shown a positive trend in development. However, despite this, in terms of this indicator for economic sustainability, the domestic agricultural sector still lags behind the average European levels.

Fig. 3.1.1: Agricultural factor income per AWU in the EU and Bulgaria



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Bulgaria	78.88	127.5	89.51	100	115.5	133.7	161.2	171.1	156	195.9	209.9	214.2	231	244.5	326.9	352.1	262.4
EU	95.09	91.34	81.04	100	111.6	110.6	115.2	116.3	113.7	112.8	129.4	126.5	131	134.9	147.1	163.1	154.7

Source: Eurostat (https://ec.europa.eu/eurostat/web/sdi/database)

❖ 3.1.2. Indicator: Government support to agricultural research and development

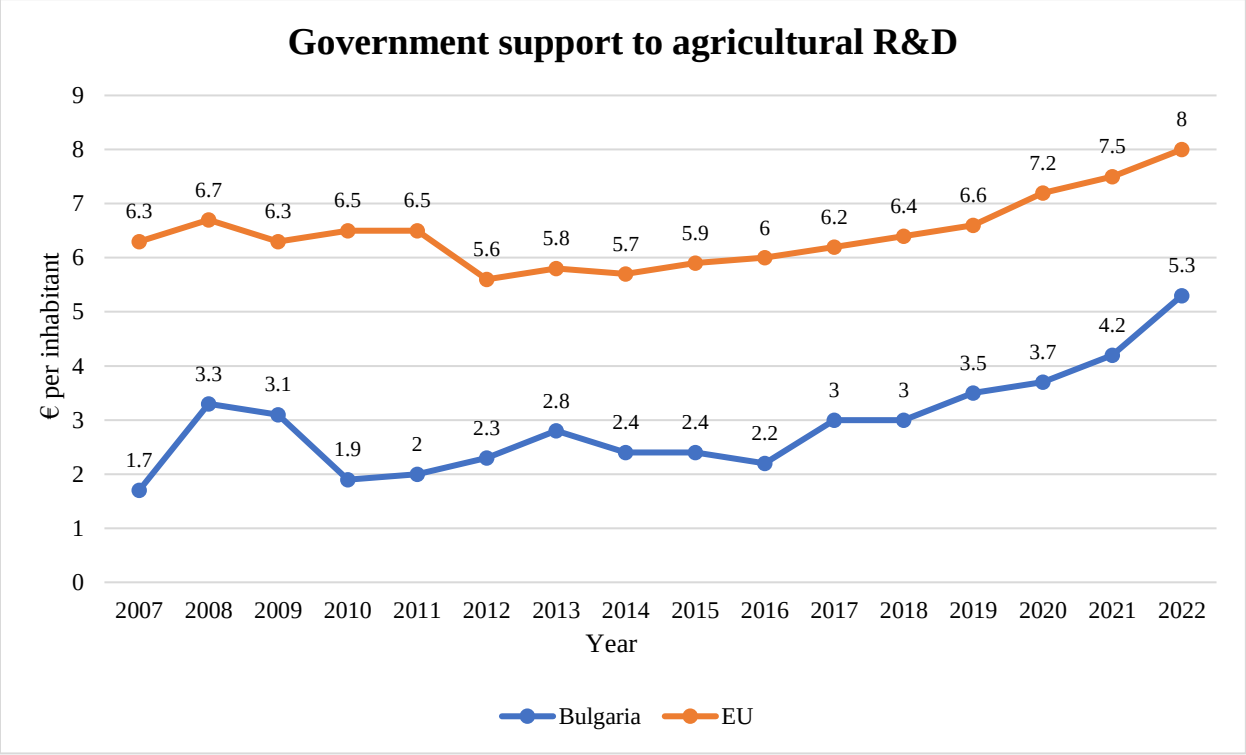
The indicator relates to the allocations from the state budget for research and development (GBARD – Government budget allocations for research and development) in agriculture. Agricultural research and innovation investments are crucial for distinguishing agricultural productivity from its environmental impact. Such investments also help farmers in the EU remain competitive and adaptive to challenges such as climate change and feeding the growing population. (EUROSTAT, Monitoring report on SDGs, 2023).

Investments in the future of agriculture in the EU have been increasing with a constant upward trend in recent years. In Bulgaria, government support for research and development in agriculture also increased significantly from 2017 to 2022, reaching €5.3 per capita in 2022 (with an EU average of €7.8 per capita) (Fig. 3.1.3).

Despite the not-so-bad positioning of Bulgaria on the map of Europe in terms of state support for research and development in agriculture, the need for a general policy of interaction between scientific research, innovation and technology to achieve economic progress and prosperity is

identified. Science policy should be related to consolidating the scientific potential for work on socially significant tasks, stimulating the quality of scientific research and increasing the effectiveness of public R&D spending.

Fig. 3.1.3: Government support to agricultural research and development in the EU and Bulgaria, euros per capita



Source: Eurostat (https://ec.europa.eu/eurostat/web/sdi/database)

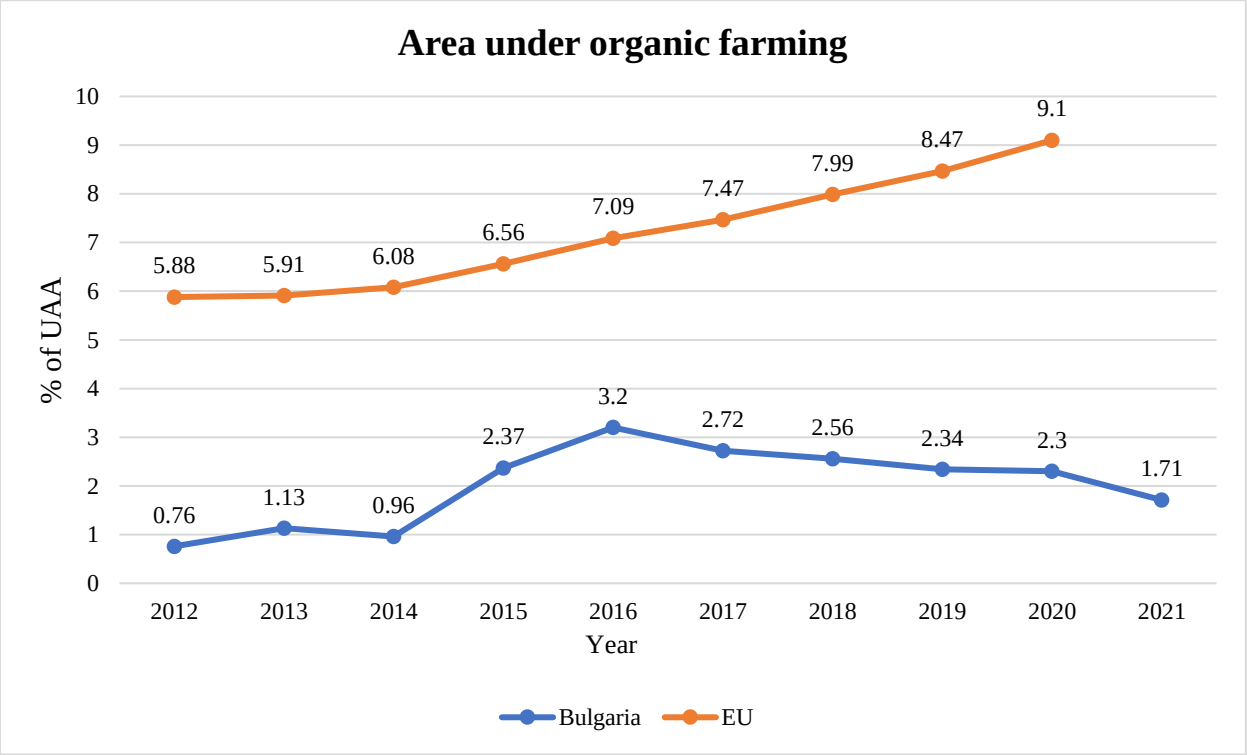
❖ 3.1.3. Indicator: Area under organic farming

The indicator measures the share of the total utilised agricultural area (UAA) occupied by organic farming (existing organic farming areas and areas in conversion, so-called transitional areas). Organic farming is rising in the EU (Fig. 3.1.6), with its share of total agricultural land increasing by 2.5% between 2015 and 2020, reaching 9.1%. However, despite this progress, the pace needs to accelerate to achieve the goal of the "Farm to Fork" strategy for 25% organic land by 2030 (EUROSTAT, Monitoring report on SDGs, 2023).

Unfortunately, from 2015 to 2021, Bulgaria has seen a continuous and noticeable decline in the number of organic farmers and in the scale of certified agricultural land for organic production. The percentage of land under organic farming in the country decreased to 1.7% of the total utilised

agricultural area (UAA) or 86,310 hectares in 2021 (including transitional areas), which is significantly below the EU average (9.1% in 2020) and far from the set goal of 25% for Europe.

Fig. 3.1.6: Area under organic farming in the EU and Bulgaria



Source: Eurostat (https://ec.europa.eu/eurostat/web/sdi/database)

The research on the progress towards sustainability in Bulgarian agriculture within the framework of the United Nations 2030 Agenda for Sustainable Development reveals some positive national-level trends, such as the increase in agricultural factor income per annual work unit (AWU) and state support for research and development activities in agriculture. Despite these positive trends, Bulgaria still lags far behind the European averages for both indicators when viewed in numerical expression. Particularly disappointing are the data showing a regression in the area of organic farming in the country – an indicator where Bulgaria significantly diverges from the EU averages. Meanwhile, achieving the goal of 25% organic farming by 2030, as outlined in the Green Deal and the UN Agenda, seems even more remote. In this regard, Bulgarian agriculture, framed within the sustainability metrics outlined in the 2030 Agenda, presents itself unfavourably.

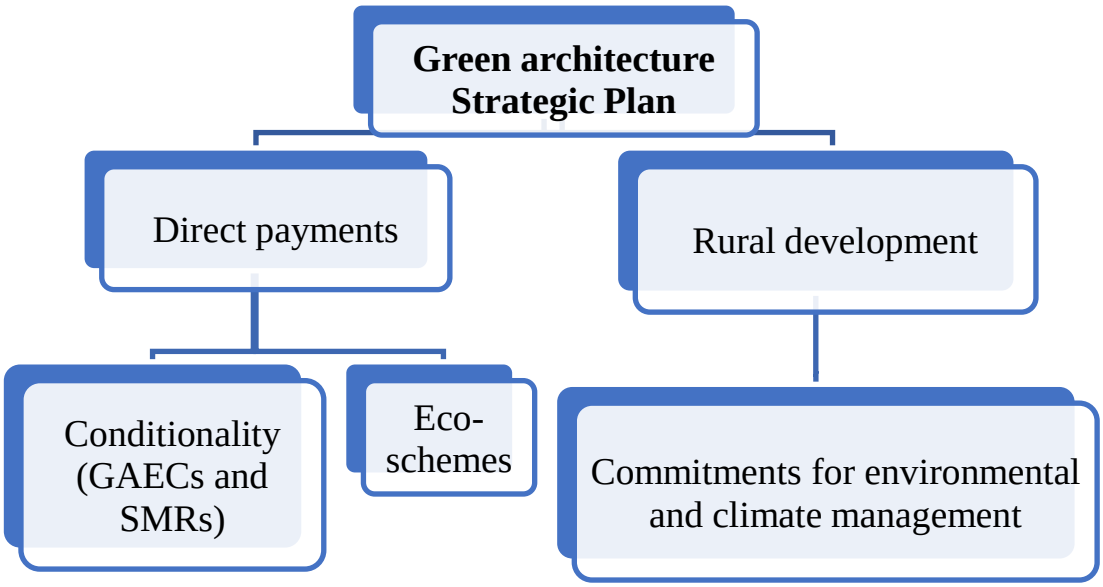
It's important to approach with some criticism the European-level application of assessing progress in agricultural sustainability solely through three indicators, which claim to cover the three

dimensions of sustainable production: environmental, economic, and social. Of course, the three indicators included in indicator 2.4.1 – "Agricultural factor income per annual work unit," "Government support to agricultural research and development," and "Area under organic farming" – have relevance to the three dimensions of sustainability. However, they are far from exhaustive and comprehensive.

3.2. Positioning of grain production in the National Strategic Plan

The second main objective of the study is to position Bulgarian grain production within the National Strategic Plan for the Development of Agriculture and Rural Areas for the period 2023 – 2027 (Strategic Plan) in the context of the mandatory preliminary conditions (the so-called "conditionality"), interventions to support area-based payments, voluntary eco-schemes within direct payments, as well as agro-environmental interventions within rural development. The aim is to investigate further the opportunities outlined in the Strategic Plan for achieving sustainability in the "Grain Production" sector concerning the economic, environmental, and social dimensions.

Fig. 3.2.1: Green Architecture in the Strategic Plan



Source: Own, based on information from Regulation (EU) 2021/2115

The proposed CAP reform contributes to the EU's commitments to environmental protection, climate action, and biodiversity conservation, as outlined in the European Green Deal, through the so-called "green architecture" (Fig. 3.2.1). This architecture includes a range of measures that link CAP payments to various increased obligations on the part of farmers. The new "eco-schemes"

aim to reward farmers for voluntarily adopting sustainable agricultural practices. There are also provisions for environmental and climate management commitments through the rural development framework, which aim to compensate farmers and other beneficiaries for their commitment to sustainable practices. Member States develop national CAP strategic plans based on a detailed assessment of local conditions and needs and must align with the environmental ambition requirements of the "green architecture." (EC, Analysis of links, 2020).

❖ 3.2.1. Mandatory preconditions (conditionality)

The rules on preconditions consist of the Statutory Management Requirements (SMRs) under Union law and the Good Agricultural and Environmental Conditions of land (GAEC) laid down in the Strategic Plan for the Common Agricultural Policy and relate to the following three areas:

• climate and environment, including water, soil and ecosystem biodiversity;

• public health and plant health;

• animal welfare.

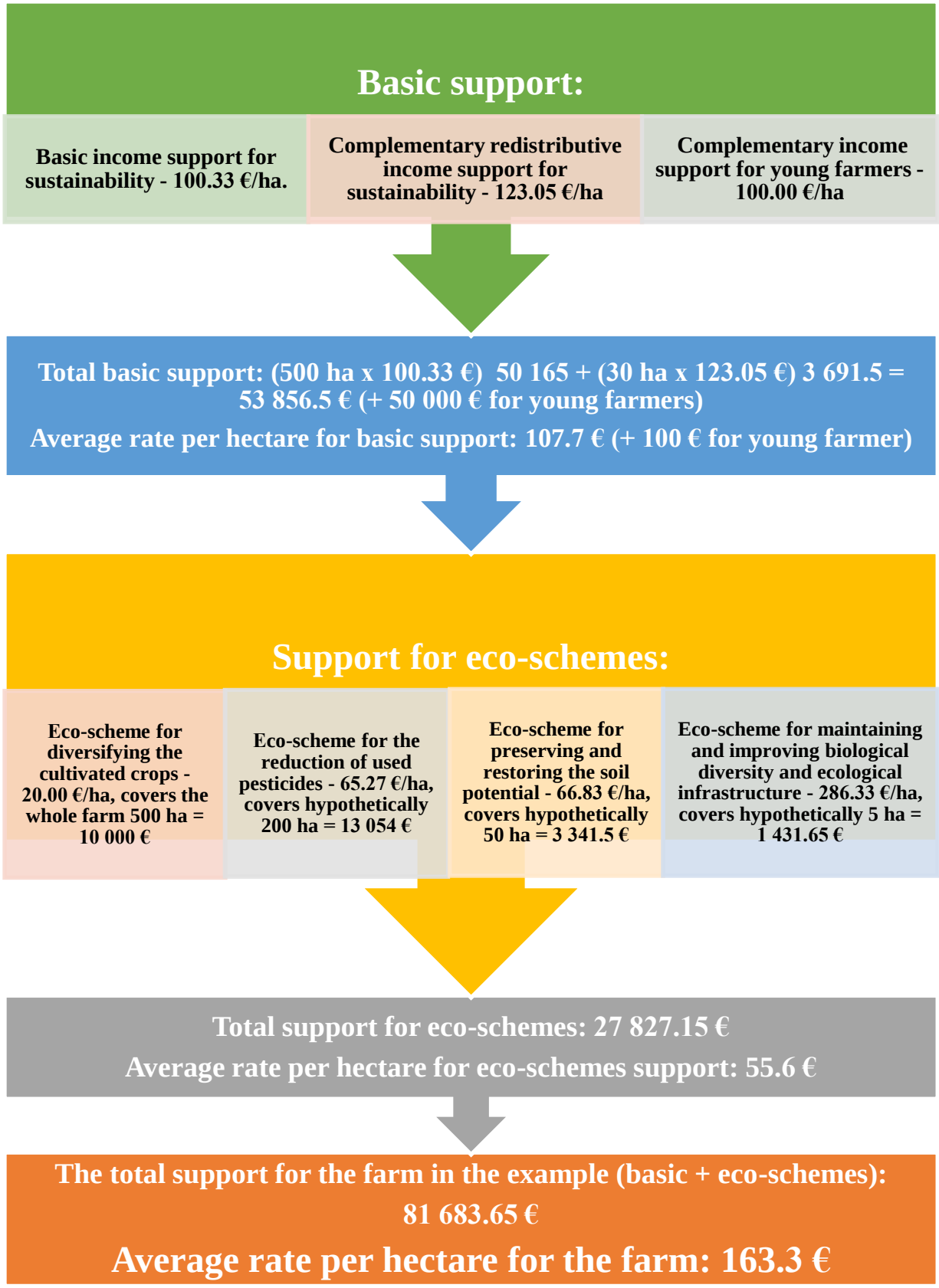
In addition, as of January 1, 2025, the preconditions within the framework of the CAP include rules regarding the so-called "social conditionality." For the first time in EU agricultural legislation, the social dimension is incorporated, and the working conditions of agricultural workers are considered when implementing the CAP (MAF, 2023, Approved Strategic Plan).

The rules related to the preconditions are the program of minimum mandatory requirements that farmers – beneficiaries of funds under the Common Agricultural Policy 2023 – 2027 should comply with to receive support under the individual interventions of the Strategic Plan. Within the analytical framework, the mandatory requirements of the preliminary conditions and the possibilities of supporting the grain-producing farms within the framework of the interventions in the Strategic Plan have been thoroughly examined.

❖ 3.2.5. An example of support for a grain-producing farm with an area of 500 hectares under direct payments

A hypothetical example of support for a grain-producing farm from the "Grain Production" sector, which manages 500 hectares of arable land, has been developed (Fig. 3.2.2).

Fig. 3.2.2: Support for grain-producing farm with an area of 500 ha



Source: Own, according to the Ministry of Agriculture and Food, Approved Strategic Plan

The specific size of the cultivated areas has been chosen because the range from 500 to 1000 hectares is most commonly indicated by Bulgarian grain producers in the survey as a scale for sustainable farming in the sector.

It should be noted that the example discussed for support under direct payments is one of the optimistic scenarios for supporting grain-producing farms, as the hypothetical farmer participates in several of the possible voluntary eco-schemes and receives additional redistributive support, given that the farm is under 600 hectares. Despite the optimistic nature of the hypothesis, the example shows that agricultural farms will receive support slightly lower than the support received in the previous programming period (approximately 340 BGN/hectare for the period 2014 – 2022, of which approximately 200 BGN/hectare is from the SAPS and approximately 140 BGN/hectare from the green direct payments). However, in return, they must comply with more ecological requirements and restrictive measures.

Analysing the Strategic Plan reveals the quantitative and qualitative increase in mandatory environmental requirements during the current Common Agricultural Policy programming period for farms growing cereals and oilseeds. The voluntary practices in the previous period within the green direct payments are transformed into mandatory requirements for receiving basic support under direct payments in the new programming period. Some of the new preconditions make it impossible to implement traditional agricultural activities in the country (GAEC 6 – Minimum soil cover to avoid bare soils in period(s) that are most sensitive), while others impose serious restrictions on the production capabilities of farms (GAEC 8 – Minimum share of arable land devoted to non-productive areas and features).

In the new programming period, Bulgarian grain producers will have increased opportunities to undertake voluntary one-year commitments under climate and environmental schemes within direct payments (from three voluntary green practices under the CAP 2014 – 2020 to eight eco-schemes under the CAP 2023 – 2027). However, the question remains about how financially attractive these new schemes are and whether the expenses incurred and the missed benefits from the green practices do not significantly exceed the compensatory payments provided.

During this programming period, the production of field crops will be supported primarily within the framework of direct payment interventions (Pillar I) and has much smaller opportunities and chances of support under the framework for rural development (Pillar II). In grain-producing

farms, achieving the average levels of support per unit of area from the previous programming period will require significantly more environmental efforts and compliance with restrictions by farmers during the current programming period. The shrinking agricultural support budget and the simultaneous increase in environmental demands on farmers is a pan-European phenomenon. This is precisely at the root of the mass farmer discontent in Europe in 2023 and 2024.

The proposed changes by the Ministry of Agriculture and Food to the European Commission in the first amendment of the CAP Strategic Plan are largely driven by the practical impracticability of some requirements and interventions, as well as the difficulties experienced by farmers and administration in implementing the new CAP.

3.3. Attitudes of Bulgarian grain producers towards European green policies and the application of ecological practices

The most important task in the analytical part of the dissertation is to determine whether Bulgarian grain producers encounter difficulties in complying with the mandatory standards for good agricultural and environmental condition of land (GAEC), as well as to register their interest and readiness to participate in voluntary commitments for support under schemes for climate, environmental, and animal welfare, the so-called eco-schemes, included in the Strategic Plan. Additionally, attitudes and expectations of domestic grain producers regarding the ambitious goals of the European Green Deal in agriculture by 2030 are investigated.

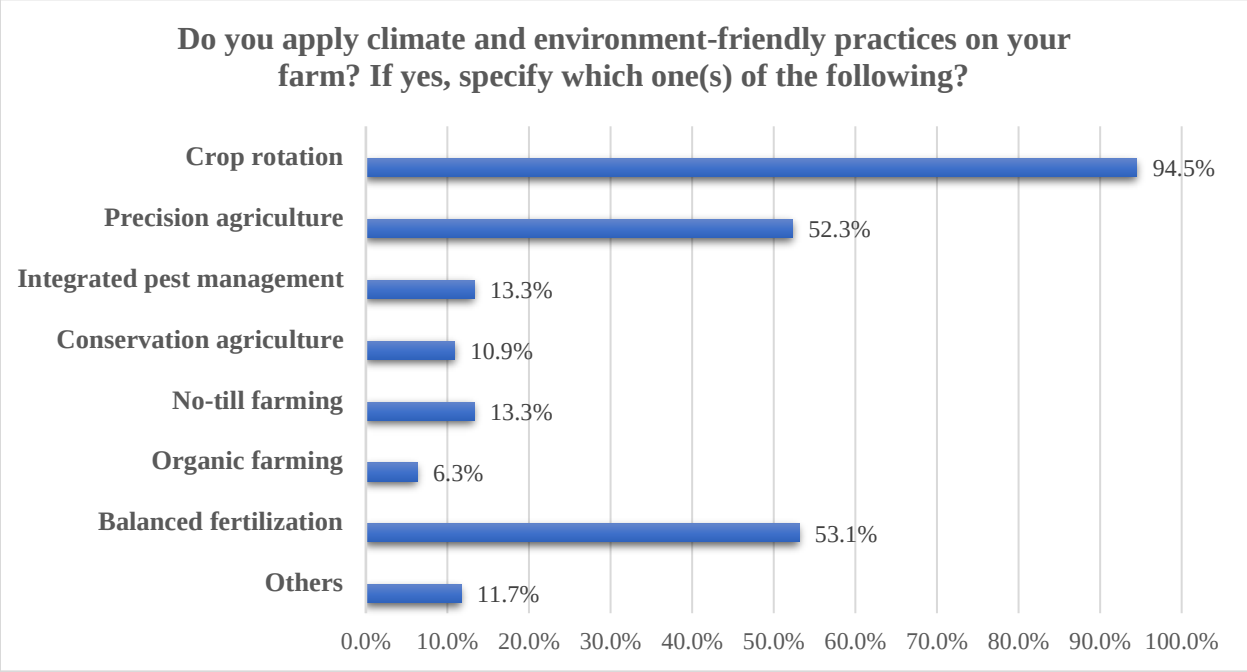
❖ 3.3.1. Profile of surveyed farms in the "Grain Production" sector

Based on the analysis of the parameters of the surveyed grain-producing farms, it can be concluded that the majority of the included farms are relatively economically stable, market-oriented, and have previous experience and history. The main profile of respondents in the survey represents grain-producing farms with the following parameters: established for more than 5 years; managed by a male over 40 years old; cultivating areas ranging from 100 to 1000 hectares; owning 20 – 25% of the land and leasing around 30% under long-term contracts; employing 4 – 8 hired workers; cultivating 3 – 6 field crops, mainly wheat, sunflower, corn, barley, rapeseed, and alfalfa; often maintaining a diverse variety/hybrid structure; lacking access to irrigation; owning storage facilities for product storage; participating in economic associations with other farmers; using bank loans for investment funds, and quite often for working capital as well.

❖ 3.3.2. Readiness of surveyed farms from the "Grain production" sector to apply the environmental conditions of the new CAP

Bulgarian grain producers traditionally maintain a high level of ecological production technologies compared to farms cultivating arable crops in many other European countries (Fig. 3.3.12).

Fig. 3.3.12: Implementation of climate and environment-friendly agricultural practices among the surveyed grain producers



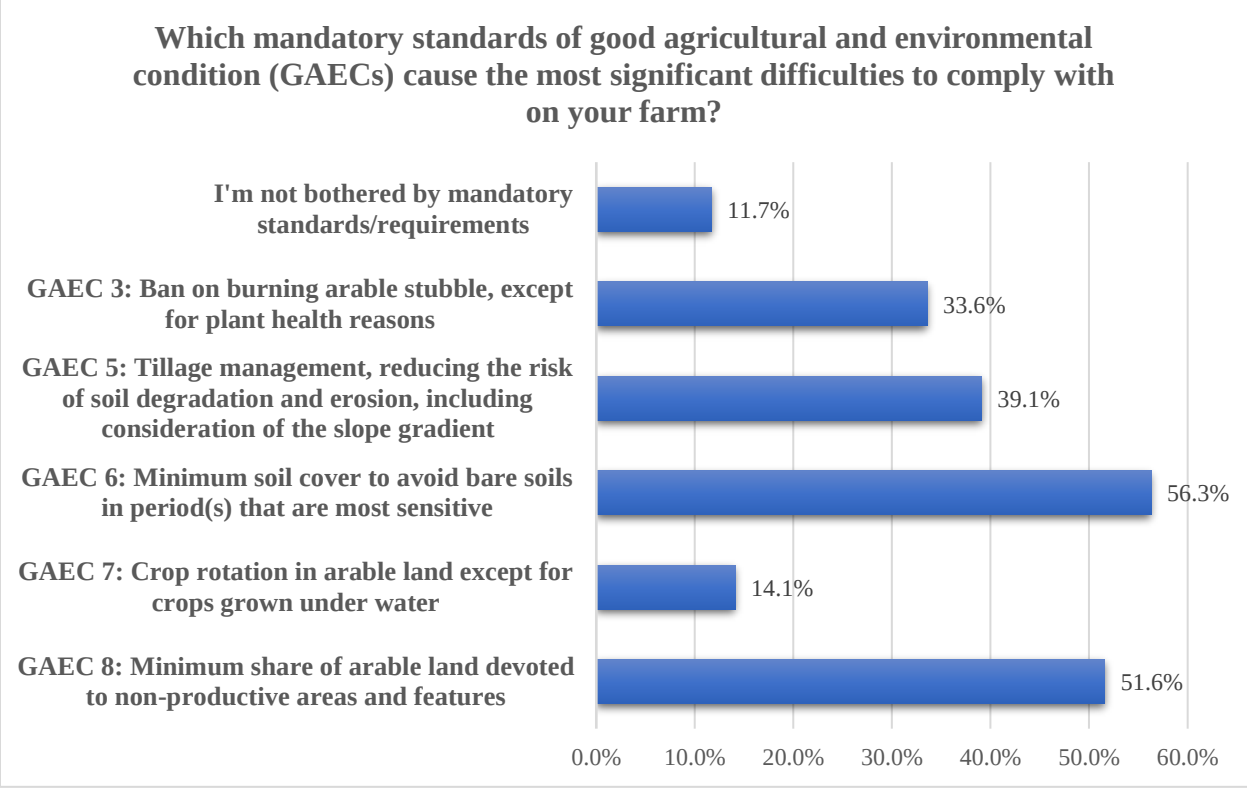
Source: Own calculations based on data from a conducted survey

Almost 95% (121 farms) of the respondents in the survey implement crop rotation on their farms. Over 53% (68 farms) of the surveyed farmers apply balanced fertilization in their agricultural practices, while over 52% (57 farms) of the participants in the survey indicate that they practice precision farming in their production technology. In addition, over 13% (17 farms) of the respondents practice no-till farming and almost 11% (14 farms) of the farmers in the survey apply conservation agriculture. Integrated pest management is practised by over 13% (17 farms) of the farms in the survey, and 11.7% (15 farms) of the surveyed farmers implement "other" climate and environmentally-friendly practices, including the so-called "carbon farming."

- **Good agricultural and environmental condition standards (GAECs) and statutory management requirements (SMRs)**

Regarding compliance with the mandatory standards for the good agricultural and environmental condition of land (GAEC), the conducted research highlights the most serious difficulties faced by farmers in implementing GAEC 6 "Minimum soil cover to avoid bare soils in period(s) that are most sensitive" and GAEC 8 "Minimum share of arable land devoted to non-productive areas and features." Only 11.7% of the surveyed farmers state they do not encounter difficulties complying with the mandatory standards/requirements (Fig. 3.3.13).

Fig. 3.3.13: Difficulties faced by grain producers regarding compliance with individual mandatory standards (GAECs)



Source: Own calculations based on data from a conducted survey

One-third of the surveyed grain producers (43 farms) indicate difficulties complying with GAEC 3 "Ban on burning arable stubble, except for plant health reasons." GAEC 5 "Tillage management, reducing the risk of soil degradation and erosion, including consideration of the slope gradient," is considered challenging for execution by 39.1% (50 farms) of the surveyed farmers.

More than 56% (72 farms) of the surveyed grain producers report the greatest difficulties in fulfilling the requirement to ensure "Minimum soil cover to avoid bare soils in period(s) that are most sensitive," according to GAEC 6. The agricultural holding is obliged to cover at least 80% of the entire cultivated area to maintain a minimum soil cover during the sensitive period from 01 June to 31 October and for areas with a slope ≥10% during the period from 01 November to 15 February (MAF, 2023. Approved Strategic Plan). The currently valid text of the GAEC 6 is the requirement that is in the greatest contradiction with the country's soil and climatic conditions and the application of traditional agricultural practices.

Only 14% (18 farms) of the surveyed farmers indicate difficulties implementing GAEC 7 "Crop rotation in arable land except for crops grown underwater."

Undoubtedly, Bulgaria and Europe's most significant production constraints and agricultural dissatisfaction are triggered by the mandatory standard GAEC 8 "Minimum share of arable land devoted to non-productive areas and features." GAEC 8 is indicated by over 51% (66 farms) of respondents as difficult to comply with due to the requirement to allocate at least 4% of the agricultural area on the farm for non-productive features and objects (landscape features), including fallow land. Consequently, Bulgarian farmers fail to generate income from production in these areas and incur losses from specific parcels due to the annual rent paid for agricultural land management and the associated maintenance costs. Allocating 4% for non-productive areas is a limiting requirement concerning realising the farm's potential for agricultural production, leading to a tangible reduction in production area at both national and European levels. This is the requirement that farmers across almost all European countries protested against at the end of 2023 and the beginning of 2024.

Regarding the statutory management requirements included in the preliminary condition for the Strategic Plan, grain producers encounter challenges and difficulties in adhering to some of the rules of SMR 2 "Protecting water against pollution caused by nitrates from agricultural sources," and SMR 7 "Restrictions on the use of plant protection products." However, as a whole, the majority of the statutory requirements are present as conditions in the previous programming period and are familiar to farmers.

According to the results of the survey among grain producers from the National Grain Producers Association (NGPA), the difficulties farmers experience in complying with some of the new

requirements related to greening practices under GAECs and SMRs are evident. However, compliance with the preliminary conditions is the mandatory prerequisite for receiving financial support under the "Basic Income Support for Sustainability" (BISS) intervention. In this sense, it is not surprising that 8.6% of the respondents, or in other words, 11 grain-producing farms (out of a total of 128), did not participate in BISS support during the first year of implementing the Strategic Plan. There is no discernible pattern among the farms that opted out of support under the basic income scheme, as they represent various farm categories based on farm size, with the largest proportion in this sample being farms with areas ranging from 101 to 500 hectares.

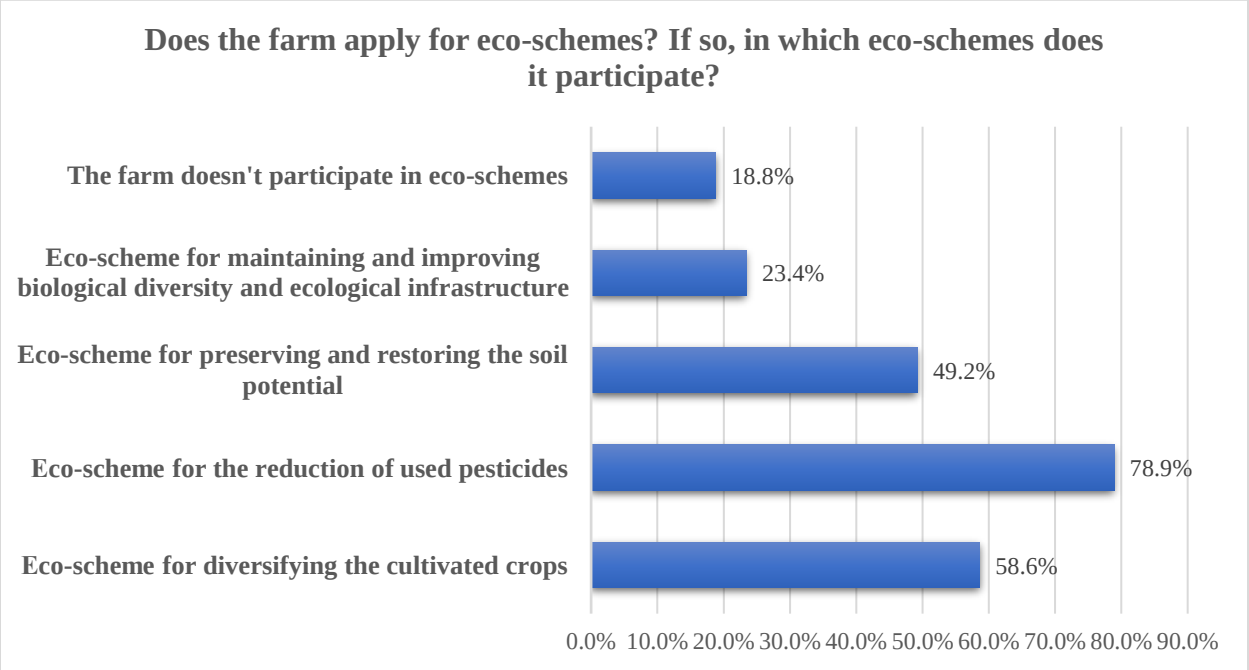
- **Climate, environmental, and animal welfare schemes – eco-schemes**

In the conducted survey among grain producers from NGPA, the highest interest is registered in applying for an Eco-scheme for the reduction of used pesticides – nearly 80% (101 farms) of respondents, and an Eco-scheme for diversifying the cultivated crops – nearly 60% (75 farms) of respondents, as well as an eco-scheme for preserving and restoring the soil potential – promoting green fertilization and organic composting – close to 50% (63 farms) of respondents (Fig. 3.3.14). Concerningly, a high percentage of respondents, 18.8% or 24 farms (out of 128), do not apply for support under eco-schemes and, therefore, do not participate in implementing voluntary annual environmental commitments included in the Strategic Plan. Four of these farms do not participate in support under BISS (Basic Income Support for Sustainability), which means that they generally abstain from direct payment support under the Strategic Plan in 2023.

The interest in the Eco-scheme for diversification of the cultivated crops among grain producers is expected, as the conditions under the intervention build upon criteria already familiar to agricultural producers from the previous programming period for providing green direct payments.

The high interest of farmers in participating in the Eco-scheme for the reduction of used pesticides, with 78.9% of surveyed grain producers or 101 farms (out of 128) participating, comes as a surprise. Clearly, the high level of interest from farmers in the eco-scheme is unexpected for experts and analysts at the Ministry of Agriculture and Food, who have indicated indicative areas for support on arable land totalling 390,991 hectares in the Strategic Plan. However, the declared areas for the eco-scheme in 2023 amount to 2,437,319 hectares, representing 623% fulfilment of the targeted indicative values. The number of applicants for the intervention is also high, with 14,566 beneficiaries (according to data from the MAF).

Fig. 3.3.14: Participation of grain producers in voluntary eco-schemes



Source: Own calculations based on data from a conducted survey

The grain producers in the country traditionally have an oppositional stance towards reducing the use of plant protection products, removing active substances from the list of permitted ones, and towards the proposal by the European Commission for the draft Regulation on Sustainable Use of Pesticides (SUR). This proposal created a precedent in the legislative history of the EU when it was rejected by the European Parliament in 2023 and sent back to the European Commission for review. Grain producers often express frustration over the lack of effective tools to combat pests, especially after the ban on neonicotinoid pesticides at the European level. In this context, farmers' interest in reducing pesticide use is surprising. It is worth noting that with appropriate financial incentives and more accessible and flexible measures, Bulgarian grain producers are willing to reduce pesticide use. Another favourable factor is that the conditions of the eco-scheme do not lead to a drastic reduction in the farm's production capacity and do not significantly threaten the quantity and quality of agricultural production. The ecological goals and requirements outlined in the eco-scheme are not overly ambitious, allowing for maximising the environmental impact of the intervention for both the application level on the fields and the majority of participating farms.

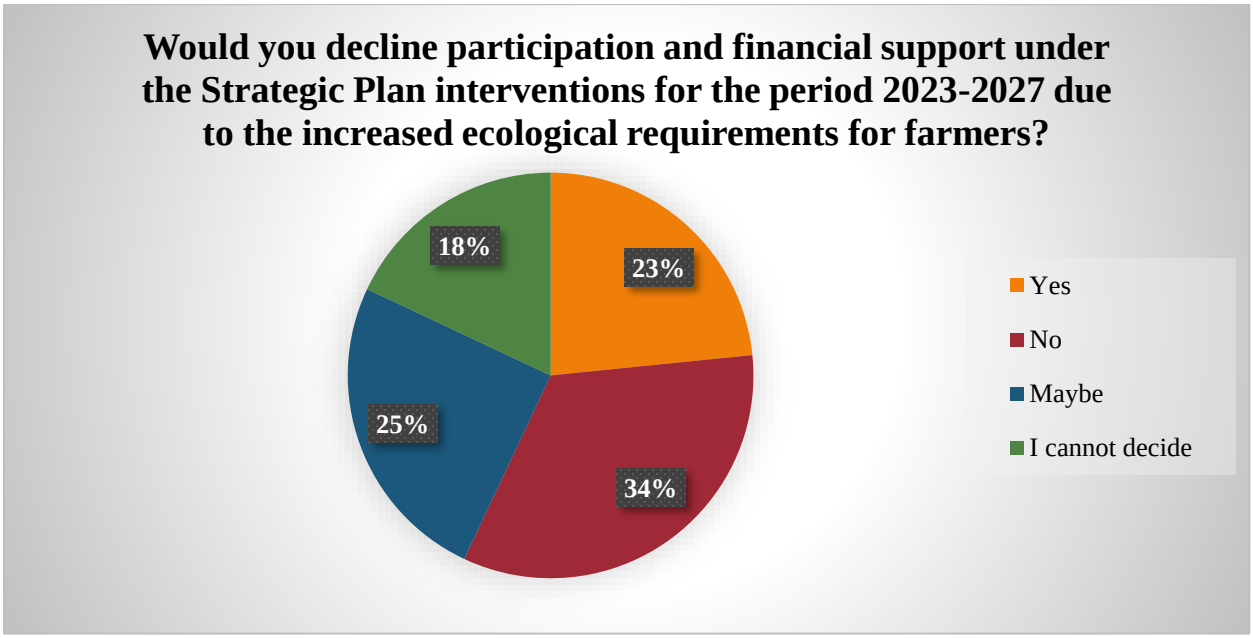
Another undeniable success among Bulgarian grain producers is the Eco-scheme for preserving and restoring the soil potential through promoting green fertilization and organic fertilization, in

which 49.2% of the respondents participate. According to the MAF, candidates for the eco-scheme are 3,845, and the areas applied for support (1,179,972 hectares) represent 283% of the indicative areas set out in the Strategic Plan (417,100 hectares).

Last but not least, among the eco-schemes, attention should be drawn to the Eco-scheme for maintaining and improving biological diversity and ecological infrastructure, of which 23.4% of the respondents in the survey participate. The analysis by the Ministry of Agriculture shows very low application for areas under this scheme – 7,253 hectares, which is 12.58% of the indicative 57,650 hectares set out in the Strategic Plan. However, 6,029 agricultural producers have enrolled in the Eco-scheme for maintaining and enhancing biodiversity and ecological infrastructure, ranking it third in the number of applicants.

The study also examines the attitudes of Bulgarian grain producers towards participation and financial support under the interventions of the Strategic Plan for 2023 – 2027 with increased ecological requirements (Fig. 3.3.16).

Fig. 3.3.16: Willingness to participate in support under the CAP with increased ecological requirements



Source: Own calculations based on data from a conducted survey

The highest share of respondents (33.6%) would not decline participation and support under the interventions of the Strategic Plan due to the higher ecological requirements. One-fourth of the respondents are doubtful, 18% cannot decide on the matter, and 23.4% of the respondents, or a

total of 30 farms, are willing to forego support and participation in the Common Agricultural Policy due to the high green requirements. In 2023, 8.6% of the surveyed farmers did not participate in the Basic Income Support for Sustainability, and 18.8% did not participate in the eco-schemes. It should be noted that a very small number of these 30 farms willing to forego support under the CAP are the same ones that did not participate in the CAP in 2023. In this sense, there is a possibility that the proportion of farmers opting out of support from European agricultural funds will increase in the coming years of implementing the Strategic Plan.

❖ 3.3.3. Achieving the goals of the Green Deal through the prism of Bulgarian grain producers

As outlined in the theoretical part of the dissertation, the Green Deal sets several specific goals through the two strategies, "Farm to Fork" and "Biodiversity Strategy," which would significantly impact European grain production and agricultural systems as a whole and they are:

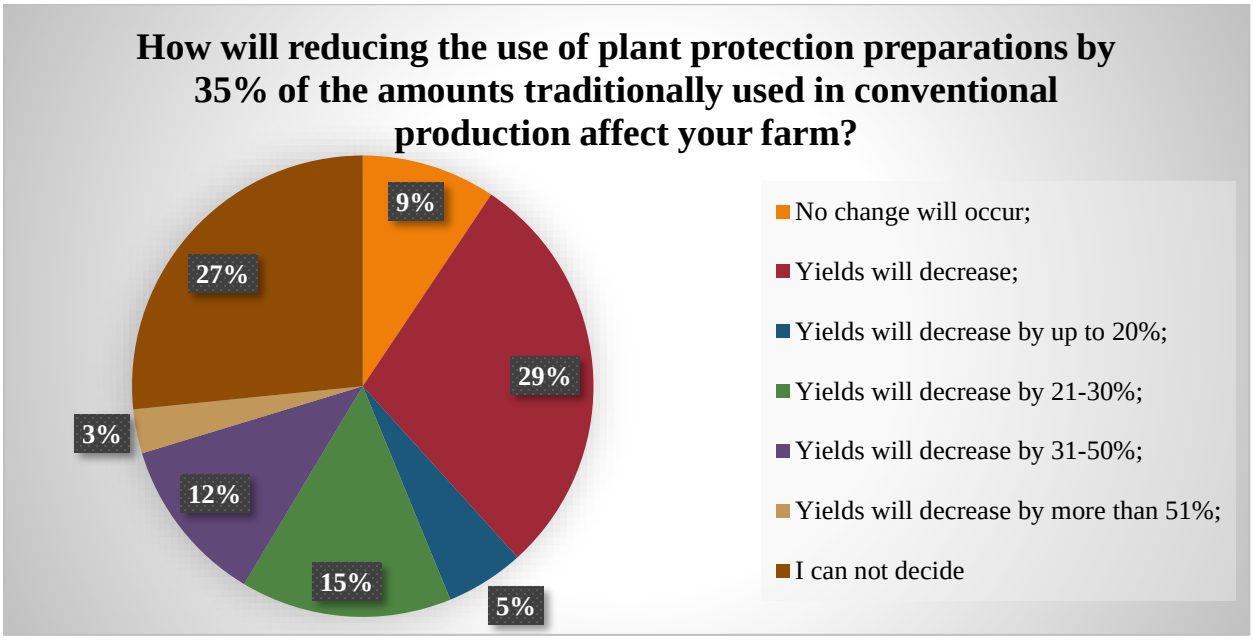
- To reduce overall pesticide use and the risk of chemical pesticides by 50% and the use of more hazardous pesticides by 50% by 2030;
- To reduce nutrient losses by 50% and decrease fertilizer use by at least 20% by 2030;
- To designate at least 10% of agricultural land as landscape features with high diversity;
- To have at least 25% of agricultural land in the EU farmed organically by 2030.

In the European Commission's proposal for a Regulation on Sustainable Use of Pesticides (SUR), as part of the implementation of Green Deal policies, member states are divided into three groups, each required to reduce pesticide use and risk at the national level by 2030 compared to the average value for the years 2015, 2016, and 2017 by 35%, 50%, or 65%, respectively. Bulgaria falls into the category of member states that are required to reduce pesticide use by 35%. Regardless of the subsequent withdrawal of the regulation, it is interesting to consider the opinions of grain producers on the topic, considering the potential continuation of the dossier at a later stage.

The highest percentage of respondents (28.9%) claim that yields will decrease without specifying how much if the standard quantity of pesticides used on the farm is reduced by 35% (Fig. 3.3.18). Additionally, a considerable percentage of respondents (26.6%) cannot assess the impact of such a percentage reduction in pesticide use on the farm. Nearly 15% of surveyed grain producers anticipate a 21 – 30% yield decrease, while another 11.7% estimate this decrease to be between 31 – 50%. It should be noted that according to 9.4% of respondents (12 farms), there will be no change

in farm production due to reduced pesticide use. Interestingly, almost all of these farms indicate that they apply conservation agriculture, no-till farming, or organic farming practices.

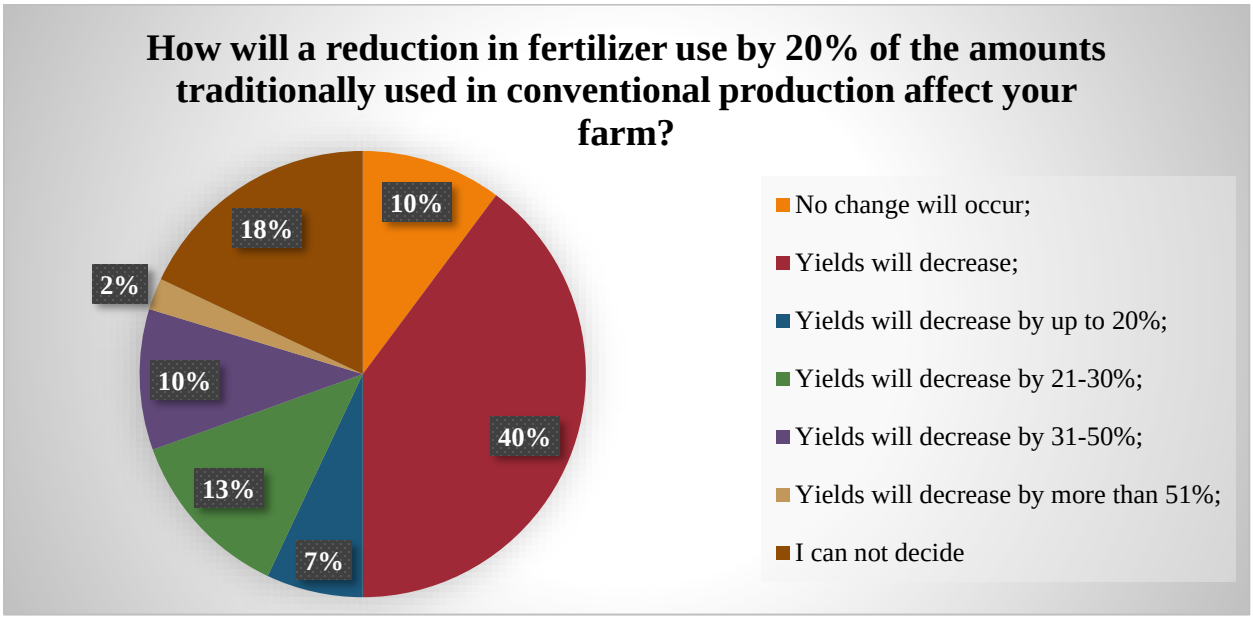
Fig. 3.3.18: Effect on farms of reducing pesticide use



Source: Own calculations based on data from a conducted survey

Grain producers are much more convinced that their yields will decrease if fertilizers are reduced by 20% compared to the standard quantities used on the farm (Fig. 3.3.19).

Fig. 3.3.19: Effect on farms of reduced fertilizer use

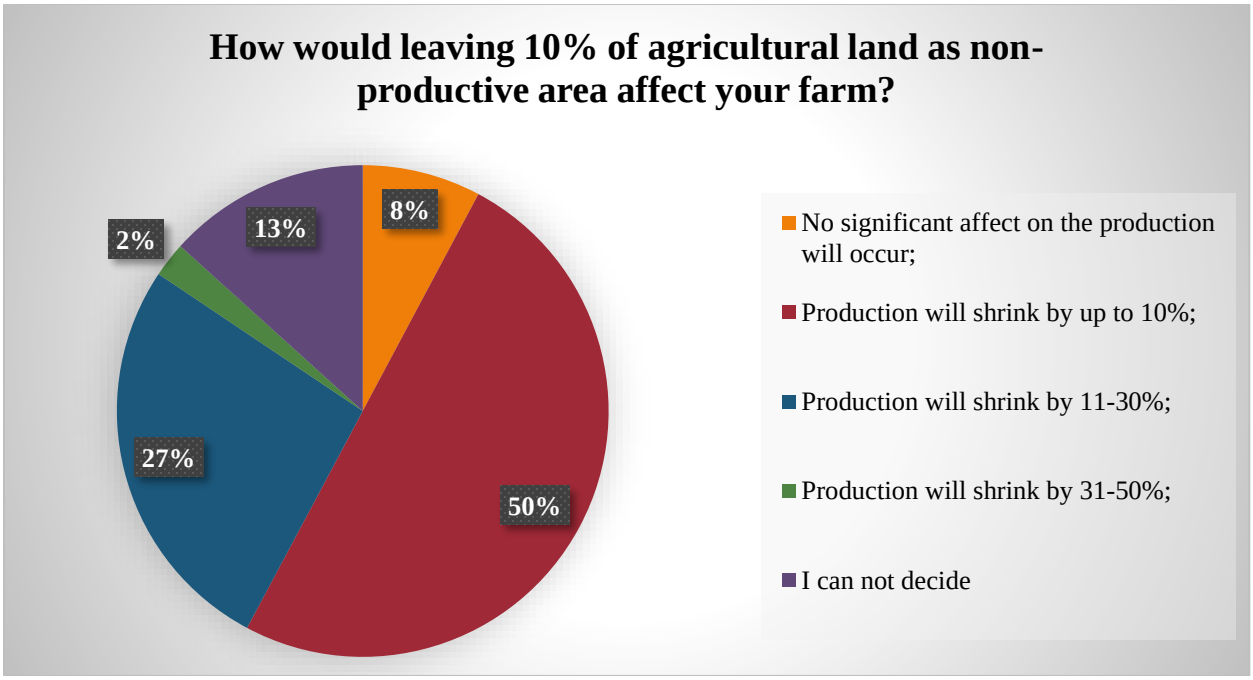


Source: Own calculations based on data from a conducted survey

Nearly 40% of surveyed farmers believe that their yields will decrease without specifying by how much if fertilizer imports are reduced by 20%. Again, a high percentage of respondents (18%) indicate that they cannot assess precisely how such a reduction in fertilizers will impact their farms. 12.5% of respondents think their yields will decrease by 21 – 30%, while another 10.2% believe that yields will be reduced by 31 – 50%. Interestingly, a stable percentage of farmers (10.2% or 13 farms) believe there will be no change in their farms due to the reduced fertilizer use by 20%. Most of these are the same farmers who believe there will be no effect on their farms even if pesticide use is reduced, namely those dedicated to no-till, conservation, or organic farming.

Regarding allocating 10% of non-productive areas in the farm to improve biodiversity, 50% of the surveyed farmers are categorical that this will lead to a reduction in farm production by up to 10% (Fig. 3.3.20). The share of farmers who cannot estimate what will be the effect on the farm decreases to 13.3% of the respondents. On the other hand, the share of farmers who believe production will shrink by 11 – 30% is relatively high – 26.6%. Under this condition, the share of respondents (7.8% or 10 farms) who believe that leaving 10% of non-productive areas will not significantly affect production decreases slightly, and these are again mostly farms applying conservation agriculture.

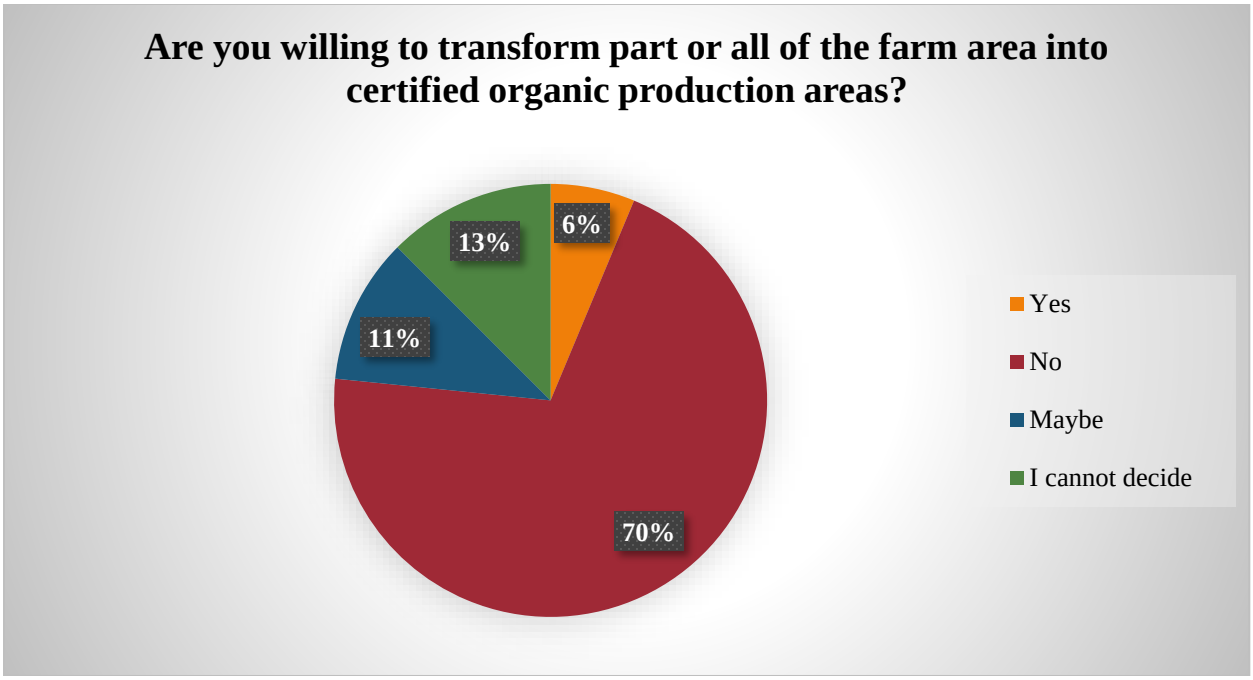
Fig. 3.3.20: Effect on farms of leaving non-productive areas



Source: Own calculations based on data from a conducted survey

The most surprising is the attitude of the surveyed grain producers towards switching part or the whole farm to organic production (Fig. 3.3.21). Under this condition, the respondents' convictions regarding accepting some of the goals outlined in the Green Deal become most apparent. A dominant share of 70.3% of the respondents are not inclined to transform part or all of the farm's area into certified organic production. Almost 11% of the respondents are hesitant, and another 12.5% cannot decide. Only 6.3% (8 farms) are inclined to adopt the principles of organic farming.

Fig. 3.3.21: Attitudes of respondents towards switching to organic production



Source: Own calculations based on data from a conducted survey

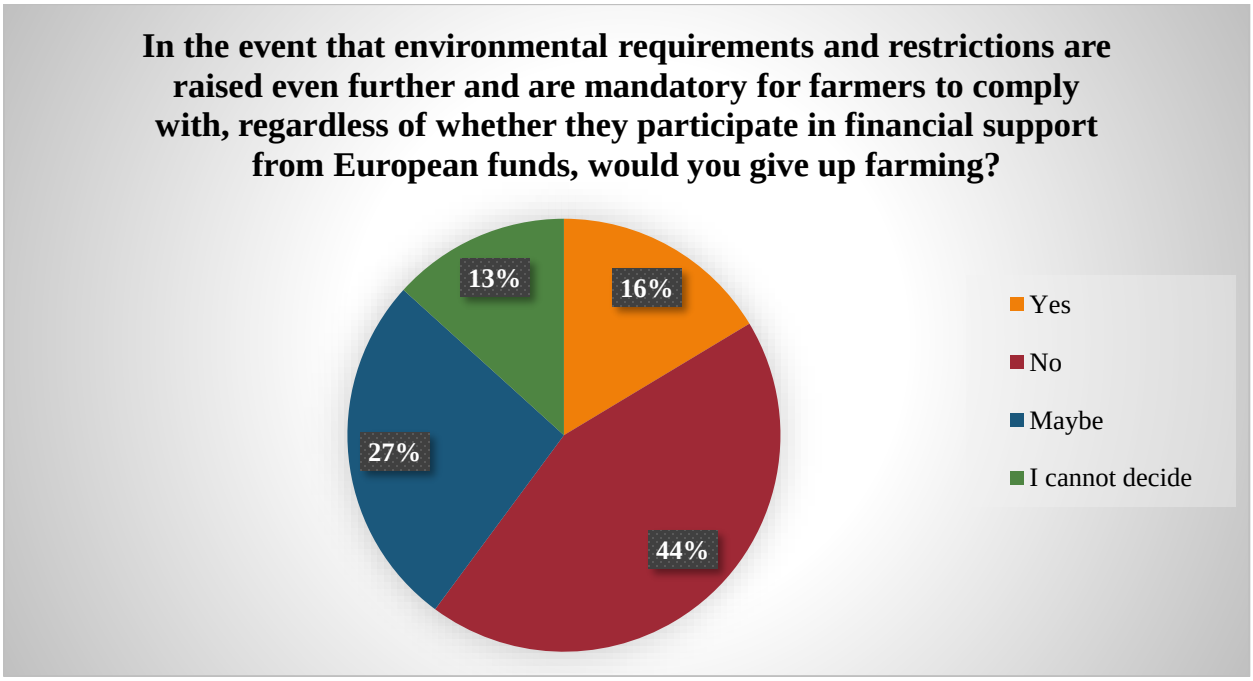
The negative attitude of surveyed grain producers towards transitioning to the organic sector is primarily explained by the fact that growing grain and oilseed crops requires larger scales to be efficient. Consequently, maintaining controlled organic farming in large areas becomes an almost impossible task despite the existence of good examples in other European countries. Most grain producers in the country believe that organic production is inefficient, has low yields, and entails additional administrative burdens, while there is also a lack of adequate market for organic products.

Interestingly, many surveyed farmers mention various practices in their free comments aimed at improving the quality of the produced grain. The practices considered by grain producers to be logical, natural, and economically justified include balanced fertilization; integration of precision

farming systems; proper grain storage; soil-friendly cultivation methods; use of more natural soil amendments and fertilizers of plant and animal origin; use of more environmentally friendly plant protection products; regular rotation of crop varieties; irrigation; automation of production processes. The practices mentioned by surveyed farmers actually contribute in one way or another to achieving the goals set by the Green Deal.

The attitudes of Bulgarian grain producers towards continuing agricultural activities, in case ecological requirements and restrictions are further increased and made mandatory regardless of whether they participate in financial support from European funds, are examined last (Fig. 3.3.23).

Fig. 3.3.23: Farmers' attitudes toward practising agricultural activities when ecological requirements are further increased



Source: Own calculations based on data from a conducted survey

It is noted with satisfaction that the largest part of the surveyed farmers (nearly 44%) are farmers by vocation and conviction and would not give up farming, no matter whether environmental pressure may increase or if they receive European support for its activity. Despite everything, the percentage of those who hesitate (26.6%) and those ready to give up farming (16.4%) is high. A total of 21 farms are ready to give up farming if green requirements increase in the future. It is observed that for these farms, the average percentage of farmed own land is relatively higher – 28.5%, and for the surveyed 128 farms, this percentage is 24%. In the mass case, the farms from

the sample have a history and have their own storage facilities. In this sense, it can be argued that these are relatively resilient and stable farms, possess their own land, and make long-term investments. Yet, they are ready to give up their agricultural activity due to increasing environmental requirements. This judgment raises many concerns but proves once again the conservatism and not-so-high adaptability of the agricultural sector.

During informal discussions with Bulgarian grain producers at the end of 2023 and the beginning of 2024, alarming concerns were raised regarding the threat to their competitiveness. Relatively stable and economically resilient farms expressed serious apprehensions about their future viability due to observed market cataclysms caused by the war in Ukraine and the ecological pressure from European institutions. These typically market-oriented and competitive agricultural producers are, for the first time, worried about the economic sustainability of their farms and have serious concerns about how much longer they can withstand ongoing crises.

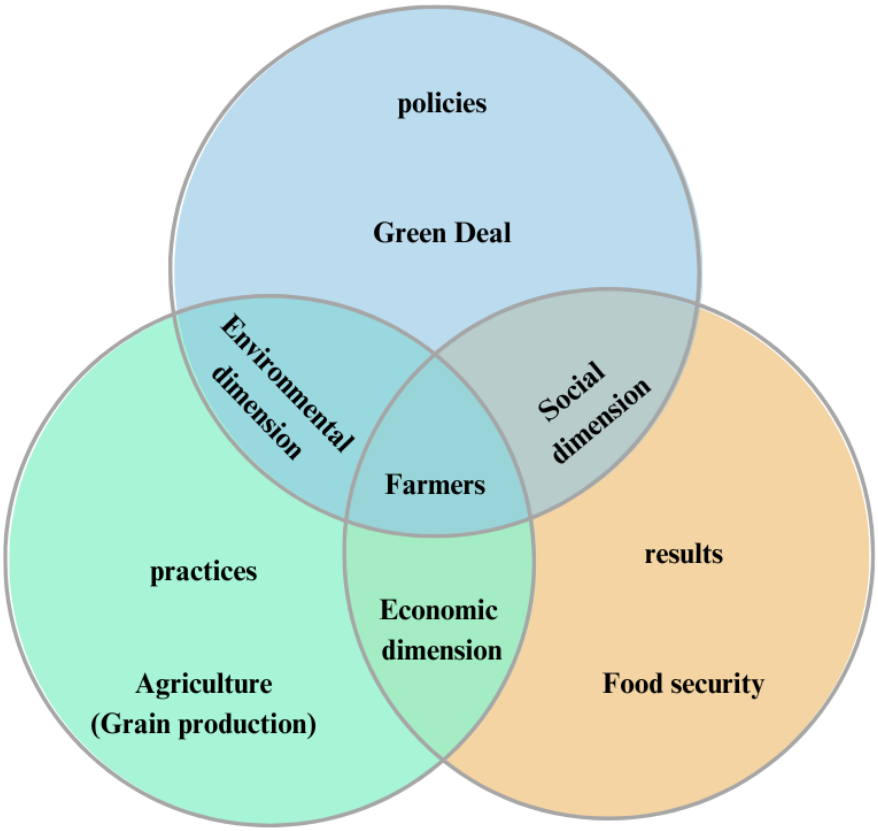
4. CHAPTER FOUR – ACHIEVING SUSTAINABILITY OF GRAIN PRODUCTION UNDER THE CONDITIONS OF THE GREEN DEAL – MISSION POSSIBLE

After the theoretical overview and the prepared analysis regarding the sustainable development of agriculture, the possibilities for ensuring food security, and the established goals and policies in the field of climate and the environment, an opinion and a thesis have been successfully formed, which at the beginning of the doctoral journey are all still hesitant and unclear. It is believed that the sustainability of grain production in the context of green and climate-neutral development can be achieved, requiring a balanced approach and reciprocity in policymaking. Farmers are the main actors in implementing green policies and achieving environmental goals. Their cooperation and involvement in actions to combat climate change are the most significant prerequisites for success.

In this regard, the efforts of European institutions should be much more focused on actively informing, educating, and updating the knowledge and skills of agricultural producers, as well as integrating them into the cause for the environment and climate, rather than coercing them to comply with restrictive requirements. It is evident that sharp turns and forcefully and rapidly imposing green policies act as a deterrent to agricultural producers and inevitably escalate tensions to the extent that it led hundreds of thousands of European farmers to protest on the streets and squares in 2023 and 2024.

In reality, agricultural producers need to feel that they are autonomously making production decisions, and they need to personally see the benefits of implementing certain environmental technologies and apply them based on conviction. Some Bulgarian grain producers are already on this path; they know they will pass their land down to their children and take systematic care to improve the health and fertility of the soil. Most Bulgarian producers have long been convinced of the economic and environmental benefits of implementing precision agriculture, crop rotation, and balanced fertilization. More and more of them find conservation agriculture principles adequate for climate and environmental concerns and economically effective regarding farm profitability.

Fig. 4.1: Diagram of interactions in the sustainable agricultural system



Source: Own

It's becoming increasingly clear that agricultural producers are not inclined to bear excessive ecological pressure and cannot embrace aggressively enforced green policies. Transitioning to climate policies should occur gradually because if ecological requirements are intensified too much, the economic sustainability of farms will be compromised, leading to a decline in social

welfare in rural areas. Maintaining a balanced approach is crucial to preserving the balance among the three dimensions of sustainable development in agricultural farms. To ensure the sustainability of European sustainability policies, they should unfold gradually, consistently, and at a measured pace.

The key to resolving the conflict between ensuring environmentally sustainable agriculture while simultaneously increasing production and guaranteeing food security lies with the farmers (Fig. 4.1). Farmers are at the center of the system of interconnections and interactions, making and implementing production decisions for agricultural practices. The achievement of the goals of the Green Deal depends on their engagement. They are essential for producing food and ensuring food security for the growing population. For a sustainable agricultural system to function successfully, farmers should be at its center, not merely as observers and not at the bottom of the pyramid, receiving instructions and policies from the top. If farmers are involved, engaged, and committed to this cause, achieving and maintaining sustainable agriculture is possible.

4.1. Model of sustainable grain-producing farm in 2023

In light of the conclusions drawn from individual analyses and studies, an attempt has been made to define the internal framework of an optimal production model for grain farming that achieves a significant balance between economic, social, and environmental sustainability. Based on the results of a survey conducted among 128 members of the National Grain Producers Association (NGPA) and the favourable trends observed in some categories of farms, as well as the positive attitudes of some farmers, an exemplary model of sustainable grain farming for 2023 has been developed. The model encompasses parameters from the economic, environmental, and social dimensions of sustainability at the agricultural farm level (Fig. 4.2).

❖ **Parameters of an economically sustainable grain-producing farm:**

- Farm size: 1,000 hectares;
- Significant percentage of owned land (over 30%);
- Significant percentage of land leased under long-term contracts (over 60%);
- Market presence: guaranteed market for at least part of the production to minimize market risk or in the absence of a market;
- Access to financial instruments and bank loans;
- Availability of insurance policies: insurance for production, yield, etc.;

- Participation in commodity trading, futures contracts;
- Participation in producers' organisations to ensure additional economic benefits;
- Crop diversification on the farm: cultivation of at least 4 – 5 different crops;
- Maintenance of diverse variety/hybrid structure on the farm: more than three varieties/hybrids;
- Presence of own facilities for storage of the entire production;
- Implementation of water-saving irrigation technologies;
- Participation in the "Basic Income Support for Sustainability" intervention and voluntary eco-schemes, ensuring both economic and ecological sustainability of the farm;
- Participation in state aid for reduced excise duty on agricultural fuel and deferment of corporate tax.

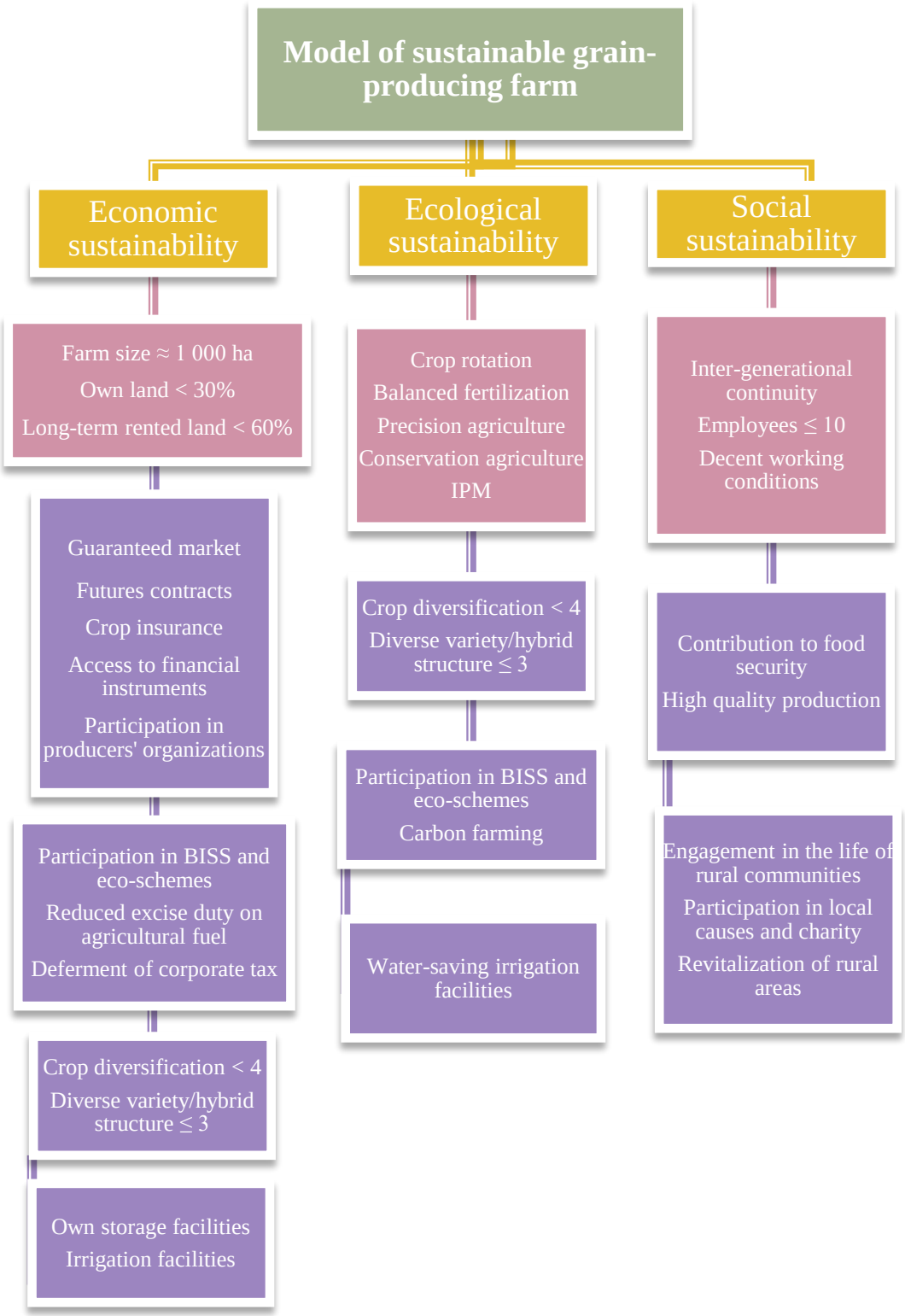
❖ **Parameters of an ecologically sustainable grain-producing farm:**

- Application of climate-friendly technologies and practices such as crop rotation, balanced fertilization, precision agriculture, conservation agriculture, integrated pest management (IPM), and others;
- Diversification of crops within the farm – cultivation of at least 4 – 5 different crops;
- Maintenance of a diverse variety/hybrid structure within the farm – cultivating more than three varieties/hybrids;
- Implementation of water-saving technologies for irrigation;
- Participation in interventions such as "Basic income support for sustainability" and voluntary eco-schemes – providing simultaneous economic and environmental sustainability for the farm;
- Practicing carbon farming.

❖ **Parameters of a socially sustainable grain-producing farm:**

- Existence of intergenerational continuity;
- Minimum number of workers on the farm – 10;
- Providing decent working conditions and fair remuneration;
- Traditionally high yields and high-quality produce;
- Engagement in the life and welfare of rural communities;
- Participation in local causes, initiatives, charity, and revitalization of rural areas.

Fig. 4.2: Model of sustainable grain-producing farm in 2023



Source: Own

4.2. Recommendations for improving the institutional environment of the "Grain production" sector

Unfortunately, in years like 2023 and 2024, the weaknesses of the "Grain Production" sector have come to the forefront, highlighting the lack of long-term stability and strong dependence on shocks and turbulence in the global market conditions. In this sense, it can be said that the sustainability of Bulgarian grain production at this moment is much more vulnerable to crises due to market disruptions rather than crises caused by climate change. Even the proposed model of sustainable grain production farming would not be able to withstand several consecutive stressful years for the economic stability of the sector. It is precisely for this reason that targeted measures and actions at the institutional level are needed, leading to a lasting improvement in the sustainability of Bulgarian grain production in the medium and long term. Otherwise, in a few years, we will discuss the "Grain Production" sector as another vulnerable sector of Bulgarian agriculture.

In this regard, recommendations have been made to the institutional and external environment to improve the sustainability of the "Grain production" sector, primarily focusing on ensuring the sector's economic efficiency, vitality, and competitiveness. Achieving economic stability is the necessary precondition for unlocking Bulgarian grain production's environmentally friendly contribution and social significance.

❖ **Recommendations regarding the implemented European policies in agriculture:**

- Taking effective measures to protect and support Bulgarian grain producers in light of Ukrainian imports of cereals and oilseeds;
- Rejecting the European Commission's proposal for a new Autonomous Trade Measures Regulation (ATM) regarding the import of agricultural products from Ukraine, deeming it insufficiently protective for Bulgarian agricultural producers. Instead, the regulation should include protective measures, licensing regimes, and import quotas;
- Continuing, and after June 2024, the implementation of the rules under the Temporary Crisis and Transition Framework for state aid measures in support of the economy following Russia's aggression against Ukraine;
- Removing double standards regarding requirements for agricultural products from European farmers and the lack of requirements for products from farmers in third countries;

- Easing some of the CAP requirements regarding preliminary conditions concerning maintaining minimal soil cover and leaving non-productive areas;
- Rejecting the proposal for a Regulation on plants obtained through certain new genomic techniques and continuing with the current requirements of the legislation regarding GMOs.

❖ **Recommendations regarding the support of Bulgarian grain producers within the CAP 2023 – 2027:**

- Implementing an active national policy to achieve real external convergence of financial support conditions for agricultural producers in Bulgaria with those in highly subsidized EU member states;
- Maintaining support per hectare is one of the aspects of sustaining viable grain production even after 2027;
- Ensuring that payments for basic income support for sustainability are paid within the year of application;
- Easing preliminary conditions within mandatory standards for good agricultural and environmental conditions of land and statutory requirements for management;
- Providing real opportunities for modernizing grain-producing farms through investment interventions of the Strategic Plan;
- Adopting applicable and attractive agroecological interventions within the rural development framework of the Strategic Plan;
- Conducting intensive informational and explanatory campaigns about the opportunities and conditions for support within the framework of the Strategic Plan.

❖ **Recommendations regarding the economic support of grain production at the national level:**

- Implementing state aid to partially recover the excise duty on fuel used for agricultural purposes, at least for the period allowed by the notification until 2027;
- Providing tax relief measures, such as corporate tax exemptions for agricultural investments, abolishing the tax on European subsidies, and others;
- Implementing national support schemes, such as promoting the production and use of high-quality seeds, targeted loans for purchasing seeds and fertilizers, and others;

- Ensuring a dedicated resource by the Bulgarian National Bank to banks for short-term and investment financing in agriculture;
- Establishing an effective financial product for the grain production sector by the Bulgarian Development Bank and providing preferential conditions for short-term working capital and investment loans for grain producers;
- Recategorizing agricultural labour and ensuring dignified health and pension insurance for those employed in the agriculture sector.

❖ **Recommendations on risk management tools and the development of an effective insurance system:**

- Establishing a guarantee fund for crisis and disaster management in agriculture;
- Developing and implementing risk management tools outlined in the Strategic Plan for 2023 – 2027;
- Creating an effective insurance system in the agriculture sector with the participation of the state, insurance companies, and agricultural producers (following the American model);
- Collecting, analysing, and summarising agro-indicators and information from the past decade to create a database for the insurance system;
- Expanding the scope of risks covered by insurance, including the possibility of insuring grain producers' income and covering the risk of drought;
- Developing capabilities for damage assessment through parametric data.

❖ **Recommendations on improving the regulatory framework in the sector:**

- Enacting a Law on Branch Organisations in the Agriculture Sector, a Law on the Agricultural Chamber, and a Law on Cooperatives to delegate rights and competencies to representative organisations and regulate the consolidation and association of farmers;
- Amendments to the Law on the Protection of Agricultural Property to develop an effective methodology for protection against violations, updating provisions regarding control and sanctions to enhance the preventive effect of the law.
- Changes to the Law on the Ownership and Use of Agricultural Land to facilitate the procedure for concluding voluntary agreements for consolidated land use;

- Rejecting proposed changes to the Law on Protection of Agricultural Land and the Law on Renewable Energy Sources aimed at facilitating procedures for constructing renewable energy facilities on fertile agricultural land;
- Amendments to the Rent Law aimed at regulating the conclusion of long-term lease agreements and establishing a fair and objective mechanism for determining rental payments;
- Streamlining the registration and reporting of agricultural producers in the National Waste Information System under the Waste Management Law.

❖ **Recommendations regarding improvement of production conditions:**

- Defining irrigation as a strategic national priority and taking measures and actions to improve irrigated agriculture in the country: state support for the price of water; easing the regulatory regimes for investment projects related to water-saving technologies;
- Preserving and maintaining agroforestry and protective forest belts;
- Providing effective tools for plant protection, such as seed disinfectants;
- Updating and enhancing the functionalities of the Electronic System for Public Notification of Plant Protection Measures.

❖ **Recommendations on improving cooperation between science and agribusiness:**

- Reducing the gap between agricultural research institutes and farmers to develop mutually beneficial partnerships;
- Workforce development in the sector through adequate training for agricultural workers (qualified mechanics, agronomists, etc.);
- Adapting and incentivising agricultural science in a market economy;
- Developing and promoting practically applicable and business-oriented scientific innovations in agriculture;
- Modernizing the infrastructure and material base of educational institutions and research institutes;
- Preserving the Bulgarian gene bank and tolerating Bulgarian varieties;
- Encouraging research to develop new successful high-yielding and sustainable varieties, hybrids, and lines of crops;
- Developing the potential of primitive species with increased resistance from the cereal group: einkorn, spelt, etc.;

- Stimulating the development of breeding directions for neglected plant species that gain economic importance due to climate change (peanuts, sesame, rice);
- Improve satellite climate observations, expand the coverage of monitored agro-indicators, and enhance agro-climatic forecasts;
- Implementing public-private partnerships in scientific research.

❖ **Recommendations regarding improving the work of the administrative apparatus and providing services with high-added value:**

- Creating an optimal business environment by streamlining administrative procedures and reducing regulatory regimes in agriculture;
- Consolidating all existing registrations and applications of agricultural producers into a unified digital register, supporting farmers with funds from national and European budgets, the so-called "single desk";
- Implementing simplified and accelerated procedures for applying, approving, and paying investment projects under the Strategic Plan and the National Recovery and Resilience Plan;
- Delegating competencies, activities, and authorizations from the Ministry of Agriculture and Food and the State Fund Agriculture to nationally representative industry organisations in the agriculture sector;
- Facilitating cooperation with agricultural producers and improving their access to information. Enhancing communication between Ministry of Agriculture and Food and State Fund Agriculture staff and agricultural producers;
- Improving the accuracy and timeliness of statistical data in the agricultural sector;
- Analyse current market trends in agriculture, which are freely available to agricultural producers;
- Enhancing and expanding the information channels of the Ministry of Agriculture and Food and the State Fund Agriculture regarding the conditions and interventions to support agricultural producers;
- Establishing working groups and a platform for rapid communication between departments in the Ministry of Agriculture and Food and the State Fund Agriculture and the industry regarding the timely resolution of problematic cases during the area delineation campaigns in the Integrated Administration and Control System and the Rural Development Program;

- Establishing functioning "hotlines" to the State Fund Agriculture and the Ministry of Agriculture and Food for questions and answers on important agricultural topics.

❖ **Recommendations regarding improving branch activity and cooperation:**

- Establishing local and national supply, credit, production, marketing, servicing, and other cooperatives and associations of grain producers to increase the competitiveness of individual farmers;
- Conducting training programs and courses by branch organisations on topics such as digital skills, successful farm management, environmentally friendly practices, optimization of production capacity, synchronization of cash flows, effective inventory management, staff motivation systems, and more;
- Strengthening the role of branch activities in the "Grain Production" sector;
- Protecting Bulgarian agricultural interests at the European level through the membership of Bulgarian agrarian organisations in Copa-Cogeca;
- Enhancing the participation of branch organisations in the work and consultations of European institutions;
- Involving grain producers and their farming organisations in national and European projects under various programs, such as cross-border cooperation programs, Horizon Europe, Digital Europe, etc.;
- Providing accessible and regular information to Bulgarian grain producers regarding support conditions, regulatory requirements, markets, and trends;
- Offering free mobile applications for timely information to grain producers about the state of agricultural product markets and current exchange prices.

CONCLUSION

With the publication in 2019 of the European Commission's communication on the European Green Deal and, subsequently, in 2020 of the communications on the Farm to Fork Strategy and the EU Biodiversity Strategy for 2030, it seems that the path of development for European agriculture and the agri-food chain is clearly outlined. It will firmly follow the line of "greening and ecologizing." This is also the path that the European Commission is pursuing in all its subsequent steps regarding legislative initiatives and policies. However, it is important to emphasise that the ambitious policy of the Green Deal and its associated strategies is formulated

at a time when the COVID-19 pandemic and the war between Russia and Ukraine are still not existing factors that can seriously undermine food security and food supply chains on the old continent and worldwide.

Sustainable agriculture is key in transforming food systems into fair, healthy, and environmentally friendly ones. However, despite the progress towards achieving the UN's Sustainable Development Goals, Bulgarian and European agricultures still have a long way to go, and the horizon for achieving the goals by 2030 is extremely surrealistic.

Many grain producers in Bulgaria are willing to implement greening practices as long as there are rational economic incentives and compensations and they do not drastically reduce production. However, concerning findings have been identified from the conducted study, showing that a significant portion of grain producers (over 20% of the study participants) are inclined to refuse participation and financial support from interventions in the Strategic Plan due to the heightened ecological requirements imposed on farmers. Some respondents did not apply during the 2023 campaign for the intervention "Basic Income Support for Sustainability" (the previous scheme for single area payments). It is also concerning to note the attitudes of some surveyed grain producers who express willingness to abandon agricultural activities if ecological requirements and limitations are further increased and made mandatory for compliance by farmers.

The competitiveness of Bulgarian and European grain producers is declining due to the heightened ecological requirements introduced in the Strategic Plan. Their competitiveness further deteriorates due to market collapses and observed competition resulting from the EU's prioritisation of agricultural production in third countries. The registered imbalance between European and Ukrainian producers jeopardises the foundations of European agriculture, the food system, and food security.

Over the past few years, the agricultural sector on a global scale has been subject to extremely dynamic and intense processes driven by a combination of several negative extreme factors – the military conflict between Russia and Ukraine, the COVID-19 pandemic crisis, and apocalyptic manifestations of climate change. These processes substantially impact global food reserves and distribution, leading to market disruptions and frequent price fluctuations. All these factors necessitate further analysis and research, both on implementing the Common Agricultural Policy in the current programming period and on the effects of implementing legislative initiatives related

to the goals of the Green Deal. In-depth and periodic analyses of the policies conducted and planned in the European agri-food chain are critically necessary to reflect the sector's real state and prevent catastrophe and food security crises. Similar socio-economic analyses will also serve to prepare and adequately plan proposals for the reform of the CAP for the programming period after 2027.

The European Green Deal is a vision for the future, outlining a sustainable outlook and perspective. However, it is crucial to implement it gradually over time to avoid disruptions in food security and declines in the economic activity of agricultural entities. For European sustainability policies to be sustainable, they should be introduced progressively, consistently, and at a measured pace. In this regard, European and national agricultural policies in the coming years should seek a balanced approach to achieving economically efficient, environmentally compatible, and socially responsible agriculture within the context of the Green Deal.

Farmers are the ones who can resolve the conflict between ensuring environmentally sustainable production while simultaneously increasing productivity and guaranteeing food security. They make and implement production decisions for agricultural practices, and achieving the goals of the Green Deal depends on their commitment. Farmers are essential for producing food and ensuring food security for the growing population. If farmers are engaged, motivated, and won over to the side of sustainable environmental development, achieving and maintaining sustainable agriculture is possible.

SUGGESTIONS FOR DISSERTATION CONTRIBUTIONS:

The following scientific and applied contributions can be highlighted in the dissertation:

- Environmental and climate policies regarding agriculture have been traced at the global level through the UN's 2030 Agenda, at the European level through the Green Deal and the Common Agricultural Policy, and at the national level through the Strategic Plan for the Development of Agriculture and Rural Areas.
- The essence and parameters of the mandatory conditions and support interventions in the Strategic Plan for the Development of Agriculture and Rural Areas for the period 2023 – 2027, which concern support for the "Grainl Production" sector within the CAP, have been clarified.

- An example of supporting a grain-producing farm with an area of 500 hectares within the direct payments of the CAP has been provided. Analogously to the provided example, it is possible to determine the support for grain-producing farms of different sizes during the current programming period.
- The internal framework of an optimal production model for sustainable grain-producing farms in 2023 has been defined, which significantly achieves the balance between the economic, social, and environmental dimensions of sustainability.
- Recommendations have been formulated for the institutional and external environment, aimed at improving the sustainability of the "Grain Production" sector and ensuring its economic efficiency, vitality, and competitiveness in the medium and long term.
- A scheme of interactions in the sustainable agricultural system has been outlined, where farmers are placed at the center of the network of relationships, emphasizing the necessity of farmers' involvement and commitment to achieving and maintaining sustainable agriculture.

Publications related to the dissertation:

- Shukadarova, N. (2023). Green conditionality and eco-schemes in the CAP Strategic Plan of Bulgaria. *Agricultural Sciences*, 15(38), 98 – 108. DOI**:** 10.22620/agrisci.2023.38.011
- Shukadarova, N. (2022). The Green Deal possible impacts on cereal and oilseed sectors and the CAP “green architecture” in Bulgaria. *Agricultural Sciences*, *14*(33), 27–35. DOI: 10.22620/agrisci.2022.33.004

Participation in scientific conferences:

- 2nd Annual Conference on the National Scientific Program "Healthy Foods for Strong Bioeconomy and Quality of Life," organised by the Agricultural University – Plovdiv on November 30, 2021;
- 9th International Scientific Conference "Agriculture and Food Supply: Markets and Policies," organised by the Institute of Agricultural Economics on October 25 – 26, 2022.