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GREEN INVESTMENT OPPORTUNITIES FOR SUSTAINABLE AGRICULTURE

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Abstract
The post-COVID society faces a measure of challenges in Agri-Food sector, including the growing importance for food quality and protection. In particular, the policy makers and economists within agricultural sector concern the growing importance of sustainability criteria, when development is able to focus on the needs of both current and future generations. Particularly, resent trends prove the increasing need of green investment in agriculture to support its sustainability. Thereby, there is an urgent need to consider the research problem of disclosing the green investment as a driver for sustainable agriculture. The paper presents the evidence on sustainable agriculture features and green investment instruments. The study is performed through the analysis of green investment approaches in the context of agriculture and financial instruments to boost green investments reproduction. The results section of the paper is focused on the current potential to strengthen green investments, supporting sustainable agriculture in Europe. In particular, European agricultural sector faces the need to implement green investments' practice, boosting particular measures of agriculture and its sustainability.

Keywords: *sustainable agriculture, green investment financing, grant, investment fund, sustanability.*
JEL Codes: *O13, O16, O19, Q01, Q5.*

Introduction

Despite development is considered within the framework of economic growth in view of classical economic theories, the contemporary understanding of positive changes in modern society is connected with sustainability that contains an ecological aspect (Vázquez and Sumner, 2013; Klarin, 2018). In particular, determining the impacts of sustainability, containing green economy, is important for agricultural sector development, which growth depends on natural resources, their quality and protection. On the one hand, the main form of capital in agricultural sector concerns natural resources, which complete replacement can be impossible. However, on the other hand, due to population growth there was increasing demand for chemical fertilizers and pesticides for the purpose of growing productivity within agricultural sector (Davies, 2013). Thereby, nowadays, the policy makers and economists within agricultural sector concern development, focusing on the needs of both current and future generations, namely sustainable development concept (UNESCO, 2021). Resent trends prove the increasing need of green investment in agricultural sector (Tran, Do and etc., 2020). The Global Environment Facility (GEF) have reported the yearly need for financing the conservation of water, land, and forests in the amount of about 400 – 600 billion USD. Recent

evidence has also suggested a financial gap of 70 billion USD in part of investments to conserve/preserve the general ecosystem, including land, lakes, etc. (Karásek and Pavlica, 2016; Alhadhrami and Nobanee, 2019).

It is now well established from a variety of researches that the rise of global population will be around 80% in the following 30 years (World Urbanization…, 2014). Existing researches recognize an important role played by agricultural production with possible increase of 50-70% (World Economic…, 2018). In particular, a number of cross-sectoral studies suggest the market value for sustainable agriculture products to rise to 872.7 billion USD globally. Thereby, additional annual investments in agricultural sector are expected to be 83 billion USD for developing countries (A framework…, 2018). It has been noted that the sustainable agriculture investment has grown by 32.5% annually since 2013. Thus, there is a great measure of green investment opportunities within agricultural sector, including farmland and sustainable forestry, potential of smart agriculture development (Green finance…, 2021).

A number of studies have shown correlation between agricultural investment attractiveness and their sustainable development, including ecological aspect (Chitimiea et al., 2021; Han et al., 2020; Alhadhrami and Nobanee, 2019). Evidence suggests that green investments boost not only low carbon and climate resilient initiatives, but also capital and resources that can be considered environmentally beneficial for different sectors of economy, including agricultural one (Martin and Moser, 2016). Surveys such as that conducted by Bastan, etc. (2018) have shown a possibility to build the model of sustainable development in agricultural sector (Bastan, etc., 2018). Experience of integral assessment of the sustainable development in agriculture is provided within researches, conducted by Sokil, etc. (2018).

Since 2015, the United Nations experts provide surveys on the 17 Sustainable Development Goals (SDGs) to include into the 2030 Agenda for Sustainable Development. The existing agenda consists of 17 goals, 169 targets and 230 indicators, which provide important information for the international community development till 2030. The issues of sustaining the natural resources and agricultural production are at the heart of the 2030 Agenda (Food and Agriculture…, 2021).

The role of green investments in agricultural sector has received increased attention across a number of disciplines in recent years. However, despite a conceptual theoretical framework of green investments, a number of questions remain unanswered, considering their role in agricultural sector.

The scientific problem of the current paper lays upon the question if green investments are able to create additional opportunities for agricultural sector development, representing a driver for productivity improvements, causing social and economic growth. This study set out to test the hypothesis on the role of green investment for agricultural sector increase.

The current paper aims to presents new evidence for the claim that sustainable agriculture development is driven by green investment boost.

The *object* of the research is green investment, providing an important source for increase in agricultural sector and its sustainability. The *subject* is green investment influence, contributing an upward trend in sustainable agriculture globally.

The methodological approach taken in this study is a mixed *methodology* based on scientific researches and statistical data analysis (within the timeframe of the last ten years) to approve correlation between green investment and the tendencies of agricultural sector development. The critical role played by green investment within agriculture is defined based on primary data of investment reports on green economy.

This study uses a qualitative case study approach to investigate the modern trends of green deal and appropriate investments trends for agriculture development. Both qualitative and quantitative methods were used in green investment analysis.

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The work has the following structure:

- in the first section, the theoretical assumptions based on green investment and sustainable agriculture concepts are proposed;
- then, instruments of green investments and their prospects for sustainable agriculture development in Europe are provided;
- possibilities for green investments increase are examined.

The data from the current study reveals several practical applications worthy for future researches, concerning sustainability and social investments. In particular, the current research provides background for agricultural and investment activity strategies implementation.

Basic theoretical assumptions of the current research

Sustainable development concept in agricultural sector. One major theoretical issue that has dominated the field of economy, management and finance for many years concerns the issues of growth and development. Despite contradictory findings on the issue, in accordance with traditional theories, development is associated with economic aspect of growth (Klarin, 2018). However, to date in economic literature the meaning of development is a subject to considerable discussion, including the following points of views on the issue: development in the form of structural transformation; the issue of human development; democracy and governance, creating the background for further development; concerning development in view of environmental sustainability (Vázquez and Sumner, 2013).

In particular, modern society relies on sustainability, including the principles of well-being, which are based on natural environment, productive harmony and responsible consumption. The experts of United Nations placed emphasis on responsible consumption and production (Sustainability Development Goal 12) among 17 sustainability goals, advocating sustainable or green way resources consumption and goods' production (United Nations…, 2021). Thereby, despite the social and economic transformation is connected with industrialization and digitalization, agriculture plays still an important role for social and economic growth.

The understanding of agricultural sector growth and its productivity increase is deeply connected with unsustainability due to its negative impacts on natural resources and environment. However, potential for agricultural sector development depends on its ability to be competitive (Figure 1).

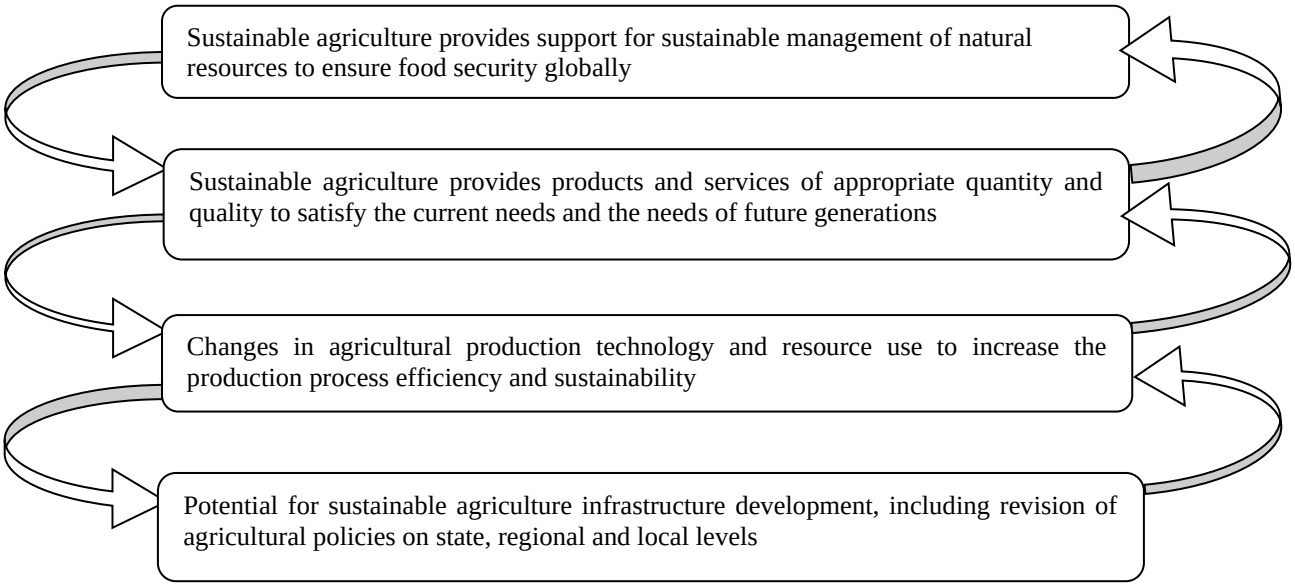

Figure 1. Sustainable agriculture features (Food and Agriculture…, 2021)

Thus, sustainable agriculture represents the vector of agrarian sector development within three areas, namely economic (economic profitability), ecological (healthy environment) and social (social equity). The integral index of sustainable agriculture development may be found as the average of the arithmetic or geometric group integral indices:

$$l_i = \frac{\sum_{n=1}^{N} l_{gij}}{N} \; or \; l_i = \sqrt[N]{\prod_{n=1}^{N} l_{gij}} \quad (1)$$

where l_{gij} – the group integral number (economic, ecological, social);

N – the number of indicators (Zalizko, 2014; Sokil, etc., 2018).

At practice, the integration ensures a need to attract additional investments, including green investment to support healthy environment as one of the most important components of sustainable agricultural sector.

Green investment and their role for agriculture development. In accordance with FTSE Russel Report, agricultural sector makes about 8 % of green economy globally (Overtaking…, 2018). In additional, the Global Green Economy Index, providing information on green economy indicators and their estimation, defines agriculture among seven main sub-categories, representing the final (environmental) dimension of the GGEI and the potential of being attractive for green investment (GGEI, 2018).

There are different approaches to green investing that define the role of investors within particular sector, including the following ones in terms of agriculture development (Figure 2).

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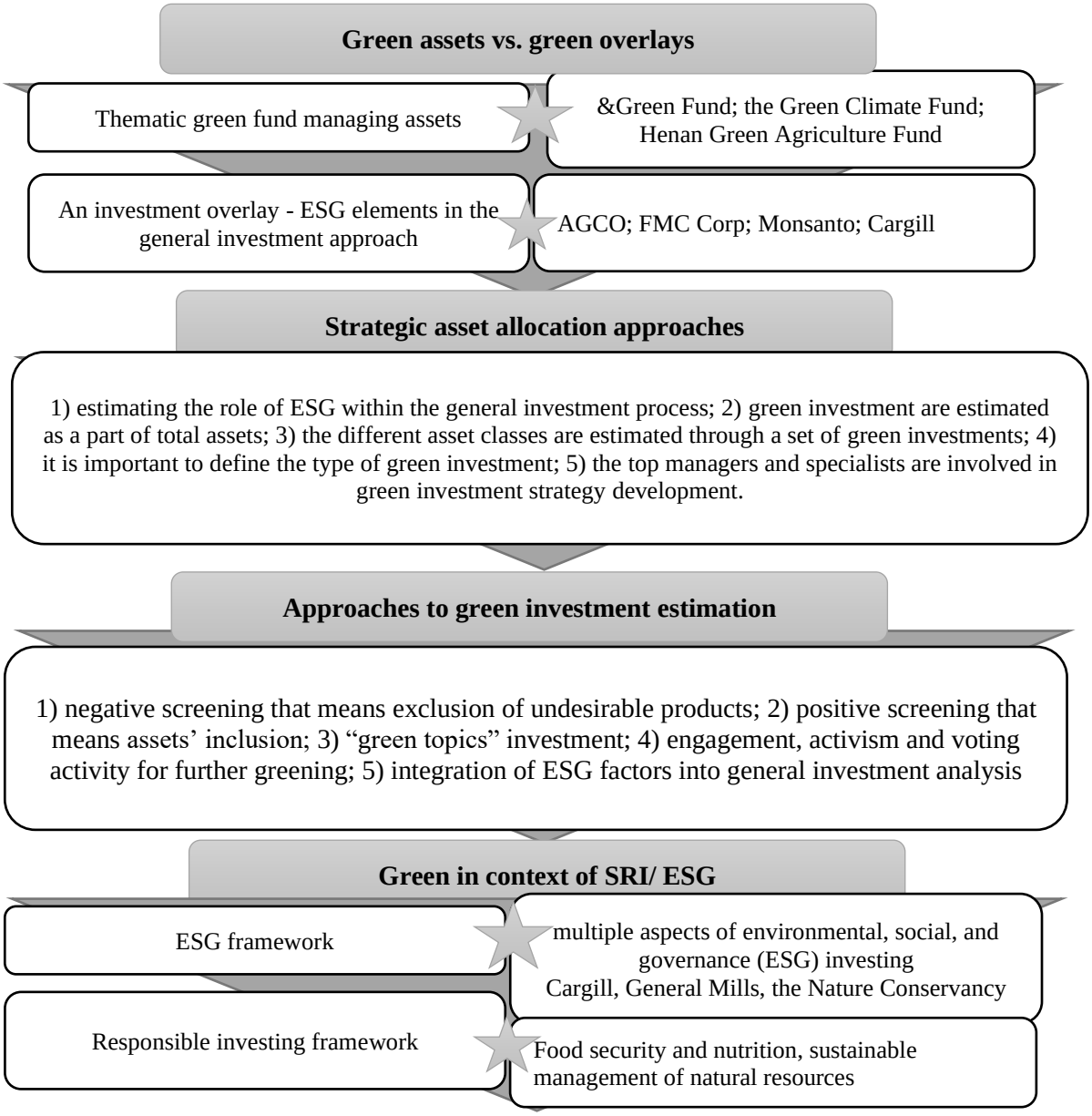

Figure 2. Green investment approaches in the context of agriculture (Inderst, etc., 2012)

Figure 2 presents a set of approaches, which help to define green investment manifistation within agricultural sector.

Simultaneously, the practical advantages of green investment approaches' implementation in agricultural sector are detected through specific financial instruments (Figure 3).

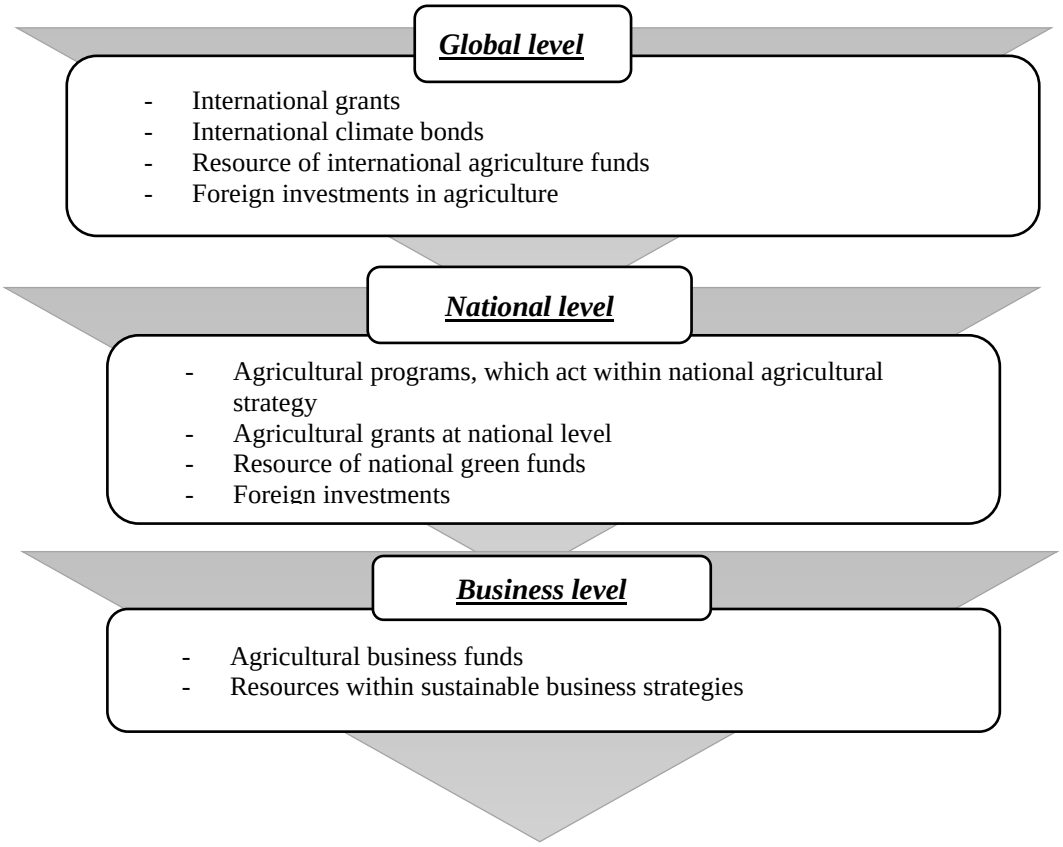

Figure 3. Financial instruments to boost green investments within agricultural sector (Inderst, etc., 2012)

Globally, green investments in agriculture are increasing particularly rapidly during COVID-19 crisis.

In particular, there is a need to satisfy around 9 billion people by 2050, boosting agricultural development and increasing natural resource productivity. This is possible in case of additional resources attraction in accordance with specific roadmaps to understand available green investment opportunities across agricultural sector.

Research and discussion results

Sustainable agriculture development and green investment instruments in Europe. The agricultural sustainability in European Union is regulated by instruments, provided within the common agricultural policy (CAP) that estimate economic, social and environmental aspects of sustainability in European countries (Figure 4).

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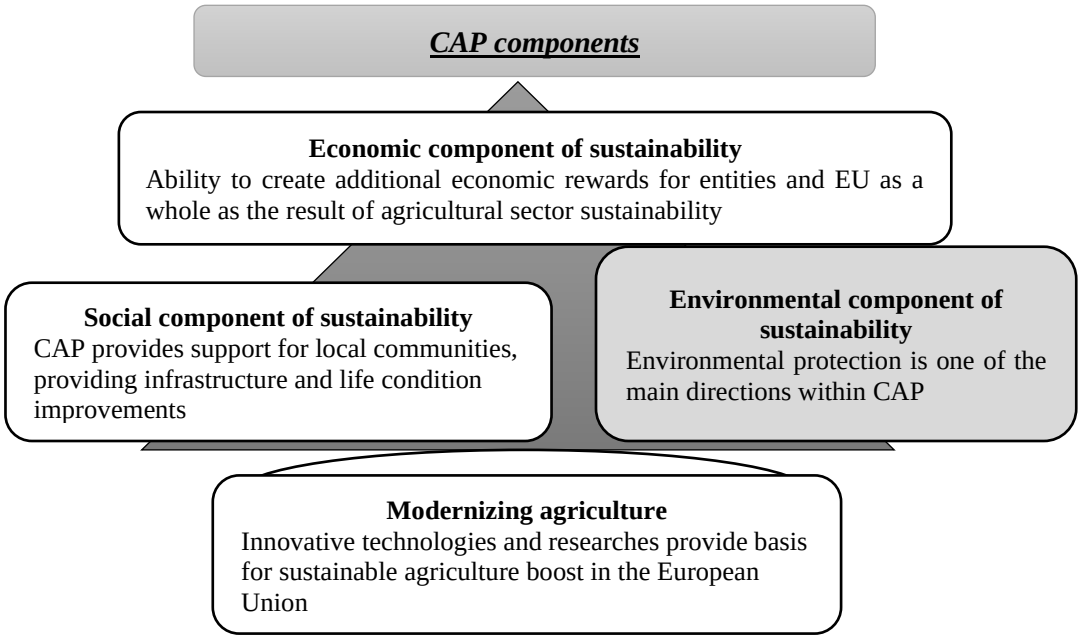


Figure 4. CAP in Europe (Sustainable…, 2021)

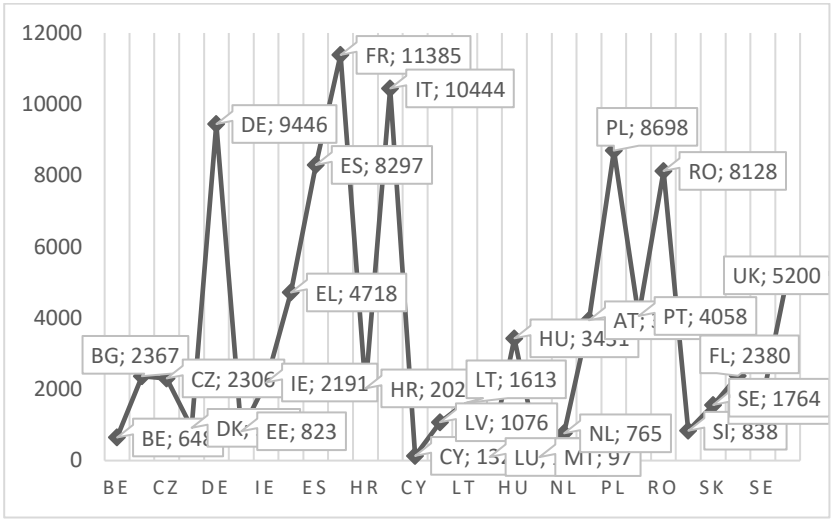
An environmentally sustainable CAP represents environmental rules and financial instruments to encourage green farming. In particular, the following measures support environmental-friendly agriculture within 118 Rural Development Programs, containing about 99.6 billion EURO from the EU budget to cover all 28 Member States:

1) the financial support of sustainable agriculture in European Union is provided in accordance with cross-compliance standards. The following instruments of financial support are used for green farmers, respecting EU rules: direct payments; the specific rural development payments, including these for organic farming and green harvesting development;

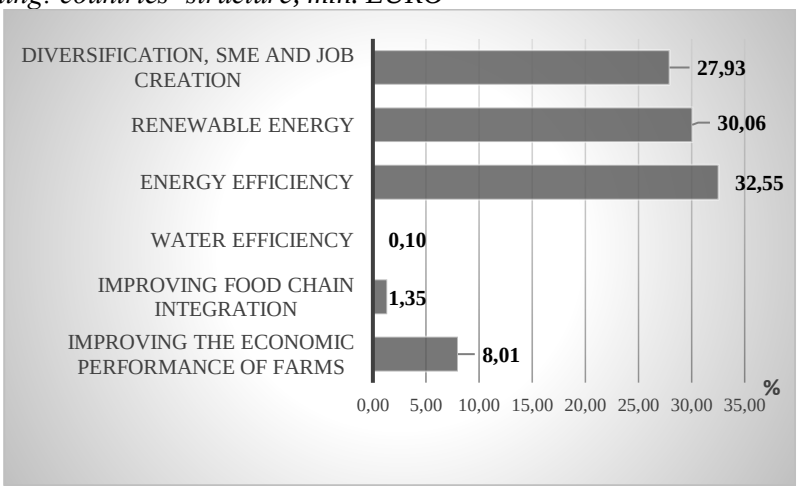
2) green direct payments for environment protection and avoiding climate change. In accordance with European Commission data, agricultural land that is covered by at least one green obligation makes about 75 % of the European Union agricultural area;

3) investment, contributing the sustainable management of natural resources, are supported by rural development policy.

Through financial instruments, the European Agricultural Fund for Rural Development (EAFRD) plays a role of a source for loans, microcredit, guarantees and equities, available to recipients in agriculture, which are undertaking financially viable projects that support the priorities of green economy in Europe (Sustainable…, 2021; Financial…, 2020) (Figure 5).



a) EAFRD funding: countries' structure, mln. EURO



b) EAFRD funding: structure by areas, %

Figure 5. EAFRD funding structures in 2014 – 2020 (Sustainable…, 2021)

Data in the Figure reveal that the need for green investment in agriculture across European countries. However, despite a rather wide range of green investment instruments, sustainable agriculture in Europe need additional investors looking for environmentally and socially-friendly agricultural businesses development.

Green investment opportunities to boost sustainable development of agricultural sector

The effective implementation of Rural Development Programmes depends on flexibility of financial instruments that help to achieve specific goals by implementing particular measures to support sustainable development of agricultural sector (Table 1).

Table 1. Potential of green investment for boosting measures for sustainable development of agriculture in Europe

Measures Alternative green investment instruments	**M 01**	**M 02**	**M 04**	**M 10**	**M 11**	**M 12**	**M 16**
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
The **European green bond standard (EUGBS),** assisting the increase of activity within the green bond market to support environmental progress.					■		■
The **International Platform on Sustainable Finance** (IPSF) that provides basis for	■	■	■				■

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sustainable finance policies and instruments implementation.	■	■	■				■
European Green Deal initiative within the Horizon Europe program that aims to support ecological and climate innovation during the timeframe of 2021-2027.	■		■				■
The **European fund for rural development (EAFRD) and national budgets**, assisting national and regional rural development programmes and plans implementation in Europe.				■	■	■	
Agricultural companies, supporting their investment attractiveness by boosting ESG initiatives.	■	■					■
Agri-tech financing provides basis for technological farming (including GPS-guided machinery, drones), supporting environmental friendly agriculture			■				■

** Measures definition in accordance with (European…, 2021; EU…, 2020):

Measure 01 (M01) - Knowledge transfer and information (M01) aims to provide information and training to improve the performance and also the social and environmental sustainability of businesses operating in rural areas.

Measure 02 (M02) - Advisory services, farm management and farm relief services (M02) is oriented to providing tailored advice on specific issues that are directly requested by the recipients of the advice.

Measure 04 (M04), which provides support for physical assets investment that aims to improve sustainability in agricultural sector.

Measure 10.1 (M10.1) Agrarian, environmental and climate commitments

Measure 10.2 (M10.2) Genetic resources use in agricultural sector

Measure 11 (M11) Organic agriculture

Measure 12 (M 12) Natura 2000 & Water Framework Directive payments

Measure 16 (M 16) Cooperation, including pilot project and social farming support.

Table 1 reveals the potential of main green investment instruments and their influence on specific sustainable agriculture measures. Thus, green investment aims to boost progress in European sustainable agriculture.

Conclusions

1. The primary part of the current research provides the evidence on sustainable agriculture features and different approaches to green investing, causing benefits for sustainable agricultural sector. The integration function of economic (economic profitability), ecological (healthy environment) and social (social equity) components of agriculture are testing, considering the priority of healthy environment for sustainable development of agriculture. The ecological potential estimation may be a topic for future researches to be implemented by using a wide range of investments to boost healthy environment within agricultural sector and support its sustainability.

2. The research provides insights into specific financial instruments to boost green investments, considering their role to support agricultural sector sustainability. Thus, there is a possibility for further re-evaluation of green investment at global, national and business level.

3. European experiences show that despite the CAP availability, representing environmental rules and financial instruments to encourage green farming, green investment potential is not fully adapted. The decision is to implement alternative financial instruments within agricultural sector.

4. Green investment instruments in European countries are considered as a feature of agriculture sustainability. Thereby, agricultural sector faces need to implement green investments' practice, boosting particular measures of agriculture and its sustainability.

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