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on the topic

«Effects of the European Green Deal on agricultural production»

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4. CASE STUDY: IMPLEMENTATION OF THE EGD RULES IN THE OPERATION OF PLZEŇSKÝ PRAZDROJ

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Abstrakt

Európska zelená dohoda (EGD) významne ovplyvňuje poľnohospodársko-potravinársku výrobu v EÚ. Táto práca analyzuje politické rámce podporujúce udržateľné postupy a efektívne využívanie zdrojov. Agropotravinárski výrobcovia čelia výzvam aj príležitostiam: prísnejšie predpisy si vyžadujú úpravy, ale ponúkajú potenciál na zvýšenie efektívnosti, vyššiu hodnotu výrobkov a certifikáciu. Zásadný význam majú inovácie a prenos poznatkov. Nové technológie, ako napríklad presné poľnohospodárstvo, sú kľúčom k dosiahnutiu cieľov EGD v oblasti životného prostredia a efektívneho využívania zdrojov.

Prípadová štúdia Plzeňského Prazdroja ukazuje úspešnú implementáciu EGD prostredníctvom obnoviteľných zdrojov energie, udržateľných obalov a ambicióznych cieľov znižovania emisií.

Na dosiahnutie cieľov EGD je potrebná spolupráca, politická podpora a holistický prístup. Zameranie EGD na udržateľnosť predstavuje cestu pre dlhodobo odolný agropotravinársky sektor EÚ.

Kľúčové slová: Zelená dohoda, agropotravinárstvo, udržateľnosť, politika, inovácie, technológie, EÚ

Abstract

The European Green Deal (EGD) significantly impacts EU agri-food production. This thesis analyzes policy frameworks promoting sustainable practices and resource efficiency. Agri-food producers face both challenges and opportunities: stricter regulations require adjustments, but offer potential for increased efficiency, higher product value, and certifications. Innovation and knowledge transfer are crucial. New technologies like precision agriculture are key to achieving EGD's environmental and resource efficiency goals.

A Plzeňský Prazdroj case study showcases successful EGD implementation through renewable energy, sustainable packaging, and ambitious emissions reduction targets.

Collaboration, political support, and a holistic approach are needed to achieve the EGD's goals. The EGD's focus on sustainability presents a path for a long-term, resilient EU agri-food sector.

Keywords: Green Deal, agri-food, sustainability, policy, innovation, technology, EU

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Introduction

The European Green Deal stands as a transformative initiative, emblematic of the European Union's commitment to combatting climate change and fostering sustainable development. Rooted in the imperative of environmental stewardship, the Green Deal sets forth a comprehensive roadmap aimed at achieving carbon neutrality and promoting sustainability across all sectors of the economy.

Central to the objectives of the European Green Deal is the recognition of agriculture as a critical linchpin in realizing its overarching goals. Agriculture, with its intricate relationship with land use, biodiversity, and climate, plays a pivotal role in the transition towards a greener, more sustainable future. By acknowledging the importance of agriculture within the Green Deal framework, policymakers aim to harness its potential as a driver of positive environmental change.

This bachelor thesis embarks on an exploration of the profound implications of the European Green Deal on agricultural production within the EU. Against the backdrop of escalating environmental challenges and evolving policy imperatives, the study endeavours to unravel the intricate dynamics at play and elucidate the transformative pathways that lie ahead.

The first chapter covers theoretical review of sustainable agri-food practices within the European Green Deal framework and analyzing the impact of the EGD on the agri-food producers. In contextualizing our inquiry, it is imperative to delve into the background and objectives of the European Green Deal. By understanding the genesis and overarching aims of this landmark initiative, we can appreciate its significance in shaping the future trajectory of agricultural production within the European Union. Furthermore, it is essential to underscore the pivotal role that agriculture plays in achieving the goals of the Green Deal. As a sector deeply intertwined with environmental sustainability, agricultural practices have a profound impact on biodiversity, soil health, and carbon emissions. By aligning agricultural policies with the objectives of the Green Deal, policymakers aim to harness the potential of agriculture as a catalyst for positive environmental change.

The second chapter contains the aims of this thesis, stating and summarizing the goals and objectives of this work for both theoretical and practical parts.

The third chapter is the methodology of the thesis, describing the procedure applied in elaboration of the thesis, theoretical in combination with qualitative approaches. Also, the case study was applied to cover better the practical implementation of the EGD rules.

The last chapter contains the practical part of the thesis. The Plzeňský Prazdroj case study represents a concrete example of the implementation of the principles of the European Green Deal

in a leading agri-food company. The company demonstrates through measures such as switching to renewable energy sources, implementing sustainable packaging concepts and aligning with the goals of the United Nations for Sustainable Development's commitment to environmental protection and responsible business practices.

Through a structured examination of policy instruments, agricultural practices, and socioeconomic dynamics, this thesis aims to unravel the multifaceted impacts of the European Green Deal on agricultural production. By traversing theoretical frameworks, methodological approaches, and empirical analyses, we seek to contribute to a deeper understanding of the evolving dynamics at the nexus of agriculture and environmental sustainability within the EU.

In navigating this exploration, the thesis is organized into several sections, each designed to unravel distinct dimensions of the topic. These sections include an analysis of key objectives and initiatives of the European Green Deal, an assessment of policy instruments affecting agricultural production, an exploration of challenges and opportunities for agricultural producers, and a methodological framework guiding our inquiry.

Through this comprehensive examination, we aim to provide insights into the transformative potential of the European Green Deal and its implications for shaping the future of agricultural production in the European Union.

1. Theoretical review

1.1 Promoting sustainable agri-food practices within the European Green Deal framework

1.1.1. Key objectives and initiatives of the European Green Deal

According to the information published by the European Commission (2020) climate change and environmental destruction are an existential threat to Europe and the world. To meet these challenges, the European Green Deal will transform the EU into a modern, resource efficient and competitive economy, achieving zero greenhouse gas emissions by 2050 (reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels) and linking economic growth to resource use to ensure zero economic growth.

Leaving no people and no place behind The European Green Deal is also our salvation from the COVID-19 pandemic.

A third of the €1.8 trillion investment from the NextGenerationEU economic recovery plan and the EU's seven-year budget will fund the European Green Deal.

To accomplish the above-mentioned goals, the EU Green Deal seeks to enact legislation in seven important policy areas. Among them are:

- **Climate:** becoming the first climate-neutral continent by 2050
- **Energy:** building a clean and efficient energy transition
- **Industry:** creating an industrial strategy for a competitive, green, and digital Europe
- **Environment and Oceans:** protecting our biodiversity and ecosystems
- **Agriculture:** ensuring a healthy food system for people and the planet
- **Transport:** providing efficient, safe, and environmentally-friendly transport
- **Finance and Regional Development:** ensuring sustainable investments to deliver the EU Green Deal (Qima, 2024).

Fig. 1: Key policy areas of the EU Green Deal

Source: Qima, 2024

1.1.1.1 Targets for Sustainable Agri-Food Production and Rural Development

By 2030, sustainable food production systems and sustainable agricultural practices must be established to increase productivity and output, protect ecosystems and strengthen the ability to adapt to climate change, extreme weather, drought, floods and other natural disasters, and progressively improve land quality and soil (Food and Agriculture Organization, 2024).

As in the Second SDG goal **"**Zero hunger" we have a related goal "Rural Development". And it is this goal that highlights the importance and motives for agricultural development. "Disparities between rural and urban areas remain pronounced," as stated by UN Secretary-General Mr. Ban Ki-Moon in the 2015 Millennium Development Goals Report (United Nations, 2015), and significant gaps continue to exist in several sectors:

- More than 1 billion people lack access to electricity, while an estimated 2.8 billion people globally lack access to modern energy services as of 2015. This severe development burden primarily impacts rural areas, where a lack of access to contemporary energy services has a detrimental impact on health, productivity, and educational attainment, eventually deepening the poverty trap.
- Compared to 87% in urban regions, just 56% of newborns in rural areas are attended by trained medical professionals.
- Approximately 16% of people living in rural areas do not use improved sources of drinking water, whereas just 4% of people living in cities do the same.
- Roughly 50% of rural residents do not have access to better sanitary services compared to only 18 per cent of people in urban areas (Rural Development: Sustainable Development Knowledge Platform, 2022).

By the providing information by Rural Development (2023) a sizable fraction of the world's population lives in rural areas, which are essential to agriculture and food security. In order to achieve SDG 2, which aims to end hunger and guarantee year-round access to safe, nourishing, and sufficient food, rural development must be addressed. This is accomplished through advancing sustainable farming methods, raising small-scale farmers' productivity and earnings, and enhancing working and land conditions. Furthermore, since three-quarters of the world's impoverished live in rural regions, rural development is closely related to SDG 1. Improving access to social safety nets, infrastructure, and basic services is one way to reduce poverty in rural areas. Another is to encourage resilient farming methods that raise household income and improve food security.

When discussing rural development, we should also mention the holistic approach to agricultural production. Holistic management describes a system thinking approach to managing resources. Originally developed by Allan Savory, it is now being adapted for use in managing other systems with complex social, ecological and economic factors. Holistic planned grazing is similar to rotational grazing but differs in that it more explicitly recognizes and provides a framework for adapting to the four basic ecosystem processes: the water cycle (Weber, Gokhale, 2011), the mineral cycle including the carbon cycle (Fairlie, 2012), energy flow, and community dynamics (the relationship between organisms in an ecosystem), giving equal importance to livestock production and social welfare.

Climate change, ecological degradation, and rural decline are mostly driven by global Agri-food systems, which are the modern knowledge, institutions, infrastructures, practices, and crops that determine the prevailing patterns of food production and consumption (Campbell et al., 2017). In order to meet these challenges, food production, processing, distribution, consumption, and governance circuits must be reimagined and recreated based on humankind's greatest agricultural experience as an immediate source of community well-being and a fundamental field of interaction with nature (Niles, 2018).

1.1.1.2 Describing the process of reduction of greenhouse gas emissions from agriculture

The Effort Sharing Regulation (ESR) covers greenhouse gas emissions from the EU agriculture sector that are not carbon-based. It establishes national yearly emissions objectives that encompass emissions from all effort sharing sectors. There was a small drop in agricultural emissions between 2005 and 2021. Forecasts for 2022 suggest that this pattern will persist. Only a slight 4% reduction in EU-level GDP from 2005 levels is anticipated by 2030, according to state predictions. An 8% reduction is anticipated if the extra steps that are currently planned are put into

action. This emphasizes the need for more effort to lower non-CO2 emissions in the agriculture sector (Greenhouse Gas Emissions from Agriculture in Europe, 2022). The Figure 2 below shows the distribution of agricultural emissions by different resources, as well as projected changes in future years.

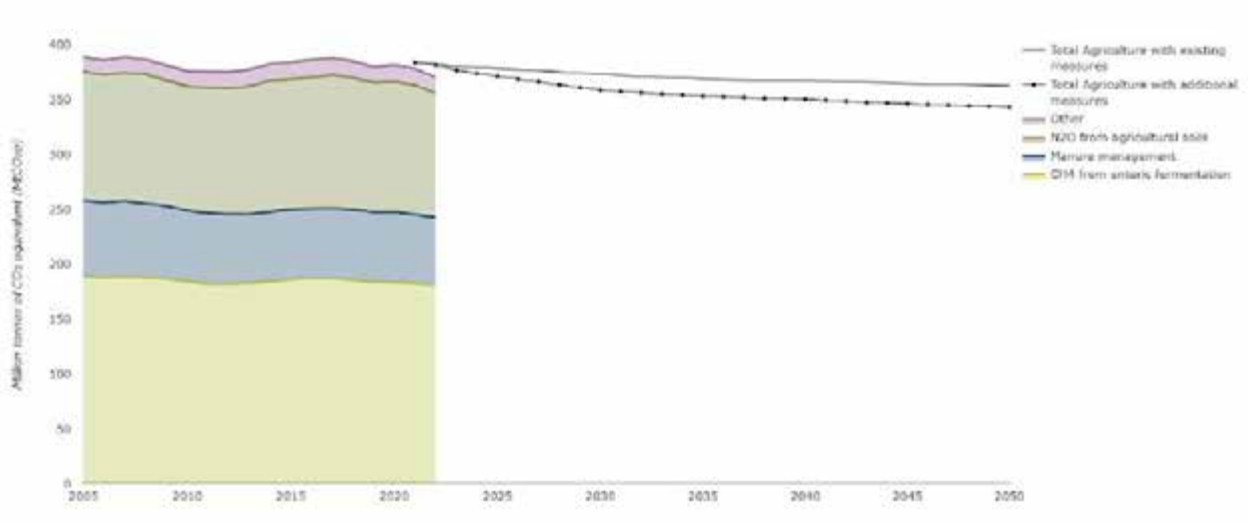

Fig. 2: EU agricultural emissions by source and projected emissions

Source: Greenhouse Gas Emissions from Agriculture in Europe, 2022

With the FAOSTAT Analytical Brief (2022), we can take a closer look at information on agri-food systems emissions. When breaking down agri-food systems emissions by gas, CO2 emissions remained stable at 7.9 Gt as the reduced emissions from deforestation were canceled out by increased CO2 emissions in pre- and post-production processes. An additional segmentation by subcomponent aids in elucidating the relative significance of particular procedures throughout global supply, consumption, and production chains. The two main sources of emissions from the global agri-food systems in 2020 were CH4 from intestinal fermentation of ruminant cattle (2.8 Gt CO2eq) and CO2 emissions from deforestation (2.9 Gt CO2eq), which combined accounted for almost 40% of the total. Other significant global contributors included CO2 emissions from home use, which came in at roughly 1.3 Gt CO2eq, and CH4 emissions from the disposal of food waste and livestock manure (Food and Agriculture Organization of the United Nations, 2022). All these components are shown in Figure 3.

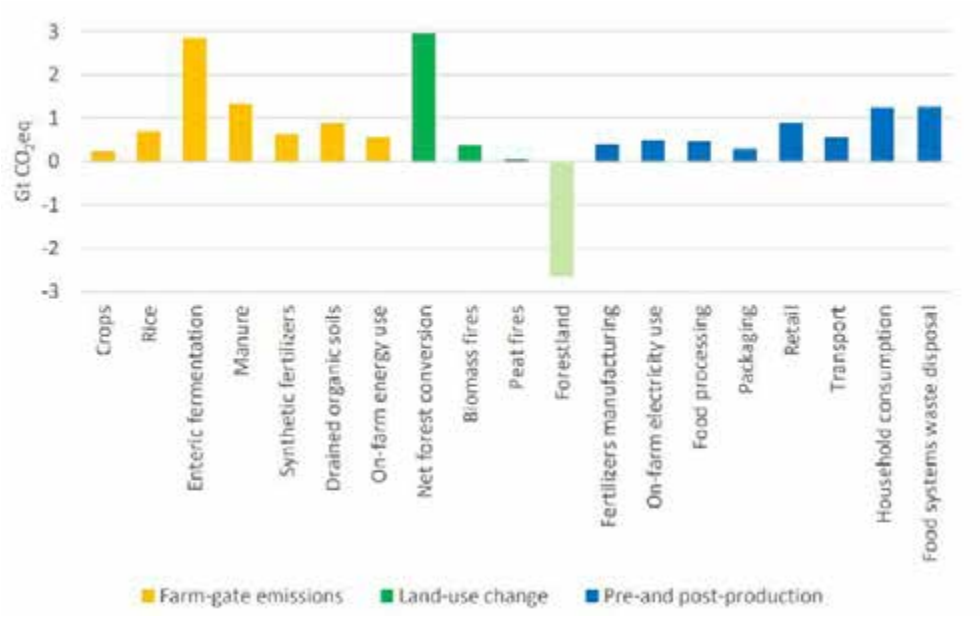

Fig. 3: Detailed composition of agri-food systems emissions (2020)

Source: FAOSTAT Analytical Brief, 2022

Global yearly anthropogenic GHG emissions decreased by 4% from 54 Gt CO2eq in 2019 to 52 Gt CO2eq in 2020, which is consistent with a well-documented decline in economic activity brought on by the COVID-19 epidemic.

There are several farm management strategies that have the potential to reduce agricultural greenhouse gas emissions below current levels. The measures vary in cost-effectiveness and practicality but include options such as optimization of fertilizer application rates, non-fertilized set-aside areas, improved feed conversion efficiency by optimizing livestock diets, improved animal productivity and rumen efficiency through the use of feed additives and breeding, better control of manure management systems to reduce the extent of anaerobic decomposition, and controlling anaerobic digestion by covering manure and Permanent pasture care, conservation tillage, suitable crop rotation, and cover crops are all measures that can help minimize CO2 emissions from soils or increase carbon absorption (Cookced, 2018).

1.1.2 Describe policy analysis

1.1.2.1 Common Agricultural Policy (CAP)

The common agricultural policy is key to securing the future of agriculture and forestry, as well as achieving the objectives of the European Green Deal (European Commission, 2021).

As implied in the Reform of the Common Agricultural Policy (2021), it tried a unique method that combined lower institutional prices with compensatory payments. The current CAP reform aims to strengthen and broaden the 1992 reform by replacing price support measures with direct aid payments, which will be accompanied by a unified rural strategy.

The CAP 2023-27 includes a variety of policy adjustments to help the EU transition to more sustainable agriculture and forestry practices.

Based on the European Commission reform (2021), the CAP 2023-27 assists agriculture in making a significantly greater contribution to the goals of the European Green Deal, and has the following goals:

- **higher green ambitions**: CAP plans are in line with environmental and climate legislation. In its CAP strategic plan, each EU country is obliged to display a higher ambition on environment and climate action compared to the previous programming period (no "backsliding") and is required to update the plan when climate and environmental legislation is modified;
- **contribute to the Green Deal targets**: the national CAP Strategic Plans contribute to the Green Deal targets (the CAP recommendations set out how this contribution is expected);
- **enhanced conditionality**: beneficiaries of the CAP have their payments linked to a stronger set of mandatory requirements. For example, on every farm at least 3% of arable land is dedicated to biodiversity and non-productive elements, with a possibility to receive support via eco-schemes to achieve 7%. Wetlands and peatlands are also protected.
- **eco-schemes**: at least 25% of the budget for direct payments is allocated to eco-schemes, providing stronger incentives for climate-and environment-friendly farming practices and approaches (such as organic farming, agroecology, carbon farming, etc.) as well as animal welfare improvements;
- **rural development**: at least 35% of funds are allocated to measures to support climate, biodiversity, environment and animal welfare;
- **operational programs**: in the fruit and vegetables sector, operational programs allocate at least 15% of their expenditure towards the environment;

- **climate and biodiversity**: 40% of the CAP budget has to be climate-relevant and strongly support the general commitment to dedicate 10% of the EU budget to biodiversity objectives by the end of the EU's multiannual financial framework (MFF) period.

The CAP 2023-27 directs support to those who need it most: redistribution of income support, active farmers, social conditionality, convergence of payments, supporting young farmers, and improving the gender balance (European Commission, 2021).

The new CAP aims to build a sustainable food system and, in so doing, will contribute to the objectives of the Green Deal, the Farm to Fork strategy (3.2.9) and the biodiversity strategy, by protecting and enhancing the variety of plants and animals in rural ecosystems. Each Member State is required to draft its national strategic plan describing the use of CAP instruments based on its current conditions and needs. A twice-yearly review of the performance of the CAP strategic plans will allow for the assessment of the EU Member States' progress in reaching their targets and achieving the CAP objectives (Milicevic, 2023).

1.1.2.2 Farm to Fork Strategy

The Farm to Fork Strategy is at the heart of the European Green Deal aiming to make food systems fair, healthy, and environmentally friendly.

According to the European Commission (2020), food systems cannot be resilient to crises such as the COVID-19 pandemic unless they are resilient. We need to overhaul our food systems, which today account for nearly one-third of global greenhouse gas emissions, consume large amounts of natural resources, lead to biodiversity loss and adverse health effects (through both under- and overnutrition), and prevent fair economic returns and livelihoods for all participants, including primary producers. Also, at Fig.4 there are main pillars of the Farm to Fork Strategy.

Fig. 4: The pillars of the Farm to Fork Strategy (2020)

Source: European Commission, 2020

The approach identifies regulatory and non-regulatory initiatives, as well as common agricultural and fisheries policies, as crucial tools for achieving a just transition.

The various regulatory and non-regulatory, measures programmed for 2020/2021 in order to create more efficient, healthy and climate-smart agri-food (Masso Marti, 2021).

Based on the Publications Office of the European Union (2021) we can highlight that in Action 11 “Legislative initiatives to strengthen farmers’ position in the supply chain and to capture a fair share of the added value of sustainable production by enhancing the cooperation within the CMO Regulation. Non-legislative initiatives can also be launched to improve transparency”. Also, take a look at the Action 12 “An EU carbon farming initiative under the Climate Pact will promote new green business. This initiative should include an ’EU Carbon Farming manual to quantify farmers' emission reductions and carbon removals in farms and forestry systems. The Commission’s proposals for the post-2020 CAP stipulated that at least 40% of the overall agricultural funds would contribute to climate action (Masso Marti, 2021).

Additional restrictions on daily farm work are part of the F2F policy. These restrictions include reducing the use of chemical pesticides, fertilizers, and antibiotics, increasing animal health requirements, and controlling food waste. Farmer-producer policy practices include creating incentives for producers (e.g., additional support for organic farming) or efforts to improve the state of agriculture (e.g., introducing new competition rules that increase farmers' bargaining power). Of course, these two elements, new constraints and new incentives, demonstrate the backwardness of the F2F approach to the current CAP.

1.1.3 Present challenges and opportunities for agri-food producers

1.1.3.1 Environmental standards and regulations

Environmental compliance is a broad phrase that includes several sustainability objectives and necessitates adhering to many laws pertaining to various environmental elements.

Governments and other regulatory agencies have created a wide range of laws, rules, and standards pertaining to environmental compliance in order to safeguard the environment even as businesses continue to produce goods and expand into new markets. This will give organizations the opportunity to consider the environmental impact of their operations. In the process of pursuing economic development, it lessens pollution, safeguards species, and enhances the green cover, allowing us to leave a better planet for future generations (Environmental Compliance, 2020).

According to the (What Is Environmental Compliance & Why It’s Important, 2021), for tomorrow's event, an environmental compliance report is crucial because it helps:

- Become familiar with the environmental laws that apply now and, in the future, and that apply to your company in different countries.
- Find out how often and what kind of environmental audits your firm conducts, and how they affect the environment and your business.
- Review the environmental management plans your business has put in place and the advantages and disadvantages of each.
- Assess the legal risks and predict the costs and fines your business will face by reviewing years of pollution records.
- Check the dates of upcoming license or permit renewals.

The benefits of environmental compliance can be cost reduction, reduced carbon footprint, corporate social responsibility, and even business profitability.

The Commission will work with Member States and stakeholders to ensure that the revised Common Agricultural Policy is fully aligned with the objectives of the Green Deal and the Farm to Fork Strategy in national strategic plans for agricultural development, as its implementation is likely to be delayed until early 2022 year The Commission will ensure that the assessment of these strategic plans is based on reliable climate and environmental standards. The Commission will work with Member States to develop the potential of sustainable seafood as a source of low-carbon food (EUROPEAN COMMISSION, 2019).

1.1.3.2 Analyzing drivers of and trends in agri-food markets

The challenge of feeding a growing world population within the confines of the "Planetary Boundaries" is being met by technologically advanced global agri-food economies, which are dominated by vertically integrated large enterprises. These economies are characterized by a "triple fracture" between agri-food economies and their three constituent elements: nature, consumers, and producers. To meet the issue of the food system's transition to sustainability, new eco-ethical-driven agri-food economies are being established around innovative agricultural and food delivery techniques concurrently with this crisis (Berti, 2020).

Borsellino et al. (2020) determinate that under the influence of a number of factors, the agricultural sector has changed rapidly in recent decades. These include globalization, trade liberalization, population growth, urbanization, rising incomes, changes in politics, changes in food consumption and dietary patterns, technological advances, and environmental degradation. Global factors have created a number of meta-trends that have significantly affected the agri-food sector worldwide. These trends have affected the functioning and structure of agri-food markets,

as well as their contribution to food security, nutrition security and the sustainability of agri-food systems.

One of the most important factors influencing the growth of the agri-food markets globally, in both developed and developing nations, is globalization. The establishment of a unified, protectionist-free global market driven by the expansion of international trade and interactions between nations is commonly referred to as globalization. Globalization should have improved food security, according to some writers, by lowering the likelihood of a global supply shock (Rungeet al., 2003), real food prices (FAO, 2004), and their volatility (World Bank, 2008).

1.1.3.3 Providing the information about finance for agricultural and agri-food SMEs

After studying the article in detail by Directorate-General for Agriculture and Rural Development (2023) we can sum up that in order to evaluate the state of affairs in the agricultural and agri-food industries, a survey was conducted among 2 389 EU SMEs and 6 550 EU farmers. This type of poll was last conducted in 2017. The funding gap for primary producers, or farmers, has nearly doubled since 2017. In contrast, the financing gap for agri-food processors has shrunk to €5.5 billion from €6.3 billion. It is currently at €62 billion, having been at €33 billion in 2017. Rejection rates have decreased from 2017 to 2018, while farmers' average loan requests have climbed, leaving larger sums unpaid.

1.2. Analysis of the impact of the European Green Deal on agri-food production

1.2.1 Overview of EU Agri-food production

Agri-food production in the European Union (EU) encompasses a wide range of agricultural operations and food processing sectors, and is essential for rural economies and global food supply chains. According to Eurostat (2023c), the EU is one of the leading producers of agricultural products in the world, thanks to its wide range of crops, animals and food products. In addition, raw agricultural commodities in the EU are significantly valued by the agri-food industry, which transforms them into a variety of processed foods, beverages and food additives. With a focus on quality, innovation and sustainability, this sector includes food processing, packaging and distribution (Directorate-General for Agriculture and Rural Development, 2021).

Diversity, productivity and a commitment to sustainability and quality are the defining characteristics of EU agri-food production.

Long-term food security is threatened by the loss of ecosystem services and biodiversity, as well as by the increase in global temperatures brought on by food production. The European Green Deal, an ambitious declaration of purpose from the European Commission released in December 2019, outlines the necessity of addressing many of these issues in the EU in order for it to become the first continent to be carbon neutral by 2050 (IFOAM, 2020).

To highlight the importance of agri-food production, it is also worth mentioning that as of January 2023, food products are among the goods that account for the largest share of household consumption expenditure in the EU. All three of these categories (47.1% of total expenditure) were characterised by high price growth in 2022, which led to the role in the cost of living crisis (Eurostat, 2023a). This data can be seen in Figure 5 (as khaki is data from January 2022 and blue – January 2023):

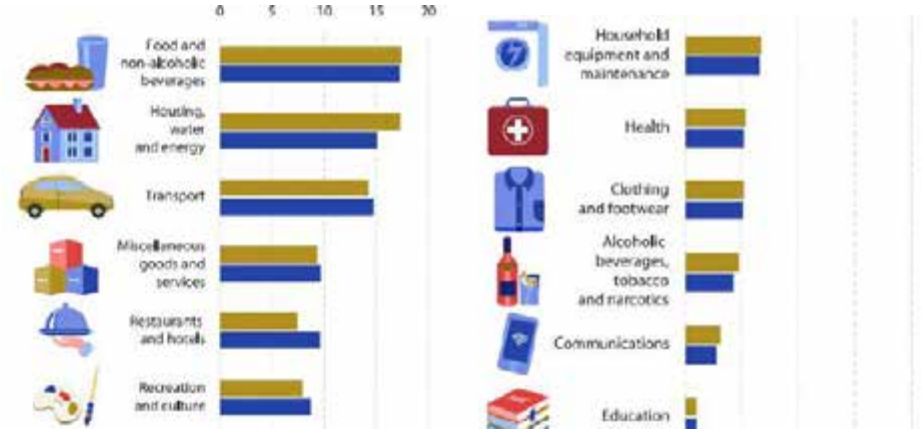

Fig. 5: Household budget structure (%, share of total household consumption expenditure, EU, January 2022 and 2023)

Source: Eurostat, 2023a

1.2.1.1 Identify key sectors and products

The food chain encompasses more than just agricultural production; it also includes food and beverage processing, distribution and service. Food and beverage (F&B) processors are striving to increase the availability and affordability of healthy, sustainable food in line with the EU's Farm to Fork Strategy. This strategy involves changing the types and composition of the food they produce, their choice of suppliers or production methods. Basic information about F&B industry in EU is represented in Figure:

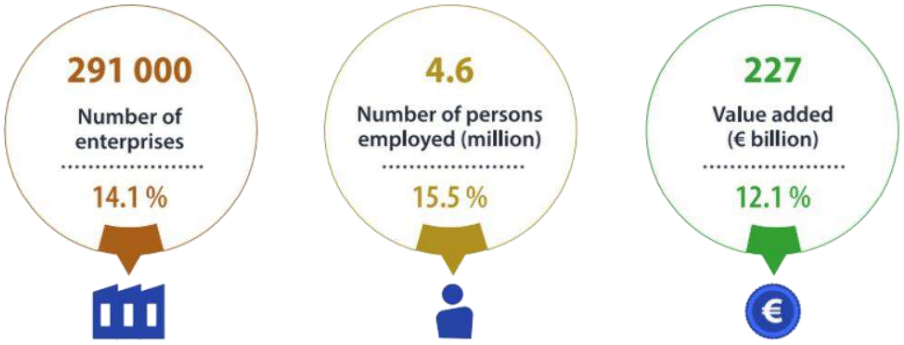

Fig. 6: Size of food and beverage processing (EU, 2020)

Source: Eurostat, 2023a

fEuropean Commission's manuscript (2023) provides us with information that around a third (32.6%) of the EU F&B processing workforce in 2020 was employed in the production of bakery and starch-based products (e.g. bread, cakes, biscuits, pasta and noodles). The next largest share was recorded in the production of meat and meat and meat products (20.4%). Just over one-sixth (17.7%) of the value added generated by EU food and drink processing companies was in the production of bakery and starch-based products. This was followed by the production of meat and meat products (17.4%) and the production of beverages (16.3%; a much higher share than in the).

Fig. 7: Structure of food and beverage processing (%, EU, 2020)

Source: Eurostat, 2023a

F&B processors produce a wide range of goods, from luxury, occasionally high-value commodities, to everyday food items. Non-processed cheese, such as Brie, Edam, Feta, or Gorgonzola, was the manufactured F&B product with the biggest value (€42.0 billion) in EU production in 2022, according to the Prodcom list (Eurostat, 2022). Figure 8 shows the percentage of which country dominates the production of a particular agri-food. For dairy producers in particular, this commodity is quite important. Approximately €8.9 billion, €8.0 billion, and €7.2 billion of the non-processed cheese produced in the EU was produced by businesses in Italy, Germany, and France (European Commission, 2023).

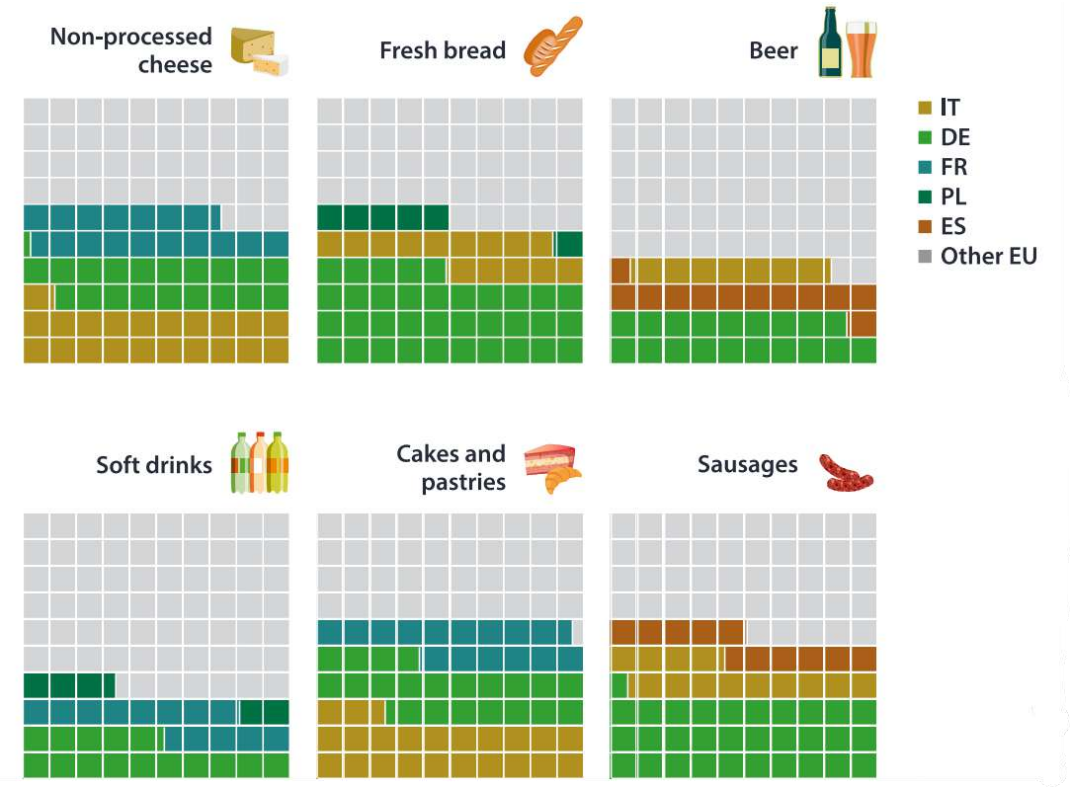

Fig. 8: Principal producers of selected manufactured food and beverage products (% based on production value, 2022)

Source: Eurostat, 2023a (online data code: DS-056120)

Fresh bread and beer were the second and third largest producers, with EU production estimated at €33.8bn and €32.0bn in 2022, respectively. Cereal producers, especially those that grow wheat, rye and barley for beer production, are relying on these products. Germany produced both products more than any other EU member state, making it the leading producer in the EU. It supplied about one-fifth (18.9%) of the beer and more than one-third (34.9%) of the fresh bread produced in the EU.

Looking at Eurostat's annual report (2023) and last year's selection, we can identify certain products that were in greatest demand and the countries that produced them. Usually, this

correlation is manifested through a historical connection or a peculiarity of the territory. The maximum level of output for manufactured food and beverage goods across all EU Member States in 2022 was distributed among 12 distinct product categories. In terms of value, sausages had the highest production value in Poland, Austria, Romania, Slovakia, and Slovenia, while non-processed cheese was the top F&B product in Greece, France, Italy, and Estonia. Of all F&B items, beer was produced at the highest rate in Czechia and Croatia. The only other Member State to claim that its main food and beverage product was fresh bread was Germany. Sweden and Ireland, on the other hand, both reported producing the most fresh or cold cuts of beef and veal. Apart from the significant production volumes of fresh bread in Germany and unprocessed cheese in Italy and France, as previously mentioned, Spain also notably excels in the production value of virgin olive oil for leading food and beverage products. This information is also shown in Figure 9 in the form of an infographic.

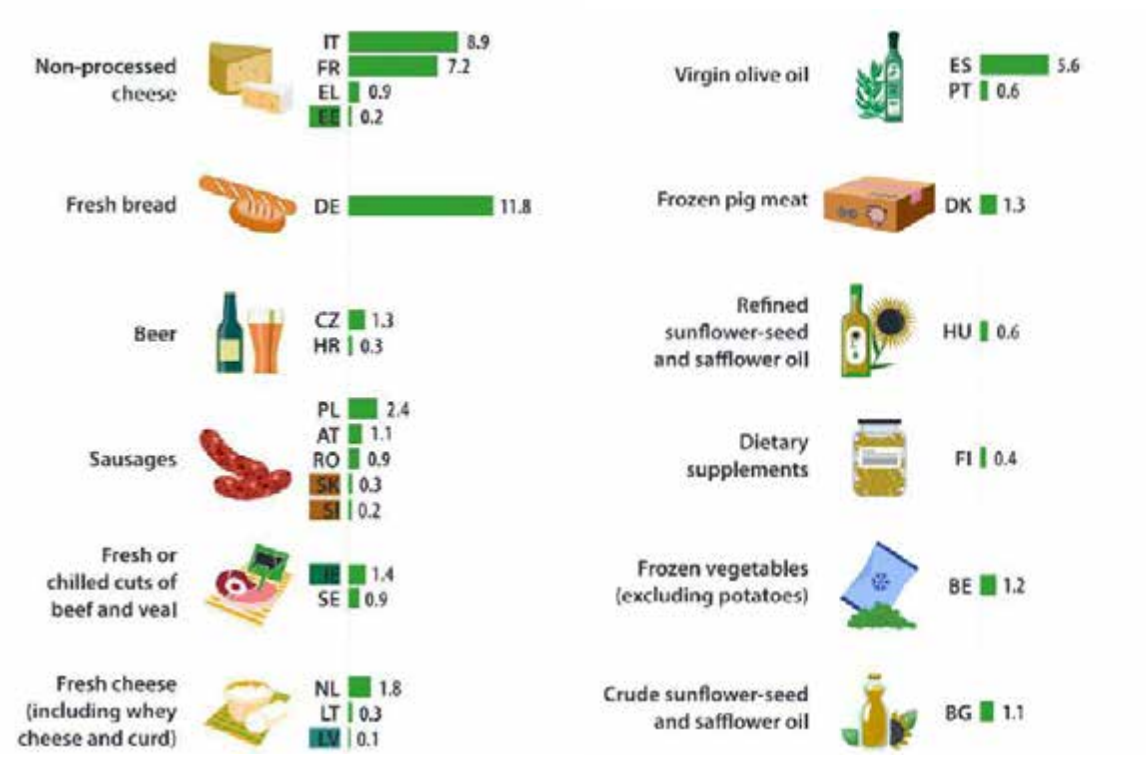

Fig. 9: Largest manufactured food and beverage products (€ billion, 2022)

Source: Eurostat, 2023a (online data code: DS-056120)

1.2.1.2 Highlighting the contribution of the Agri-food production to the EU economy

With a total surplus of EUR 70.1 billion, the EU's agri-food trade balance reached an all-time high in 2023.

This is 12.8 billion euros more than in 2022. The main part of this surplus falls on various types of goods; the most important drivers of this surplus are grains and products of the flour-

milling and semolina industry, dairy products, wine and wine-based products. Nevertheless, the EU has a trade deficit in some goods. Most of this applies to oil and protein crops, fruits and nuts, as well as oil and protein crops, fruits and nuts, coffee, tea, cocoa and spices. This improved the EU's trade balance thanks to price dynamics in 2023, when prices for processed goods remained high and prices for major imported crops declined (Eurostat COMEXT, 2024).

EU exports were constant in 2023 at EUR 228.6 billion, a high level compared to 2022. They mostly declined in the direction of China and the US, with the UK seeing the largest increase. Figure 10 represents the structure of Agri-food Trade with Extra EU-27 through years.

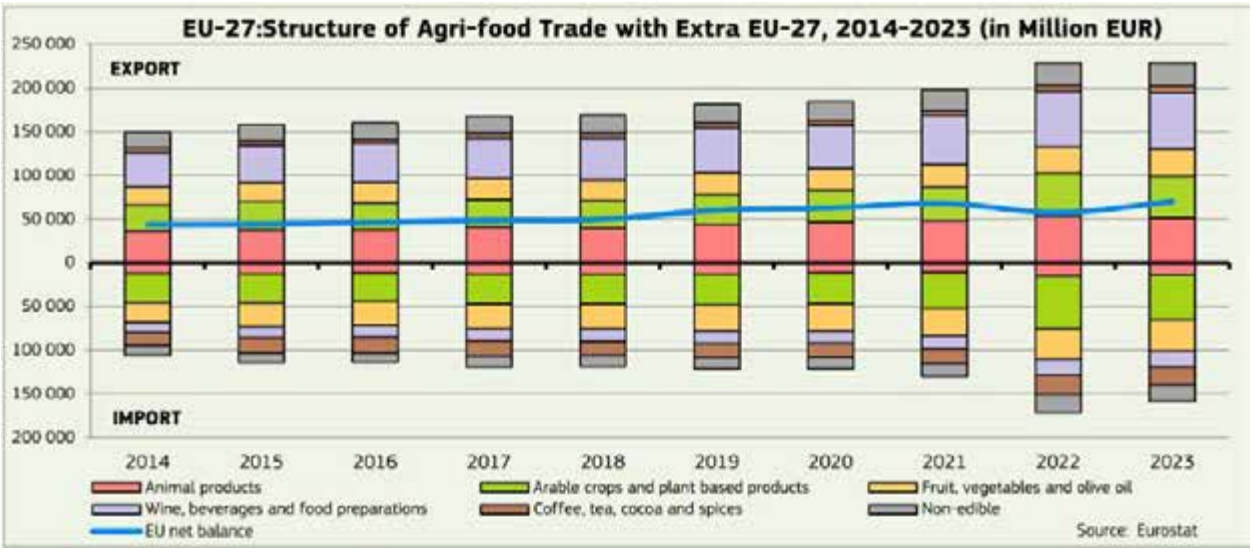

Fig. 10: EU-27: Structure of Agri-food Trade with Extra EU-27, 2014-2023

Source: Eurostat COMEXT, 2024

According to the Eurostat COMEX (2024) report in 2023, EU agri-food exports came in at EUR 228.6 billion, essentially unchanged from the record-breaking year of 2022. Nevertheless, EU exports fell in December 2023, falling -7% from December 2022 and -12% month over month to EUR 17.7 billion. According to the exports' unit value index (see right), the high level of EU export value is mostly explained by the generally high prices for EU agri-food exports during 2023. This offset a slightly declining trend in export quantities over the previous three years (according to the volume index). Also, as the conclusion of the analysis with over 36 countries with which the EU had substantial trade in 2023, the top three destinations accounted for more than 40% of EU exports. With exports amounting to EUR 51.3 billion, the UK continued to be the leading destination, propelled by rising export prices for a range of goods. With exports of EUR 27.2 billion, the US came in second place, however this was less than the year before mainly because of a decline in the export of spirits and liqueurs. China came in third place with EUR 14.6 billion in exports, primarily in the form of prepared cereals and pigmeat.

A few of the EU's major exports, such as dairy goods (-EUR 759 million, -4%), wine and wine-based products (-EUR 681 million, -4%) and spirits and liqueurs (-EUR 675 million, -7%), also saw a moderate decline in export values. This is mostly explained by lower pricing for dairy products exported, even if volume has increased by 2%. On the other hand, export volumes of spirits and liqueurs fell by 11% and wine and wine-based products by 7%. Also, the top 3 exported product categories by the EU represent close to 30% of total EU agri-food exports: cereal preparations and milling products (EUR 24.2 billion, 11% of EU exports), dairy products (EUR 19.6 billion, 9%) and wine and wine-based products (EUR 17.6 billion, 8%) (Eurostat COMEXT,2024).

According to the Eurostat report (2024) on import activity in the EU: in 2023, imports of agri-food products from the EU fell by 7% (-12.8 billion euros) and reached 158.6 billion euros for the year, reaching a record level in 2022. It fell further in December 2023 to €13.1 billion, down 16% from December 2022 and down 7% month-on-month. The dynamics of the price of imported products, thus, is the main factor explaining the price dynamics of EU agri-food imports. The top 3 origins of EU imports represented 28% of EU total imports in 2023 and the EU imported more than EUR 1 billion from 33 different countries, which showed overall a good diversification pattern. Top-3 importers of the agri-food in 2023 are Brazil, UK, and Ukraine. The level of imports from Ukraine, however, has changed significantly during the year. They remained at a high level until May, but since June they have been lower the 2022 level starting in June, and approached the 2021 levels at the end of the year. The reason for this change was the Russian invasion and the destruction of a large part of the enterprises, processing plants and directly harvested areas. Figure 11 shows monthly trends in imports from Ukraine to the EU.

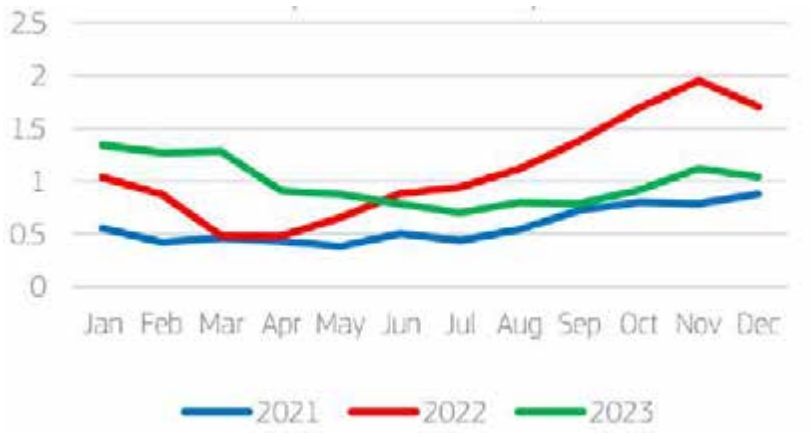

Fig. 11: EU agri-food imports from Ukraine (in billion EUR)

Source: Eurostat COMEXT, 2024

Prices for these products fell due to lower imports of corn, wheat, rapeseed and sunflower oil from Ukraine, as their supply to the EU processing industry decreased and their supply to the

EU processing industry decreased. It was especially difficult to replace the import of sunflower oil from Ukraine (European Union, 2023).

1.2.2 Identifying economic and social impacts for agri-food producers

1.2.2.1 Changes in agri-food production techniques and technologies

Undoubtedly, throughout human history, technological and innovative advancements have affected the course of agriculture. In addition to being crucial catalysts for changing the agri-food systems toward more resilient, efficient, sustainable, and inclusive patterns, technologies and innovations are also necessary to meet the Sustainable Development Goals (FOFA. FAO, 2022). Agri-food developments and technologies have a direct and tangible influence.

Agriculture 4.0 — a revolution in agriculture — has been observed in the past decade only in the digital innovation domain, with the introduction of big data analytics, cloud computing, cheap and improved sensors, and high-bandwidth mobile communication. It laid the groundwork for the next (r)evolution, which will include unmanned operations and autonomous decision systems, and be based on quantum computing and artificial intelligence (Alexandrova-Stefanova et al. 2023).

We need to speed up technology upscaling in new contexts and locations, reduce the time lag between technology generation and use for impact, and use technology responsibly and sustainably while considering socio-economic and environmental effects in order to maximize benefits and minimize challenges associated with emerging technologies and innovations for the agri-food systems transformation (Alexandrova-Stefanova et al. 2023).

A team of FAO scientists conducted a study and found over 200 distinct possible emerging agrifood technologies and advances during the Horizon scanning procedure. After that, this list was updated to include 167 entries, eliminating ones that were not as inventive and decreasing overlap. Alexandrova-Stefanova et al. (2023) then selected the 32 most promising ones and arranged them into eight categories:

1 "Advanced digital technologies" for agriculture, including connectivity, aerial robotics and drones, Artificial General Intelligence for agriculture, digital twins, Internet of Food, and quantum computing.
2 "Nano-chemicaltechnology & nanobiotechnology" with topics like nanorobotics, nanomaterials for water and food packaging, bioplastics, fertilizers, and antibiotics.
3 "Advanced biotechnologies" like synthetic biology, RNA interference, controlling gene expression, environmental biotechnology, and artificial neurons.

4 "New enabling, technologies & nutrition" encompassing 3D printing of food and liquids, 4D nanoscale printing, and personalized nutrition.

5 "New emerging energy & transport" covering nuclear energy in agriculture, global logistics networks, transportation of complex molecules, novel biomass and energy storage technologies.

6 "Net-tech & financial innovation" including carbon credits in agriculture and aquaculture, social impact bonds.

7 "Policy innovation" with innovation policy labs, territorial food-to-consumer economy, access to sustainability information, nature-based and ecosystem innovations, and frugal innovation.

8 "Advanced geospatial technologies" like real-time satellite imagery, autonomous GIS, and positioning systems.

1.2.2.2 Identifying income effects of transitioning to green agri-food production

The goal of the green transformation of agri-food systems is to reduce poverty, increase economic growth, and improve the sustainability of agricultural production and processing. It also aims to improve the basic food security of threatened areas and contribute to greater environmental sustainability, climate change resilience, and greenhouse gas emission reduction (Watts, 2024).

The transition to "green" agri-food production can have a significant impact on producers' profits. Food manufacturers can increase their market appeal and command premium prices by adopting solid food industry practices such as reducing waste, using renewable energy sources, and ethically sourcing ingredients. Sustainable food products are becoming more and more popular with consumers, allowing producers to earn higher margins and increase profitability. Steel practices also often increase operational efficiency and save costs, which increase profits. Government incentives and certification of organic food also provide financial support and market recognition, helping to increase producers' incomes.

1.2.3 Showing environmental Outcomes and Sustainability

1.2.3.1 Comparing reduction of carbon emissions and environmental footprint

A primary goal of the European Green Deal is to cut net greenhouse gas emissions by at least 55% by 2030 when compared to 1990 levels. This is so-6called “Objective 55.” (APlanet, 2022) The EU's agricultural GHG emissions are expected to decrease by 2% in 2022, with a 3% overall trend decrease between 2005 and 2021. According to forecasts from member states, GHG emissions will stay roughly the same until 2030. This might climb to an 8% drop if the extra actions that the Member States currently have planned are put into action (Greenhouse Gas Emissions from Agriculture in Europe, 2022).

Developments in the level of greenhouse gas emissions may be traced using data for the Kyoto basket (Kyoto Protocol, 2023) of greenhouse gases. By 2020, greenhouse gas emissions in the EU had fallen 31.7 % (Figure 12)compared with their 1990 levels; note that economic activity was particularly low during the first year of the COVID-19 crisis (Eurostat, 2023).

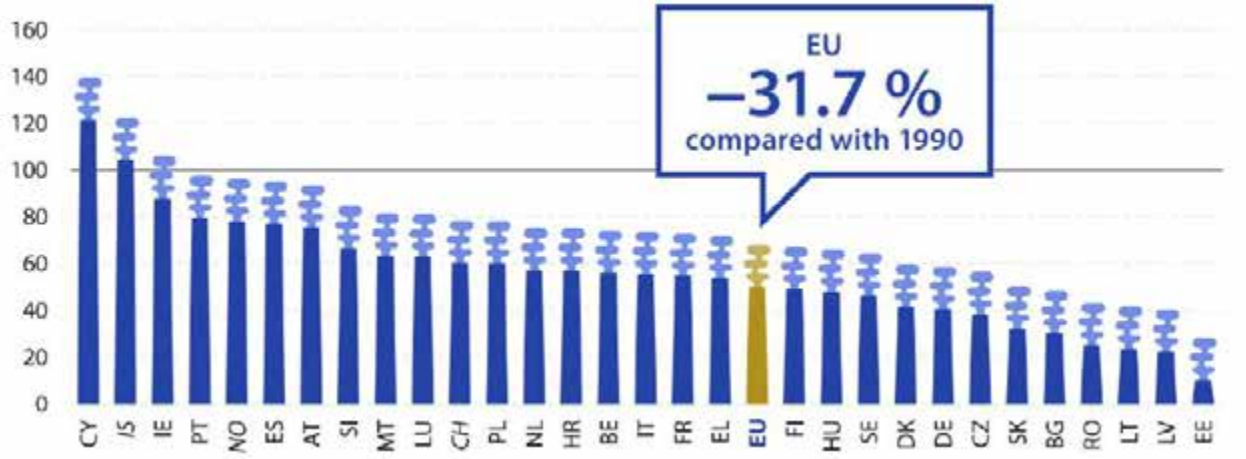

Fig. 12: Greenhouse gas emissions in EU member states (2020)

Source: Eurostat, 2023

According to the United Nations Environment Programme (2023) publication global GHG emissions increased by 1.2% (0.6 GtCO2e) from the year before to a record high of 57.4 GtCO2e in 2022 (Figure 13). This rate was slower than the GHG emissions rise of the 1990s (1.2 percent per year) and 2000s (2.2 percent per year), but it is slightly higher than the average rate in the decade before the COVID-19 pandemic (2010–2019). According to the World Meteorological Organization (2023), atmospheric CO2 concentrations increased to 417.9 ± 0.2 parts per million in 2022. They will rise until annual emissions are sufficiently lowered to be balanced by removals.

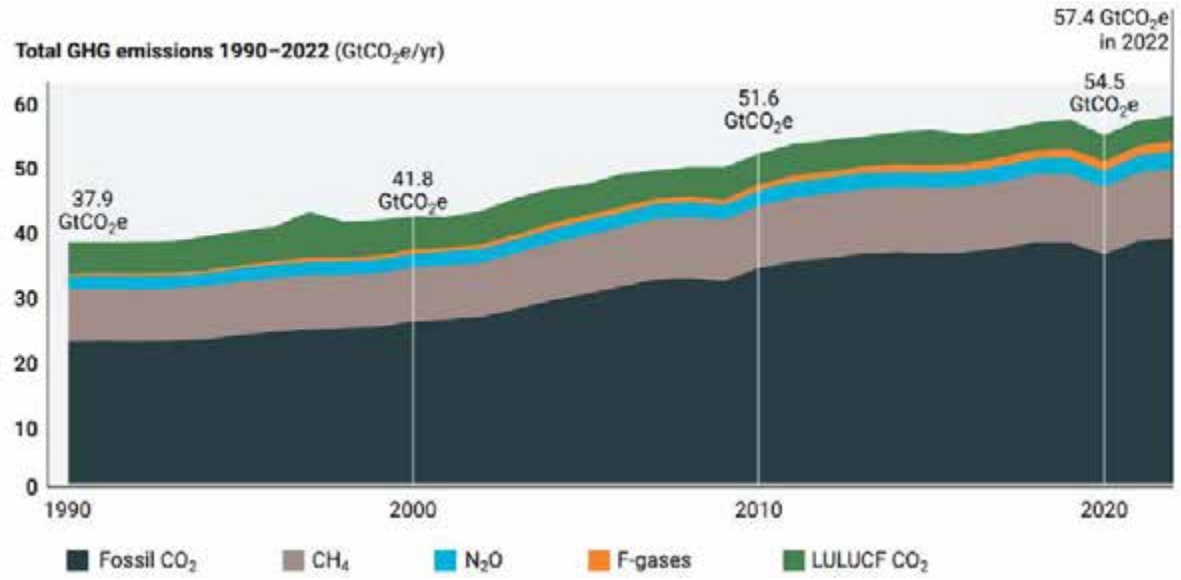

Fig. 13: Total net anthropogenic GHG emissions, 1990–2022

Source: United Nations Environment Programme (2023)

Emissions have decreased in almost all sectors, especially in the energy, industrial, and residential sectors. On the other hand, despite environmental laws and efforts to improve vehicle efficiency, emissions from transportation have not been reduced fast enough. Agricultural emissions have also increased in recent years. Despite significant progress in reducing greenhouse gas emissions, achieving a climate-neutral economy in the EU by 2050 will require significant efforts across all sectors of the economy (European Environment Agency, 2022).

1.2.3.2 Preservation of biodiversity and ecosystem services

Preservation of biodiversity and ecosystem services is a critical component of sustainable agriculture, with profound implications for ecosystem health, resilience, and agricultural productivity. Numerous studies have highlighted the importance of biodiversity in supporting essential ecosystem functions, such as pollination, nutrient cycling, pest regulation, and soil fertility maintenance (Isbell et al., 2017; Tscharntke et al., 2012).

Farmers can reap several advantages from maintaining biodiversity in their agricultural landscapes, such as better pest management, better soil health, and greater resistance to environmental stressors (Altieri & Nicholls, 2004; Bianchi et al., 2006). For instance, preserving a variety of plant communities can improve crop resistance to pests and diseases, inhibit the growth of weeds, and lessen the need for pesticides (Letourneau et al., 2011; Tscharntke et al., 2005).

Based on the article “Biodiversity and ecosystems” by the European Commission (2023) a comprehensive, systemic, and ambitious long-term plan to preserve the environment and stop ecosystem deterioration is the 2030 Biodiversity Strategy. It is a fundamental component of the

European Union's leadership in worldwide action for global public goods and the Sustainable Development Goals, as well as the European Green Deal. By 2030, it seeks to restore Europe's biodiversity, which will benefit people, the environment, and the climate. It also serves as the EU's proposal for participation in the impending international talks on the framework for biodiversity that would govern the world after 2020.

Sustainable development depends on biodiversity and strong ecosystems, especially when it comes to food and nutrition security, access to water and health, good governance, and peacekeeping. Conservation of ecosystem services and biodiversity is important for reducing poverty and the likelihood of natural disasters. That's why we're taking action at all levels to combat unsustainable behavior that threatens ecosystems and biodiversity around the world (Biodiversity and ecosystems, 2023).

The EU Biodiversity for Life (B4Life) flagship initiative is designed to help the poorest countries protect ecosystems, combat wildlife crime and develop green economies (Biodiversity for Life | Capacity4dev, 2014).

The European Commission (2023) highlights the EU ‘Biodiversity for Life’ (B4Life) initiative, launched in 2014, which fully integrates biodiversity and ecosystem conservation with socioeconomic development and poverty eradication, through an innovative cross-cutting approach. B4Life operates in 3 priority areas:

- good governance for a sustainable management of natural resources
- ecosystem conservation for food security and sustainable rural development
- ecosystem-based solutions toward a green economy

2. Aims of the thesis

The European Green Deal is a transformational programme aimed at addressing climate change, environmental degradation and sustainable development in the European Union. The impact of the Green Deal on agri-food production at all levels of the value chain is crucial. This thesis explores how the Green Deal's goals, policies and initiatives are changing agri-food practices, promoting sustainable development and affecting the economic and environmental outcomes of agri-food production.

What are the implications of the European Green Deal for the productivity, sustainability and economic viability of EU agri-food production?

The main objective of this thesis is to provide a critical analysis of the main agri-food production-related goals, strategies, and initiatives of the European Green Deal, including sustainability targets, policy tools, and initiatives to support ecologically friendly afri-food processing methods. In order to obtain the information needed to achieve this objective, the thesis was divided into the following goals:

1) Promoting sustainable agri-food practices within the European Green Deal framework

2) Analysis of the impact of the European Green Deal on agri-food production
3) Case Study: Implementation of the EGD rules in the operation of Plzeňský Prazdroj

It will assess how the implementation of EGD would affect the environment, with a particular emphasis on greenhouse gas emissions, biodiversity preservation, and sustainable land use. The thesis also seeks to identify possibilities and problems that the EGD may present for agri-food stakeholders and offers suggestions for maximizing gains and minimizing risks.

It is important to understand how a company can affect the environment and to identify the ways in which it does so. After analysing this, it is possible to select and use generally accepted rules and regulations to increase production efficiency and at the same time reduce its negative impact on the environment. This paper also provides real-life examples of how companies have used new rules, adapted to new policies and changed their agri-food production processes to support sustainability and organic initiatives.

3. Methodology

As for my research I used theoretical in combination with qualitative approaches. The initial information was obtained by analyzing secondary data sources, with a focus on high-quality and up-to-date literature, such as journal articles and published reports from reputable institutions, and a report from the company was also requested.

The research's theoretical component lays the theoretical groundwork and conceptual framework for comprehending how the European Green Deal affects agri-food output. Its objectives are to create a thorough grasp of fundamental ideas, theories, and frameworks; to pinpoint areas of unmet research need; and to direct the gathering and processing of data. Enhancing rigor, validity, and holistic viewpoint are the goals of the research through the integration of theoretical insights with quantitative methodologies. A thorough grasp of the effects of the European Green Deal on agri-food productivity can be obtained by combining theoretical understanding with empirical data to provide a nuanced analysis of the subject. This method makes it easier to identify recommendations and policy implications for the Green Deal's promotion of sustainable agri-food practices. Overall, the integration of theoretical and quantitative approaches advances knowledge, informs evidence-based policymaking, and contributes to the sustainability of agricultural production within the European Union.

In order to fully exploit the promise of sustainable agricultural practices, it is imperative to solve a number of economic, logistical, and legal obstacles. These insights emphasize the complex nature of the shift to green agri-food production inside the EU.

This thesis will also use a case study element based on the company “Plzeňský Prazdroj “ to better highlight the implementation of the EGD in agri-food production. Case study will be used to show the changes implemented in the company's operations, several examples from the company's official documentation will be provided. The analysis of the above company was conducted in February 2024 in order to collect the maximum amount of fresh information from the report published by the company at the end of 2023. Initiatives that the company wants to implement in its production were also worked out. This company was chosen because of its popularity in the Slovak market and has a fairly extensive influence among about 50 countries. Due to the developed export abroad, the company has to meet certain requirements, so it was clear that such changes as the EZU would have a considerable impact on Plzeňský Prazdroj. Due to the fact that the company is an excellent example of an agro-food producer, their actions and methods must meet the established requirements in order to continue foreign economic activity. The

production of beer drinks is a rather energy-intensive and raw material-intensive process, so the company cannot ignore the use of inappropriate raw materials and neglect environmental initiatives established to improve the environment. This is the direct responsibility and need of this production as they can harm the environment by their activity. It also has the option of influencing European consciousness and the transition to more efficient production or any other type of activity. The purpose of using this case study was to show how an agro-food production enterprise can meet the European Green Agreement and successfully implement new production processes. Supporting environmental initiatives is an important component of well-known companies, because they have a certain influence and should become an example for smaller enterprises.

4. Case Study: Implementation of the EGD rules in the operation of Plzeňský Prazdroj

4.1 Providing history and general information about Plzeňský Prazdroj

Plzeňský Prazdroj, a. s. is a Czech company, a brewery founded in 1842, which produces the first Pilsner Urquell beer. Prazdroj currently also includes the Radegast brewery and the Velké Popovice brewery. Plzeňský Prazdroj is the largest beer producer in the Czech Republic and is also the largest exporter of beer abroad (Horáček et al.,2015). Figure 14 shows the territory of the Czech and Slovak Republics with the locations of the breweries of Plzeňský Prazdroj, a.s. & Plzeňský Prazdroj Slovensko.

Fig. 14: Breweries and malthouses of Plzeňský Prazdroj in Czech Republic and in Slovakia

Source: Plzeňský Prazdroj, 2023

On 1 March 1859 the brewery registered the Pilsner Bier - Pilsner Beer trademark with the Chamber of Commerce and Trade in Pilsen and in 1898 the Pilsner Prazdroj - Pilsner Urquell trademark. Since 2017, it has been under the Japanese parent company Asahi (Studio: Co Bude S Plzeňským Prazdrojem V Rukách Japonského Asahi - Seznam Zprávy, 2016).

Based on the article oPive.sk (2018) he beer producer makes the most of the brewery's brewing capacity, which is approximately 63 thousand hectoliters per week, during the peak demand season. For this reason, the brewery is spending around 11 million euros to expand the brewhouse. The lager capacity will rise by a third to more than 88 thousand hectoliters a week and 3.5 million hectoliters annually once all the work is finished in May of this year.

Plzeňský Prazdroj currently exports beer to more than 50 countries around the world. The largest foreign consumer is Germany, with Slovakia in second place. "Consumption on the Slovak

market is continuously growing, which is evidenced by the fact that the most Pilsner lager is drunk in our country after Germany," says Martin Grygařík, Sales Director, Pivovary Topvar. (Němečková, 2017). “We are proud we export our beer to more than 50 countries around the world. We export our products in various types of packaging - from bottles, cans and kegs to mobile tanks. We use road, railway, as well as sea transportation. Plzeňský Prazdroj is the largest exporter of domestic beers. The company exported more than 1.7 million hectoliters in 2021”, - according to the Plzeňský Prazdroj, a.s (2022).

With its own brewery, Topolchany started exporting malt in addition to beer. Four managers of the company took over as owners of Topvar in 1994, acquiring 51% of the company's shares. The employees had 31% of the shares, and the town of Topolchany held 15%. To modernize the plant, all it took was 370 million Slovak crowns and a promise. After being privatized, comparable breweries in Košice, Michalovce, and Ilava started to collapse, while Topvar's status was quite different. The company expanded every year. The brewhouse, bottling, and other technology upgrades were modernized, which was beneficial. The brewery grew to be the nation's third biggest. Just behind the global behemoths SABMiller and Heineken. Topolcany even declared itself to be Slovakia's beer capital (Plzeňský Prazdroj Slovensko, a.s., 2022). In February 2010, it moved all production from Topolcany to the east. In 2018, Pivovary Topvar was renamed Plzeňský Prazdroj Slovensko, a.s. The original name had been associated with the company, which now employs more than 650 people, for more than a decade. By renaming itself, Plzeňský Prazdroj Slovakia will establish close cooperation with Plzeňský Prazdroj in the Czech Republic, with which it also shares a close cooperation and a superior collegial relationship, in addition to the portfolio of beers offered.

4.2 Presenting the new integrated management system policy

Plzeñsky Prazdroj Slovensko, a.s. (2023) made a report where they explained their key principles to guide our business conduct are implemented through the Integrated Management System (IMS), according to the following international standards:

ISO 9001	Quality Management
FSSC 22000 a GMP* ISO	Food and Feed Products Safety
45001	Occupational Health and Safety
ISO 14001	Environmental Protection
ISO 50001	Energy Management

In part od environmental protection principles Plzeñsky Prazdroj Slovensko, a.s. (2023) highlights that their program through which they commit themselves to environmental protection, is integrated with the sustainable development framework of Asahi Group Holdings, Ltd. In line with this framework, Plzeñsky Prazdroj, a.s. & Plzeñsky Prazdroj Slovensko, a.s.strives to continuously reduce environmental impact by:

- Annual reviews of the environment area, defining targets and target programs based on the results of regular assessment of environmental aspects;
- Applying process management and investment in new technology in order to reduce our water and energy consumption and greenhouse gas emissions;
- Using recyclable packaging materials for our products;
- Moving towards operations with zero landfill waste.
- Continuous improvement of the environmental management system with the aim of enhancing its efficiency.

An essential component of sustainable development, energy management forms the basis of the European Green Deal. In order to lower greenhouse gas emissions, improve energy security, and facilitate the shift to a low-carbon, sustainable economy, the Green Deal promotes energy efficiency, renewable energy sources, and decarbonization programs. So, it is important to mention what changes in management policy Plzeñsky Prazdroj, a.s. & Plzeñsky Prazdroj Slovensko (2023) made and are in process of implementing. In order to achieve measurable results, the company further undertakes to promote the purchase of energy-saving products and services as well as proposals of activities aimed at improving energy performance; carry out regular and proper maintenance of the Company's utilities infrastructure and invest in energy-saving technologies; define and review energy goals and targets while taking account of major energy-related aspects and legislative requirements; analyse the efficiency of power, gas and water consumption in order to avoid wasting energy. All of these changes and further requirements are affirmed by the Managing Director of Plzeňský Prazdroj, a.s. & Plzeňský Prazdroj Slovensko - Dragos Constantinescu.

The company is committed to the Science Based Targets and, through their parent group Asahi, they are a member of the global RE100 initiative focused on the use of electricity from renewable sources (Správa o udržateľnosti, 2023).

Plzeňský Prazdroj Slovensko is also involved in the 'Respect 18' awareness campaign, which seeks to change the public's tolerant attitude towards underage drinking. Also, they have a goal that their soft drinks will account for 25% of company's portfolio by 2030 (Zodpovednosť, 2020).

Plzeňský Prazdroj, a well-known Czech brewery, uses the Global Reporting Initiative (GRI) index to ensure transparency regarding its sustainability efforts. The brewery provides full reporting on its environmental, social and governance (ESG) activities in accordance with GRI standards. This covers energy consumption, water use, waste management, employee welfare, community engagement and ethical management practices. With the help of the GRI Index, the Pilsen plant demonstrates its commitment to the principles of sustainable development, responsibility and continuous improvement. This contributes to strengthening trust with stakeholders and a positive impact on its activities and surrounding communities (Plzeňský Prazdroj, 2023). An example of the usage and estimation of the GRI INDEX at Plzeňský Prazdroj is shown in Figure 15.

GRI ŠTANDARDY	INDIKÁTORY	UMIESTNENIE INFORMÁCIE	POZNÁMKY
VŠEOBECNE ZVEREJŇOVANÉ ÚDAJE (GRI 2)			
ORGANIZÁCIA A REPORTING			
GRI 2-1	Údaje o organizácii	O spoločnosti, O správe, Výročné správy CZ a SK	
GRI 2-2	Subjekty zahrnuté v správe o udržateľnosti	O spoločnosti, O správe	
GRI 2-3	Vykazované obdobie, cyklus vykazovania a kontaktné údaje	O správe	1. januára – 31. decembra 2022
GRI 2-4	Úpravy skôr zverejnených informácií	O správe	
GRI 2-5	Externé overenie	O správe	
ČINNOSŤ A ZAMESTNANCI			
GRI 2-6	Aktivity, hodnotový reťazec a ostatné obchodné vzťahy	Editorial, O spoločnosti, Suroviny, Kontrolný	
GRI 2-7	Zamestnanci	Ľudia, GRI dáta – Ľudia	2-7 b iii – pracovníci bez stanoveného pracovného času sú vykázaní ako ostatní pracovníci pod GRI 2-8.
GRI 2-8	Ostatní pracovníci	GRI dáta – Ľudia	
SPRÁVA A RIADENIE			
GRI 2-9	Štruktúra a zloženie správy a riadenia organizácie	O spoločnosti, Stratégia, Výročné správy CZ a SK	
GRI 2-12	Úloha najvyššieho správneho a riadiaceho orgánu dohľadu nad riadením vplyvov	Stratégia	
GRI 2-13	Delegovaná zodpovednosť za riadenie vplyvov	O spoločnosti, Stratégia	
GRI 2-14	Úloha najvyššieho správneho a riadiaceho orgánu v oblasti reportingu udržateľnosti	O správe	
GRI 2-17	Kolektívna informovanosť najvyššieho správneho a riadiaceho orgánu	Stratégia	Nové zaradené,
GRI 2-18a	Hodnotenie výkonnosti najvyššieho riadiaceho orgánu	Stratégia	Nové zaradené,

Fig. 15: GRI index content for the period from 1 January 2022 to 31 December 2022 Plzeňský Prazdroj

Source: Plzeňský Prazdroj, 2023

4.3 Analyzing the implementation of the sustainable concepts of the European Green Deal at the Plzeňský Prazdroj

According to the report by Plzeňský Prazdroj (2023), water, energy, and emission data are specific to production sites. Measuring other consumption, which makes up only 0.4% of overall consumption, is done at company-owned distribution centres. In terms of both performance and energy usage, the Proud microbrewery (located on Plzeň premises) is a negligible source of consumption.

Megajoules per hectolitre, or MJ/hl, is the unit of measurement used to indicate the ratio of energy use to total production in a product like beer. A lower energy intensity, as it relates to Plzeňský Prazdroj breweries, is typically regarded as preferable from an efficiency and environmental standpoint because it uses less energy per unit of beer produced. As part of their operational efficiency goals and sustainability initiatives, lower energy intensity represents more efficient industrial processes, less resource use, and possibly lower environmental impacts associated to energy consumption.

Therefore, in the Plzeňský Prazdroj (2023) report, we can see a Table 1 in which we can observe that the company has tried to reduce this indicator and use less electricity to manufacture its products. It can also be seen that during the COVID-19 pandemic, the energy intensity increased, but this was due to certain restrictions on the number of workers on site, thus proving that a larger number of professionals can lead to higher production efficiency.

Tab. 1: Energy intensity of the product (2019-2022)

Ratio of energy consumption to the total volume of beer production in breweries (MJ/hl)				
BREWERIES	**2019**	**2020**	**2021**	**2022**
Plzeň	83,16	91,37	91,62	85,67
Nošovice	76,80	82,29	77,58	69,69
Velke Popovice	76,54	84,34	84,93	84,08
Veľký Šariš	77,87	77,42	79,59	72,66
The ratio of energy consumption to the total volume of malt production in malthouses (MJ/ton)				
STORAGES	**2019**	**2020**	**2021**	**2022**
Plzeň	2 883	2 889	2 798	2 689
Nošovice	2 649	2 734	2 703	2 668
Veľký Šariš	2 504	2 387	2 397	2 280

Source: Plzeňský Prazdroj (2023), own processing

Business sustainability is an integral part of Plzeňsky Prazdroj, a.s. & Plzeňsky Prazdroj Slovensko corporate strategy. Company's approach is based on the Sustainable Development Goals (SDGs) adopted at the United Nations Summit in September 2015, with their activities primarily leading to a reduction in our carbon footprint with the aim of not warming the planet by more than 1.5°C. Plzeňsky Prazdroj is committed to the Science Based Targets and, through the parent group Asahi, they are a member of the global RE100 initiative focused on the use of electricity from renewable sources. (Správa o udržateľnosti, 2023)

Plzeňsky Prazdroj, a.s. & Plzeňsky Prazdroj Slovensko support all 17 goals UN Sustainable Development Goals (SDGs) adopted at the UN Summit in September 2015. Figure 16 shows the SDSs that the analysed company pays the most attention to and tries to promote and improve. They focus in detail on selected goals that fall within the area of the work:

Fig. 16: SDGs supported by Plzeňsky Prazdroj, a.s.

Source: Správa o udržateľnosti, 2023

Accordingly, the company sets out 7 main Pillars of the strategy for itself. In Figure 17, we can see these pillars clearly displayed.

Plzeňsky Prazdroj, a.s. & Plzeňsky Prazdroj Slovensko are also a member of the global RE100 initiative, which focuses on the use of electricity from renewable sources. The Asahi Europe is also committed to working towards Science Based Targets leading to the avoidance of global warming of more than 1.5°C. (Plzeňský Prazdroj, 2023)

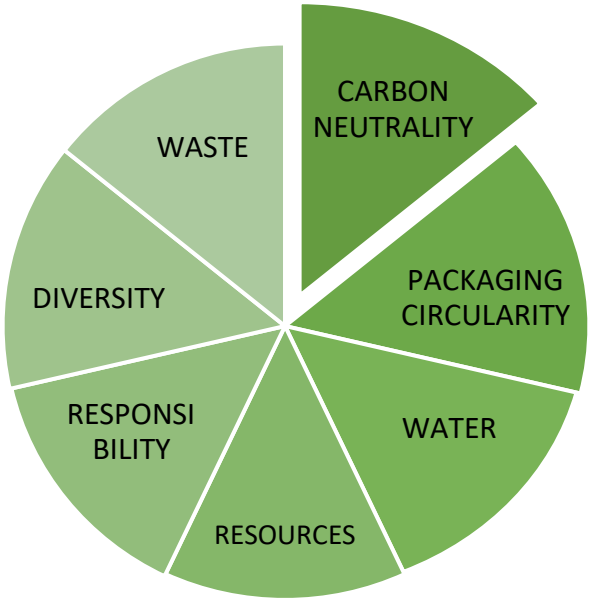

Fig. 17: Pillars of the strategy of Plzeňsky Prazdroj, a.s.

Source: Plzeňský Prazdroj, 2023

Transition to renewables

A significant decrease in emissions occurred after the Pilsen plant switched to renewable heat supply. The company buy woodchip heat from Plzeňská teplárenská, and one year after signing the contract for the supply of green steam, the brewery has reduced our carbon footprint by 38 thousand tonnes of CO_2. The total emissions of all breweries in the Czech Republic and Slovakia decreased by 47%, the Pilsen brewery alone reduced its emissions by a full 76%. The sustainability of the wood source was also confirmed by an audit carried out at the supplier. (Report about Sustainability in Plzeňský Prazdroj, 2023)

Also, in their report Plzeňský Prazdroj (2023) mentioned about in the breweries in Nošovice and Velke Popovice they produced wastewater treatment plants and used it to produce heat. At the sewage treatment plant in Velke Popovice company install photovoltaic panels for electricity production. Another installation of photovoltaics in Nošovice and in Veľký Šariš was planned for 2023.

Plzeňský Prazdroj has set itself certain goals for the future, which it must achieve in the period 2025-2050 to support the company's work under the European Green Deal. Figure 18 highlights just a few of these targets: (Plzeňský Prazdroj, 2023)

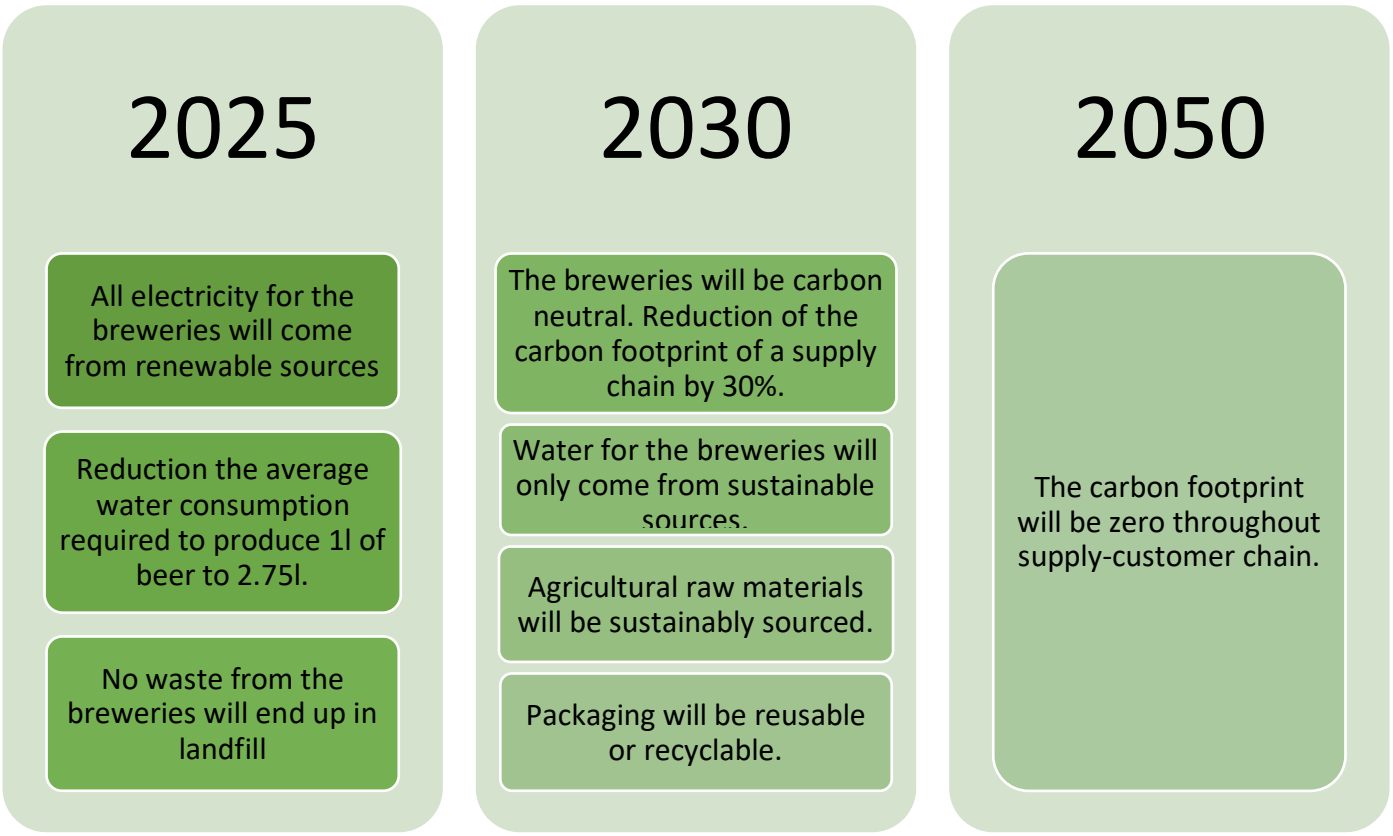

Fig. 18: Commitments for the future improvements

Source: Plzeňský Prazdroj, 2023

Plzeňský Prazdroj's carbon impact is greatly decreased by switching to returnable glass bottles, especially in light of the 2021 phase-out of PET bottles. The company's energy-efficient operations operate at 97.3% capacity around the clock, covering 31% of the Czech and Slovak markets with a new line in Velke Popovice that can produce 50,000 bottles per hour. During the installation process, downtime was utilized for updating the completely automated lager tanks and fixing any damaged floors. In addition to streamlining beer production, this 620 million Czech crown investment meets consumer demand for environmentally friendly packaging, making it a viable option for beverage packaging. (Report about Sustainability in Plzeňský Prazdroj, 2023)

Continuing electric vehicle testing with MB eSprinter and Volvo FL. In 2023, trialing heavy-duty electric MB Actros. Emphasizing efficient driving through driver training. Achieved 0.7% emissions reduction in secondary distribution. Strengthened train services on Plzeň - Veľký Šariš route, saving 70 tonnes of CO_2 annually.

The great improvement was highlighted in the sector of the Report of Plzeňský Prazdroj (2023), that reduction of the overall emissions for a considerable amount of time, as evidenced by the share of emissions in Scope 1 production and Scope 2 to our total emissions. Production of CO_2 emissions was 21% of total emissions in 2019, the year the company has chosen as the baseline for measuring emissions reductions. However, by 2022, that number had dropped to just

13%. Plzeňský Prazdroj has accounted for 9% of our total emissions in Scope 1, 2, and 3 from the Czech Republic and Slovakia in 2019.

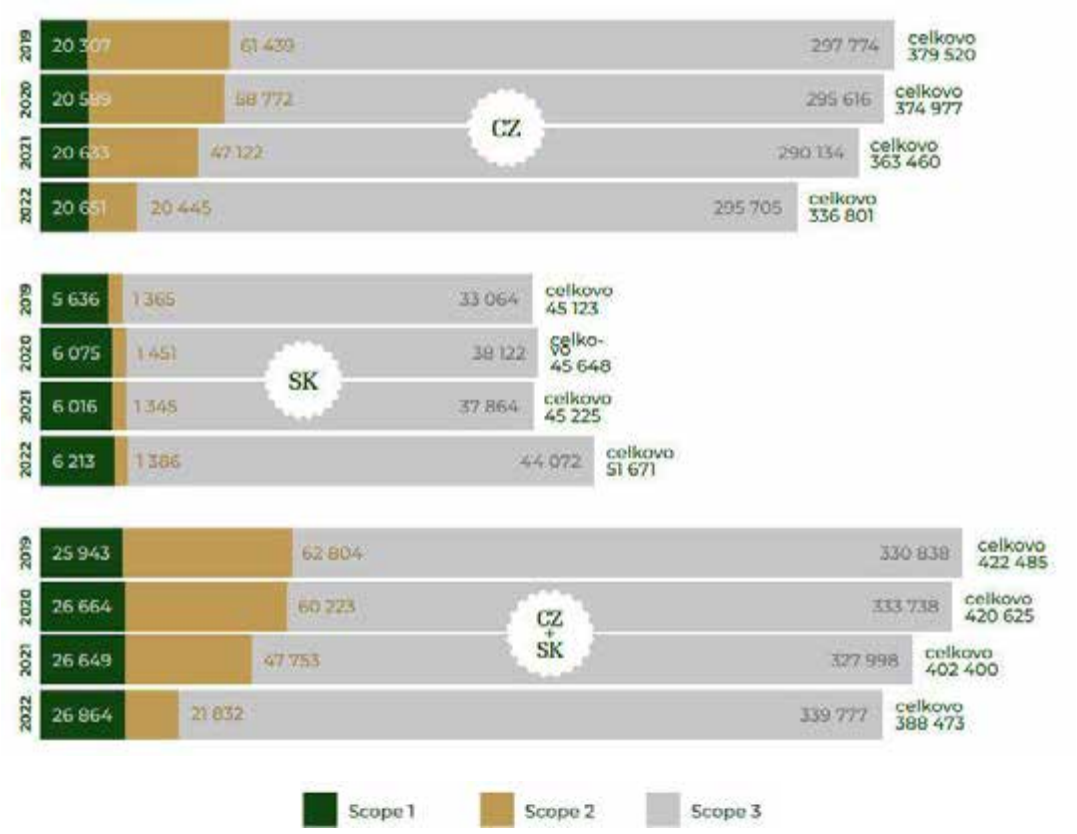

Fig. 19: Absolute emissions direct and indirect in tonnes (t CO_2e)

Source: Plzeňský Prazdroj, 2023

Figure 19 illustrates the total direct (as a Scope 1), indirect (Scope 2), and Additional indirect emissions arising from the value chain (Scope 3) emissions that were emitted during the period 2019-2022 in the Czech Republic and Slovakia by Plzeňský Prazdroj, a.s. & Plzeňský Prazdroj. In this graph we can see a significant improvement, that emissions have actually decreased over the years.

By 2030, the products will be produced exclusively in packaging that contains at least 50% recycled materials. Plzeňský Prazdroj strives to avoid plastic that is reused from virgin materials. The company is gradually abandoning the sale of beer in plastic bottles, actively reducing the amount of packaging and giving preference to recycled materials. They also advocate for reusable packaging. The enterprise reduces the thickness of cans and increase the content of recycled aluminum. Plzeňský Prazdroj's commitment to environmental stewardship and the circular economy is demonstrated by this sustainable packaging initiative. (Obaly, 2021)

Conclusion

Following the comprehensive review provided in this bachelor's thesis, the following important findings about how the European Green Deal would affect agri-food production in the EU may be made as a revolutionary project, the European Green Deal seeks to achieve carbon neutrality, advance sustainability, and encourage a green transition in a number of industries, including food systems and agriculture. The Green Deal is bringing about major changes in value chains, production techniques, and agricultural practices through its focused efforts, policy tools, and lofty targets.

The thesis is divided into the parts that can help understand and estimate the impact of the European Green Deal on the agri-food producers. This work can be summarized in 3 main parts:

1) Highlighting the modern promoting sustainable agri-food practices within the European Green Deal framework .

The two main policy frameworks influencing the direction of agri-food production in the EU going forward are the Common Agricultural Policy (CAP) and the Farm to Fork Strategy. These policies advocate for sustainable farming practices, encourage the adoption of environmentally friendly production methods, and incentivize the transition towards a more circular and resource-efficient food system. Agri-food producers must adjust to the demands and goals of the European Green Deal, which presents both opportunities and problems. Higher prices, greater operational efficiency, and the ability to obtain incentives and certifications for sustainable practices are some of the possible economic benefits, even though compliance with laws, environmental standards, and the switch to green production methods may necessitate additional costs and operational adjustments.

2) Analysis of the impact of the European Green Deal on agri-food production , within needing changes that are required to achieve the goals that are set by the European Union.

The agri-food industry must make a concentrated effort to promote innovation, embrace cutting-edge technologies, and enable knowledge transfer if the Green Deal is to be implemented successfully. New technologies are essential for lowering environmental impact and increasing resource efficiency. Examples include digitalization, precision agriculture, and sustainable packaging.

3) Case study that shows how implementation of the EGD rules could be done on the example of the Czech company - Plzeňský Prazdroj .

The Plzeňský Prazdroj case study represents a concrete example of the implementation of the principles of the European Green Deal in a leading agri-food company. The company demonstrates through measures such as switching to renewable energy sources, implementing sustainable packaging concepts and aligning with the goals of the United Nations for Sustainable Development's commitment to environmental protection and responsible business practices. It is worth noting that Plzeňský Prazdroj has made significant progress in reducing its carbon footprint by switching to renewable heat and using wood chips as an energy source. As a result of this transition, emissions at its breweries in the Czech Republic and Slovakia decreased by 47% and in Pilsen by 76%. The company has also set itself ambitious goals for the future. In particular, it wants to achieve zero greenhouse gas emissions by 2050, increase the use of renewable energy sources and switch to packaging materials containing at least 50% recycled content by 2030. These commitments demonstrate Plzeňský Prazdroj's commitment to sustainable practices in its operations and are in line with the goals of the Green Deal.

A multitude of academics have conducted in-depth analyses of the impact of the European Union (EU) on agri-food production, providing insight into the difficulties involved in integrating organic practices in this industry. Müller and Schmidt (2020), for example, examine the challenges involved in switching to organic agricultural methods and stress the necessity of all-encompassing legislative frameworks to assist with these kinds of projects. In a similar vein, Mercier (2019) emphasizes the advantages organic agriculture has for the environment and the economy, highlighting how it can improve food production systems' sustainability. Furthermore, Smith et al. (2018) emphasize the significance of coordinating policies with environmental goals as they address how EU rules influence agri-food practices.

Although there are acknowledged benefits to using organic processes, there are significant obstacles to its use. According to Jones (2021), farmers frequently struggle to control diseases and pests without the use of synthetic inputs, which can result in output losses and unstable financial conditions. Additionally, Fritz and Matopoulos (2018) notes that small-scale producers face obstacles as a result of the need for large infrastructure and training investments associated with the switch to organic production.

Achieving the ambitious goals of the European Green Deal requires further joint efforts, political support and a holistic approach involving all actors in the agri-food value chain. This applies to reducing greenhouse gas emissions and preserving biodiversity in the EU agricultural sector.

To sum up, the European Green Deal serves as a crucial foundation for determining how sustainable agri-food production will develop in the Union. The Green Deal seeks to balance

economic growth and environmental protection by addressing environmental issues, encouraging creative solutions, and facilitating the shift to a circular and resource-efficient food system. This will ensure the agri-food sector's long-term viability and resilience within the EU.

Resume

Európska zelená dohoda predstavuje ambiciózny plán pre Európsku úniu, ako sa do roku 2050 stať uhlíkovo neutrálnou a podporiť udržateľný rozvoj vo všetkých odvetviach vrátane poľnohospodárstva a výroby potravín. Táto bakalárska práca analyzuje dôsledky Zelenej dohody pre výrobcov poľnohospodárskych a potravinárskych výrobcov pri prechode na ekologickejšie postupy.

V teoretickej časti sú načrtnuté kľúčové environmentálne ciele, ako je dosiahnutie čistých nulových emisií, zachovanie biodiverzity a vytvorenie udržateľných potravinových systémov do roku 2030. Zníženie emisií skleníkových plynov z poľnohospodárstva je najvyššou prioritou, pričom do roku 2030 sa majú znížiť minimálne o 55 % v porovnaní s úrovňami z roku 1990.

Hoci politické nástroje, ako je spoločná poľnohospodárska politika a stratégia "z farmy na stôl", poskytujú rámce a stimuly, výrobcovia poľnohospodárskych potravín čelia pri zavádzaní udržateľných metód značným výzvam. Patrí sem dodržiavanie sprísňujúcich sa environmentálnych predpisov, vyššie prevádzkové náklady vyplývajúce z prechodu na nové výrobné postupy, investície do nových technológií a zabezpečenie odbornej prípravy pracovnej sily.

Existujú však aj príležitosti prostredníctvom prémií na výrobky za udržateľnú ponuku, zvýšenie efektívnosti vďaka optimalizovaným postupom, ekonomické stimuly a dotácie na ekologické iniciatívy a dlhodobé výhody v oblasti odolnosti. Pre výrobcov bude mať rozhodujúci význam podpora inovácií a zdieľanie poznatkov.

Analyzuje sa súčasný stav agropotravinárskej výroby v EÚ, pričom sa zdôrazňuje jej hospodársky význam, ale aj naliehavá potreba znížiť jej uhlíkovú stopu a vplyv na životné prostredie v súlade s cieľmi Zelenej dohody. Kľúčové odvetvia, ako je spracovanie potravín a nápojov, musia uskutočniť zásadné zmeny v oblasti udržateľnosti.

Práca poskytuje hĺbkovú prípadovú štúdiu Plzeňského Prazdroja, popredného českého pivovaru, ktorá ilustruje, ako agropotravinárske spoločnosti prijímajú a implementujú zásady európskej Zelenej dohody.

Plzeňský Prazdroj zaviedol integrovaný systém riadenia udržateľnosti zosúladený s medzinárodnými normami pre kvalitu, bezpečnosť potravín, ochranu životného prostredia a energetický manažment. Formálne sa tiež zaviazal k vedecky podloženým cieľom znižovania emisií prostredníctvom iniciatív, ako je RE100 pre využívanie obnoviteľných zdrojov energie.

Medzi konkrétne prijaté opatrenia patrí transformačná investícia vo výške 620 miliónov EUR na zvýšenie obsahu recyklovaných materiálov v obaloch, ktorej cieľom je do roku 2030 dosiahnuť aspoň 50 % recyklovaných materiálov a zároveň postupne vyradiť plasty. Prazdroj tiež uprednostňuje opakovane použiteľné sklenené fľaše pred jednorazovými obalmi.

Pivovar uskutočnil zásadnú energetickú zmenu, keď svoj najväčší závod v Plzni prešiel na obnoviteľné teplo z drevnej štiepky. Vďaka tomu sa emisie v tomto pivovare znížili o 76 %. Ďalšie iniciatívy v oblasti obnoviteľných zdrojov energie, ako je fotovoltaika, sa plánujú aj v ďalších prevádzkach.

Celkovo sa emisie z prevádzky Prazdroja znížili o 47 % vďaka opatreniam, ako je prechod na vykurovanie a zvýšenie účinnosti. Spoločnosť si stanovila ambiciózne budúce ciele vrátane dosiahnutia čistých nulových emisií do roku 2050 vo všetkých oblastiach.

Okrem emisií Prazdroj zosúlaďuje svoje postupy s cieľmi trvalo udržateľného rozvoja OSN v oblastiach, ako sú čistá energia, zodpovedná výroba, udržateľné komunity a opatrenia v oblasti klímy. Poskytuje úplné správy o udržateľnosti podľa štandardov GRI.

Z analýzy vyplýva, že na to, aby agropotravinárski výrobcovia splnili ciele Zelenej dohody, je potrebná holistická transformácia v celom hodnotovom reťazci - od udržateľného získavania surovín, optimalizácie výrobných procesov pre energetickú/zdrojovú efektívnosť, zavádzania obnoviteľných zdrojov energie, uprednostňovania ekologického balenia/dopravy a v konečnom dôsledku dodávania výrobkov s nižšou uhlíkovou stopou.

Vyžaduje si to kapitálové investície do čistých technológií, komplexné uhlíkové účtovníctvo, schopnosti dodržiavania právnych predpisov, školenia zamestnancov a zapojenie na všetkých úrovniach. Rozhodujúcimi faktormi budú spoločné prístupy v rámci dodávateľských reťazcov, politická podpora a ekonomické stimuly zo strany vlád a proaktívne environmentálne riadenie zo strany vedúcich predstaviteľov priemyslu.

Hoci sú výzvy obrovské, Zelená dohoda predstavuje pre výrobcov poľnohospodárskych potravín príležitosť, ako zabezpečiť budúcnosť svojich prevádzok, zlepšiť povesť značky, získať prémie za udržateľnosť a viesť prechod k zabezpečeniu dlhodobej výroby potravín v rámci environmentálnych hraníc.

Bibliography

1. Altieri, M. A., & Nicholls, C. I. (2004). Biodiversity and pest management in agroecosystems. Biodiversity and pest management in agroecosystems, 1-16.
2. ALEXANDROVA-STEFANOVA, Nevena, et al. (2023). Harvesting change: Harnessing emerging technologies and innovations for agrifood [Online]. Rome: Food and Agriculture Organization of the United Nations. Available from: https://openknowledge.fao.org/server/api/core/bitstreams/03d82fe7-49e5-4077-8aa6-2d0f3c1893b4/content
3. APLANET. (2022). European Green Deal: Objectives and Initiatives for a Sustainable Future. Aplanet. [Online]. 31 October 2022. Available from: https://aplanet.org/resources/european-green-deal-objectives-and-initiatives-for-a-sustainable-future/
4. BERTI, Giaime. (2020). Sustainable Agri-Food Economies: Re-Territorialising Farming Practices, Markets, Supply Chains, and Policies. Agriculture. 5 March 2020. Vol. 10, no. 3, p. 64. DOI https://doi.org/10.3390/agriculture10030064.
5. Biodiversity and ecosystems. (2023). international-partnerships.ec.europa.eu. [Online]. Available from: https://international-partnerships.ec.europa.eu/policies/climate-environment-and-energy/biodiversity-and-ecosystems_en#the-eu-biodiversity-strategy
6. Biodiversity for Life | Capacity4dev. (2014). capacity4dev.europa.eu. [Online]. Available from: https://capacity4dev.europa.eu/groups/b4life_en
7. BORSELLINO, Valeria, SCHIMMENTI, Emanuele and EL BILALI, Hamid. (2020). Agri-Food Markets Towards Sustainable Patterns. Sustainability. [Online]. 12 March 2020. Vol. 12, no. 6, p. 2193. DOI https://doi.org/10.3390/su12062193.
8. CAMPBELL, Bruce M., et al. (2017). Agriculture production as a major driver of the earth system exceeding planetary boundaries. Ecology and Society. 2017. Vol. 22, no. 4. DOI https://doi.org/10.5751/es-09595-220408.
9. COOKCED. (2018). Archive:Agri-environmental Indicator - Greenhouse Gas Emissions. ec.europa.eu. [Online]. 21 February 2018. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Agri-environmental_indicator_-_greenhouse_gas_emissions&oldid=374989
10. DIRECTORATE-GENERAL FOR AGRICULTURE AND RURAL DEVELOPMENT. (2021). Annual activity report 2020 - Agriculture and Rural Development. commission.europa.eu. [Online]. 8 June 2021. Available from: https://commission.europa.eu/publications/annual-activity-report-2020-agriculture-and-rural-development_en

11. DIRECTORATE-GENERAL FOR AGRICULTURE AND RURAL DEVELOPMENT. (2023). Access to finance remains insufficient for farmers and agri-food SMEs - European Commission. agriculture.ec.europa.eu. [Online]. 12 October 2023. Available from: https://agriculture.ec.europa.eu/news/access-finance-remains-insufficient-farmers-and-agri-food-smes-2023-10-12_en
12. Diverzita. (2024). udrzatelnost.prazdroj.sk. [Online]. Available from: https://udrzatelnost.prazdroj.sk/diverzita/
13. Environmental Compliance. (2020). ComplianceQuest QHSE Solutions. [Online]. Available from: https://www.compliancequest.com/environmental-compliance/
14. EUROPEAN COMMISSION. (2019). The European Green Deal. eur-lex.europa.eu. [Online]. 11 December 2019. Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52019DC0640
15. EUROPEAN COMMISSION. (2021). CAP 2023-27. agriculture.ec.europa.eu. [Online]. 2021. Available from: https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/cap-2023-27_en
16. EUROPEAN COMMISSION. (2023). Key figures in the European food chain 2023 edition. ec.europa.eu. [Online]. November 2023. Available from: https://ec.europa.eu/eurostat/documents/15216629/18054337/KS-FK-23-001-EN-N.pdf
17. EUROPEAN COMMISSION. (2024). The European Green Deal. European Commission. [Online]. 2024. Available from: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en
18. EUROPEAN COMMISSION. (2020). Farm to Fork Strategy. food.ec.europa.eu. [Online]. 2020. Available from: https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en
19. EUROPEAN ENVIRONMENT AGENCY. (2022). Is Europe reducing its greenhouse gas emissions? www.eea.europa.eu. [Online]. 22 June 2022. Available from: https://www.eea.europa.eu/themes/climate/eu-greenhouse-gas-inventory/is-europe-reducing-its-greenhouse
20. EUROSTAT. (2022). European business statistics regulation. ec.europa.eu. [Online]. 2022. Available from: https://ec.europa.eu/eurostat/web/prodcom/legislationEurostat
21. EUROSTAT. (2023a). Key Figures on Europe | 2023 Edition. [Online]. 2023. Available from: https://ec.europa.eu/eurostat/documents/15216629/17706595/KS-EI-23-001-EN-N.pdf/5df7a393-8461-9270-7eaa-91a4b1c2acc6?version=4.0&t=1707831012194
22. EUROSTAT. (2023b). Performance of the Agricultural Sector. ec.europa.eu. [Online]. November 2023. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Performance_of_the_agricultural_sector

23. EUROSTAT. (2023c). Forests, forestry and logging. ec.europa.eu. [Online]. December 2023. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Forests,_forestry_and_logging
24. EUROSTAT COMEXT. (2024). Monitoring EU Agri-food trade. [Online]. Available from: https://agriculture.ec.europa.eu/document/download/b2e5ee02-4a25-4a6b-9663-92dbee9eb211_en?filename=monitoring-agri-food-trade_dec2023_en.pdf
25. FAIRLIE, Simon. (2012). Maximizing Soil Carbon Sequestration: Carbon Farming and Rotational Grazing – Mother Earth News. www.motherearthnews.com. [Online]. 2012. Available from: https://www.motherearthnews.com/homesteading-and-livestock/soil-carbon-sequestration-rotational-grazing-ze0z1208zkon/#axzz2PmJWctkM
26. FAO. (2004). The State of Agricultural Commodity Markets. Google.com. [Online]. 2004. Available from: https://scholar.google.com/scholar_lookup?title=The+State+of+Agricultural+Commodity+Markets+2004&author=FAO&publication_year=2004
27. FAO. (2022). The future of food and agriculture – Drivers and triggers for transformation. [Online]. 3. FAO. ISBN 978-92-5-136639-4. Available from: https://openknowledge.fao.org/items/66a787f4-af91-4f6e-b436-560010ab72d4
28. FAO. (2023). Conservation Agriculture | Food and Agriculture Organization of the United Nations. www.fao.org. [Online]. 2023. Available from: https://www.fao.org/conservation-agriculture/en/
29. FERREIRA, Jo-Anne Louise. (2010). Sustainable Agriculture and Rural Development. Teaching and Learning for a Sustainable Future. [Online]. 2010. Available from: https://www.researchgate.net/publication/265209434_Sustainable_Agriculture_and_Rural_Development
30. FOOD AND AGRICULTURE ORGANIZATION. (2024). Indicator 2.4.1. fao.org. [Online]. 2024. Available from: https://www.fao.org/sustainable-development-goals-data-portal/data/indicators/Indicator2.4.1-proportion-of-agricultural-area-under-productive-and-sustainable-agriculture/en
31. FRITZ, Melanie and MATOPOULOS, Aristides. (2018). Sustainability in the agri-food industry: a literature review and overview of current trends. In: 8th International Conference on Chain Network Management in Agribusiness the Food Industry. [Online]. May 2018. Available from: https://www.researchgate.net/publication/273627391_Sustainability_in_the_agri-food_industry_a_literature_review_and_overview_of_current_trends

32. Greenhouse Gas Emissions from Agriculture in Europe. (2022). European Environment Agency. [Online]. Available from: https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-agriculture
33. Greenhouse Gas Emissions from Agrifood Systems Global, Regional and Country trends, 2000-2020 Greenhouse Gas Emissions from Agrifood Systems Global, Regional and Country trends, 2000-2020 FAOSTAT Analytical Brief 50 FAOSTAT EMISSIONS BACKGROUND. (2022). Online. Food and Agriculture Organization of the United Nations. Available from: https://openknowledge.fao.org/server/api/core/bitstreams/121cc613-3d0f-431c-b083-cc2031dd8826/content
34. HORÁČEK, Filip, BARÁK, Michal and ČERNÝ, Aleš. (2015). MAPA: Komu patří pivovary v Česku? Čtyři piva z deseti jsou z Prazdroje Zdroj. iDNES.cz. [Online]. 14 October 2015. Available from: https://www.idnes.cz/ekonomika/podniky/podily-pivovaru-na-tuzemskem-trhu.A151014_105550_ekoakcie_fih
35. IFOAM. (2020). Food security and agricultural and food policy in the EU. IFOAM Organics Europe Publications. [Online]. 2020. Available from: https://read.organicseurope.bio/publication/eu-food-and-farming-policy-and-food-security/food-security-and-agricultural-and-food-policy-in-the-eu/
36. Kyoto Protocol. (2023). ec.europa.eu. [Online]. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Kyoto_Protocol
37. MASSO MARTI, Albert. (2021). The Farm to Fork Strategy Implications for Agriculture and the CAP: Research for AGRI Committee. [Online]. Publications Office of the European Union. Available from: https://op.europa.eu/en/publication-detail/-/publication/b552e7e0-1f40-11ec-bd8e-01aa75ed71a1/language-en/format-PDF/source-241965823
38. MILICEVIC, Vera. (2023). The Common Agricultural Policy – Instruments and Reforms | Fact Sheets on the European Union | European Parliament. EuropeanParliament.eu. [Online]. October 2023. Available from: https://www.europarl.europa.eu/factsheets/en/sheet/107/the-common-agricultural-policy-instruments-and-reforms
39. NĚMEČKOVÁ, Jitka. (2017). Martin Grygařík obchodním ředitelem Pivovarů Topvar. Prazdroj. [Online]. 11 January 2017. Available from: https://www.prazdroj.cz/martin-grygarik-obchodnim-reditelem-pivovaru-topvar
40. Obaly. (2021). udrzatelnost.prazdroj.sk. [Online]. Available from: https://udrzatelnost.prazdroj.sk/obaly/
41. OPIVE.SK. (2018). Prazdroj pracuje na rozšírení, kapacita stúpne o tretinu. opive.sk. [Online]. 11 February 2018. Available from: https://opive.sk/prazdroj-pracuje-na-rozsireni-kapacita-stupne-o-tretinu/

42. PLZEŇSKÝ PRAZDROJ. (2023). Správa O Udržateľnosti 2022. [Online]. 2023. Available from: https://udrzatelnost.prazdroj.sk/wp-content/uploads/2023/10/Plzensky-Prazdroj_Sprava-o-udrzatelnosti-2022.pdf
43. PLZEŇSKÝ PRAZDROJ, A.S. (2022). Exports. Prazdroj.cz. [Online]. 2022. Available from: https://www.prazdroj.cz/en/exports
44. PLZEŇSKÝ PRAZDROJ SLOVENSKO, A.S. (2023). Integrated Management System Policy. [Online]. 1 March 2023. Available from: https://www.prazdroj.cz/cospospohzeg/uploads/2023/03/Politika-_EN_2023.pdf
45. Plzeňský Prazdroj Slovensko, a.s. (2022). Pivnety.sk. [Online]. Available from: https://pivnety.sk/sk/plzensky-prazdroj-slovensko
46. QIMA. (2024). What Is the EU Green Deal? Goals, Key Legislation, and Impacts on Business. blog.qima.es. [Online]. 7 March 2024. Available from: https://blog.qima.es/sustainability/what-is-eu-green-deal
47. Reform of the Common Agricultural Policy (CAP). (2021). eur-lex.europa.eu. [Online]. Available from: https://eur-lex.europa.eu/EN/legal-content/summary/research-and-innovation/farm-reform-cap-2021_en.htm
48. Scholar. (2020). Assessment of the EU's Pesticide Risk Indicators as a Tool for Measuring Progress on the Sustainable Use of Pesticides. Scholar. [Online]. Available from: https://scholar.google.com/scholar_lookup?journal=The+Journal+of+Environmental+Management&title=Assessment+of+the+EU%E2%80%99s+Pesticide+Risk+Indicators+as+a+Tool+for+Measuring+Progress+on+the+Sustainable+Use+of+Pesticides&author=&publication_year=2020&volume=&issue=&pages=&doi=
49. Statistical classification of economic activities in the European Community. (2021). European Commission. [Online]. Available from: https://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NACE_REV2&StrLanguageCode=EN
50. UNEP. (2019). Commonalities and Differences in Soil Erosion Assessments for Global Change Studies: A Review. Frontiers in Earth Science. [Online]. 4 July 2019. Vol. 7, p. 193. DOI https://doi.org/10.3389/feart.2019.00193.
51. United Nations. (2023). Report of the Secretary-General on the state of food security and nutrition in the world 2023. Food and Agriculture Organization of the United Nations. [Online]. 2023. Available from: http://www.fao.org/3/cb4985en/CB4985EN.pdf
52. United Nations. (2024). FAO Food Price Index. Food and Agriculture Organization of the United Nations. [Online]. 2024. Available from: http://www.fao.org/worldfoodsituation/foodpricesindex/en/

53. United Nations. (2021). Greenhouse Gas Emissions from Agriculture. [Online]. Available from: https://www.un.org/sustainabledevelopment/blog/2021/06/greenhouse-gas-emissions-from-agriculture/
54. United Nations. (2024). Land Degradation Neutrality. [Online]. Available from: https://www.un.org/sustainabledevelopment/infrastructure-industrialization/
55. United Nations. (2022). Neglected and underutilized species for food and agriculture. Food and Agriculture Organization of the United Nations. [Online]. Available from: http://www.fao.org/3/x8041e/x8041e.pdf
56. United Nations. (2020). State of the World's Biodiversity for Food and Agriculture. Food and Agriculture Organization of the United Nations. [Online]. 2020. Available from: http://www.fao.org/3/ca8839en/ca8839en.pdf
57. United Nations. (2022). Sustainable Development Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture. [Online]. Available from: https://www.un.org/sustainabledevelopment/hunger/
58. United Nations. (2021). Sustainable Development Goals: 17 Goals to Transform Our World. [Online]. Available from: https://www.un.org/sustainabledevelopment/sustainable-development-goals/
59. United Nations. (2023). The State of Food Security and Nutrition in the World 2023. Food and Agriculture Organization of the United Nations. [Online]. 2023. Available from: http://www.fao.org/3/cb4985en/CB4985EN.pdf
60. United Nations. (2021). World Population Prospects 2021. United Nations Department of Economic and Social Affairs. [Online]. Available from: https://population.un.org/wpp/Download/Standard/Population/
61. Vogelsang, Stefan, et al. (2017). The Sustainable Intensification of Agricultural Systems. Sustainability. [Online]. 2017. Vol. 9, no. 3, p. 422. DOI https://doi.org/10.3390/su9030422.
62. WBGU. (2011). World in Transition: A Social Contract for Sustainability. German Advisory Council on Global Change (WBGU). [Online]. 2011. Available from: https://www.researchgate.net/publication/273016618_World_in_Transition_A_Social_Contract_for_Sustainability
63. World Bank. (2024). Agriculture, Forestry and Other Land Use (AFOLU). [Online]. Available from: https://www.worldbank.org/en/topic/agriculture/overview