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From Farm to Table: Enhancing Agricultural Sustainability and Social Justice

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Abstract

The thesis explores how to make the agri-food system more sustainable and fair, addressing in an integrated way the environmental and social issues that characterise contemporary agriculture. It aims to investigate the current problems of this sector and suggest regulatory solutions that can effectively foster sustainability.

The adopted methodology combines the analysis of case studies and current EU regulation with a qualitative empirical research conducted through semi-structured interviews with twenty small farmers in Italy. Through the study of concrete cases, the Rodale Institute in the United States, the organic cultivation of Pu'er tea in China, and the Ferrari Farm in Italy, alternative agricultural practices that promote soil health and the rational use of resources are illustrated. Furthermore, through the case studies of Brazil and Sierra Leone, the thesis explores the social repercussions of intensive agriculture and a global value chain governed by the imperatives of productivity and profit maximisation.

Among the main findings, it emerges that sustainable agricultural models offer better performance in terms of soil health, climate resilience, emissions reduction, and long-term profitability. However, there remain significant obstacles to their diffusion. Moreover, the analysis of the European regulatory framework highlights a strong strategic ambition but also numerous implementation contradictions. The interviews confirm the existence of a gap between the objectives of European policies and the concrete experiences of farmers, especially in relation to the Common Agricultural Policy and available subsidies.

Finally, the thesis proposes a set of recommendations useful for regulating agriculture to encourage sustainability and improve the critical issues identified in the analysis. The results offer useful insights for rethinking agricultural policies, hoping for the development of regulatory and financial instruments more consistent with long-term objectives in terms of climate, biodiversity, and human rights.

Key words: sustainable agriculture; monocultures; soil degradation; biodiversity; farmers; agribusiness; social sustainability; hydroponics; agri-food chain; global supply chain; global value chain; exploitation of labour; ecological transition; European Green Deal, Farm to Fork, Common Agricultural Policy; KPIs.

Glossary

- *Abiotic distress*: Set of harmful environmental conditions that reduce plant growth and productivity. E.g., drought, high salinity, oxidative stress, and extreme temperatures (Kopecká et al., 2023).
- *Nitrogen*: Fundamental macronutrient of plants necessary for chlorophyll generation, foliage development, and overall plant growth, protein synthesis, and enzyme and DNA formation (Fageria & Baligar, 2005).
- *Tillage*: Distribution of the soil to control weeds, making fertilisers more efficient, and improving aeration, root penetration, and water filtration (Angon et al., 2023).
- *Carbon Footprint*: The measurement of the amount of carbon dioxide produced by a certain activity (Cambridge University Press, n.d.-c).
- *Soil health*: Soil's capability to sustain the productivity, diversity, and environmental services of land-based ecosystems (Intergovernmental Technical Panel on Soils, 2020).
- *Biodiversity*: The variety of Earth's living species. It includes animals, plants, bacteria, and fungi (The Wise Apple, 2025).
- *Regenerative Agriculture*: Holistic farming practice to improve air and water quality, biodiversity, and the soil's capability of storing carbon (FAO, 2022).
- *Hydroponics*: Cultivation method that uses water instead of soil to transport nutrients to plants (Pontetti, 2024).
- *Monocultures*: Agricultural system based on the intensive cultivation of a single crop over a large area to increase productivity at the expense of biodiversity and ecosystem resilience (ZeroCO2, n.d.).
- *Agribusinesses*: Typically refers to large-scale, capitalist, industrialised agriculture and supply chains. It includes production, input manufacture, processing, and distribution of agricultural goods (Ioris, 2018).
- *Food insecurity*: When individuals lack regular access to an adequate amount of safe and nutritious food required for normal growth and a healthy life (FAO, n.d.).
- *UTPs*: Unfair Trading Practices. They are practices that significantly depart from good commercial conduct, do not align with good faith and fair dealing principles, and are unilaterally imposed by a party on another (European Commission, 2014).
- *SMEs*: Small and Medium Enterprises. They are enterprises with less than 250 employees and with an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million (European Commission, 2003).
- *Caporalato*: informal or illegal recruitment of workers by an intermediary (the Caporale) who provides a job in exchange for a share of the workers' wages (Omizzolo, 2020).

- *Smuggling*: organise or assist the illegal entry of a person into a State of which he or she is not a citizen or permanent resident, to obtain economic or material gain, directly or by distribution (United Nations Office on Drugs and Crime, 2000).
- *Human Trafficking*: serious crime and human rights violation involving the recruitment, transport, or harbouring of persons through force, deception, or coercion for exploitation. There is no official definition, this is the one provided by the Palermo Protocol.
- *Forced labour*: according to Art. 2(1) of ILO Convention No. 29, 1930 (Forced Labour Convention) "*the term forced or compulsory labour shall mean all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily*" (ILO, 1930).
- *EGD*: European Green Deal. It is a programme proposing to build a cleaner, healthier, and climate-neutral Europe by transforming production and consumption patterns (European Council, n-d).
- *F2F*: Farm to Fork. It is the strategy part of the Green Deal with the aim of making the food system sustainable (SlowFood, n.d.).
- *CAP*: Common Agricultural Policy. Supports agricultural producers and ensures food security in the EU (European Commission, n.d.-n).
- *CRSD*: Corporate Sustainability Reporting Directive. It is the EU Directive requiring large and listed companies to publish regular reports on the environmental and social risks they face, as well as the effects of their operations on people and the environment (European Commission, n.d.-i).
- *CSDDD*: Corporate Sustainability Due Diligence Directive. It is the EU Directive fostering sustainable and responsible corporate behaviour in companies' operations and across their global value chains (European Commission, n.d.-l).
- *EU Taxonomy*: What the EU is doing to develop a system for classifying sustainable activities across the EU. The Taxonomy Regulation entered into force in 2020 (European Commission, n.d.-m).
- *CBAM*: Carbon Border Adjustment Mechanism. It is the EU's tool to put a fair price on the carbon emitted during the production of carbon-intensive goods imported into the EU (European Commission, n.d.-g).
- *GSC*: Global Supply Chain. It is the network of organisations, persons, resources, information, processes, and technology entailed in the production of a good, starting from the delivery of source material to the delivery to the final consumer (Islam, 2023).
- *GVC:* Global Value Chain. It is the systemic and coordinated structures of the organisation of economic activity (Lianos et al., 2022).

0. Introduction

Every day, millions of people put food on the table without knowing what happens before it gets there. Behind a kilo of tomatoes or a pack of pasta lie political choices, imbalances of power, and too often, exploitation. Agriculture, once a symbol of care for the land and those who cultivate it, is today at the centre of profound contradictions.

According to the latest FAOSTAT data release, approximately one-third of all anthropogenic greenhouse gas emissions originate from the agrifood systems, primarily involving crop production activities, land-use change, and pre- and post-production processes within the food supply chain. In 2022, the emissions of these systems reached 16.2 billion tonnes of CO2, 10% more than in the year 2000 (FAO, 2024). Regarding the European Union specifically, agriculture is responsible for 11% of the EU's greenhouse gas emissions (3% more than the industrial sector). Between 1990 and 2019, there was a 20.5% reduction in emissions, also due to a decrease in the use of fertilisers (Boix-Fayos & de Vente, 2023).

What we do with cropland is very important since healthy soil is essential to absorb carbon dioxide and combat climate change; it allows us to better manage climate crises and create a resilient food system. Nevertheless, what are considered "conventional" agricultural practices often exploit the land, use substances that are harmful to both the environment and to us humans, cause deforestation, soil degradation, and loss of biodiversity.

The environmental issue is not the only one characterising the agri-food system. The global value chain is extremely complex and stratified: it spans continents, various regulatory frameworks, and a multitude of actors with unequal bargaining power. As will be analysed in the course of the thesis, it is based on dynamics of power and exploitation that affect both small farmers, penalised by reduced margins and competition imposed by large buyers, and local communities, forced to suffer the environmental and social consequences of an industrialised agricultural system oriented to profit maximisation. It is crucial to comprehend these mechanisms to envision just and efficient solutions that can guarantee a sustainable future for both producers and consumers.

This thesis will discuss how to develop a more sustainable food system, starting from agricultural practices, addressing the conditions of workers, and finally identifying the policies that can improve the system.

0.1. The paradox of the current agricultural system

The current agricultural system contains a paradox. On the one hand, it aims to maximise production through monocultures and intensive cultivation. As will be analysed in Chapter 1, conventional practices include attitudes that are often harmful to the soil, such as tillage and the use of chemical fertilisers and

pesticides. On the other hand, it aims to become sustainable, as indicated by the objectives of European regulations, including the Green Deal. It is clear that these goals are contradictory.

Nevertheless, such a system did not always define agricultural production. As stated by Frank Uekötter, MaMoGH project coordinator and environmental humanities professor at the University of Birmingham in the United Kingdom, "*A couple of centuries ago, farmers produced multiple crops to feed their families and maybe put aside some surplus as a safeguard for the coming year. Only if they had an outstanding harvest were they able to sell some of their product*" (European Commission, 2023). Monocultures became prevalent in 1945, and nowadays they supply much of the food we consume, including wheat, rice, corn, sugar cane, rapeseed, coffee, tea, and cocoa (Salaheen & Biswas, 2019). The reason behind their popularity is that, as stated by Uekötter, "*Specialisation meant more efficient planting and harvesting, fewer types of expensive equipment, fewer labourers with specialised knowledge of individual crops, and strengthened knowledge of one value chain and commercial market, including all its regulations and tariffs*". Therefore, more efficiency means more productivity and profit. These systems have been favoured by Governments, even through subsidies (European Commission, 2023).

However, in aiming to maximise production, both the well-being of the environment and the people who work within this sector are put aside. As will be explored in this thesis, this corporate-dominated model penalises many communities and workers while generating significant negative environmental impacts. At this point, it is legitimate to ask who the real beneficiaries of this model are.

0.2. Towards sustainable agriculture

Currently, there is no official or widely recognised definition of *agricultural sustainability*; instead, the term is still broad, multifaceted, and open to various interpretations and paradigms, reflecting the complexity and diversity of the associated environmental, social, and economic issues.

The concept will be better explored in Chapter 1; however, to provide a brief introduction, it can be noted that Velten et al. (2015) have identified five main perspectives on the topic, summarised in the following table.

Cluster	Brief description	Main focus
Anthropocentric Goals Cluster	Human-centric perspective: Agriculture as a tool to ensure economic viability, food security, and stable living conditions. It aims to meet human needs and improve the quality of life of farmers.	Economic and social aspects

Production and Overarching Goals-Centered Cluster	Balance between production and sustainability. Promotes productivity while maintaining some environmental concerns. Recognises multiple roles of agriculture.	Productivity with environmental awareness
Systems Thinking Cluster	Focused on long-term sustainability, it promotes a collaborative approach between stakeholders and decentralised decisions to enhance local communities. It highlights the need for sustainable governance at multiple scales, with attention to biodiversity conservation and natural practices.	Collaborative and sustainable governance
Comprehensive Cluster	Integrates all three dimensions of sustainability (economic, social, environmental). Encourages continuous improvement through learning, innovation, and adaptive management. Supports local empowerment and a holistic vision.	Integrated and multidimensional sustainability
Knowledge and Science Cluster	Priority to scientific knowledge, technological innovation, and precision agriculture. Combine research and sustainability to improve the agricultural system.	Innovation and technology

These clusters are empirical categories that emerged from the quantitative analysis of data collected by Velten et al. (2015) through their research. They derive from two main positions: the Techno-Economic Position and the Agroecological-Ruralist Position. The former emphasises the importance of economic efficiency, agricultural productivity, and the central role of modern technology and applied sciences. Agricultural management is seen as a system in which the market and technology are fundamental tools to meet human needs, ensure food security, and promote economic growth. Environmental aspects are considered as they support production, while social and community issues receive less attention. This approach promotes intensive agriculture, based on the use of external inputs and advanced technologies. The latter places greater emphasis on ecological and social values, with attention to the conservation of ecosystems, biodiversity, and the well-being of rural communities. It values traditional knowledge, low-input agricultural practices, and the multifunctionality of agriculture, including cultural and social functions in addition to production. It promotes a holistic, integrated, and participatory approach, which requires structural changes in the way of producing and managing agricultural resources, often privileging the local scale and community management. Among the key scholars contributing to these positions are Pierce, Farell and Hart, Tait and Morris, Johnson, Rezaei-Moghaddam and Karami, Thompson and Scoones, Robinson, O'Riordan, Cobb, Frouws, Hermans, Marsden, and Pretty (Velten et al., 2015).

Several legislative instruments have been introduced at the EU level to encourage sustainable agriculture in this intricate and dynamic conceptual environment. These are the European Green Deal, which is the EU's overall strategy to achieve climate neutrality by 2050. Its specific articulation in the agricultural sector is the Farm to Fork strategy, which aims to make the European food system fairer, healthier, and more

environmentally friendly. Instead, the New CAP includes economic instruments to incentivise the ecological transition of agriculture. However, critical issues regarding the current legal framework remain relevant, as will be later analysed.

0.3. Methodology

This thesis aims to answer the following research question: *How can the agricultural sector be made more sustainable, and which regulatory tools can be adopted to achieve this goal?* The analysis will focus on alternative agricultural practices and imbalances along the food chain, assessing the effectiveness of current European policies in promoting environmental and social justice.

The paper aims to answer the following research question through the analysis of significant case studies and an empirical study based on semi-structured interviews with small farmers, to closely understand the environmental and social criticalities of the current agricultural system and identify possible sustainable, fair, and regulated solutions. Indeed, the research adopts a qualitative and interdisciplinary methodology that combines legal analysis, environmental reasoning, and empirical investigation.

The selection of case studies aims to concretely show the critical issues of the agri-food sector. Each case study provides an in-depth view of specific issues such as monocultures, export-driven production, hydroponic innovation, and the health risks associated with chemical-intensive farming. These cases were selected for their relevance, diversity, and ability to show the tension between industrial agriculture and more sustainable alternatives.

The 40-Year Report on the Farming Systems Trial (FST) by the Rodale Institute was chosen for its thorough comparison of conventional and organic systems and its longitudinal approach. It analyses three agricultural methods, one conventional and two organic, and measures the effects on soil health, yields, economic performance, and environmental impact. It confirms that organic systems are superior across environmental, agronomic, and economic dimensions. Furthermore, compared to the Conventional one, they offer a resilient response to climate threats (Rodale Institute, 2021). Indeed, its results offer strong evidence in support of sustainable alternatives, important to show the feasibility and advantages of adopting sustainable agricultural practices.

The Pu'er Tea Plantation study conducted by Li et al. (2025) compares conventional and organic tea crops, showing that conventional practices are much more polluting than organic ones and less capable of storing CO2, mostly due to the use of synthetic fertilisers and pesticides (Li et al., 2025). This case not only reconfirms how organic farming is superior from an environmental protection point of view, but also reveals

how products that we consume every day can be extremely polluting. It aims to underline the importance of making informed and responsible choices as a consumer.

Ferrari Farm by Giorgia Pontetti in Italy and the vertical farms of the MIRAI company in Japan show cutting-edge technological innovation in hydroponic systems, demonstrating an alternative to traditional agriculture capable of creating a more resilient sector, increasing productivity and product quality, and saving resources. They show what the agriculture of the future could be, capable of growing food in any environment and under any climate condition.

Focusing on the social dynamics of the agri-food sector, the case of Brazil's export-oriented monocultures (de Souza & Ribeiro, 2025) and Sierra Leone's land grabbing (Turay, 2024; Bonuedi et al., 2021) demonstrate the socio-economic costs of a global food system that privileges international agribusiness over local communities These two cases are fundamental to show the dark side of the global food value chain. The exploitation of local populations is a common phenomenon, allowed by the system and local regulations. Therefore, they not only show the consequences at a social level, but also how weak local Governments and the lack of a stringent legal framework allow these dynamics.

Finally, the Uruguayan case (Evia, 2023) reveals the human cost of lax pesticide regulation and the systemic disregard for farmworker health. These examples together highlight the environmental, social, and legal gaps of the current global food model.

The analysis of European regulation, namely of the European Green Deal, the F2F strategy, and the CAP, is essential because these policies influence the incentives and limitations faced by farmers in the EU. Understanding how these regulatory frameworks work is essential to determining their true impact on sustainability and social equity, as agriculture is one of the most heavily regulated sectors in Europe. Furthermore, these policies claim to promote biodiversity, reduce emissions, and support small farmers; this study examines whether these claims are accurate and whether the current legal framework effectively fosters sustainability. The thesis focuses on the European regulatory framework for two main reasons: first, to comprehensively address all international regulations would be excessive with respect to the aim and scope of the work; second, the European Union represents a leading regulatory actor and has an active role in promoting environmental and social standards also beyond its borders. As the saying goes, "*America innovates, China replicates, and Europe regulates*" (Iozzia, 2024).

Complementing the desk analysis, this thesis incorporates semi-structured interviews with small-scale Italian farmers. This has the purpose of collecting the real experience of farmers, investigating the agricultural practices they adopt, their values and opinions, what obstacles they encounter (including economic, regulatory, and infrastructural ones), how they perceive their relationship with supermarkets and agribusiness, and whether public subsidies or policies effectively support them or not. As in this thesis the

situation of smallholders is extensively discussed in this thesis, hearing the actual perspective of small farmers adds even more understanding. 20 farmers were interviewed, and they were contacted personally or by phone. The selection was made through the contact details on the websites of the respective companies, or by going directly to various markets in Rome and Turin, where they were asked the questions on site. They included 12 small-scale family farmers, 4 small organic farmers, and 4 small and medium-sized enterprises (SMEs).

The interviews followed a semi-structured format, consisting of a qualitative research method that allows for a natural, conversational flow by combining prepared questions with the flexibility to explore topics in more depth based on the interviewee's responses. They are designed to gather rich, open-ended insights into participants' beliefs, behaviours, and experiences, making them ideal for understanding complex issues (Dovetail Editorial Team, 2023). This method allowed for flexibility in exploring topics like intergenerational renewal, working conditions, pricing systems, environmental awareness, perceptions of subsidies and bureaucracy, and knowledge of the CAP. By demonstrating how specific global dynamics are felt locally, they enhance the analysis, contextualising the notions explored in this thesis.

This qualitative approach helps understand the disconnection between the sustainability goals on paper and the concrete barriers faced by farmers. It offers crucial insights on how the EU's agricultural model can change to better serve the planet and those who feed it.

Finally, this thesis addresses this topic because agriculture has become a central sector in our globalised world. Unlike idyllic images portrayed in food advertisements with smiling farmers harvesting their local production, the reality of today's supply chain is different. A great amount of the food purchased is imported and does not come from the farmer living next to your city. The demand for food is higher than before, requiring an intensified production and the overexploitation of lands. Indeed, this supply chain is far from perfect, showing cases of erosion of the soil, excessive use of chemicals contaminating lands and water, abuses of power from big companies, negative impacts on local communities, and mistreatment of workers. Discussing these topics and creating knowledge about existing supply and value chains is essential to change the system and the mindset of consumers.

0.4. Potential challenges

The in-depth analysis of this topic presents a series of challenges, linked both to the complexity of the subject and to the methodology employed.

The thesis is based on a multidisciplinary research framework that involves agronomy, economics, law, social sciences, public policies, and human rights. Agriculture, in fact, is not considered solely as an

economic-productive activity, but is the subject of an integrated analysis that includes environmental dimensions (e.g., biodiversity conservation), social (e.g., exploitation of labour and concentration of bargaining power), regulatory (e.g., the Common Agricultural Policy and the Farm to Fork strategy), and cultural (e.g., eating habits and the role of local communities). Moreover, since sustainable agriculture is at the centre of political debates and social protests, as will be analysed in the following chapters, the topic is subject to continuous updates and evolutions, which make its study particularly dynamic and constantly changing.

Added to this complexity is the difficulty deriving from the absence of shared international standards and the persistent terminological ambiguity. Central concepts such as "sustainable agriculture" or "social sustainability" lack univocal and operational definitions.

Furthermore, the study of sustainable agricultural practices, from crop rotation and use of biofertilisers to hydroponic techniques and precision agriculture, requires a detailed knowledge of agronomic and biological concepts that go beyond the traditional legal or socio-political background. Translating these concepts in an accessible but scientifically rigorous way, avoiding simplifications and inaccuracies, represented a significant methodological challenge.

Finally, the empirical component of the research, based on semi-structured interviews with small agricultural producers, entailed further logistical and methodological difficulties. Getting in touch with farmers proved complex, both due to their limited availability of time and a certain initial distrust towards academic research. Finding the contacts of SMEs was particularly difficult: many subjects were reluctant to participate or did not respond. Conducting the interviews also had to take into account practical constraints (such as timetables, workplaces, availability), as well as a certain linguistic and cultural heterogeneity. The qualitative nature of the data collected required careful systematisation and cautious interpretation to avoid undue generalisations or excessively subjective readings.

0.5. Structure and contents

The thesis is divided into four main chapters focused on crucial aspects of sustainable agriculture and social justice along the agri-food chain.

Chapter 1 deals with the topic of sustainable agriculture, analysing the most environmentally friendly agricultural practices and the main obstacles to their diffusion. It also contains a focus on hydroponic cultivation as a significant innovation to overcome some limitations of traditional practices.

Chapter 2 focuses on social sustainability, exploring the dynamics of monocultures and global value and supply chains, with specific case studies that highlight the issues related to labour exploitation, inequalities, and the power of large corporate groups in the agri-food sector.

Chapter 3 analyses the current European legislative framework regarding sustainable agriculture, including key policies such as the Green Deal, the Farm to Fork strategy, and the new Common Agricultural Policy (CAP), assessing its strengths and weaknesses, with particular attention also to recent farmers' protests and relevant regulatory amendments.

Chapter 4 presents the results of a qualitative analysis based on interviews with farmers and operators in the sector. It evolves by proposing concrete solutions to facilitate the transition towards more sustainable agricultural practices through improvements in current policies.

The thesis concludes with a summary of the results that emerged and recommendations aimed at promoting more sustainable and fair agriculture. There is also an annex illustrating the questions asked to farmers.

1. Chapter 1 – Sustainable Agriculture

Defining sustainable agriculture can be complex as the concept of sustainability itself is multifaceted. Sustainability involves different dimensions – environmental, economic, and social – but also different techniques. There are many ways to approach sustainability, raising the question of what is truly sufficient and which methods are the most effective. Focusing on agriculture, should we cultivate less or prioritise efficiency through organic and biodynamic farming techniques? It is clear that we should move toward a phase of degrowth. At the same time, the current situation includes developed countries that are overconsuming with a significant amount of wasted food, developing nations striving for economic growth and higher living standards, and other regions facing hunger and food insecurity. As the truth is that no one is willing to sacrifice their wealthy lifestyle, are sustainable farming techniques enough?

Leaving these questions aside for the moment, in general, sustainable agriculture aims to produce agricultural goods with minimal environmental cost while ensuring food accessibility and availability for this generation and future ones (Muhie, 2022). The concept gained relevance with the Brundtland Report (1987), but its definition is still uncertain. As Velten et al. (2015) stated, five main perspectives on sustainable agriculture can be identified. The Anthropocentric Goals Cluster has a human-centered perspective. It sees sustainable agriculture as the tool to provide economic viability, food security, and stable livelihoods. Therefore, it aims to fulfil human needs while at the same time maintaining productivity. It also has the goal of improving farmers' working conditions and quality of life. Nevertheless, it has a limited focus on the environmental aspect, leaving aside fundamental targets such as biodiversity and ecosystem resilience. Consequently, it mostly emphasises economic and social outcomes, which however could lead to overexploitation of natural resources. The Production and Overarching Goals-Centered Cluster defines sustainable agriculture as the balance between production and sustainability. It favours productivity while considering environmental concerns, including soil health, water management, biodiversity, and resilience. Furthermore, it recognises that agriculture plays different roles and functions besides food production, that is for instance carbon sequestration and resilience of the soil. Nevertheless, this cluster prioritises productivity over ecological and social goals and strongly relies on input farming strategies. The Systems Thinking Cluster focuses on the long-term perspective of sustainability. It highlights the importance of a collaborative approach between the different stakeholders to achieve results but at the same time advocates for decentralised decision-making to empower local communities. Consequently, it focuses on the need for sustainable governance at multiple scales. It pays particular attention to environmental goals, prioritising biodiversity conservation and the integration of sustainable and natural practices. The implementation of this cluster, however, can be complex and slow as it requires a strong collaboration between the stakeholders, especially for regions with limited resources and institutional capacity. The Comprehensive Cluster takes into account all three dimensions of sustainability – economic, environmental, and social. It

pays particular attention to environmental goals, including maintaining biodiversity and conserving resources. It encourages the continuous improvement of agricultural practices through learning, innovation, and adaptive management. It supports local empowerment as well. As in the previous cluster, it may be difficult to implement. Involving different goals and strategies may result in competition between priorities, making policy development more complex. The Knowledge and Science Cluster focuses on scientific knowledge, innovation, and precision agriculture. It prioritises scientific research and the use of technology. Therefore, it combines innovation with sustainability to improve the agricultural system. However, it does not concentrate much on social goals and community governance. Furthermore, technologies require high initial costs and small farmers may not be able to afford them.

Having these many definitions may create confusion on which are the goals of sustainable agriculture, as they each prioritise different things. A possible alternative is to focus on the actions that can make farming more resilient and respectful of the environment. This chapter will explain in depth the starting points that farmers should consider when transitioning to sustainable agriculture and some of the possible practices. It will analyse case studies, showing the benefits and barriers to implementation.

1.1. Sustainable farming practices

Purchasing food as a consumer may often seem like an "automatic action", whether it is done at the supermarket or from a trusted greengrocer. We do not reflect upon the origin of produce and how it got to our food got to our plate. For those who are not experts or particularly interested in agriculture, grocery shopping usually means grabbing what is needed in the rush of the day and perhaps paying attention to the origin of the product or checking if it has the label "bio" or if a certain vegetable is seasonal. However, the way our food is produced matters. Farming requires careful attention and various precautions, from the type of crop and the characteristics of the land to the use of fertilisation and pesticides. The soil has a natural balance that must be preserved, yet it is often overlooked in trying to achieve maximum production, putting its health at risk and resulting in long-term damages.

In particular, crop selection and management are fundamental. Indeed, resistant crops can increase tolerance to abiotic stress – meaning the set of environmental conditions negatively impacting plants' growth and yield, including drought, salinity, oxidative, or extreme temperatures (Kopecká et al., 2023) – and reduce vulnerability to pests and diseases (Wezel et al., 2014). Several approaches exist on this matter. For thousands of years, plant selection and breeding techniques have been used to grow crops that are more resistant to harsh climates, can produce more yield, or have desirable traits such as more nutritional value and tolerance to pests. Nowadays, GMO and genome editing have entered the scene. Specifically, GMOs allow the transfer of a desired trait from a crop to another, while genome editing involves the DNA sequence

modification of a living organism to customise its genetic makeup (D'Ausilio, 2024). However, these solutions are often temporary due to the continuous evolution of pathogens to defeat resistance. To slow down their adaptation process, a possible solution is crop rotations and different plating patterns (Wezel et al., 2014).

Microorganisms can also play a crucial role. The soil contains microbes that enhance plants' health by improving nutrient absorption and availability, water uptake, and root development. In a tablespoon of healthy soil, more than 9 billion living organisms can be found, ranging from microscopic bacteria to fungi. Some species, such as Trichoderma and Bacillus, can protect plants from pathogens as they act as natural biopesticides, reducing the need for synthetic ones. Others can increase plants' tolerance to abiotic stress by producing protective substances such as osmoprotectants and exopolysaccharides. Techniques, including crop rotations and plant breeding strategies focused on the development of traits that encourage microbial interactions, can help develop these microorganisms (Wezel et al., 2014; Koskey et al., 2021; Rodale Institute, 2021).

At this point, it is clear that crop rotation has a pivotal role in the preservation of soil health. Differently from monocultures that lead to the exploitation of the soil and its deriving consequences, alternating low-nutrient-demanding crops with high-demanding ones can optimise nutrient use and even improve water retention and soil stability (Wezel et al., 2014). But why is it essential to meet the soil's needs? Replacing natural vegetation with agricultural fields exposes the topsoil to risks, including drying out. This can lead to a decrease in microorganisms and nutrients, but also to a higher susceptibility to winds and rains. Furthermore, unsustainable farming practices – including monocultures, excessive tilling, and overgrazing – accelerate soil erosion and deplete essential nutrients, resulting in the loss of fertile soil. This not only reduces the quantity of cultivable land but also creates new deserts, pollutes waterways, and alters their flows, potentially increasing the frequency of floods. In addition, hyper-cultivated crops like cotton, wheat, soybean, coffee, and palm oil – being major drivers of deforestation – represent a significant threat. This is because substituting trees with agricultural plants weakens soil stability, as they lack the deep root systems needed to hold the soil, and those crops in particular are responsible for worsening soil erosion. Intensive agriculture's impact can be understood by the fact that we have lost half of the Earth's topsoil in the last 150 years. This alarming data makes it clear once again that we need to do things right, and we need to do it now if we want to avoid having a future with no cultivable land. Having healthy soil has a direct influence on food quality and crop yield. It means having a soil that can store carbon and consequently help mitigate climate change (World Wildlife Fund, 2025).

A last point to be mentioned concerning crop selection is the use of cover crops. These are plants grown between main crops, acting as a living compost layer. The benefits are numerous: on one hand, it suppresses weeds and decreases water evaporation; on the other, it improves soil health, prevents erosion, and increases

nutrient retention. Brassica plants are a good example, as they not only increase the soil's health but also act as natural pest control (Wezel et al., 2014).

Another important factor to be taken into account when farming is fertilisers. Indeed, correct fertilisation can optimise nutrient assimilation and crop production. However, there are two main issues related to their employment. First, their use is too intensive. For this reason, the European Commission has set the target of reducing their use by 2030 to cut down 50% of nutrient losses. Furthermore, it supports the sustainable use of fertilisers to keep productivity high but at the same time reduce the detrimental effects on the environment (European Commission, n.d.-c).

The second main concern is related to synthetic fertilisers, which are the most used. There are several reasons for their widespread use. Firstly, they have a quick outcome, as the chemicals they are composed of are absorbed by plants much faster and have immediate effects, reducing the timeframe from weeks to days. Furthermore, they are more affordable and cost-effective. They can be easily blended with other chemicals, such as pesticides, making them more time- and labour-efficient. In addition, the amount and the concentration of each nutrient can be managed more easily and, therefore, it is possible to regulate the absorption rate. These represent important advantages if it weren't for the fact that synthetic fertilisers contaminate the soil, water, and air due to their tendency to volatise. Furthermore, their constant application may affect the soil's PH, leading to a decrease in beneficial microorganisms and insects. Overfertilisation may also cause fertiliser burns, which occur when plants' leaves become yellow or brown, curl, and shed. Finally, even though they are time-effective with regard to quick outcomes and blending, they require more frequent applications (EOS Data Analytics, 2024; EOS Data Analytics, n.d.).

Viable alternatives exist. An example is Splitting Nitrogen Fertilisation, which requires the application of small doses of nitrogen at different stages of the crop's growth rather than a big quantity in a single application. This has the purpose of matching the demand of plants with the supply. The reason why this technique can improve the growth of crops is that nitrogen is one of the three most important macronutrients of plants, and it is vital for chlorophyll generation, foliage development and overall plant growth, protein synthesis, and enzyme and DNA formation. The advantage is that it increases efficiency and reduces the quantity of fertiliser used. At the same time, it may require a high initial investment as tools like soil or plant sensors may be needed for the monitoring of nitrogen levels (Wezel et al., 2014; Fageria & Baligar, 2005).

Biofertilisers represent another alternative solution. They contain living microorganisms that help plants absorb nutrients more effectively. Therefore, they allow soil stability while improving its fertility. Some examples are the Arbuscular Mycorrhizal Fungi (AMF) that encourage root health by facilitating the absorption of phosphorus and water; Plant Growth-Promoting Rhizobacteria (PGPR) increasing disease resistance and nutrient uptake; and Nitrogen-fixing Rhizobia that form a symbiotic relationship with legumes and convert the atmospheric nitrogen present in the air into a usable form. The limitation of this

approach, however, is that its effectiveness depends on the conditions of the soil and it has low commercialisation rates, resulting in a moderate adoption rate from farmers (Wezel et al., 2014).
Lastly, organic fertilisation is a further option that uses compost, manure, and plant residues to provide nutrients and improve the health of the soil. In particular, it optimises soil structure, promotes biological activity, and increases the soil mineralisation, having positive results in the long-term. Two main limitations of this approach are the difficulty in measuring the levels of nitrogen of the fertilisers and the need for integrated livestock farming in case of a widespread adoption, which may require a redesign of the farming system (Wezel et al., 2014).

A further crucial aspect of farming is the management of weeds, pests, and diseases. These are controlled through the deployment of pesticides. However, it is well known that many pesticides are toxic, bioaccumulative, and persist in the environment, contaminating water, food, and even our bodies. Indeed, traces of pesticides have been found in breast milk. This happens because they impact both abiotic (non-living) and biotic (living) components. More precisely, pesticides pollute water bodies through evaporation and surface runoff. Once in the water cycle, it is easy to imagine how pesticide-laden water evaporates, condenses, and eventually returns into the soil and waterbodies through rain, reaching even groundwater. This process leaves traces of toxic chemicals and affects human and aquatic health. High levels of pesticide residues have also been found in drinking water. Evidently, this has repercussions on animal health as well. Herbicides decrease food availability for birds, leading to starvation. Furthermore, the accidental poisoning of wild animals is frequent, causing organ toxicity, metabolism disruption, and disruption of neurotransmitter functions (Kaur et al., 2024).
Alternatives to synthetic pesticides exist as well. Biopesticides use living organisms – bacteria, fungi, or AMF inoculants – to treat pests. They induce resistance to infections, use antibiosis[1] to suppress pathogens, steal resources from harmful organisms, and deactivate pathogen germination. A further solution is represented by natural pesticides made from plants. They can be, for instance, essential oils, seed-based pesticides, pyrethrum flower extracts, aqueous plant extracts, or compounds from trees. Biopesticides represent an opportunity for developing countries, allowing them to achieve self-sufficiency by producing plant-based pesticides themselves rather than relying on imports. Furthermore, organic farmers, who are not authorised to use synthetic ones, could benefit from their use as well. The major issue related to both these variants is that their field application provides inconsistent results, leading to an understandably low commercialisation rate. Furthermore, when it comes to biopesticides, specialised knowledge is required for correct and efficient use, while natural pesticides have high production costs and possible limitations in their use as some countries mandate strict approval processes (Wezel et al., 2014).

[1]A process through which an antagonistic association occurs between two organisms, resulting in one of them being adversely affected.

A last fundamental point is tillage. Tillage has been used a lot in the past to prepare the soil before planting crops. It consists of disturbing the soil using harrowing, plowing, and levelling tools with the purpose of controlling weeds, making fertilisers more efficient, and improving aeration, root penetration, and water filtration. Indeed, in the short run, it improves germination and early plant growth, allows an efficient weed control, and enhances nutrient availability. However, research show that frequent tilling negatively affects the soil, making it vulnerable to erosion and ruining fungal networks. This is because it influences natural soil aggregates, increases compaction, and accelerates the decomposition of SOM. Furthermore, in the long run, it can lead to infertility and more vulnerability to climate change. Also, due to the increase of compaction, water infiltration (initially improved) declines. Finally, over time, weeds develop resistance, requiring more herbicide use. Consequently, it is advisable to switch to Reduced-Till or No-Till at all as, in general, it is best not to interfere excessively with the soil (Angon et al., 2023; Rodale Institute, 2021).

After having analysed these points, it is clear that the standard agricultural practices typically used are detrimental to both the environment and human health. Exploring alternative approaches is important as they represent the starting point and foundation for more sustainable farming. Currently, different practices reflect them. Indeed, this section presents two of the most innovative and sustainable practices.

Regenerative Agriculture is based on three main principles: restoring soil health, increasing biodiversity, and avoiding synthetic herbicides and pesticides. In particular, the first goal is pursued through minimal soil disturbance (and therefore reducing to the minimum or eliminating tillage) and cover cropping to prevent erosion and water loss while at the same time increasing microbial activity. This objective is of particular importance as having healthy soil means having a sink that can efficiently store CO2. The second goal instead involves crop rotation and integration of livestock. Furthermore, regenerative agriculture encourages the use of compost and recycled materials, reducing waste production. It also promotes small agricultural communities and small-scale farming. However, RA faces some barriers, especially from a large-scale adoption perspective. Indeed, it has high transition costs and, as there are no global standards, obtaining a certification can be difficult. Furthermore, there is rarely general knowledge about RA techniques among farmers, who consequently need training to fill the gaps. This last challenge is a common issue in sustainable agriculture and remains difficult to overcome due to farmers' scepticism (Muhie, 2022; Khangura et al., 2023).

Precision Agriculture, or satellite farming, is a further example. Its goal is the optimisation of resources and minimisation of environmental impact through the use of technology to measure and respond to crop variability. The final result should be a system that can customise farming practices based on soil needs and variations. This allows for a more efficient use of resources, reducing waste through a more precise distribution of water, pesticides, fertilisers, etc. The result is a decrease in costs regarding inputs and in the use of chemical substances that can harm the environment. It is, therefore, based on sensors, GPS, and

images from satellites, and it uses GNSS (Global Navigation Satellite System) and GIS (Geographic Information Systems) to create maps of the field. At the same time, the use of these technologies entails a high initial investment and the knowledge to understand and use the data collected. Indeed, precision agriculture is a solution that gives benefits back in the long term (Muhie, 2022), as numerous sustainable projects have shown.

The truth is that sustainability, regardless of the sector, often means having higher initial costs because doing things the right way requires investment. For instance, giving workers at least the minimum salary is pricey if compared to how much in reality certain companies pay their employees. Nevertheless, the long-term benefits outweigh these costs. As we cannot keep polluting the planet, it is necessary to take a step back, actually look at the reality, and recognise that actions must be taken as soon as possible. This is because acting now is less expensive than waiting until the crisis worsens, and therefore before it is no longer reasonably possible to adapt to, minimise, or avoid harm from climate change. It represents a financial commitment needed to have a future and guarantee it to the next generations. However, it can also represent an advantage as regulations will become stricter, and companies anticipating and adapting early to market trends gain a competitive edge compared to those forced to act later. Furthermore, businesses should not aim just at obtaining revenue but also at creating social value. Prioritising short-term gains at the expense of future ones is a losing strategy that will not create any improvement. Regarding agriculture specifically, carrying on unsustainable practices is counterproductive as if soil degradation persists, then farmers will not eventually be able to keep doing their job. Indeed, different studies comparing conventional and sustainable practices show how adopting techniques that protect the soil are the most convenient in the long run.

1.1.1. Evidence from comparative studies

Different case studies have been conducted to compare conventional and sustainable practices. Among them, the 40-Year Report on the Farming Systems Trial (FST) by the Rodale Institute is to be mentioned. Being executed over a significant time, this research is comprehensive and shows the reliability of its findings by addressing any scepticism that could arise from shorter-term studies. Its purpose is to mimic the actual practices of American farmers to understand how they impact the soil, farmers, and the communities around them.

It analyses three techniques, namely the Conventional System, Organic Legume System, and Organic Manure System. The first one reflects standard grain farming based on the use of synthetic pesticides and nitrogen fertilisers. The second one is the representation of organic grain cultivations, relying on legume cover crops to fix nitrogen levels and crop rotation for pest control. The third one reflects organic dairy and beef farming, utilising composted manure and different crop rotations to increase fertility and reduce pests. Furthermore, the trial examines various aspects, including soil health, cost-efficiency assessment of yields,

weed management, economic analysis, water quality investigation, and environmental impact (Rodale Institute, 2021).

The soil health assessment notably focuses on four aspects. In particular, it considers Soil Organic Matter (SOM), which fosters pore space formation, water retention, and soil structure, resulting in better aggregate stability and moisture management of the topsoil layers. Regarding this aspect, organic systems showed a higher level of SOM than the conventional one; especially, the organic manure system was the best performer. On the contrary, conventional methods deteriorate SOM over time, leading to less fertility and more risk of erosion. This is because there is a limited diversity and quality of carbon inputs[2] in conventional corn and soybean systems. The Soil Microbiome Diversity and Activity, meaning the presence of microorganisms in the soil, is another critical aspect taken into account. Concerning the organic systems, the organic legume was the one with the highest diversity, while the organic manure had the highest number. A third analysed factor is Soil Compaction. To be noted is that the more the soil is compacted, the worse it is, as soil requires space for pores to retain air and moisture, essential for plant survival. The consequence is a limitation in plants' roots to expand and absorb water and other nutrients, making crops more vulnerable both to drought and floods. The result of the study is that organic systems had much less compacted soil than the conventional one. Finally, soil nutrient availability is examined, connected to the fertilisation technique used. Conventional systems use synthetic fertilisers to supply nitrogen to plants, which, however, is highly soluble and easily leaches into groundwater or is lost in the atmosphere as nitrous oxide, a particularly polluting greenhouse gas. This often leads to water pollution[3], increased GHG emissions, and nitrogen loss. On the contrary, organic systems use organic nitrogen resources – including SOM, animal manure, or leguminous cover crops – which release nitrogen slowly, avoid leaching or volatilisation, and encourage higher microbial activity and diversification (Rodale Institute, 2021). As a result, this trial clearly demonstrates that the organic systems utilise techniques that perform better and contribute to soil improvement.

A second aspect evaluated by this research is the balance between costs and efficiency in performance. Regarding corn, at first the results showed that organic-manure and conventional systems relying on tillage produced more or less the same amount of yield. The organic legume system delivered 20% less but made up for it with lower production costs. The outcome changed when the tillage technique stopped being used. Indeed, a 6.7% decrease was recorded in all three systems. However, tillage requires higher inputs and labour costs. For this reason, this reduction did not particularly impact profits. Even though the amount produced is more or less the same, the benefit of switching to a sustainable technique is that organic systems

[2] The sources of carbon inputs include organic matter, plant residues, and microbial byproducts. In conventional systems, carbon inputs are low due to monocropping, synthetic fertilisers, lack of organic amendments (e.g., manure, cover crops, compost, etc), reducing microbial activity, and the high presence of the carbon-to-nitrogen ratio.

[3] Conventional crops have six times more nitrate leaching, which contaminates groundwater.

showed a higher resistance to drought and floods. This was further confirmed during the drought of 2016, when the organic manure system produced 31% more corn than the conventional one. Furthermore, organic corn grain contains more protein than conventional corn, meaning that even the nutritional score of the product is enhanced, making it more attractive to the market. The results of other grains showed that organic techniques are comparable or even perform better than conventional methods. In particular, wheat production was comparable across all three methodologies, while the organic systems producing oats exceeded the conventional one, with the organic manure system outperforming by 29%. Notwithstanding these impressive results, sustainable practices are rarely adopted (Rodale Institute, 2021).

Organic techniques – including crop rotation, cover cropping, and mechanical weed control – produce more desirable results regarding the management of weed and herbicide resistance. Indeed, they allow a better toleration of weed competition and maintain strong yields, as these procedures do not impact the health of the soil. In general, weeds represent a problem as they compete with plants for crop, nutrients, and sunlight. Furthermore, they attract harmful pests. Conventional systems using synthetic herbicides have only worsened the situation. This is because, to prevent harm to plants, GMO herbicide-tolerant crops have been developed, allowing greater use of glyphosate (herbicide). However, this not only pollutes the environment but is counterproductive, as weeds are adapting to it, requiring an increase in the use of herbicides. Furthermore, herbicides impact water quality as well as they remain on the surface of water (Rodale Institute, 2021).

A surprising revelation from this research is that organic systems are the most profitable. This is because the manure and leguminous cover crops used as fertilisers and pesticides are less expensive than their synthetic versions. The reduction of these products consequently results in the decrease of expensive GMO seeds developed to resist these toxic chemicals. Furthermore, as sustainable practices encourage the health of the soil instead of leading to its degradation, fewer corrective measures are needed to restore the soil. Also worth noting is the fact that these synthetic products are not only expensive but also subject to price volatility. Opting for the organic selection means being less exposed to market fluctuations, providing more financial stability. Lastly, as already mentioned, organic systems provide consistent results over time, also in case of floods and drought, making them more convenient. Due to these properties, organic systems are the most portable ones. In particular, organic manure provides the most income whether or not farmers receive premium prices[4]. In the case that premium prices are given to farmers, organic legume becomes highly lucrative as well (Rodale Institute, 2021).

The following chart provides a summary of the comparison between organic and conventional systems.

[4] Premium prices refer to the extra amount of money that consumers are willing to pay for the quality of organic products. Organic products are more expensive as they often have a certification (that is paid by farmers), they are limited in their supply since most farmers use conventional methods, and they have higher labour and production costs.

Aspect	Conventional System	Organic Systems
Soil Health	Deterioration of SOM over time, low microbiome diversity and activity, compacted soil, and limited soil nutrient availability due to synthetic fertilisers	Higher levels of SOM, high microbiome diversity and activity, less compacted soil, and nutrient soil availability encouraged by sustainable fertilisers
Cost-Efficiency Performance	Low cost efficiency (yields highly influenced by weather conditions and deterioration of soil over time)	High cost efficiency (resistance to weather conditions and fostering of soil health)
Weed Management	Use of herbicides with environmental pollution	Use of weed-tolerant techniques with no negative impact on the soil
Water Quality	Contamination of water	Improved water infiltration, reduced runoff, lower pollution
Economic Viability	High costs due to synthetic products and corrective measures, vulnerable to price fluctuations	More profitable (especially with premiums) and financially stable
Environmental Impact	High carbon emissions and pollution	Higher resilience, soil as an efficient carbon sink

This system trial proves that organic systems are more convenient from every point of view. A particularly important aspect is the economic viability, as the belief that sustainable practices are not financially convenient is widespread. However, this conviction represents a major obstacle to their development. Trials like this one are fundamental to dismantling misconceptions impeding sustainable farming from becoming widespread. They demonstrate that organic practices not only can offer market, regulatory, and economic advantages but also enhance resilience since climate change is probably the major threat farmers face.

The results of the Farming Systems Trial are confirmed by several other case studies. An example is the research conducted on the tea plantation of the city of Pu'er (Yunnan Province, China) that compares organic and conventional crops. The assessment's results show that organic tea plantations produced less CO2 than half of the conventional ones. Organic tea plantations have an average carbon emission of 1.24 t CO2 eq ha−1, which is 218% lower than conventional plantations, where emissions reach 3.96 t CO2 eq ha−1. The major contributors to emissions are chemical nitrogen fertilisers, which are substituted with biofertilisers and compost in organic farms. Furthermore, the trial shows that organic tea plantations are more capable of storing CO2, making the soil a more efficient sink. It is clear, even in this case, that conventional techniques have a much higher carbon footprint (Li et al., 2025). Since tea is one of the most consumed beverages, with production surpassing five million tons per year, knowing that less polluting

alternatives exist is fundamental. Cutting in half the emissions of such a big industry could have enormous positive effects on the environment, starting from the health of the soil to our own well-being.

Finally, to strengthen the economic viability case, a comparative study was conducted on the economic income of conventional and organic farming. The assessment provides both a product-specific and a country-specific comparison. To make some examples: due to price premiums, organic coffee farms in Africa generated 75% more revenues than conventional ones; blueberry crops in the US entail higher labour prices, which are compensated by the 49% increase in retail prices; organic corn and soybean yielded 30% more during drought. Regarding states, organic farms in the Czech Republic were more profitable, but they had to rely on EU subsidies to remain economically viable; Pakistani and Turkish organic wheat crops saw a decrease in their costs and an increase in income mainly due to lower input expenses associated with conventional systems; Senegal organic farmers struggled due to the lack of price premiums and low consumer awareness (Durham & Mizik, 2021). This case study shows a realistic picture of reality. Sustainable practices can be profitable, but not in every case. Labour costs and initial investment can be high. At the same time, consumers' awareness and willingness to pay must be present. Bioproducts are expensive, and not everyone can afford them. It is probable that with an increase of sustainable farmers, the prices for consumers will go down, but currently, they are pricey. Therefore, this assessment shows that organic farms can be profitable, and most of the time, they are. Meanwhile, the growth margin is still high.

1.2. Main Barriers

In the previous paragraph, the benefits of sustainable agriculture have been extensively discussed. To conduct a thorough analysis, however, barriers that hamper its application need to be addressed as well.

A first general concern regards the capability of maintaining food security. Studies show that organic yields produce from 7 to 35% less than conventional practices and may also be less stable. Connected to this, there is the issue of land availability. As the production is less, more land is required to produce the same outcome. Estimates suggest that the same amount of yield obtained from 1 unit of conventional land requires 1.6 units of organic land. At the same time, others argue that sustainable agriculture can still provide regular access to the global population if we change our dietary lifestyle and waste less (Boix-Fayos & de Vente, 2023). Indeed, while it is true that sustainable practices are less productive and require more space, it is also true that the current agri-food system is characterised by great waste, unjust distribution, and land degradation resulting from overexploitation. If these issues were to be tackled, the concern about food security would be less alarming.

From this, we can derive the greatest obstacle to sustainable agriculture: dietary shift and change of the system. As mentioned, people do not like to renounce the commodities they already have, and in general,

it is not simple to shift alimentary and consumer habits. Even more challenging is modifying a globalised supply chain based on the exploitation of people and the environment.

Regarding farmers specifically, a main obstacle is the lack of knowledge. There is a difficulty in understanding what sustainable development is and, therefore, a knowledge gap on sustainable practices that can improve their crops. This is the consequence of different factors. First of all, farmers lack both training and support. They are not trained in sustainable farming and environmental management, and at the same time, they receive limited technical assistance from experts (Laurett et al., 2021). This is also because they lack access to specialists such as ornithologists and botanists. Furthermore, farmers generally are not educated in financial planning, marketing, and entrepreneurship, commonly leading to the development of informal and reactive businesses instead of having structured strategic planning or advisory boards. Moreover, they lack leadership training as these firms are usually within families, resulting in a lack of long-term entrepreneurial vision (Kata & Kusz, 2015; Cederholm Björklund, 2018).

These last two points are strictly connected to a further fundamental barrier: mentality. As just mentioned, these businesses are usually family-run and rooted in tradition. This means that many farmers see their farms as a lifestyle and their agricultural techniques as family farming traditions. The result is a reluctance toward sustainability and resistance to making structural changes or changing behaviours. Fuelling this hesitation is the fear of the unknown and the aversion to risk. Finally, there is a difficulty in perceiving the benefits (Laurett et al., 2021; Cederholm Björklund, 2018). This limited mentality has a major impact, making it hard to involve farmers.

An additional important obstacle is connected to economic viability. As already mentioned, sustainable farming requires an increase in production costs and a high initial investment. These costs can be challenging for farmers who often do not possess the financial resources to make such an upfront investment. Indeed, the transition frequently requires new equipment, seeds, or livestock, which can be expensive. Precision agriculture is a perfect example of this. At the same time, there can be a lack of external finances, as subsidies do not always cover the entire investment and are often delayed, creating additional financial instability and uncertainty. Therefore, subsidies and financial rewards may not be proportional to the effort required from farmers (Laurett et al., 2021; Kata & Kusz, 2015).

External barriers are relevant as well. Big companies with large supply chains dominate the market, making it hard for small agricultural firms to compete. Furthermore, prices are dictated by supermarket chains, which are known for exploiting and underpaying farmers. This makes it hard for farmers to make the financial investment to transition to sustainable farming, as prices from supermarkets are low compared to those of biological products. Lastly, consumer demand is fluctuating (Cederholm Björklund, 2018).

Consumer demand, indeed, can hinder sustainable agriculture as well. The reason is that it is difficult to understand what consumers wish as they say they want green and bio products, but at the end of the day, they are not willing to pay their prices (Laurett et al., 2021; Cederholm Björklund, 2018). Additionally, not everywhere is there widespread attention to sustainability, and therefore no demand at all for green food.

Finally, a further fundamental barrier is the regulatory environment and bureaucratic procedures. Strict guidelines and certifications have been defined regarding sustainability. However, it is difficult for farmers to comply as they struggle to understand them, especially when laws change frequently. Furthermore, the paperwork required is too complex and lengthy. Farmers are asked to describe their activities, land use, and expected environmental impacts. Nevertheless, most of them do not have the required administrative skills to fill these forms and enough finances to pay an external consultant. Additionally, in the cases they manage to fulfil their administrative obligations, delays in approval are frequent, making farmers wonder whether or not they will receive subsidies from the State, and therefore complicating even more the creation of an investment plan (Laurett et al., 2021; Kata & Kusz, 2015; Cederholm Björklund, 2018).

In conclusion, sustainable agriculture is a vast concept that offers many benefits, but at the same time still faces too many barriers. Addressing these gaps is fundamental to creating a new vision and understanding of farming. The fact that climate change is already here and transitions need to be made is difficult to accept, but it needs to be done. Nobody likes change, especially when they do not benefit us in the short term, and therefore it is difficult to see the advantage. But what we need to understand is that the practices addressed as conventional/“normal” were wrong in the first place. Maybe in the past, humans did not have a conception of responsibility towards the next generations, but now we do. And current generations are already suffering the consequences of that negligence. Soil health is what allows us to eat and, therefore, to live. It is only reasonable to start taking care of it.

1.3. Focus on Hydroponic

When talking about sustainable agriculture, the hydroponic alternative has to be mentioned. It is a method of cultivation that uses water instead of soil to transport nutrients to plants. The plant develops in a sterile substrate where they are irrigated with a nutrient solution containing water and mineral salts (Pontetti, 2024). It consists of an alternative completely different from any practice mentioned till now and a solution to many issues regarding current agricultural methods.

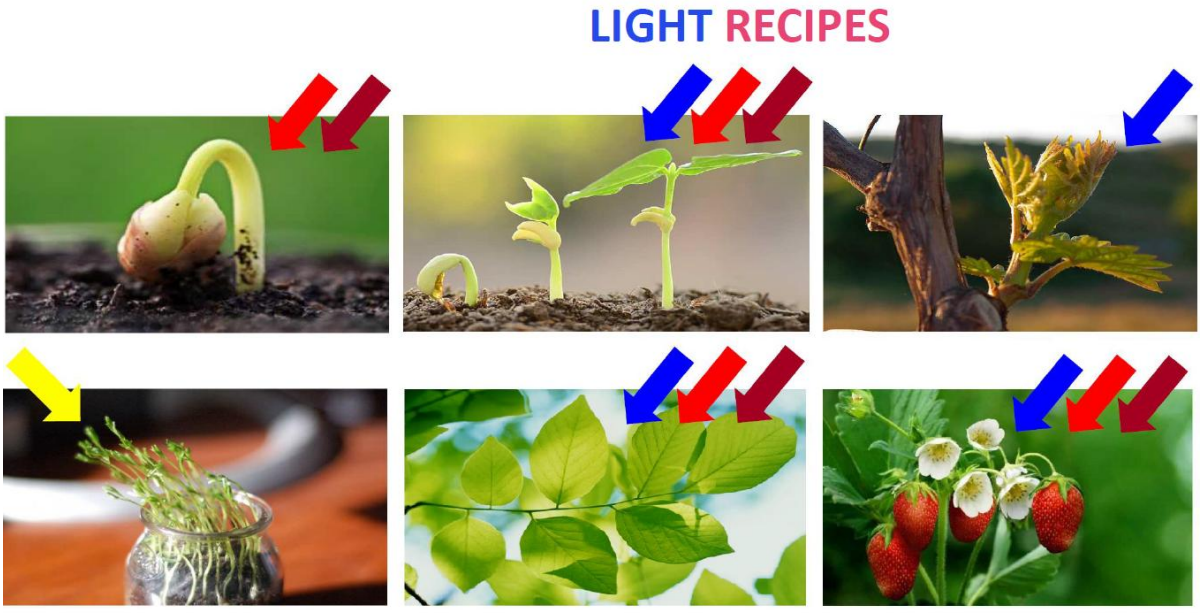
It is a system designed for water efficiency. It is composed of a closed-loop system that recirculates water. Its plastic containers prevent water infiltration and evaporation. Furthermore, excess water is collected, filtered, and reused,

minimising waste and total water input. Regarding nutrient uptake, instead, the solution is delivered directly to the root zone. This means that there is no runoff or percolation loss[5]. Its advantages are multiple:

- It saves up to 70-80% of water; it reduces the use of pesticides and fertilisers while making plants grow faster due to direct nutrient uptake.
- It is highly productive.
- It eliminates any problem related to soil erosion and land contamination, as it uses no soil.
- It optimises space since it permits multi-story and vertical farming (Kannan et al., 2022).

In Italy, Giorgia Pontetti developed her own hydroponic farm called "Ferrari Farm". She challenged everyone, proving that this system works and can produce vegetables everywhere, with weather conditions or barriers. Indeed, the Ferrari Farm is situated in Petrella Salto, a seismic area where winters are very cold, summers are very hot, and it is difficult to access water. It consists of two airtight, sterile, and fully computerized glass greenhouses that use sunlight and a phytotron fully illuminated by LED lights (featuring special lamps she designed and built) for vertical hydroponic farming. This allows plants to grow in complete sterility, eliminating the need for pesticides, as it solves the problem of diseases and pathogens at the source (Pontetti, 2024; Ferrari Farm, n.d.).

In particular, the LED lighting system is tailored to the plants' specific needs, as different colours and intensities can support distinct stages of growth and vary depending on the crop type and development phase. This permits better control of plants and use of their genetic potential (Pontetti, 2024). The picture shows, according to her study, the type of LED used to meet plants' needs.



The advantages are again numerous: the farm operates with minimal environmental impact, uses no chemicals or pesticides, and delivers clean, zero-kilometre, high-quality crops all year round. By optimising vegetative cycles and

[5] Runoff is the water that flows over the surface and does not infiltrate the soil, often carrying away nutrients and causing pollution. Percolation loss is the water seeps too deep into the soil beyond the root zone, making it impossible for plants to absorb it and potentially leaching nutrients into groundwater.

shortening phenological phases, it ensures efficient and sustainable production in every season. In addition, it uses space more efficiently than traditional crops, and its management is simpler as it is automated. Indeed, it requires no operative manpower. The greatest advantage is that it could be done basically everywhere, including cities or deserts. Consequently, this system can guarantee food safety (Pontetti, 2024).

However, she did not stop here. She invented ROBOTFARM, a fully automated hydroponic greenhouse producing salads, spices, microgreens, and babygreens that can be put in our kitchens at home. She developed the MIG Vertical Farm: a sterile, hermetic, automatic hydroponic vertical farm in an ISO 20' shelter that is transportable and able to operate autonomously in scenarios where military personnel are deployed. It does not require clean water to function; it can also use puddle water, which is sterilised and demineralised internally. Additionally, it sterilises the air and has an attitude control mechanism able to level the cultivation area even on non-planar surfaces. Finally, she brought her farm into space, allowing astronauts to enjoy fresh food, reminding them of home and giving them a vital boost to their morale. These projects demonstrate once again that soilless cultivation that uses LED artificial lighting – tailored in terms of duration, intensity, and spectral quality to achieve the different phases of plant growth – represents a practice capable of growing crops in any kind of environment, even space. It is an optimal solution to climate unpredictability and land availability. It can respond to crises and emergencies, including wars or climate disasters. Lastly, it can provide food that is not contaminated with pesticides or chemical harmful substances (Pontetti, 2024).

Italy is not the only country working on this technology. Japan is one of the pioneers in the adoption of hydroponic cultivation as a response to its scarcity of arable land and rapid urbanisation. Indeed, Japan has installed underground hydroponic greenhouses to grow crops such as rice and vertical farming within urban settings. This has enabled a better management of spaces and has significantly increased the production (Kannan et al., 2022). Different companies have specialised in the realisation of hydroponic greenhouses. An example is MIRAI, which has transformed the abandoned Sony company in Miyagi into one of the biggest plant factories in the world. It consists of a soilless vertical farm producing around 10,000 heads of lettuce per day using 17,000 LED lights to simulate sunlight. To be noted is that the establishment was abandoned do to the 2011 Tohoku earthquake and tsunami (Dickie, 2014), showing that hydropower can not only fulfil the demand for food, but also give a new life to abandoned buildings and respond to natural disasters.

Other countries are developing hydroponic cultivation as well, including Germany, the Netherlands, Iran, and Russia. In general, this trend is being embraced in countries where land availability is limited (Kannan et al., 2022). Even

though it requires high initial costs and knowledge, it stands out as a versatile solution to many limitations of the current conventional approach. Starting from land degradation and availability, to the chemical contamination of food and water scarcity. It is a more sustainable, resilient, and space-efficient model capable of reshaping the future of food production.

2. Chapter 2 – Social Sustainability

Agriculture has become a central sector in our globalised world, creating complex Global Supply Chains [6] and Global Value Chains[7]. Local farmers selling their products in markets still exist, but the buyers' behaviour has changed. Grocery shopping is mostly done in supermarkets. To make an example, in Italy, 70% of the population buys vegetables at the supermarket or in discount markets. Alternatively, from markets (42%) or greengrocers (43%) (Mercuriali, 2022). Furthermore, the amount of grocery shopping done online has increased. From 2017 to 2024, the percentage of individuals worldwide purchasing food online more than doubled, rising by 175%. In 2024, the number was indeed 2.2 million persons having their groceries delivered (Statista, n.d.). However, this service is mostly done by supermarkets, e-commerce giants such as Amazon, and platforms specialised in food delivery, including Instacart.

This shift in consumer behaviour and retail dynamics is part of a broader transformation of the agri-food supply and value chain, where multiple actors (producers, retailers, and consumers) interact in a complex and often unbalanced system. However, consumer behaviour can have a relevant impact. Raising awareness of human rights injustices and farmers' poor working conditions can influence consumers' demand, and purchasing products that respect both environmental and social sustainability can shape production. One only needs to look at how food offerings in supermarkets have changed compared to a few years ago. Today, many packaged products carry indications such as "palm oil free", following studies that have highlighted the potential negative effects on health. Others report the reduction of emissions with statements such as "produced with X% less CO_2". Although in some cases these are greenwashing operations, this change highlights a transformation in consumer preferences and, consequently, the adaptation of the market. Today's consumer is more attentive to these details and makes them weigh in their purchasing choices (Execs In The Know, 2023). The problem is that consumers still do not pay enough attention to these matters. The data just illustrated is proof of this. Many still prefer supermarkets to local producers, and there is even a part of the population that still does not believe in climate change. It is therefore essential that consumers become better informed about the dynamics behind food production and the impact their

[6] By Global Supply Chain, we refer to the network of organisations, persons, resources, information, processes, and technology entailed in the production of a good, starting from the delivery of source material to the delivery to the final consumer (Islam, 2023). It is mainly conceived in terms of: flows of goods and inputs, logistical organization, and technical and commercial coordination between suppliers and producers. Consequently, the supply chain is about connecting all the physical stages of production, optimizing costs, reducing times, and protecting against risks (Baldwin & Freeman, 2022).

[7] By Global Value Chain, we refer to the systemic and coordinated structures of organization of economic activity. It does not simply focus on market logics but also on transnational governance (contract law, intellectual property, technologies, etc.), sequences of activities that add value (tangible and intangible) from design to sale, power relations between actors (e.g., large retailers vs. local producers), and on the political-economic vision focused on the distribution of value along the chain (Lianos et al., 2022).

choices can have, particularly in terms of encouraging improvements in both agricultural practices and the social dimension of agri-food production.

Indeed, social sustainability is a key factor that should be considered in the dynamics of this system. As McGuinn et al. (2020) highlight in their study, there is no universal definition of social sustainability, but it is regarded as a dynamic, contextual, and often vague concept. However, among the different interpretations, it is identified as one of the three main sustainability pillars, alongside the economic and environmental ones. Within the context of the EU, social sustainability includes social progress, improvement of living conditions and welfare, social cohesion, a competitive social market economy, and the progression of sustainable development of the EU social model. As there is no precise definition, several debates on its interpretation have occurred. This has facilitated the dialogue between different actors, but at the same time, it has complicated its practical application and enabled stakeholders to use the concept instrumentally. Indeed, the concept of social sustainability has an organisational function, but lacks definite content. The debate is stuck in philosophical questions about what a "good society" and a "worthy life" mean, leading, however, to logical loops that are difficult to resolve. In particular, three main interrogatives are: "*What people need vs. what is good for the bio-physical environment?*", "*What people need vs. what people want?*", and "*What is good for the bio-physical environment vs. what people want?*". Nowadays, the concept of social sustainability is put aside compared to the economic and environmental pillars (McGuinn et al., 2020), but as this chapter will analyse, it is necessary to introduce it into the dynamics of the agri-food system to improve conditions for those working in this sector and the local communities impacted by the globalised value chain.

2.1. Monocultures and Global Value/Supply Chain

In Chapter 1, we discussed agricultural conventional practices aimed at maximising production, leading, however, to the exploitation and depletion of the soil. Different types of producers carry out these practices, but among the most polluting ones we find multinational corporate agribusinesses encouraging monocultures and the privatisation of the food system. The use and management of monocultures conducted by these big companies have an enormous impact. They not only negatively contribute to climate change, but also to social inequalities. Furthermore, they shape the entire supply chain (production, processing, distribution, and consumption of food) and influence food regulation. Therefore, in serving their interests, they mould the food sector, affecting food security, health, community sovereignty, cultures, the environment, and knowledge systems (Munoz-Araya et al., 2024). This topic is closely linked to social sustainability, as these forms of value chains impact not only the health of the soil and the environment, but also the conditions of workers and local communities. It is essential to address the political and power dynamics that lie behind food production because, as will be shortly analysed, in these contexts, there are

often actors who exercise strong control over the market to the detriment of others, with less influence and fewer opportunities.

As mentioned, monocultures are part of this system. They consist of intensively cultivating a single crop over a big area to maximise yield, regardless of the environmental impact. Indeed, the substitution of natural ecosystems with uniform landscapes causes a decrease in wild plantations, animal species (including pollinators and beneficial insects), and soil microbial diversity (resulting in less fertility and resilience to pests). Interfering this much with the soil, as previously discussed, leads to degradation and desertification, while at the same time draining groundwater resources (since monocultures necessitate a large amount of water) and contributing to water contamination. Furthermore, they are a major cause of deforestation (Munoz-Araya et al., 2024).

Consequently, it can be affirmed that monocultures have a great impact both on the environment and on the food chain system. The costs of these negativities, however, are not paid by big companies; instead, they are externalised, impacting local ecosystems and communities. Indeed, the expansion of monoculture often involves the acquisition of land originally owned by local farmers, giving rise to the phenomenon of "land grabbing", which displaces traditional farming communities. The context behind this is that these large companies are not local; rather, these are foreign companies that relocate their business to countries where regulations are less stringent, to reduce costs and avoid complying with certain requirements. However, they end up exploiting the resources of the host territory, paying workers low wages, and in the end exporting crops, leaving local communities in a situation of food insecurity, social instability, degraded land, poor working conditions, and a weak rural economy. The contradictory nature of monocultures is that they are often justified as deemed necessary to "feed the world", but the reality is that food distribution is not done equitably. Most large-scale agricultural productions are not even intended for human consumption, but they are used for animal feed, processed food, and biofuels – such as soil and palm oil. At the same time, those who are, do not feed local communities but are destined to meet the demand of foreign markets, often wealthier countries. Therefore, they leave poorer nations more or less in the same situation while worsening conditions for countries where monocultures are established. On top of that, monocultures produce a large quantity of wasted food (Munoz-Araya et al., 2024).

The following paragraphs will discuss the impact of monocultures and agribusiness through real-world cases.

2.1.1. Monocultures and Food System Pressures: The Case of Brazil

In the last years, Brazil has become a major agricultural giant, exporting soybeans, corn, sugarcane, and beef. In particular, it controls more than 50% of the global soy trade. This was possible as over the last ten

years, the production of cassava and rice decreased by 20-30%, leaving space for soy plantations that expanded by more than 100%. Sugarcane production increased as well. It is to be noted that China purchases 70% of soybeans for animal feed, while sugarcane is acquired for biofuel generation. Therefore, local common food left the place for crops to be more profitable from an export perspective. This is a fundamental point as it is reflected in the internal market. Indeed, domestic prices are now tied to international markets, resulting in price volatility. In the years 2021-2023, a price escalation was registered. Respectively, rice and beef saw a 40-50% increase due to the limited availability of these products for locals as the majority is exported. The price of vegetable oil was 60% higher as a result of the rise of soybean demand for biodiesel. Finally, the bean price grew by 35% since most of the land is used for soy, and not much remains for cultivating other beans. The outcome is locals not being able to purchase affordable food anymore and turning to poor dietary habits, relying on cheaper, low-nutrient processed foods. This shift is increasing the risk of nutrient deficiency and health-related issues, including obesity, diabetes, and malnutrition. This happens because profit derives mainly from foreign buyers rather than local consumers. For this reason, small farmers are being displaced to leave space for agribusiness expansion, and no investments are being made to provide infrastructure for local distribution. Indeed, between the years 2000-2023, 2 million small farmers lost their land and many of them were forced to move to urban slums, living in a condition of poverty and food insecurity. Between the years 2015-2022, the level of rural unemployment increased by 15%. Furthermore, small farmers do not typically have the resources to compete with big companies. Consequently, this export-oriented agricultural model, which was supposed to bring economic growth and employment, is instead obliging farmers to leave their land (decreasing unemployment by 15%) and paying local agricultural workers wages below the minimum standard. At the same time, it is increasing economic inequalities. Clearly, the “feed the world” justification mentioned before is not true. In 2022, 33 million Brazilians faced food insecurity and consumed unhealthy food due to the high prices (de Souza & Ribeiro, 2025).

Monocultures also have a significant impact on the environment. They are indeed the first driver of deforestation in Brazil, in particular hitting the Amazon and Cerrado forests. In the last 25 years, 17% of the Amazon forest has been lost due to soybean cultivation and cattle ranching. Only in the year 2022, over 11,500 km2 of the Amazon forest were destroyed. Cattle ranching alone accounts for 80% of Amazon deforestation. Moreover, due to the high demand for soybeans, part of these forests, wetlands, and savannas have been converted into vast monoculture farms. The result is the disruption of the already delicate rainfall cycle and a serious threat to wildlife living in these areas. Furthermore, the exploitation of the soil, together with the overuse of pesticides and fertilisers, has already resulted in soil degradation across 40% of the land and water contamination. The once-fertile Cerrado Region is now facing desertification due to deforestation and unsustainable practices. Finally, agriculture employs 70% of Brazil’s freshwater, reducing water supply availability of drinking water and leading to longer drought periods. River levels have also declined. Most

of this water is mainly used for intensive irrigation and energy generation. All of these factors are exposing the agricultural sector to climate change. As already mentioned in the first chapter, unsustainable practices make crops and yields less resistant to rises in temperature, rains, and extreme weather events. This will ultimately affect overall productivity, impacting the export-oriented agricultural model (de Souza & Ribeiro, 2025).

2.1.1.1. Governments' interventions and representation

In response to the situation outlined above, the Government has made some interventions to try to stabilise prices and guarantee food access to its population, such as implementing import subsidies, controls, and strategic food stockpiling. Furthermore, subsidies for small farmers have been introduced to encourage them to focus on the internal market, not exports. Land-use policies have been issued to protect domestic agriculture and impede large companies from controlling the entire agricultural business. To further reach this objective, programs have been introduced to redistribute lands to small farmers, while laws have been enacted to protect Indigenous territories and prevent illegal land grabbing and deforestation. Moreover, the Food Acquisition Program (PAA) was founded to support small landowners by purchasing their yields and redistributing them in community kitchens and public food programs. This project not only increases food access but also creates a stable income for farmers (de Souza & Ribeiro, 2025).

Despite these interventions, the situation remains critical since large agribusinesses significantly impact the actions of the Government. These companies are strongly represented within the Brazilian National Congress[8], especially by the *Banda Ruralista*, composed of politicians aligned with the interests of agribusinesses. This has a significant impact on debates and decisions. In particular, different policies have been influenced by lobbies. The Biodiesel Mandates are an example of this. They require diesel producers to blend a specific percentage of biodiesel into traditional diesel. However, the major ingredient of biodiesel is soy oil, leading to an increase in the demand for soy. These policies were pushed by soy producers to create a guaranteed market for their product. Furthermore, many policies omit relevant socio-environmental issues, including the loss of biodiversity, pesticide contamination, water overuse, labour conditions, and land tenure insecurity due to land grabbing. Moreover, these companies influence licensing regulations as well. In Brazil, licensing is necessary to carry out any activity that may have an impact on the environment. Having more relaxed policies regulating licensing allows for easier and quicker expansion of their business, even if it is at the expense of the Cerrado and Amazon forests. The Matopiba agricultural frontier is one of

[8] Regarding more specifically representation in the Parliament, historically, the Congress was composed of two competing Ministries, namely the Ministry for Agrarian Development (MDA), representing family farming, and the Ministry of Agriculture (MAPA), standing for agribusinesses. Even though the MAPA had more influence and budget, the MDA was still able to provide some protection to local inhabitants. Nevertheless, it was dismantled in 2016, making it even more difficult for small farmers to have their voices heard (Sencébé, Pinton & Cazella, 2020).

the key areas of agribusiness expansion, especially of soy and sugarcane. This area is also the home of many traditional and indigenous communities. The expansion of agribusinesses, however, is generating several conflicts over the control of the land, which usually end up with local communities being evicted. This is allowed by state and judicial tools, as to claim frontier areas, it is necessary to deliver a formal land registration. The issue with this system is that most of the time, local communities do not have legal titles over lands, but they hold customary land rights, leading to a non-recognition of their use and presence by State institutions (Bastos Lima, 2021).

Brazil shows a grim side of the food supply chain, where local farmers are displaced and overlooked, workers are exploited, the population is left to fend for itself in a situation of food insecurity that is occurring to follow the interests of large companies, and the soil and environment are severely damaged. Unfortunately, Brazil is not the only place where agribusinesses are impacting the social, economic, and environmental situation of local communities.

2.1.2. Sierra Leone's case: foreign investments and land grabbing

Sierra Leone's case represents a further example of the influence that large foreign companies can have on the local population. To understand the context, it is important to know that the majority of the inhabitants are smallholder farmers. Indeed, agriculture accounts for 2/3 of employment and GDP. The major crops are rice (cultivated by 85% of farmers) and cassava, but also maize, millet, sweet potatoes, and groundnuts. Over 60% of households consume the food they produce themselves. However, these farmers face numerous challenges. They lack access to agricultural inputs, including fertilisers and pesticides, which creates an elevated demand for labour. Furthermore, the majority of households live in areas with weak infrastructure and no functional market, reducing access to food, social services, inputs, and opportunities to generate income. Nevertheless, their major issues derive from the presence and investments of agribusinesses. Since the year 2000, over 25% of arable land has been acquired by large foreign companies. A great part of this percentage is represented by lands that were already being farmed before, and therefore already productive. To obtain them, companies need to turn to the Paramount Chief, the intermediary of these transactions. The role of Paramount Chiefs is to protect the land, put in contact the company with local farmers, and provide the final signature. They cannot decide to lease the soil without the consent of landowners since they are not the holders but the trustees, as established by the Chieftaincy Act of 2009. In practice, things do not always work according to the law. Indeed, chiefs often dominate the negotiations, even by overriding the landowning family. Furthermore, negotiations are often dominated by political elites and local authorities, disregarding local communities. The biased representation, weak negotiation skills of local representatives, and imbalances in power and information lead to a lack of transparency, unfavourable contracts, lease agreements with terms that remain unknown, and easier land grabbing by companies (Turay, 2024; Bonuedi et al., 2021).

However, land grabbing has a significant impact on both the environment and population. Regarding the environment, tenure insecurity reduces the efforts toward climate adaptation and mitigation since when people lack land security rights, they have no incentive to use sustainable agricultural practices. Moreover, agribusinesses are the cause of deforestation, erosion, and degradation. Concerning the population, as local rural communities are highly dependent on agriculture, losing crops is particularly damaging. It can lead to loss of livelihoods, homes, and access to essential resources such as food and water. 15% of respondents in the study conducted by Bankolay Theodore Turay in 2024 affirmed that tenure insecurity damaged their livelihoods, as being displaced makes it harder to maintain a stable income. Indeed, compensation in case of displacement is very low and may be significantly delayed. 20% of respondents said that land grabbing led them to food insecurity. In fact, despite the number of investments, poverty and food security remain high. This is also due to the fact that as a large number of farmers consume the food they produce, losing their land can largely affect their food access. Furthermore, land grabbing is the cause of many disputes and conflicts over land ownership, use, and purpose, that even culminated in violence. Additionally, it leads to social disruption and psychological harm. Marginalised groups are the most severely impacted, as they are the least likely to be compensated or consulted when their land is taken. In particular, the ownership of migrants is often non-recognised or seen as non-permanent, making them more vulnerable to being displaced. Due to patrilineal inheritance and marriage norms women are often excluded and cannot possess lands. Even when they do, they are most of the time excluded from negotiation and have limited decision-making power. The disproportion of their rights is notable since they are responsible for the household survival and the major users of forests, pasture, and water. Fishermen and water users are disregarded as well, even though agribusiness projects often disrupt water access downstream. Finally, land grabbing damages pastoralists too, as it blocks grazing corridors by converting the use of the land (Turay, 2024).

Foreign investment could play a key role in improving agricultural productivity by introducing new technologies and achieving economies of scale. However, the harm created to the environment and population outweighs the benefits, especially in a weak Government. Indeed, land deals involve large quantities of money and complex procedures, making them vulnerable to corruption. Corruption is particularly elevated when the Government has weak institutions, where bribery of officials or chiefs occurs and lesser safeguards are ensured to protect local communities. This situation is further exacerbated by agricultural lobbies, which collude with politicians to facilitate land acquisition and pressure landowners to sell their land. Furthermore, they manipulate administrative processes to gain the authorisation and approval to acquire lands, even at the expense of the population. This makes the Government incapable of managing lands, preventing displacements, resolving disputes effectively, and enforcing the law by punishing violations. In addition, the current land regulation is unable to protect the interests of inhabitants, as it is mostly customary law, which makes ownership rights unclear and therefore easier for investors to acquire land without proper consent from the holders. The consequence of corruption, lobbying, and a weak

Government is the system mentioned before, based on displacement of communities, land grabbing, exclusion of local communities and underrepresentation of vulnerable populations, concentration of land ownership in the hands of agribusinesses, and loss of trust in the authorities and the law (Turay, 2024).

2.1.3. Final considerations

These two cases show a complex regulatory landscape. On the one hand, legal requirements can act as barriers for local communities. In Brazil, licensing and formal land registration impose burdens on local communities that may not have the legal titles or competencies to utilise these instruments, leading to displacement. Similarly, in Sierra Leone, the involvement of Chiefs in negotiations established by the law does not necessarily benefit inhabitants. Furthermore, in general, ownership requires meeting several legal conditions, as customary law is insufficient and land property is not typically recognised. On the other hand, these same rules are often used as instruments to help agribusinesses acquire land, giving them legal means of consolidating their control over regions, frequently at the expense of vulnerable communities.

Even though monocultures and agribusinesses do not have such a severe impact everywhere, it is important to reflect on these situations as the products cultivated in these states are things we consume more or less daily. As mentioned, monoculture produces coffee, tea, rice, palm oil contained in most processed foods, soy used to feed animals we eat, etc. It is essential to remember that consumers' choices matter, and buying food from these cultures means supporting this system.

2.2. Vulnerability and Labour Exploitation

Labour exploitation is not limited to large-scale monocultures; it is a broad and interconnected concept of social unsustainability that affects different contexts. While in Brazil and Sierra Leone, it takes place through land appropriation and precarious conditions for local workers, in Europe, it emerges through the marginalisation of migrants and the growing vulnerability of small-scale farmers. Among the manifestations of social unsustainability, there is also the labour exploitation of women and children. Furthermore, in countries where regulations are less strict and adequate protections for workers are lacking, cases of workers contaminated by chemicals used in intensive agriculture are not so rare. Understandably, the levels of social sustainability depend on the regulations in force in the State, but in general, fundamental rights violations are common across different parts of the agri-food sector, and they happen worldwide, not only in developing countries.

2.2.1. Migrants' Exploitation

Europe represents a clear example of a developed region where migrant exploitation is a widespread issue. This is the result of several factors. The first one is the labour demand. In the last twenty years, the

dependence of migrants has increased due to the decline in native workers. Indeed, between 2011 and 2017, 1,3 million Europeans left their jobs in the agrifood sector. The majority of this workforce was replaced by both EU and non-EU migrants, employed in crop production, fruit, horticulture, viticulture, livestock, and dairy and meat processing. This, combined with the modernisation of the system of the past three decades (e.g., greenhouse farming, automation, etc), the effects of climate change, and the dynamics of a globalised supply chain, led to an increase in demand for flexible and cheap labour. The modernisation and vertically integrated approach[9] resulted in a market predominantly controlled by large companies, with a limited number of small farms, and high prices for farmers. These elements led to a high dependence on migrant workers to fill gaps and keep costs low. This reliance is also fuelled by the so-called "Prosperity Paradox", which is when, due to an increase in income, local workers leave farming, leading to rural depopulation and migrants filling the gap under precarious conditions. Indeed, they are often employed under extreme conditions, exposed to heat, cold, and pesticides. They endure long hours in exchange for low wages and often live in housing lacking access to basic services (Palumbo, Corrado, & Triandafyllidou, 2022).

Strict migration laws represent a second contributing factor. Undocumented migrants are easy to exploit as they can only do undeclared work. In case of abuses or even medical injuries, they are unable to seek help from the authorities or even access healthcare. Furthermore, they cannot rent a house with a further contract. However, not all exploited migrants are undocumented; they can also be legal seasonal workers, asylum seekers, or intra-EU migrants. The vulnerability in these relationships comes from power imbalances, dependencies, and a lack of alternatives. Within these dynamics, women are even subject to sexual blackmail, rapes, and patriarchal forms of control and exploitation (Palumbo et al., 2022).

It can therefore be deduced that these exploitative conditions are legally enabled by the current legislation. It is not a phenomenon carried on by "bad actors" but a feature of the system that is in place. It is therefore fundamental for policymakers to start addressing the issue as a result of institutional systems and market structures, rather than a crime committed by big companies and landowners. Indeed, despite the different European legal systems, all countries suppress workers' rights to reduce agri-food production costs as they fail to provide protection and rights to migrants. And even if some measures were taken, they were mostly palliative and did not address structural inequalities. Even if laws – such as the EU Directive on Unfair Trading Practices (2019/633) regulating power imbalances by banning certain exploitative business-to-business practices or the Common Agricultural Policy (CAP) introducing new rules tied to subsidies to make land owners respect social and labour standards (Palumbo et al., 2022) – exist, it remains challenging

[9] Vertical integration is a business strategy based on the control of multiple stages of the production chain, meaning all or part of the steps that take a product from the field to the table. For example, a company might grow the crop, process it in its firm, package it, and distribute it to supermarkets. This business strategy is more and more common among farms.

to guarantee migrants' rights and address inequalities in a Europe that is more and more closing its doors, becoming a fortress extremely difficult to access.

A reflection of this system is the phenomenon referred to as Caporalato. It is the informal or illegal recruitment of workers by an intermediary (the Caporale) who provides a job in exchange for a share of the workers' wages. In particular, the Caporale is an unlawful intermediary providing workers to employers and migrants with permits, documents, and accommodation in exchange for money and obedience. They cooperate with specialists – including lawyers, accountants, public officials, and politicians – to make the system legal. It consists of a relationship based on power imbalance and structural dependence, where the worker is technically free, but still accepts precarious working and living conditions in the absence of alternatives, whether they do not exist for real or they do not perceive them. This is increased by barriers including the language, social and economic isolation, ignorance of the law, and unlawful and untransparent recruitment. It not only involves migrants but also women and retired persons. As mentioned before, women's harassment, rapes and exploitation are particularly serious and alarming, reflecting an abusive and misogynous system (Omizzolo, 2020; Peleggi, 2021). The dynamics just described characterise, in general, forced labour and modern slavery: they emerge from the interaction between supply-side vulnerability and business-side demand. The vulnerability of workers derives from conditions of poverty, discrimination, weak labour protections, and stringent immigration policies. The demand for forced labour from businesses is due to concentrated corporate power, irresponsible sourcing practices, cost-cutting, and weak or absent regulations. Indeed, as LeBaron outlines in her paper, forced labour is not a sporadic event but a business choice deriving from the supply chain dynamics (LeBaron, 2021).

Different factors are fuelling this phenomenon, including the globalisation of the agri-food supply chain, contractual power being in the hands of organized retail chains, and the CAP abandoning protectionist measures in favour of a free market (Peleggi, 2021).

Regarding Italy in particular, this phenomenon has changed over time due to the evolution of the legislation and public opinion. In general, the topic of the treatment of migrants was not publicly discussed. It started to gain attention after protests and journalistic investigations. However, in recent years, institutions and entrepreneurs have started to deny and neutralise the problem, supporting instead a system that sees migrants as a threat and that cannot manage fluxes efficiently. The Italian Testo Unico Immigrazione (d.lgs 286/1998[10]) and the Bossi-Fini law (2002) are a reflection of this approach. The more recent Decreto

[10] The Legislative Decree 286/1998 referred to as Testo Unico Immigrazione or Legge Napolitano, regulates the conditions for the entrance and stay of foreigners, including residence permits for migrants. It defines the figure of the unlawful migrants as the person entering Italy without a permit and identifies forced identification, fines, detention in Centri di Permanenza per il Rimpatrio / Repatriation Holding Centres (CPRs), and forced removal as a solution and punishment, as entering unlawfully the territory of a state nowadays is not only an administrative violation but also criminal (Ministero della Giustizia, 1998).

Sicurezza (L. 132/2018[11]) supports this perspective as well, as it abolished humanitarian residence permits and introduced more restrictive criteria to obtain permits, including being under special protection or medical care. As this law sees humanitarian protection as excessive and used improperly, its objective confinement of humanitarian residence permits to specific cases. Its orientation is, therefore, the exclusion and selection of migrants (Omizzolo, 2020).

This system led to several factors. First of all, the change in the market and supply chain, together with the current legislation, led to a decrease in wages to the point at which even the use of technologies and agricultural machinery is less convenient. The demand for such unpaid workers, at the same time, has been filled by migrants who, being undocumented, with no access to health care or any declared work, accept these conditions. This is the result of strict immigration laws that exclude asylum seekers and irregular migrants from access to an adequate reception system, as well as from social and labour inclusion. The inadequacy of the current legal system led to an increase in agromafias and caporalato (Omizzolo, 2020; Peleggi, 2021).

According to the Osservatiorio Placido Rizzotto mentioned by Omizzolo (2020), the fundamental rights of approximately 450,000 agricultural labourers are violated, with over 132,000 subject to conditions akin to slavery. More than 300,000 workers are employed for less than 50 days a year, thereby remaining in a vulnerable and precarious situation. At the same time, this system generates 4,8 million euros per year, evading 1,8 million euros of taxes.

While it may be excessive to say that the State deliberately supports the Caporalato system, this governance inevitably fosters illegal labour. Taking into consideration how many migrants arrive in Italy, the underenforcement of existing legislation or selective enforcement, and the fact that the state cannot repatriate or detain every undocumented migrant, it is easy to understand that their number within the Italian territory is significant. Lacking legal pathways to employment, housing, and healthcare, they consequently find themselves in a state of systemic exclusion. Without the ability to sign work contracts, access public services, or rent accommodation lawfully, these individuals are pushed into the informal economy, creating fertile ground for exploitative networks and organised crime to emerge and thrive. Although Caporalato is punished in Italy by Law No. 199 of 2016 and Article 603-bis of the Italian Criminal Code[12], more investigations and inspections need to be done.

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[11] The Bossi Fini law has introduced the obligation to undergo fingerprinting and photographic identification to obtain a residence permit or its renewal. It extended the use of CPT and it created a system to reject easily asylum requests considered unfounded.
[12] Law 29 October 2016, n. 199 introduces a new regulation to oppose Caporalato and labour exploitation, in particular by rewriting article 603-bis of the Italian Penal Code. Specifically, it states that anyone who recruits workers for third parties in exploitative conditions, taking advantage of the workers' state of need, is punished with imprisonment from 1 to 6 years and a fine of 500 to 1,000 euros for each worker recruited. If the acts are committed with violence or threats, the penalties increase to

Lastly, it is important to acknowledge that the Caporalato exists everywhere and it is a European phenomenon. Indeed, seasonal migrants are employed in Spain, Greece, Germany, the UK, Norway, and Sweden. They usually come from Africa, Bangladesh, and Pakistan; the majority of them are young (between 18 and 34 years old) and male (Omizzolo, 2020). Therefore, the Caporalato is not a marginal phenomenon. Even though international and national laws exist to prevent the exploitation of workers, it is not enough. Once again, it is not only the single person who commits the crime, but the system that allows them to do it.

2.2.2. Child exploitation

A final issue to be discussed regarding the exploitation of vulnerable categories is child labour. This often occurs in cases of food insecurity and low-income families that struggle to meet their basic needs and see their children as a necessary means to survive. In these cases, children are pulled out of school to assist the families in farming activities, domestic services, or selling their products in markets. In some cases, they even beg for money on the streets. This may seem the right move to respond to the necessities of today. Still, without education, it is not possible to access better opportunities and find a job that allows them to exit the condition of poverty. Furthermore, being exposed to situations of stress and economic difficulties as children has relevant implications for the physical and cognitive development of the child. Lastly, long hours of work in precarious conditions can lead to physical exhaustion and more vulnerability toward malnutrition and illness (Bhakti & Nicholas, 2025).

Child labour, however, is very connected with migrant exploitation. The Global Report on Trafficking in Persons by the United Nations (2024) shows that children are the category with the greatest increase among victims detected after COVID-19, with a recorded increase of 26% in 2022 compared to the pre-pandemic period. This especially concerns male minors, unaccompanied migrants, who become vulnerable to forms of forced labor, including fruit and vegetable picking, cleaning greenhouses, labor in the fields and agricultural warehouses, loading/unloading products, and exposure to pesticides without protection. In Western and Southern Europe, many migrant children (mostly unaccompanied), mainly from North Africa, sub-Saharan Africa, and Asia, have been trafficked for forced labour. The majority of exploited children are between 14 and 17 years old, but there are also younger children. Unaccompanied ones are the ones with a higher risk of being forced to work as they need to earn money, have no family or legal guardianship, and are invisible to social protection systems (United Nations Office on Drugs and Crime, 2024).

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imprisonment from 5 to 8 years and a fine of 1,000 to 2,000 euros for each worker. Furthermore, the law lists four conditions which, if present even individually, constitute an indication of exploitation: wages clearly different from collective agreements or disproportionate to the work performed (even if repeated only twice); repeated violations of the rules on working hours, rest, holidays, etc.; violations of safety and hygiene regulations in the workplace; and degrading working, surveillance or accommodation conditions (Mazzanti, 2016).

2.2.3. Exposition to dangerous substances

In talking about the exploitation of workers, it is also important to mention the consequences of unsafe working conditions, in particular when working with chemical substances. As mentioned in Chapter 1, synthetic pesticides and fertilisers not only pollute the environment but also have consequences on living beings. Uruguay's soy monocultures show this issue. Starting from the 2000s, the cultivation of modified soy able to tolerate herbicides became a trend, leading to a systematic adoption of pesticides. Several workers are exposed to these chemical substances, as safety devices are often avoided due to costs, and official safety protocols are either ignored or absent. Local women are also affected by pesticide exposure, even without being in direct contact with the chemicals. They live next to crops, washing contaminated work clothes and taking care of their children. The result of this exposure is evident in their children's symptoms and the development of a form of risk mapping, based on olfactory memory, seasonal patterns, and recurring symptoms. However, their capabilities are not taken advantage of by hospitals, nor is their exposition recognised. Nevertheless, constant exposition leads to headaches, vomiting, dermatitis, breathing problems, and in serious cases, also miscarriage and foetal deformity. Local medical institutions at the same help contribute to this system, as often symptoms are minimised or associated with generic causes such as stress or nutrition. They tend not to correlate issues with the use of pesticides. This favours a system where workers do not feel safe in reporting the situation as they do not trust public institutions and are scared for their jobs (Evia, 2023). Unfortunately, this is not the only case, as these substances are largely abused. However, it is an example of a broader, systematic neglect of health and safety in agriculture, where economic interests are put above human rights, and where the neglect of these situations perpetuates a cycle of harm, mistrust, and silence.

2.3. Power Imbalances in the Food Chain

A further aspect that needs to be assessed in describing the agri-food supply chain is the influence that retailers and big companies have on producers, in particular on the small farmers.

In recent years, chain retailers such as supermarkets gained significant market and buyer power. The consequence of this goes beyond pricing, as it affects the variety of products on store shelves and the supplier's incentive to innovate and improve quality (Kim & Nora, 2022). A major concern of the current market structure, however, is that farmers often find themselves in a weaker position compared to processors, retailers, and wholesalers. This may trigger different negative implications for farmers, including receiving low prices and entering into contracts with Unfair Trading Practices (UTPs) (Deconinck, 2021).

To fully grasp these issues, it is necessary first to understand the market structure. To begin with, the agri-food chain has an "hourglass" shape, meaning that many farmers characterise it, few buyers (processors, wholesalers, and retailers), and many consumers. Therefore, there is a large number of farmers supplying to a small number of processors, who sell the product to a large number of consumers. This puts farmers in a position of vulnerability and to accept UTPs (Deconinck, 2021).

A second relevant factor is that many economic models assume that farmers sell their products in spot markets where prices are homogeneous. The reality, however, is that market access depends on the agreements made, quality standards imposed by buyers, the involvement of farmers' cooperatives, pricing, and the presence of already established long-term relationships. These factors led to a market dominated by supermarkets, replacing traditional markets and imposing strict requirements, such as consistency, traceability, and high-quality food. Nevertheless, smallholders struggle to meet these demands for different reasons. The dimension and geographical position can impact the capability of providing a consistent amount of food. Limited land and yield variability make it difficult to produce food regularly, while being close to cities and well-connected roads facilitates the delivery of fresh food. Furthermore, being part of a cooperative or farming association can give an advantage, as it helps meet the demand by merging production, and it provides more bargaining power. In addition, having access to technical services, including agricultural training, can support achieving the requested standards (e.g., quality, hygiene, traceability, etc). Available infrastructure is another fundamental factor. A functioning irrigation system to produce all year round without depending on rain, a personal means of transportation, warehouses and packaging to help preserve the product well and present it better, cold storage, and technologies to receive orders, update prices, and plan deliveries – all constitute necessary infrastructures. Other elements are low bargaining power and minimal access to finance or inputs. The result is that smallholders, who often do not have access to these resources and competences, are left out by supermarkets. This increases inequality within rural areas and concentrates benefits in already better-off regions/farmers (Deconinck, 2021; Cardoso & Souza, 2020).

A second fundamental result of this market evolution is buyers contacting farmers directly and not with an intermediary. This, together with the exclusion from supermarkets, leads to vertical coordination based on contracts regulating how and what farmers should produce. To make some examples, in the U.S., contract farming increased by 24% between 1969 and 2013. In Spain, over 80% of pig production is handled through contracts. This is important because contracts bring efficiency but raise concerns as well, due to the low bargaining power farmers have. In fact, UTPs[13] can be frequent in these types of contracts. They can be delayed payments, unfair terminations and cancellations, unilateral or retroactive changes in the contract,

[13] Unfair Trading Practices significantly depart from good commercial conduct, do not align with good faith and fair dealing principles, and are unilaterally imposed by a party on another (European Commission, 2014).

imposition of marketing and promotional costs on suppliers, claims for unsold or wasted products, and upfront fees to secure contracts. Unfortunately, UTPs are not carried out exclusively by big companies but also by small buyers (such as local processors or distributors) who can take advantage of weak rules or desperate sellers. This happens when they lay out contracts with unclear terms, when the farmer has no alternative buyer, or when the terms are changed last minute by the buyer, and there is no way to say no. An example is a contract with no fixed price where the buyer can change how much to pay the farmer based on how well the market is. The buyer does not need to be a big company to abuse the situation. Therefore, we should not focus only on how big the firm is but also on how fair the terms of the contracts are (Deconinck, 2021; Cafaggi & Iamiceli, 2018). Among the consequences of UTPs, there is the limited incentive to share information such as the quality or the quantity expected, especially when the contract is made with actors having more bargaining power. This is because farmers are afraid of sharing information that may be used to increase the profits of buyers while reducing margins for suppliers. This leads to a less efficient and coordinated supply chain (Kim & Nora, 2022). However, hope springs eternal, as fortunately, not all actors in the agri-food supply chain are evil, and there can be fair trading practices as well. Indeed, buyers can help farmers increase their quality by offering inputs, training, equipment, and loans or credit. In return, the farmers have to sell only to that buyer. These contracts can be a win-win, especially to farmers who lack resources or capital, but they work as long as there is a relationship of trust where the contract is not breached by either party. It is therefore clear that the interaction between buyers and suppliers can determine both efficiency and fairness of the supply chain (Deconinck, 2021).

A third relevant factor characterising this market is that even small deviations from competition can largely influence prices for farmers. This is because farmers cannot easily switch buyers or stop producing, especially if they harvest perishable food. So, a slight change in the demand of the buyer can influence the income of farmers. Therefore, a small advantage for a big company can result in a big loss for small producers (Deconinck, 2021).

To summarise it, the current market has a complex structure that does not favour smallholders, market access is variable and difficult, especially regarding supermarkets, and it is based on vertical coordination that allows UTPs. Within this structure, supermarkets are dominant players. Their introduction allowed an improvement in efficiency and an expansion in consumers' choice. They negotiate directly with producers, source their offerings from a variety of brands, and do not have difficulties in switching suppliers. Furthermore, their purchase is centralised, they operate at the regional or national level, and their brands are competitors with their suppliers' brands. These factors are what allow supermarkets to have both stronger buyer power and bargaining power compared to independent small food stores. In particular, they have greater leverage regarding perishable goods. The study conducted by Deconinck (2021) provides two examples to illustrate this point. It compares iceberg lettuce with vine-ripe tomatoes. Iceberg lettuce is

highly perishable, meaning that it has to move quickly within the supply chain and needs to be sold to the consumer within a short period. This urgency can be used by buyers to create more favourable agreements and exploit farmers, who are forced to accept low offers. Furthermore, lettuce is highly standardised as lettuce heads look a lot alike, and there is little branding or quality variation. This makes it easy to switch suppliers, increasing competition among farmers. On the contrary, vine-ripe tomatoes are generally less perishable and more manageable. In addition, there are several types of tomatoes, differentiated by certifications, heirloom, flavour quality, etc. They are harder to substitute, and supermarkets depend on specific suppliers. The result is farmers having more bargaining power as their product is more unique. Indeed, the study found that lettuce farmers gained only 20% of the price surplus, while tomato farmers received 86%. This shows that the more perishable and standard a product is, the easier it is for supermarkets to push down prices and exploit farmers. When products are more durable and distinctive, instead, farmers' gains are higher and supermarkets' buyer power is weaker (Deconinck, 2021; Kim & Nora, 2022).

So far, the picture that emerges is one of a market dominated by big companies, influencing prices and creating unfair situations for small holders through their buyer power. Even though this occurs, it is also important to acknowledge that this is not always the case. Big buyers, such as processors and supermarkets, have the power to influence prices but they cannot do it everywhere or at all times. Furthermore, no pattern of widespread abuse has been identified, as retail and processing markets are often competitive and profit margins are too thin to allow massive markups or markdowns. Moreover, not all big companies exploit farmers for profit. Indeed, the difference between what farmers are paid compared to prices in supermarkets is high, but it is also true that food chains are complex. This discrepancy might be due to structural costs, global price pressures, and the productivity gap. Lastly, farmers' struggles are not always related to competition. Farms are often family-run and important decisions such as expanding are not necessarily based on a business strategy, but on personal or generational choices to make an example. A further reason could be subsidies from the Government keeping uncompetitive farms operative. In addition, global agriculture is more and more productive, leading prices to fall over time and creating more pressure on farmers. This means that also in competitive markets, farmers can lose money, and that it is not always about buyer power, but also the productivity gap. Therefore, what needs to be understood is that, for sure, large companies have their part in influencing prices, but it is not always the reason for a struggling farm. The point is that being a smallholder in a market that requires constant production and high standards is difficult, even more so when the number of farmers is higher than buyers. So, the issue of a small farm is mostly that it cannot compete on costs and production (Deconinck, 2021).

In conclusion, the agri-food system is complex. It is easy to point the finger at big retailers, but the reality is more intricate. It is true that they abuse the limited bargaining power of small farmers and that they may

influence competitiveness. At the same time, this is allowed by the current structure of the supply chain. The same supply chain that permits big companies to exploit foreign lands through monocultures.

Even in this case, consumer choice can play a significant role. Deciding to buy vegetables directly from farmers at local markets is a more sustainable and responsible choice, as these products are typically local, seasonal, and less resource-intensive. Furthermore, it supports small-scale farmers and local businesses, who often offer higher-quality products. While it is true that grocery shopping at supermarkets is more convenient from a time perspective, it is important to remember that every purchase we make is a form of indirect financing of the system that provides those goods. It is like saying that you agree with the practices behind it. Of course, supermarkets remain essential for purchasing certain items, but choosing to buy vegetables and meat from local specialised shops and directly from producers can make a difference, especially for small-scale producers who rely on this support. By doing so, we not only finance sustainable practices but also local products produced by local farmers, ultimately benefiting our own economy rather than financing multinational enterprises.

3. Chapter 3 – Legislative Framework

In the previous chapters, sustainable farming practices and the key social challenges within the agri-food market were discussed. This chapter instead focuses on outlining the main environmental policies and objectives of the European Union, with particular attention to the agricultural sector. As previously discussed, how a State regulates the agricultural sector (ranging from farming practices to workers' rights) is crucial. Lax or poorly enforced policies can result in severe consequences for the local population, both from an environmental and human rights perspective. The topic of corporate influence over state decisions and insufficient regulatory safeguards was discussed as well. The cases of Brazil and Sierra Leone clearly illustrate both these issues. Moreover, we have seen how policies not directly related to agriculture, as in the case of Caporalato and migration laws[14]. Lastly, Uruguay served as a reminder of the need for comprehensive and enforceable social safeguards in the industry by showing how insufficient worker protections can have major negative health effects. Consequently, regulation plays a central role in this sector, on the incentives, constraints, and opportunities that farmers and agri-food companies encounter when implementing more sustainable models.

The European Union, in particular, is focusing on the achievement of sustainable goals through environmental policy and climate action. Agriculture is a fundamental component of its agenda. Through directives, regulations, strategies, and financial instruments, the EU aims to achieve Net Zero and increase climate mitigation and adaptation. More specifically, regarding the agricultural sector, further objectives include reducing environmental impact, strengthening food safety and promoting healthy diets, defining sustainability standards at a global level, and reducing waste along the food supply chain. However, this regulatory architecture often clashes with the socio-economic realities of farmers, generating conflicts, compromises, and gaps in the implementation between ambitious environmental objectives and their concrete implementation on the territory.

This chapter explores how the EU regulates agricultural sustainability by examining the current legal framework and considering the criticisms raised in recent academic and policy debates.

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[14] The previous chapter analysed Italian policies on caporalato and immigration. At the international level, instead, the main measures adopted against trafficking and smuggling are based on two key instruments: the Trafficking in Persons Protocol, which aims to prevent and combat trafficking, protect and assist victims, and promote cooperation between States. This protocol establishes the legal basis for criminalising exploitative practices that may occur in labour-intensive sectors and cross-border production systems. The second instrument is the Smuggling of Migrants Protocol, which criminalises smuggling and aims to prevent it. The latter recognises that migrant smuggling can easily lead to situations of exploitation, particularly when they become indebted or irregular workers. To regulate working practices, there is the UN Guiding Principles on Business and Human Rights; a piece of soft law aiming at promoting the "Protect, Respect and Remedy" framework and emphasising the duty of states to protect and provide access to remedy in case of breach of human rights by companies. It encourages corporations as well to conduct human rights due diligence. However, being non-binding, its efficacy is limited (UNODC, 2021). Similarly, the Forced Labour Convention, 1930 (No. 29) and the Abolition of Forced Labour Convention, 1957 (No. 105) by the International Labour Organisation (ILO) require the members of the ILO that ratify the conventions to abolish forced and compulsory labour. However, it applies only to States that decide to ratify the conventions (ILO, 1957).

3.1. Current EU Legislation

This section provides an outline of the primary legislative and policy instruments that the European Union has implemented to guide the agriculture industry toward sustainability. It describes the guiding frameworks, namely the Common Agricultural Policy (CAP), the Farm to Fork approach, and the Green Deal, and highlights their goals, methods of implementation, and constraints. These initiatives, however, are criticised for their poor support for small farmers, inconsistent implementation among Member States, and limited enforceability, even though they represent the EU's goal of achieving climate neutrality and protecting biodiversity.

3.1.1. Green Deal and Farm to Fork

In 2019, the European Union launched the Green Deal: a package of policy initiatives aiming to set the EU's path towards green transition. It responds to the increase in pollution and temperatures due to human activity by committing every policy area to fight climate change (Council of the European Union, 2025). It has three main objectives, namely the reduction of greenhouse gas emissions to zero by 2050, promoting the decoupling of economic growth from the overuse of natural resources by emphasising resource efficiency and competitiveness, and making sure that no person or place is left behind. Furthermore, it requires key areas to face transformations to create a society and environment capable of mitigating and withstanding future climate and ecological challenges. These include protecting and restoring natural ecosystems, sustainable use of natural resources, and improving public health (Wrzaszcz & Prandecki, 2020).

As mentioned, the Green Deal applies to all policy areas, and therefore to all sectors of the European economy. In particular, the goal for the energy sector is to ensure a clean, secure, and affordable supply; for industries, it has the objective of transitioning to a clean, circular economy; in the buildings sector, it seeks to promote efficient resource use in renovation and construction; in mobility, the focus is on smart and sustainable transport (Wrzaszcz & Prandecki, 2020). Regarding the agriculture and food sectors, the Green Deal has set the target of 50-55% GHG emissions reduction by 2030. It urges this transformation due to agriculture's great impact. It accounts for 11% of the EU's greenhouse gas emissions (more than the industrial sector, accounting for 9%), and rural areas represent 40% of EU land. Consequently, farmers need to assume a new role: that of protectors of biodiversity through sustainable practices, and at the same time, beneficiaries of biodiversity, boosting their productivity (Boix-Fayos & de Vente, 2023).

To realise the objectives of the Green Deal, the EU employs different tools, including investment and innovation programs, legislation and regulations, social dialogue to ensure the participation of stakeholders, and international cooperation to increase global environmental standards (Wrzaszcz & Prandecki, 2020).

Indeed, the Green Deal does not consist of a set of targets; rather, it aims to foster an environment capable of enabling the transition by supporting the people who have to those who will be affected by it. It ensures a just and fair clean transition by setting up two funds: the Just Transition Fund, supporting workers and regions in developing new skills to become greener, and the Social Climate Fund, providing support to vulnerable groups through investments in energy efficiency, improvements of buildings, clean heating, and so on. However, these are not the only funds available. The EU Solidarity Fund provides financial support to places affected by extreme weather events due to climate change, the NextGenerationEU funding national projects aiming at climate change mitigation, and the EU Civil Protection Mechanism to aid countries in case of climate-related emergencies. Regarding agriculture specifically, a significant commitment has been made to help farmers financially cope with the impact of climate change and the costs resulting from it. Indeed, farmers in 22 Member States received €330 million. This includes countries like Spain and Portugal affected by severe droughts, and Italy impacted by floods. Furthermore, to further assist farmers, the Commission has granted Member States the possibility to complement the EU funding by up to 200% with national funds and to offer higher advance payments of CAP funds to enhance farmers' cash flow (European Commission, n.d.-c).

Regarding the legislative environment, the Green Deal includes several ambitious measures. Among them, we find the Climate Law, the "Fit for 55" package, and the Farm to Fork (F2F) strategy.

The Climate Law is the first European piece of regulation that introduced the goal of climate neutrality, ensuring that all EU policies contribute to it. It has established the binding target to achieve net-zero GHG emissions by 2050 and requires the introduction of an additional intermediate goal of 90% emissions reduction by 2040 (Filipović et al., 2022; European Commission, n.d.-c).

The "Fit for 55" Package, instead, is a regulatory package aiming at reducing emissions by 50% by 2030. It strives to accomplish this goal by revising the Renewable Energy Directive, the Energy Efficiency Directive, and the Energy Taxation Directive. Specifically, it seeks to increase the production of renewable energy, mandate a 3% annual renovation rate for buildings, and introduce new taxes on energy products aligned with climate targets. Furthermore, it imposed stricter standards for vehicle emissions and expanded the number of charging stations for electric vehicles. Lastly, it promotes carbon removal through natural sinks, involving better regulation of land use, forestry, and agriculture (Filipović et al.).

The F2F strategy is a central component of the Green Deal. It aims at creating a fair, healthy, and environmentally friendly food system through ensuring access to safe and nutritious food, minimising the climate and environmental impact, addressing issues such as food waste and food with low nutritional

value, and empowering farmers as central actors of the transition (Wrzaszcz & Prandecki, 2020). It focuses on some key points, particularly the need for a resilient food system capable of providing food in crises, as shown by the COVID-19 pandemic. To achieve this, sustainable agricultural practices need to be implemented that can effectively mitigate climate change and biodiversity loss. Furthermore, it promotes a shift toward healthier and more sustainable diets, involving a reduction in meat consumption and an increase in plant-based meals. It strives to address the issue of food insecurity by managing food waste and affordability. This is particularly relevant, as 33 million people in Europe face food insecurity, while at the same time, obesity rates are rising. Better alimentation and distribution of food are necessary to correct these disparities and create a more balanced system. Moreover, the European Union is the largest importer and exporter of agri-food products. This means that it can set standards for both EU companies exporting their items and companies aiming to sell in the EU. Lastly, it emphasises the economic opportunity that sustainable farming presents, as it allows for obtaining a competitive advantage. Therefore, its main goals are decreasing the environmental and climate impact, ensuring food security and public health, generating economic returns, making food affordable, and setting global sustainability standards (European Commission, 2020). More concretely, several measures have been taken:

Goal	Measures
Decrease in environmental and climate impact	F2F targets by 2030: • Reducing the use of chemical pesticides and eliminating hazardous pesticides by 50%; • Downsizing nutrient loss by 50% and fertiliser use by 20% (without compromising soil fertility); • Using organic practices on at least 25% of EU farmland; and • Diminishing the sales of animals and aquaculture use by 50%. This will improve climate resilience, reduce input use (e.g., pesticides and fertilizers), and enhance environmental results. Furthermore, the EU encourages shorter supply chains and less dependence on long transportation. Lastly, the EU will apply zero tolerance towards illegal, unreported, and unregulated fishing (Wrzaszcz & Prandecki, 2020; European Commission, 2020).
Ensure food security and healthy diets	• The EU will develop contingency plans to secure the food supply in case of crisis, including the improvement of already existing crisis mechanisms and the revision of the agricultural crisis reserve; • Encouragement of sustainable food in public institutions such as schools and hospitals;

	• Tax incentives and subsidies, including a VAT reduction on organic products (European Commission, 2020).
Set global sustainability standards	• The EU will introduce a Code of Conduct for companies. This includes: reformulating products to align with healthy, sustainable diets; reducing carbon footprint and environmental impact; increasing energy efficiency; and adopting more ethical marketing strategies. • The European Commission will revise marketing standards and strengthen Geographical Indications (GIs) to promote sustainable practices. • International agreements encouraging the other parties to adopt high standards for animal welfare, pesticide use, and antimicrobial resistance (European Commission, 2020).
Reduction of waste	• EU target of reducing waste by 50% by 2030, through the introduction of new methods to measure food waste, establishment of binding targets, and food loss prevention; • Promotion of circular business models to decrease food waste and use it for resource recovery, bio-refining, and promoting energy efficiency; • Circular Economy Action Plan (CEAP) to help develop a sustainable EU Bioeconomy; • Revision of the Food Contract Materials Legislation to make sure that companies use safer and eco-friendly materials for food packaging; • The EU will create new initiatives to replace single-use packaging in food services with reusable alternatives (European Commission, 2020).

Taking together these measures, it can be affirmed that the Green Deal does not aim only at setting goals but at creating a coherent plan to restructure the European economy and society along sustainable lines, with integrity, social fairness, and economic resilience at the core of the EU's long-term vision.

3.1.2. Common Agricultural Policy

The Common Agricultural Policy (CAP) is among the oldest and relevant agricultural policies of the European Union. It was first launched in 1962 with the purpose of increasing productivity and ensuring food security. However, over the years, several reforms have been made. The first one was the MacSharry Reform of 1992, introducing concepts going beyond merely production. These include accompanying measures supporting environmentally friendly farming methods, the expansion of the land area used for farming to reduce the intensity of production, increased attention towards the role of farmers as environmental stewards, and measures aligned with environmental goals to increase food security. The

second reform, Agenda 2000 of 1997, made sustainability one of the core objectives of the CAP. Indeed, measures promoting animal welfare and ecosystem conservation were introduced together with financial incentives to adopt sustainable practices. In fact, the CAP provided farmers with compensation for income loss or additional costs deriving from the implementation of these practices. The Fischler Reform (2003) transformed the structure of this policy by introducing two pillars: direct income support (Pillar I) and rural development and environmental protection (Pillar II). Furthermore, it introduced the concept of cross-compliance: to receive financial support, farmers needed to meet environmental, animal health, and food safety standards. Lastly, decoupled payments replaced most production-linked support. Lastly, the 2013 Reform made the CAP greener by addressing four areas: rural development, CAP financing, direct payments, and market cooperation. It also introduced the "greening mechanism", allocating 30% of direct payments to those who implemented environmental practices such as crop diversification, maintenance of permanent grassland, and conservation of ecological focus areas. Since 2013, the following reforms focused on innovation, climate change and environmental protection (Wrzaszcz & Prandecki, 2020; Cuadros-Casanova et al., 2023).

The current version of the CAP has been updated by the 2023-2027 reform. It is the result of a political agreement between the European Council and the European Parliament reached in June 2021. It has the purpose of responding to several challenges, namely the need for a resilient system that emerged during COVID-19, the socio-economic inequities in rural areas, and environmental degradation. This new CAP has a central role in implementing the goals of the European Green Deal, and in particular of the F2F strategy and the EU Biodiversity Strategy for 2030 (European Commission, 2022).

Going into more detail, it follows ten specific objectives across the three sustainability pillars: environmental, economic, and social. These are:

Pillar	**Goal**
Environmental	1. Climate change mitigation and adaptation 2. Sustainable management of natural resources (e.g., water, air, soil) 3. Biodiversity protection
Economic	4. Support viable farm income and resilience 5. Improve competitiveness and market orientation 6. Enhance the position of farmers in the value chain
Social	7. Attract young farmers and ensure generational renewal 8. Promote employment, growth, gender equality, and social inclusion in rural areas

	9. Improve responses to societal demands on food and health 10. Foster knowledge and innovation (Kappler, 2023)

These objectives are fundamental as they guide Member States' CAP Strategic Plans, which are mandatory and must be in alignment with the Green Deal (European Commission, 2022).

3.1.2.1. The New CAP

The structure of the New CAP is made of Two Pillars, plus one. Pillar I is Direct Payments and Market Interventions, including direct income support, eco-schemes, social conditionality, and market measures. Its focus is on annual payment and short-term incentives. In their CAP plan, Member States must examine and explain how the distribution they intend to make direct payments fairer. However, to address possible inequalities, the CAP sets some requirements: at least 10% of direct payments must be directed to redistributive income support for smaller farms; by 2026, all per-hectare basic income support must reach at least 85% of the national average following internal convergence requirements; external convergence mandates an increase in payment levels for under-compensated Member States, aiming to reach 90% of the EU average; payments must be granted to active farmers with an eligibility defined by Member States according to the economic activity. Furthermore, Member states may implement capping and degressive solutions superior to the €60,000–€100,000 thresholds. The redistribution of direct payments is fundamental as it can increase payments per hectare of the smallest farms by 7 to 10%. Pillar II is Rural Development, emphasizing long-term investments in rural vitality, sustainability, and innovation. It supports four main areas: sustainable land management both on farmland and forest land, climate action, animal welfare, and cooperation among rural actors. This pillar requires Member States to spend at least 35% of their rural development budgets on actions aiming at the welfare of the environment, climate, and animals. However, payments for Areas with Natural Constraints (ANC), supporting farmers' income besides their level of impact, will contribute only half to this objective. The +1 Pillar regards sectoral interventions, involving investments in specific areas. To make an example, at least 15% of Member States' funding will be devoted to sustainable sectoral interventions in the fruit and vegetable sector, and 5% to the wine sector. Finally, the New CAP structure includes cross-cutting horizontal objectives involving the modernisation of the agri-food system through knowledge, innovation, and digitalisation. Indeed, each Member State must develop a national Agricultural Knowledge and Innovation System (AKIS) strategy (European Commission, 2022; Kappler, 2023).

The New CAP introduced the concept of conditionality. Conditionality is the set of basic environmental and climate requirements that farmers must respect to receive subsidies under this policy, including and especially direct payments and animal or area-based payments. These include the protection of wetlands and peatlands by 2025; adhere to the obligations of the Water Framework Directive and the Directive on

Sustainable Use of Pesticides; shift from crop diversification to crop rotation, unless scientifically proven that it is more beneficial otherwise[15]; leave 4% of arable land non-productive or fallow lands[16]. Conditionality also enforces social standards that must be adhered to starting in 2025. These include clear employment contracts with transparent and predictable employment conditions, meaning that the remuneration, workplace, type of work, the beginning, notice periods, paid leaves, and so on must be clear for the worker. These conditions must be put in writing. Furthermore, employers must ensure a safe workplace that protects workers. This involves creating a safe environment around farm machinery and equipment, supplying clothing and protective gear when handling chemical substances, and preventing contact with dangerous substances. To meet these requirements, a farm advisory system will be employed to assist farmers. The application is voluntary from 2023 but mandatory from 2025 (European Commission, 2022; Kappler, 2023).

A further innovation of the New CAP is Eco-Schemes, funded through Pillar I. They support farmers who voluntarily choose to adopt environmental practices in exchange for financial aid. Member States must allocate at least 25% of direct payments to eco-schemes, which can either compensate for a cost or be an exceed compensation given if farmers comply with WTO rules. They are flexible and can either be annual or multi-annual. To support this transition, a total of €48.5 billion has been set aside for eco-schemes between 2023 and 2027. To be eligible for echo-schemes, farmers should carry on agricultural practices that are related to climate, environment, animal welfare, and antimicrobial resistance; align with the needs and priorities of their Member State's CAP Strategic Plan; go beyond the requirements set by conditionality; and contribute to the achievement of the Green Deal's goals (European Commission, n.d.-a; European Commission, 2022).

In addition, a section of the CAP focuses on supporting young farmers and promoting gender inclusion. It requires that at least 3% of direct payments must be directed to young farmers through additional income aid, start-up aid, or investment funding. This also has the purpose of increasing the number of young farmers, as only 11% of EU farmers are less than 40 years old. Moreover, Member States must include in their CAP Strategic Plans measures to support female farmers. At the moment, 28% of all farm managers are women. An Erasmus Program is available as well to train them and improve their knowledge base. This

[15] To improve the health of the soil, the CAP requires the shift to crop rotation. This is because crop diversification is not as beneficial for the soil as crop rotation. To keep crop diversification in the CAP Strategic Plan, Member States will have to demonstrate that crop diversification is a valid option. Exemptions are forecasted for smaller holdings with no more than 10 hectares of arable land and for farms with a large proportion of permanent grassland. Instead, organic farms must comply with this requirement. Taking into account the exceptions, the arable land applying crop rotation is estimated to be 86% (European Commission, 2022).

[16] This requirement does not apply to farms under 10 ha. For those who can compensate for this reduction with eco-schemes (the ecological program that involves the use of catch crops or nitrogen-fixing crops), the obligatory minimum is 3%. If the farmer adopts eco-schemes and also dedicates a portion of the land to non-productive land, the total percentage of non-productive land can reach up to 7% (European Commission, 2022).

is fundamental to enhancing the transnational learning-related mobility of young farmers and women from rural areas (European Commission, 2022).

In sum, the evolution of the CAP (starting from a policy focused on productivity and food security to one deeply focused on environmental, economic, and social sustainability) reflects the ambition to align the agri-food sector to the Green Deal's goals. This new version in particular aims at supporting farmers in the transition and at ensuring that agriculture makes a significant contribution to biodiversity preservation, climate resilience, and generational renewal.

3.1.3. Criticisms

The previous sections of this chapter described the European legislative tools regulating the agri-food system, highlighting their ambitious nature regarding sustainability and the significant targets they establish for farmers and agribusinesses to meet. However, several criticisms have been raised.

According to Moschitz et al. (2021), a first criticism is that the current policies are insufficient. In particular, the targets set by the F2F Strategy are non-binding, and no clear implementation roadmap has been drafted by the EU. This results in having many experts involved to create tailored solutions for companies that, on the other hand, create the risk of policy deadlock due to conflicts of interest between stakeholders. Moreover, the lack of binding measures makes it difficult to ensure that the indicated goals are met by member States, especially since they have different institutional capacities and not all of them have the same motivation or are prepared to carry out these strategies (Moschitz et al., 2021). Regarding the CAP, instead, eco-schemes remain underfunded. Eco-schemes are voluntary for farmers but mandatory for Member States. They are indeed nationally allocated and implemented, but Member States retain wide discretion in how to design and allocate them. This creates both flexibility and inconsistency across countries in scope, ambitions, and effectiveness. Furthermore, they have been used as administrative shortcuts to formalise existing practices rather than to create change, creating a sort of greenwashing where States do not aim at creating an impact. They carry on a symbolic environmentalism through "safe" and easy verifiable measures. In addition, even though Pillar I requires a minimum 25% of budget allocation to eco-schemes, no binding performance indicators or result-based payment mechanisms have been established to check whether the funded companies are achieving ecological outcomes or not. As a result, even larger companies not significantly improving their farming practices are receiving payments. All this, together with the limited oversight from the EU on member states and the lack centralised benchmarks or environmental targets, significantly impacts the achievement of the climate and biodiversity goals outlined in the Green Deal. Similarly, the F2F strategy does not set binding instruments to achieve concrete outcomes as well. Even here, Member States have full discretion in implementing their National Strategic Plans

(NSPs), showing the same issues of the CAP. Regarding eco-schemes in particular, criticisms have been brought up on the missed opportunity that they represent. They could have supported the downsizing of the livestock industry (representing two-thirds of the EU agriculture's GHG emissions), the restoration of wetlands and peatlands, and the compensation of farmers adopting carbon-sequestering practices like agroforestry or silvopasture. However, these goals have not been effectively prioritised or funded. Consequently, both the F2F and CAP are being criticised for not being able to deliver a real transition, as both provide unclear definitions and concepts, insufficient translation of goals into concrete actions, and non-binding measures (Boix-Fayos & de Vente, 2023; Moschitz et al., 2021).

A second criticism regards an issue already mentioned: the budget is not always allocated to finance sustainable practices. In particular, most CAP funds are destined for direct payments, which, however, mostly favour large companies with input-intensive farms. On the other hand, the funds devolved to Rural Development, supporting sustainable measures, are much less. Furthermore, eco-schemes only receive 25% of Pillar I (roughly 19% of the entire CAP budget), and just 30% of Pillar II (approximately 7% of the overall CAP budget) is allocated to environmental and climate investments. With this distribution of payments, the CAP is contributing to GHG emissions, income inequalities, and limited protection of biodiversity. Furthermore, funds are given to large farms that are doing less to increase mitigation and probably with greater financial autonomy, rather than rewarding smaller or sustainable farms. A further relevant flow related to CAP payments is the fact that production is still at the basis of payments allocation. This incentivises intensive agriculture and landscape homogenisation, while at the same time impacting habitat diversity. This is not the only mismatch with the goals of the Green Deal. To make an example, the CAP does not set targets to maintain pollinator diversity, nor the control invasive animal species. Lastly, due to the limited public budget invested in sustainability effectively, the willingness of farmers to use green practices and bear the costs is fundamental. However, this remains low. Education and risk communication remain important to achieve Green Deal goals, but the knowledge about the costs of inaction is not spread nor effectively integrated into public discourse (Cuadros-Casanova et al., 2023; Wrzaszcz & Prandecki, 2020).

At this point, a relevant concern arises: whether the goal of climate neutrality by 2050 can be reached through these policies. Studies show that current policies only lead to a 60% reduction in emissions (Wrzaszcz & Prandecki, 2020). This demonstrates that setting ambitious targets is not enough to reach concrete results. These criticisms show a system giving Member States decisional power in how to implement their plans, a logical approach, as it allows them to design tailored solutions for their needs. At the same time, as shown previously, Governments are not impartial institutions. They are made of politicians, who do not seek just citizens' interests but their own, and therefore, to be re-elected. This means that they pursue short-term goals. At the same time, the phenomenon of regulatory capture is not rare, due

to the influence that lobbies have. Examples of these have been provided in Chapter 2. Brazil and Sierra Leone's Governments show how public institutions can disregard their own population to benefit large companies. Furthermore, there are no binding performance indicators, and the budget destined for sustainable practices is limited. Both the Green Deal and the PAC aim at creating a plan for the transition, but, as highlighted by these critics, more needs to be done. The reality is that States need a bigger push, as there are still heads of Government denying climate change. Indeed, creating policies regulating a transition is not easy, especially when they involve a complex globalised supply chain.

3.2. Farmers' protests and the Omnibus Package

At the end of 2023 and the beginning of 2024, Europe witnessed several protests from farmers. Among the countries involved were France, Germany, Italy, the Netherlands, Belgium, Poland, and Romania. The reasons varied across countries, but all shared some common concerns. Firstly, there is a general discontent towards the stringent sustainability requirements imposed by the Green Deal and the CAP. As previously mentioned, these include the reduction of GHG emissions by 55% by 2030, a decrease in the use of pesticides, and crop rotation. Nevertheless, many farmers affirm that these measures are too ambitious and rapid, and that, at the same time, they do not provide practical solutions or adequate alternatives to facilitate the transition. A second topic regards the redistribution of subsidies introduced by the New CAP. Indeed, farmers worry about the cut in financing and their inability to sustain the costs of the transition. This is fuelled by their income going down, while tax benefits (such as those on agricultural diesel) are being phased out, and the costs of agricultural inputs continue to rise. A third reason for protests is the import of low-priced products from other countries, including Ukraine. In particular, farmers argue that the low prices of Ukrainian products impact their competitive power within the market, creating a situation of unfair competition. This is, as will be discussed in the following chapter, a serious concern that unites the majority of farmers. They indeed complain about imports coming from extra EU countries, where companies exploit their workers, using many pesticides, and having very few restrictions, while on the other hand, they have to abide by these limitations. This creates a disparity in prices, as if they sold their products at the same prices, they would not be able to cover their costs (Sky TG24, 2024; Il Fatto Quotidiano, 2024; Renno, 2024).

Regarding Member States more specifically, in Germany, protests started in December 2023 due to the Government's economic policy. Indeed, the German Government promised to finance the transition to clean and greener energy. Nevertheless, the local Government had submitted a draft budget rejected by the German Supreme Court, highlighting a 60 billion hole in the country's finances. To address the situation, Chancellor Scholz had to reduce spending and implement cuts, particularly affecting the agricultural sector. The last straw was the cuts to the agricultural diesel subsidy, a tax benefit in effect since 1951. The

Government plan was to gradually remove this financial aid by 2026, raising concerns for small farmers and agricultural firms already facing an increase in taxes (Sky TG24, 2024). These protests were on one side supported by many Germans, but on the other side, concerns arose about whether farmers were really struggling. This is because at the protests, the majority of farmers were from large companies parading their tractors (Kautt, 2024). This could raise doubts about the authenticity of the protests, leading to suspicions that they may be leveraged by large companies to ease the sustainability requirements imposed by the CAP. Furthermore, these protests have been highly politicised, as in 2024, three-quarters of East Germany would participate in the vote, and elections to the European Parliament will be held in June. Indeed, the political scene in Germany is more and more fragmented, and extremist parties are taking advantage of this crisis. (Baccini, 2024). However, these dynamics divert attention from what is really important to do for local farmers who, unlike big companies, are struggling. As stated by the sociologist Rolf Heinze, German agricultural policies have always been influenced by big companies, largely benefitting from the subsidy system in place. What farmers are indeed asking is for the Government to address the issue at the root (Klein & Waldow, 2024).

Regarding France, farmers were protesting to urge the Government to take concrete actions to safeguard the national agricultural sector. They were asking for protection for the local agri-food sector from foreign competition, simplify bureaucracy, and reduce tax pressure to improve wage policy. Protests were supported by public opinion as well, with 89% of the French population backing the farmers in their opposition to excessive EU regulations, the increase in taxes and fuel prices, and unfair pricing practices by supermarket chains (Sky TG24, 2024; Scopece, 2024; Il Fatto Quotidiano, 2024). The French government, in response to these protests, had pledged to present strong measures to support the agricultural sector. However, according to Greenpeace France, the measures adopted do not really benefit farmers, but rather favour agribusiness. Indeed, the agricultural crisis has provided the pretext to dismantle, in an opaque and accelerated manner, the main environmental protections, especially within the CAP, without real justification or evidence of the effectiveness of the changes in responding to the difficulties of the sector. Furthermore, this emergency procedure has overturned central elements of the CAP that have been negotiated for years, without public debate or broad consultation (Greenpeace France, 2024).

In Italy, although food prices have increased, payments received by farmers for their products have dropped, recording a reduction of 10.4% compared to last year. This phenomenon is evident especially in fresh products (fruit and vegetables) and wheat. This, together with the discontent towards foreign products impacting local production, was a key driver of the protests in Italy (Coldiretti, 2024; Pezzola, 2024).

These protests are the result of the system and policies described so far. In a globalized market such as the food one, external products can have a strong impact on local sales. As much as Europe tries to set sustainability standards, unfortunately not all the world adopts the same type of policies. This, added to the

already existing difficulties of farmers, can create discontent towards policies that have a good purpose but fail to take into account all the facets of the agri-food market.

3.2.1. The Omnibus Packages

Because of the discontent of farmers, the European Commission adopted in February 2025 the Omnibus packages to simplify the legislation, stimulate competitiveness, and increase investment capacity. According to the EU, bringing competitiveness and climate goals together will attract investments, enable companies to thrive, and unlock the European full economic potential. It is indeed pursuing the goal of decreasing administrative burdens by at least 25% (35% for SMEs) by the end of this mandate. It aims at reducing bureaucratic complexity for SMEs and small mid-caps to help them follow the regulations without excessive difficulty, while at the same time concentrating stricter policies on the largest companies, which are most likely to have a greater environmental impact. It strives to accomplish this through the proposals of the first Omnibus packages. These proposals cover different fields, including legislation, sustainable finance reporting, sustainability due diligence, EU Taxonomy, CBAM, and European investment programmes (European Commission, 2025). The following analysis focuses on the main modifications brought by the Omnibus packages.

3.2.1.1. Amendments to the CSRD Requirements

The Omnibus packages have brought several changes to the EU Corporate Sustainability Reporting Directive (CSRD), especially regarding its scope of application. The CSRD requires large companies and listed companies to regularly disclose information on the social and environmental risks and opportunities they face and the impacts of their activities on people and the environment (European Commission, n.d.-d). What the packages require is that sustainable reporting will target mainly the largest companies, leading to an exclusion of around 80% of companies from the scope of CSRD. More precisely, the drafting of a Sustainable Balance sheet is requested only of companies with more than 1,000 employees and 50 million euros in turnover / 25 million euros in net assets. Consequently, companies with less than 1,000 employees will no longer have the obligation to report, but they will have the possibility to choose to adhere voluntarily to the Voluntary SME Standards[17]. In this new context, sustainability reporting requirements on big firms must not impact smaller ones in their value chain. In addition, a two-year delay is foreseen for companies currently within the scope of the CSRD (at least 250 employees and 50 million euros in turnover) that were

[17] VSME standards are a simplified scheme aligned with the ESRS. Even though they are voluntary, they can be of great use for SMEs as the Omnibus Packages have established which information related to ESG can be requested by banks, large companies subject to the CSRD, and companies subject to the CSDD. These requests will be uniform and limited to what is already provided for by the VSME standards. Therefore, if an SME draws up a sustainability report following the VSME, it will respond in a standardised and transparent way to requests along the value chain, facilitating relationships with customers, banks, and large companies (Fumero, 2025).

originally required to report on 2025 data starting from 2026 should remain subject to the obligation only if they exceed 1,000 employees and, in any case, with a delay of two years. Lastly, the packages simplify the ESRS by making reporting more streamlined and less onerous for companies (European Commission, 2025; Fumero, 2025).

3.2.1.1. Amendments to the EU Taxonomy Requirements

The Omnibus packages modified the EU Taxonomy as well. The EU Taxonomy is a classification system defining the criteria aligned with environmental goals for economic activities, It is fundamental to direct investments useful to transition to a green economy. It helps create a common language and a clear definition of what sustainable investments are to finance green actions. This protects private investors from greenwashing and helps companies in the mitigation of the market and to become climate-friendly (European Commission, n.d.-e). Modifications include the decrease of reporting obligations, focusing on the largest companies (aligned with the CSDDD scope), while allowing voluntary reporting for other large companies within the CSRD scope. Indeed, companies subject to the CSRD with more than 1,000 employees but with a turnover of up to 450 million euros will no longer be obliged to report their alignment with the Taxonomy; instead, they will be able to choose whether or not to adopt it. Furthermore, the Omnibus packages introduced a financial materiality threshold for the Taxonomy reporting, while reducing the reporting templates by approximately 70%. Moreover, the Do Not Significant Harm (DNSH) criteria for pollution prevention and control concerning the use and presence of chemicals, applicable horizontally across all economic sectors under the EU Taxonomy, have been simplified. Adjustments of the key Taxonomy-based performance indicator for banks, the Green Asset Ratio (GAR), were made as well. This allows banks to exclude from the denominator exposures to companies outside the future scope of the CSRD (i.e., companies with fewer than 1,000 employees and a turnover of less than €50 million). Finally, they introduced the option to include in the report activities partially aligned with the EU Taxonomy (European Commission, 2025; Fumero, 2025).

3.2.1.2. Amendments to the Due Diligence Requirements

Modifications to the due diligence area and the Corporate Sustainability Due Diligence Directive (CSDDD) have been introduced as well. This directive fosters sustainable and responsible corporate behaviour, requiring companies to identify and address potential or actual human rights violations and environmental impacts. Furthermore, it requires large companies to adopt and apply a transition plan for climate change mitigation and intermediate targets to achieve the EU sustainable goals (European Commission, n.d.-f). The modifications include the simplification of the sustainability due diligence requirements to avoid unnecessary complexities and costs. A further harmonisation of due diligence requirements is included to create a level playing field across the EU. A reduction of burdens and trickle-down effects was introduced

for SMEs and small mid-caps by limiting the amount of information large companies can request for value chain mapping. In addition, the frequency assessment along the value chain will not be required every year anymore, but every 5 years. This reduces regulatory pressure on supply chain management. Furthermore, information that companies falling within the scope of the CSDDD can request from suppliers will be differentiated based on their size. In particular, as mentioned before, for companies with up to 500 employees, the information requested will be limited to the data required by the VSME standards; on the other hand, for companies with more than 500 employees, there is no regulatory limit on the information that can be requested. The extension of compliance preparation time was added for the largest companies, delaying the implementation of sustainability due diligence requirements by one year (until 26 July 2028), while bringing forward the adoption of the guidelines by one year (to July 2026). Moreover, EU civil liability conditions were removed, while ensuring victims' right to full compensation for damages caused by non-compliance and protecting companies from excessive compensation claims, within the civil liability frameworks of Member States. A final key modification is the fact that indirect suppliers must not be automatically included in the risk assessment unless plausible information emerges that suggests a concrete risk (European Commission, 2025; Fumero, 2025).

3.2.1.3. Amendments to the CBAM Requirements

Furthermore, the Omnibus packages modified the Carbon Border Adjustment Mechanism (CBAM) too. The EU uses this tool to avoid carbon leakage, meaning when EU companies relocate production to countries with laxer environmental regulations to continue polluting at lower costs, or when carbon-intensive imports displace more sustainable local products. It achieves this by imposing a fair price on goods with carbon-intensive production, with the aim of reducing industrial emissions even outside the European Union (European Commission, n.d.-g). With the Omnibus packages, small importers, particularly SMEs and individuals, are now exempt from CBAM obligations. This was done by establishing a cumulative annual threshold of 50 tonnes per importer, thus eliminating CBAM obligations for around 182,000 importers (90% of the total), while still covering over 99% of emissions in scope. For the rest of the importers remaining in the CBAM scope, rules were simplified to facilitate compliance. This includes streamlining the authorisation process for CBAM declarants or making the calculation of embedded emissions and reporting requirements easier. Moreover, preliminary steps for CBAM extension were taken, with a future expansion to include other ETS sectors and downstream goods, followed by a new legislative proposal for scope extension in early 2026. All this is coupled with measures to increase CBAM effectiveness, including the reinforcement of anti-abuse provisions and the development of a joint anti-circumvention strategy in collaboration with national authorities (European Commission, 2025; European Commission, n.d.-g).

3.2.1.4. Amendments to investment programs

Lastly, the Omnibus packages introduced changes to investment programs, including the InvestEU[18]. In particular, the investment capacity was increased by using returns from past investments and optimising still available funds to finance innovative activities supporting priority policies. The expectation is to mobilise around €50 billion. Furthermore, how Member States can contribute to the programme, support their own business, and mobilise private investments was facilitated. Lastly, administrative requirements were simplified for implementing partners, financial intermediaries, and final recipients (SMEs). This simplification is expected to generate €350 million in cost savings (European Commission, 2025).

The Omnibus packages mark a change in the EU's strategy: an attempt to make climate goals more practical, efficient, and inclusive rather than a retreat from them. However, the perception when reading these policies is a bit of a step backward, especially regarding the CBAM. While it is true that the measures have been relaxed for the smallest companies, which are generally those in greatest difficulty and pollute the least, fundamental measures are still missing. For now, it is reasonable not to impose stringent requirements on them; however, supportive programs are also needed to prepare them for a gradual transition towards future compliance with more demanding standards. At the same time, the issues indicated in the criticisms remain, which allow large companies to divert the system. The Omnibus packages are a first step towards making EU sustainability policies more workable, but unless they are accompanied by genuine support and protections against systemic imbalances, the risk is that of easing immediate unhappiness without addressing enduring injustices.

3.3. The Role of Interest Groups

As mentioned several times in this thesis, policies can be influenced by companies. As demonstrated in the cases of Brazil and Sierra Leone, corporations have the ability to affect not only the policies of their home countries but also those of the countries where they have relocated. We have also observed that EU sustainable policies have been impacted by public dissatisfaction. This paragraph will focus on the influence that both companies and the public opinion can have on policies.

Policy makers have the formal authority to determine policy priorities, but do not work alone. The agenda-setting process involves several actors, including political parties, bureaucratic institutions, citizens, media, and interest groups. Together, they shape the agenda. Interest groups, in particular, play a significant role.

[18] InvestEU is the largest risk-sharing instrument supporting priority investments within the EU. It addresses financial barriers and drives investments to boost competitiveness, R&I, decarbonisation, sustainability, and skills development. At the moment, almost 45% of its operations support climate goals (European Commission, 2025).

They can represent different societal interests based on the goals and objectives of the group they represent. They can be business groups, typically focused on keeping the existing political environment aligned with their status quo, or citizen groups more likely to push for new policies aligned with social needs. Interest groups seek to direct policies towards their interests while suppressing the opposing initiatives. Frederik Stevens (2025) refers to them as *dream issues* and *nightmare issues*. Moreover, interest groups and policymakers have a dependent relationship in which the former require the latter to incorporate their dream issues into policies, and the latter require the former's advocacy and input to make well-informed decisions. The inputs provided to policy-makers are either expert-based information or societal support. The first one consists of providing technical and specialised knowledge relevant to the policy formulation stage. The second one is the support given by the public to certain issues. Policies indeed are often influenced by public opinion (Stevens, 2025). The Omnibus packages serve as evidence of this last point. However, not all groups have the same influence over policies. It depends on the resources that these groups have, including financial resources allowing them to hire expert lobbyists, fund research, and build the infrastructure needed for effective lobbying. Groups providing societal support, on the other hand, may struggle to have an influence on policies unless they can generate strong public support and use alternative strategies (e.g., grassroots mobilization or media campaigns). A further decisive point is the coordination and alliances between groups to amplify their influence (Stevens, 2025).

Regarding the European Union, the situation is a bit different. Indeed, in the agenda-setting process, societal support has a greater impact as EU institutions need to demonstrate responsiveness. This is fundamental for input legitimacy, which is the perception that the European Commission is responsive to societal needs. During the policy formulation, however, expert knowledge becomes more important to gain output legitimacy, needed to demonstrate that policy proposals are well-informed and effective. This underlines the central role that reputation plays for the European Commission. Furthermore, even though societal support information is effective for agenda-setting influence, it has an influence mostly when issues are highly salient and have widespread interest mobilisation. When issues are less politicised, expert information becomes the most influential. Interest groups can benefit from this, as aligning with institutional priorities and public opinion can increase their agenda-setting influence, especially when they engage in large advocacy campaigns (Stevens, 2025).

At the State level, lobbying may be different. Going back to the Brazil case, agribusinesses engage in direct lobbying, both influencing the agenda-setting and shaping public narratives. This allows them to influence public opinion through media and advertising campaigns, mould environmental policies, and subjugate the sustainability discourse to market-based reasoning. To make an example, in Mato Grosso, agribusinesses were able to weaken legal environmental protections, including allowing environmental compensation, flexible compliance mechanisms, and market-based conservation. Indeed, agribusiness stakeholders pushed

for market-friendly solutions such as carbon trading mechanisms and legal amnesties for illegal deforestation, permitting companies to avoid direct responsibility. In addition, the representative farmer organizations (such as FAMATO and Aprosoja) in Mato Grosso, controlled by the same elites dominating the local Government, were able to ease or delay the enforcement of their nightmare issues. Moreover, agribusinesses successfully influenced the public opinion and media in believing that their sector is a driver of national economic success and that sustainability restriction represent an obstacle to progress. In this way, they were able to influence policies and weaken legal environmental protections. Of particular relevance is the impact that representative farmer organizations have on politics, as they can minimise farmers' discontent while at the same time avoid criticism of the actual power structures (Ioris, 2018).

These cases show lobbying from different perspectives. When analysing policies, these dynamics must also be taken into account. This is because, although we have seen that public opinion is relevant, the influence of companies is stronger. Starting from the fact that not everywhere interest groups representing social needs actually have an influence, it is also important acknowledge that not all important issues reach public opinion or become important media cases. Consequently, in general, the majority of the influence is made by companies that at the same time pursue their own interests. This chapter has illustrated how regulating sustainability is deeply complex and frequently involves contradictions. Specifically, the EU has set ambitious environmental goals through the adoption of legislative tools such as the Deal and the Common Agricultural Policy. At the same time, these instruments have several shortcomings, starting from the lack of binding measures to the absence of clear KPI to track achieved goals. Recent farmers' protests and the political response through the Omnibus packages highlights the need to balance environmental ambition and socio-economic realities but it is important to remember that a clear plan to achieve an orderly transition is still missing. This shows a further broader challenge, namely that sustainability policies are continuously shaped by conflicting interests, public pressure, institutional constraints, and corporate influence. This is evident both in Europe but even more in countries like Brazil. Future policies must be ambitious and technically sound, protected from regulatory capture, and backed by mechanisms that guarantee fair and enforceable implementation across Member States if sustainability goals are to be truly achieved.

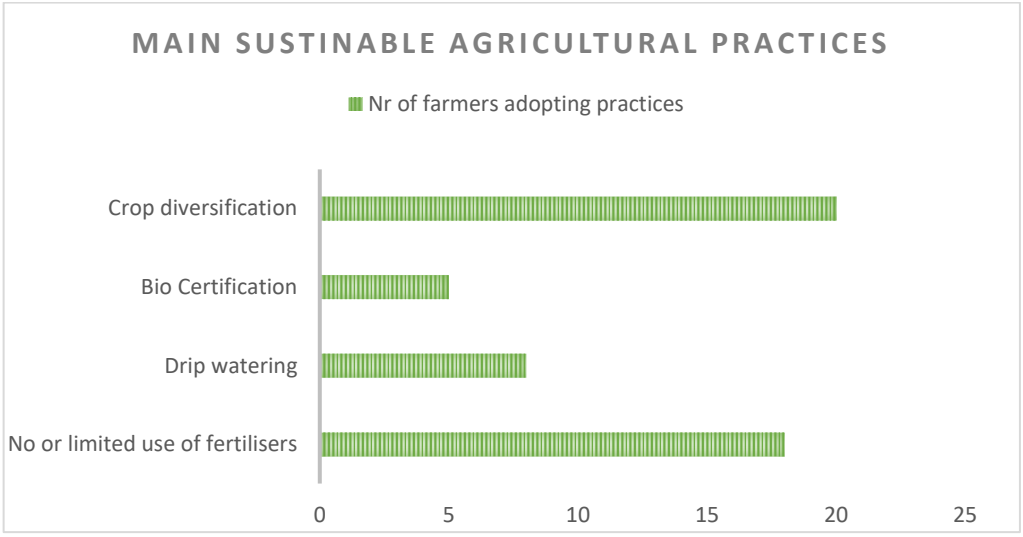
4. Chapter 4 – Evidence and Recommendations

To complement the normative and systemic analysis carried out in the previous chapters, a qualitative survey was conducted based on 20 interviews with farmers. The aim was to collect direct testimonies on the application of sustainable agricultural practices, the working conditions of farmers, and the perceptions of those who daily experience the challenges of the transition towards a more sustainable agri-food system. The following chapter presents the data collected and analyses potential measures to improve current legislation.

4.1. Qualitative analysis

To broaden the scope of this thesis, 20 interviews were conducted with farmers, including 12 small-scale family farmers, 4 small organic farmers, and 4 small and medium-sized enterprises (SMEs). They were asked 9 questions regarding the use of sustainable farming practices, main sales channels and ambitions, opinions regarding large companies influencing their sales and policies, and opinions on current laws (in particular the CAP) and on their working conditions. A complete overview of the questions is reported in Annex I.

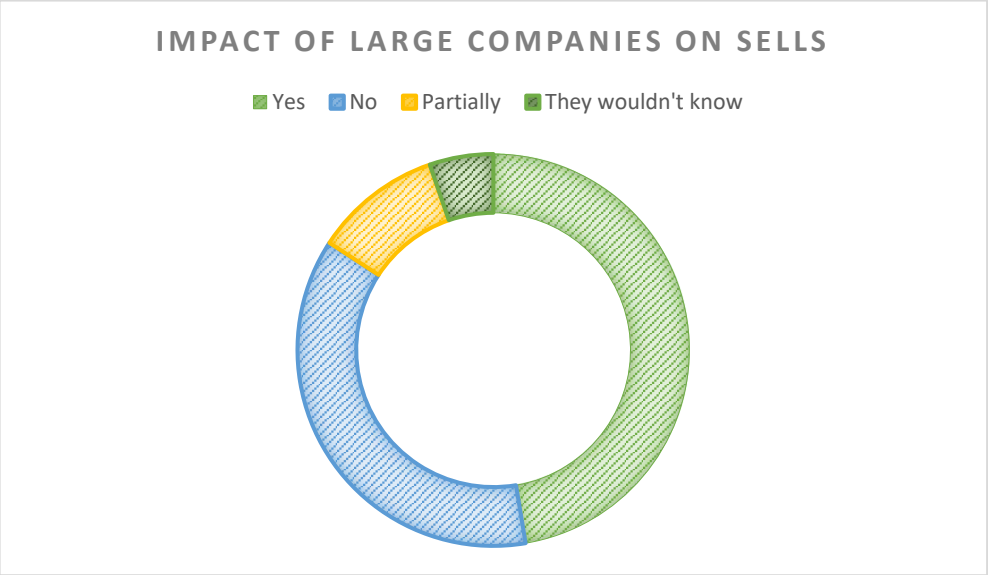
Regarding the first question, all interviewees reported adopting sustainable practices, although to varying degrees. The majority of smallholders stated that they do not use synthetic inputs, including pesticides and fertilisers, and adopt drip watering. Furthermore, as they are small farmers, they do not focus on a single crop, but diversify production (crop diversification) to ensure product availability throughout the year and avoid selling only in certain seasonal periods. Organic farmers adopt sustainable practices in line with the requirements of organic certification. This requires farmers to use cover crops, adopt crop rotation, use certified organic seeds and production methods without synthetic inputs or GMOs, and adopt composting and recycling practices to minimize the environmental impact of waste (Image Line, 2024). The SMEs interviewed also employ sustainable practices, including organic techniques (one has the certification), complex crop rotations, and the use of self-produced compost.



Concerning the main sales channels, the large majority of interviewees sell their products in local markets (16 out of 19). Among these, five also sell through direct farm shops, and one additionally supplies local restaurants. One of the interviewees sells through *Campagna Amica di Coldiretti*, other two through their shop and the website, while a third uses his own agritourism as a sales channel and keeps part of the production for processing into flour and pasta, while the excess is sold to traders.

When talking about the market they would like to reach, 18 out of 20 affirmed that they prefer staying where they are for two reasons. First, they do not have the capacity to sell to supermarkets, and they value quality over quantity; secondly, they enjoy the close relationship with their clients. Some of them tried to collaborate with supermarkets, but they highlighted that, to meet the demand, they were forced to resort to unsustainable practices. They also complain that commercial counterparts impose high requirements in exchange for poor remuneration, even in terms of wages. A farmer said that they tried to collaborate with supermarkets and resellers, but they had to repeatedly ask for payments. The remaining two said they would be open to collaborations with ethical entities, but not with large chains.

When asked whether they think that large agricultural companies and multinationals have affected their sales, interviewees' opinions were divided: some believe that the presence of supermarkets has not affected their sales, thanks to a loyal customer base that is attentive to quality. Others, however, say that the impact has been significant; in particular, a farmer reported that the opening of a NaturaSì point near the market has significantly reduced sales. However, they all agree that low-priced foreign products affect their sales and that local products should be protected.



In addition, they all think that large companies influence agricultural policies and regulations.

14 out of 20 receive subsidies from the Italian State. They regard wine and olive oil production, the purchase of agricultural machinery, bio production, and compensation for natural disasters. However, 7 of them affirm that they are scarce and insufficient to cover the real needs of agricultural activity.

Regarding the CAP, 16 out of 20 know what it is. Nevertheless, 7 farmers declared that they did not know the CAP in detail, while 3 did not express any opinion on the matter. Those who expressed an opinion on the matter said that CAP subsidies are insufficient and often finance conventional farming practices that lead to environmental and social degradation. One said he agreed with the Omnibus packages, but that more controls must be put in place to avoid corruption in the CAP downsizing.

Concerning working conditions, many of them said that it is a hard job; there are no vacation days or weekends. Many of them complained about the lack of manpower and security for workers. Only three of them had no complaints, saying that they enjoy the relationship with clients and that their team is small but sufficient.

Lastly, when asked about what the State could do to improve their working conditions and the agricultural sector, many agreed that it should valorise local products. In addition, several request a decrease in tax, affirming that more than half of their earnings are absorbed by the State. Overall, there was consensus on the necessity for increased subsidies, along with greater investment in education for both farmers and consumers. Additionally, respondents highlighted the need for stricter oversight of working conditions and a simplification of bureaucratic procedures.

The interviews conducted permitted the collection of valuable testimonies from the field, offering a concrete insight into the difficulties and daily needs of smallholders, organic farmers, and SMEs. Despite the

differences between the farmers involved, some priorities remain fundamental for all of them: the need to protect and enhance local products, the insufficiency of currently available subsidies, the excessive burden of taxation, and the lack of manpower and adequate protection for workers. "*Lo Stato dovrebbe abbassare le tasse. Si mangia 60% dei nostri guadagni. Scrivilo nella tua tesi quanto ci toglie lo Stato!*"[19] - said a farmer interviewed at a Roman market, expressing frustration over the perceived tax burden. Their family business does not even receive subsidies to help them with the high costs. Similarly, a farmer affirmed that 70% of his income was taxed. "*Manca la manodopera e non abbiamo abbastanza soldi per assumere altri dipendenti. Le grandi aziende vanno all'estero, pagano i lavoratori una miseria e usano tutte quelle cose chimiche nei prodotti. Noi invece siamo costretti a rispettare tutte queste leggi, veniamo perennemente controllati però alla fine nei supermercati vendono prodotti con le schifezze. Questo non significa che anche noi vogliamo sfruttare i lavoratori però dovrebbe essere data precedenza ai prodotti locali*"[20] stated another farmer regarding imported products. This opinion was shared by all the farmers interviewed. "*Bisogna istruire le persone. Si parla tanto di dieta mediterranea ma non sanno qual è la vera dieta mediterranea. Si consuma troppa carne e prodotti confezionati ma nessuno mangia più i cereali e i legumi. Le persone non capiscono l'impatto dei loro acquisti e mangiano male. Le grandi aziende non hanno un impatto rilevante sulle mie vendite se i clienti sono informati e ragionano. Se non sanno come il cibo che costa poco viene prodotto, poi quando vengono nel mio agriturismo si lamentano dei prezzi alti e mi chiedono perché qui costa così e invece al supermercato costa meno*"[21] said another farmer. The widespread perception is that agricultural policies, influenced by large economic players, are distant from the real needs of the territory and do not sufficiently incentivise sustainable practices. In this context, necessary structural reforms are highlighted: more equity in access to funds, strengthening food and agricultural education, a reduction in bureaucracy, and above all, a recognition of the social, economic, and environmental value of local agriculture.

[19] English translation: The state should lower taxes. It eats up 60% of our earnings. Write in your thesis how much the state takes from us!

[20] English translation: There is a shortage of manpower, and we do not have enough money to hire more workers. Big companies go abroad, pay workers a pittance, and use all those chemical things in their products. We, on the other hand, are forced to respect all these laws; we are constantly checked, but in the end, in the supermarkets, they sell products with rubbish. This does not mean that we also want to exploit workers, but priority should be given to local products.

[21] English translation: We need to educate people. There is a lot of talk about the Mediterranean diet, but they do not know what the real Mediterranean diet is. We eat too much meat and packaged products, but no one eats cereals and legumes anymore. People do not understand the impact of their purchases, and they eat badly. Big companies do not have a significant impact on my sales if customers are informed. If they do not know how cheap food is produced, then when they come to my agritourism, they complain about the high prices and ask me why it costs so much here, when it costs less at the supermarket.

4.2. Critical issues and solutions

This thesis covered a broad spectrum of issues related to the sustainability of the agri-food system. Chapter 1 serves as a brief guide on how to start cultivating sustainably, highlighting the critical issues with the current agricultural model and the main barriers that hinder the transition towards more sustainable practices. Chapter 2 describes social issues along the agri-food supply chain, focusing on monocultures and production delocalisation by large companies, exploitation of workers, and market imbalances putting small businesses in difficulty. Finally, Chapter 3 analyses the European policies currently in force, exploring the role of lobbies and the influence of public opinion in defining regulatory instruments as well. In light of what has emerged, it is possible to outline a summary of the current situation.

Regarding the environmental dimension, agriculture significantly contributes to GHG emissions, soil degradation, and carbon loss. This is the result of extensive input use and exploitation of the soil, which lowers resilience to climate shocks and impacts soil fertility. The concrete consequences of this are soil degradation and erosion, loss of biodiversity, and reduced organic matter; contaminated water due to excessive use of synthetic inputs; air pollution due to CO_2 and N_2O emissions and agrochemicals (Peeters et al., 2020); decrease of species resulting from habitat homogenisation and ecological infrastructure loss (including pollinators, birds, and soil life); exposure of animals and humans to harmful chemicals.

Concerning consumer consumption and food availability, food diversity has increased due to the globalised supply chain, allowing access to a greater variety of products. Nevertheless, nutritional quality is not always ensured, and safety standards for workers may be insufficient (e.g., Uruguay's case). In particular, nutritional quality has declined over time due to breeding and industrial farming, lowering the level of vitamins and minerals. Moreover, the consumption of highly processed foods has become widespread, yet these products are a major contributor to serious public health issues, including obesity, and represent a significant burden on healthcare systems, accounting for an estimated 10-12% of total healthcare expenditures. At the same time, biological products, although healthier, remain a niche due to their high price and poor availability in mainstream distribution channels (Peeters et al., 2020).

With respect to the social and economic perspectives, the situation is more complex due to the number of parties involved. Starting from the structure of the supply chain, the EU food system is unequal and import-dependent. The agri-food supply chain is dominated by supermarkets and large companies, which causes mainly include the difficulty of farmers in competing with large companies, which, in addition to having a significant influence on agricultural policies, benefit from instruments such as CAP subsidies (e.g. payments per hectare), which predominantly favour large companies and often benefit landowners more than farmers active in the field. On the other hand, imported products from foreign companies are sold at low prices on the market, as these companies relocate abroad precisely to avoid European regulatory

requirements. Within this market dynamics, many farmers are in a state of poverty, and the total added value of the agricultural system is overestimated because it does not take into account externalities, meaning the negative impacts on the environment, public health, and society that are not calculated in the price or official economic balance sheets. This is further worsened by the rise of farmers' costs of agricultural inputs at a faster pace than selling prices, sharply reducing profits. According to Peeters et al. (2020) research, if this trend continues, family farms could nearly disappear in a decade. On the other hand, the populations and farmers in the countries from which these products are imported often face exploitation and endure challenging and disadvantaged conditions. However, labour exploitation characterises the entire supply chain, not only in foreign countries.

What has been done so far? In the European Union, several targets have been set by the Green Deal, including achieving Net Zero by 2050 and a 55% reduction in GHG emissions by 2030. Several funds have been established to finance these goals, such as the Just Transition Fund, Social Climate Fund, and NextGeneration EU. Regarding agriculture specifically, the F2F strategy sets targets by 2030 to make farming more sustainable, while the New CAP has redistributed the allocation of payments to finance the transition and environmental/climate actions. Moreover, it requires Member States to develop Agricultural Knowledge and Innovation Systems (AKIS), and it has established environmental and social requirements for farmers to receive subsidies, which will become mandatory in 2025. As mentioned, the various targets have been scaled down by the Omnibus packages based on the needs and difficulties of companies, especially small ones. The requirements have, in fact, been simplified and focus mainly on large firms.

At the same time, several criticisms have been highlighted regarding the current legislation. First of all, it does not provide a clear roadmap to implement measures to achieve the Green Deal's goals. In addition, there is a lack of legally binding constraints and instruments. Indeed, the objectives of the Farm to Fork (F2F) strategy are not binding, and Member States have full discretion on how to implement the National Strategic Plans (NSPs), both for F2F and for the CAP. A perfect example of this is Eco-Schemes introduced by the CAP: they are binding to Member States, which, however, possess high discretion, creating inconsistencies regarding ambitions and impacts (e.g., they often formalise existing practices instead of incentivizing real changes); there are no performance indicators or results-based indicators; and even unsustainable farms can receive the funds. This is connected to the lack of instruments to evaluate impacts and progress: there is no centralized system for monitoring environmental results, nor binding environmental performance indicators. In addition, the distribution of CAP payments does not support the sustainable transition, as the majority of funds consist of direct payments, which, however, favour large intensive companies. Only 25% of Pillar I and 30% of Pillar II finance are allocated to the environment and climate.

In analysing the current situation, it is important to mention one last factor, that is, how much people are dedicated to the transition. There is a weak political commitment, as some Government leaders either still deny climate change or do not take sufficient action. At the same time, farmers' willingness to bear the costs of sustainable practices is not high. In general, there is a lack of education and public awareness of the costs of inaction. As emerged from the interviews as well, small farmers tend to avoid broadening their horizons or investing in more sustainable practices. Insights from the interviews are that they often assume a lack of skills or knowledge, which discourages them from seeking information on how to obtain funds or innovate their farms from the beginning.

4.2.1. Proposed solutions

What can be done to improve current legislation to better support the transition and achieve the predefined objectives? This paragraph will outline the proposed solutions for each identified issue.

A major criticism regarding EU legislation is that it is not enough to protect the environment. On this matter, what is proposed by different researchers is directing payments to the achievement of climate goals, such as the increase of biodiversity. In their paper, Peeters et al. (2020) present the "Public Money for Public Goods" approach to increase environmental protection. They suggest that subsidies should be used to fund non-marketable public goods (such as biodiversity, soil fertility, clean water and air), instead of supporting the production of marketable goods. This means that farmers would be paid to deliver non-marketable public goods, including carbon sequestration, biodiversity restoration, and landscape ecological networks. This has the purpose of shifting the focus from commodity production to environmental services. Payment schemes could be based on soil carbon monitoring, ecological infrastructure mapping, and on the type of crops and practices farmers adopt. Focused more on the characteristics that crops must possess to deliver non-marketable public goods, Guyomard et al. (2023) propose a new echo-scheme of the CAP rewarding permanent unploughed grasslands and leguminous grasslands (such as clover and alfalfa). This is because the older permanent unploughed grasslands are, the more they can store carbon in the soil. In addition, permanent grasslands help control soil erosion, filter water, provide high-quality fodder for animals, and increase the microbial diversity of the soil. At the same time, leguminous grasslands naturally fix atmospheric nitrogen, reducing the need for chemical fertilisers. The proposal is to base the level of payments on the age of the lawn (the older it is, the more it is worth) and to provide additional bonuses if the lawn has a large quantity of leguminous grassland. In addition, even though CAP's conditionality already requires to shift from crop diversification to crop rotation, they suggest introducing a diversity index based on crop functional groups with additional bonuses for farms with an average land size of less than 4 hectares (smaller plots tend to favour greater biodiversity) and to farms maintaining permanent soil cover through cover crops. It is particularly relevant that these non-marketable public goods are achieved by larger companies. From what emerged from interviews, smallholders already adopt sustainable behaviours on

their own. They are forced to diversify cultivation, as otherwise they will sell their products only for one period of the year, and generally are against the use of pesticides. They care about the soil, and they give priority to the quality of the product rather than the quantity. While what would make the system sustainable would be to completely revolutionise the agri-food supply chain, these types of subsidies could be more effective as they are based on the achievement of specific goals, such as increasing biodiversity or having healthy soil.

Even though small farmers already adopt some sustainable practices, a major issue is that they lack the knowledge and do not show the ambition to go beyond. As mentioned in Chapter 1, they have difficulty in understanding what sustainable development is, lack training and support, and are generally not educated in financial planning, marketing, and entrepreneurship. Furthermore, they are mostly family-run and rooted in traditional businesses. This emerged from the interviews as well. Many farmers rely on cooperatives or Coldiretti to manage their funds and do not know in detail the laws that govern them and that can guarantee them additional funds (such as the CAP). Furthermore, many are older and lack the motivation to expand production or the capacity to engage in new projects that require investment and commitment. In general, in the markets visited to conduct interviews, young farmers were quite rare; in one case at a family farm, the mother was more knowledgeable than her daughter. A farmer stated that the young workers she collaborated with had standard working hours and did not work on weekends; however, farming is a full-time and demanding job, and not working on weekends is simply not an option. The lack of young farmers further fuels this issue. This is because farmers planning to retire soon are often unwilling to pursue organic certifications or adopt more sustainable practices that require investments. In addition, some farmers have explicitly stated that they do not have the entrepreneurial mindset needed for these kinds of changes. Consequently, education and training programs should become one of the central points of European governance. Moreover, a consulting service with trained advisers specialised in sustainable farming and agroecological transitions should be made available to mentor farmers and cooperatives. Lastly, creating networks of innovative farms could be useful to more easily spread sustainable agriculture strategies among farmers. These not only provide an example for other agricultural companies but can also encourage the adoption of agroecological practices in other contexts (Peeters et al., 2020).

These services are also useful to help farmers with complex bureaucratic procedures and legislation, which represents a fundamental barrier, especially for small companies. Field research has shown that many smallholder farmers meet the requirements to be considered “organic” but have simply not yet begun the formal process of obtaining certification. A farmer also stated that he had not looked into the possibilities of accessing subsidies related to sustainable practices, because he did not know how to move in this area; on the contrary, it is the large companies that know these procedures well, boast contacts and, consequently, grab a large part of the available funds. Simultaneously, a simplification of procedures and a reduction of bureaucracy could encourage innovation and requests for funds by companies.

A major concern for all farmers is the presence in the market of low-priced products imported from other countries. Various things can be done about this. First, when talking about the Omnibus packages, the CBAM was mentioned. This tool has the potential to be effective in addressing this issue. Nevertheless, the CBAM, starting from 2026, will apply only to products with a high carbon leakage risk, including iron/steel, cement, fertilisers, aluminium, hydrogen, and electricity (European Commission, n.d.-h). Agricultural products are not included within its scope. Their integration, however, could ensure fair competition for European farmers by accounting for the carbon footprint of imported agricultural goods. It is necessary indeed that the EU prioritises local products, also with respect to supermarkets. A further important measure that can be taken is phasing out polluting products. The EU is already doing this with palm oil and soybean oil, aiming at decreasing consumption until reaching 0% by 2030 (Transport & Environment, 2018). At the same time, many polluting products are still imported. To make an example, the majority of imported soy is destined for animals on farms. Finding a sustainable alternative would significantly reduce soy consumption. Another possible approach is to regulate through contracts between private parties. Governments do not carry this out, but it consists of clauses inserted in contracts. As the low prices are the result of the exploitation of the local population and unsustainable practices, including provisions in agreements that require compliance with certain standards can be an effective way to regulate companies operating abroad. While not a comprehensive solution, this approach can contribute positively.

However, we must not forget the other side of the coin, namely the conditions and regulations of the countries where intensive cultivation takes place. As obvious as it may seem, what is needed is a stronger Government, capable of resisting corruption and lobbying influence, without neglecting the conditions of its citizens. Furthermore, it would be essential to raise standards and security measures to protect local populations, as well as guarantee adequate minimum wages.

A further major concern for farmers is low income. Field research has shown that many farmers are dissatisfied with the amount of work they do and the fact that much of their earnings are taken away in taxes. They also complain that they do not earn enough to afford more workforce, and many have claimed that large companies and supermarkets affect their sales. On these matters, Peeters et al. (2020) highlight different possible measures. First, they affirm that a decrease in input costs is necessary to increase profit margin. Second, the EU should incentivise the production and selling of agricultural products that have a higher commercial value through transformation, organic certification, or direct sales. This can also occur through short supply chains, which allow direct sales from the producer to the consumer, reducing intermediaries and additional costs, thus improving revenues for small farmers. Lastly, they suggest replacing subsidies based on the extension of the agricultural surface with payments based on basic income linked to the number of full-time equivalent (FTE) workers, meaning based on the work actually performed. Surface-based subsidies led to agricultural models that are intensive in capital, energy, and land. Consequently, they favour those who own more capital (e.g., large properties, machinery, fertilisers) and

incentivise intensive and unsustainable agricultural practices that require many external inputs. The proposed alternative is providing basic income for each full-time work unit to valorise agricultural manpower in relation to territorial extension, encouraging more sustainable practices. This allows to better focus on working conditions, even those of thousands of seasonal workers who often find themselves in precarious conditions.

Lastly, one of the concerns regarding current legislation is that excessive discretion is granted to Member States without establishing clear performance indicators or results-based metrics to effectively monitor progress. Reducing Member States' discretion may be complicated, as they are strongly tied to their sovereignty; it could also be less effective as well, since it would limit their ability to develop more appropriate and tailored solutions to specific national needs. A more appropriate solution would be to develop common and official metrics with well-defined KPIs that serve to track the progress of the operations carried out by the States, to also avoid what was mentioned previously, that is, Member States formalising existing practices instead of incentivising real changes. What Member States should do is require companies to draw up reports based on a common set of official KPIs and metrics, valid at the European level. This would allow collecting comparable data, concretely analysing the situation, and building realistic but ambitious transition plans, oriented towards achieving objectives such as Net Zero or increasing biodiversity. However, it is not enough to limit ourselves to measuring and planning: it is also essential to define clear performance indicators and result-based metrics, to direct strategies in a dynamic and adaptive way, based on the data collected and the progress actually achieved. It would also be necessary to establish intermediate milestones and constantly monitor the effectiveness of the policies adopted, correcting the path where necessary. While using a common system of metrics, each Member State should develop detailed plans adapted to its national context, the specific characteristics of the agricultural sector, and the technical and economic feasibility of the objectives. Finally, public support should be targeted, providing subsidies and technical support to those who actually need it to face the transition.

Below is a summary of the main problems encountered and the related proposed solutions.

Issue	Who is impacting	Proposed solutions
Current regulations not enough to protect the environment	Environment	• Subsidies to fund non-marketable public goods • Subsidies based on characteristics of the soil (presence of grassland or type of crop)
Lack of knowledge and entrepreneurial mindset, and family-run businesses rooted in tradition	Small farmers	• Training and education • Consulting service • Networks of innovative farms

Complex regulatory environment and bureaucratic procedures	All farmers, especially small companies	• Training and education • Consulting service • Simplification of procedures • Reduction of bureaucracy • Regulation through private contracts
Agricultural products coming from other countries at low prices	All farmers	• Introduction of agricultural products within the scope of the CBAM • Prioritisation of local products • Phasing out polluting products
Low income and difficulties of small farmers	Small farmers	• Lower input costs • Incentivise production and selling of agricultural products with higher commercial value • Payments based on basic income linked to the number of FTE workers
Member States' excessive discretion	Achievement of goals	• Common and official metrics • Clear KPIs

Major issues of the agri-food supply chain were highlighted by a farmer during the interviews. He affirmed that, although bureaucracy is formally simplified every year, it continues to be complex and not very accessible, especially for small and medium-sized businesses. He highlighted how even the most structured companies operate with limited margins, having to rely mainly on their own resources, since the available public subsidies are insufficient. He reported, for example, that he currently receives half of the CAP funds compared to previous years. Furthermore, he said he had suffered two floods and hailstorms, but had received financial support only for the first extreme weather event, with funds completely inadequate to cover the damage. He also highlighted some critical issues related to the eco-schemes of the new CAP: although they represent a step forward, they are not accessible to everyone, since they are divided into categories that favour certain crops or landscapes. For example, contributions for the protection of landscape assets are more easily obtainable by those who own olive groves, while other farmers, despite adopting sustainable practices, are excluded. Finally, he highlighted a structural problem in the agri-food system: the quality of sustainable agricultural practices is not valued. Quantity is rewarded mainly over quality, both in pricing and in consumer perception. In fact, on the shelves, lower-cost products tend to have priority, regardless of production methods. Similarly, in the grain exchange, no distinction is made between conventional wheat and wheat grown according to ecological criteria, effectively cancelling any economic

recognition for those who invest in environmental quality and soil health. Therefore, at the end of the day, if the consumer does not care about the quality and how food was produced but purchases the product that costs 20 cents less, being sustainable is not convenient at all. Once again, the importance of the role of the consumer and their influence on the agri-food system is highlighted. The transformation towards a more sustainable agriculture cannot happen only through changes in policies or economic incentives: a change in consumer purchasing behaviour and mentality is also essential. Continuing to reward low-cost products means, often unknowingly, feeding a system based on exploitation, both of local workers and, to an even greater extent, of those employed in foreign supply chains where intensive monocultures prevail. Changing this system, therefore, requires teamwork, involving farmers, institutions, distributors, and citizens.

5. Conclusion

This thesis addressed the topic of sustainable agriculture with the aim of explaining how it can be regulated more efficiently. Starting from an analysis of sustainable agricultural practices, the work has progressively highlighted the inequalities that still characterise global agri-food supply and value chains. This approach has made it possible to analyse the contemporary food system and demonstrate how the lack of adequate regulatory tools contributes to both an aggravation of the climate crisis and social injustices. The first major set of results concerns the environmental and production dimension. The data collected and the case studies analysed demonstrate that sustainable agricultural practices, such as organic farming, the use of biofertilizers and biopesticides, no-tillage, and the adoption of hydroponic systems, offer significant advantages over conventional agriculture, both in terms of soil health and resilience to climate change. Experiences such as those of the Rodale Institute and Ferrari Farm show how it is possible to grow more efficiently, saving water, reducing the use of pesticides and synthetic fertilizers, and improving the quality of food products. However, these practices remain marginal, hampered by high initial costs, lack of training, difficulty in accessing credit, and a lack of structured incentives. In particular, the absence of shared benchmarks makes it difficult to evaluate the performance of farms in transition, making current policies less effective and allowing for the financing of companies that are not sustainable.

The second set of results concerns the social and systemic criticalities of the agri-food system. As shown by the cases of Brazil, Sierra Leone, and Uruguay, the current structure of global value chains favours logics of exploitation that penalise small producers, migrant workers, and rural communities. Monocultures destined for export, land grabbing, intensive use of toxic substances, and contractual imbalances along the food supply and value chain are still the norm in many contexts. These phenomena not only compromise food safety and access but also generate regressive effects on the health and well-being of local populations. At the same time, in European countries, small farmers complain about the excessive bureaucratic burden, the price pressure imposed by large-scale distribution, and the stringent sustainability requirements imposed by the New CAP, hindering access to subsidies as well. While the protests were partly politicised and also involved large companies, often not in economic difficulty, whose main goal was the relaxation of regulatory requirements, it remains undeniable that the motivations behind the agricultural discontent are well-founded. The presence of low-cost foreign products in European markets creates unsustainable pressure on prices, making it increasingly difficult for local producers to develop fairer and more sustainable models. Furthermore, the environmental sustainability requirements imposed by European legislation, although justified, are difficult to achieve in the short term for small companies, which have neither the economic resources to innovate their production systems nor the funds necessary to, for instance, hire consultants capable of supporting them in reporting. Although even small agricultural operators must undertake a path towards more sustainable practices, it is necessary to recognise that they represent a marginal share of the overall environmental impact, especially compared to large intensive players. At the

same time, as highlighted both in the critical analysis of the CAP and the interviews conducted, the subsidies received by small farmers are often insufficient, while direct payments of the CAP end up supporting even large companies with a strong environmental impact, contributing to consolidating a systemic imbalance.

5.1. Findings from the qualitative analysis

This thesis presents a qualitative analysis based on interviews conducted with 20 small and medium-scale farmers. The interviews showed that all the interviewees adopt, in different forms, sustainable agricultural practices. In general, these are producers who favour quality over quantity, both for value reasons (such as opposition to the use of chemical and synthetic substances) and for structural characteristics of the market in which they operate: many sell directly in shops or local markets, where demand is limited and more oriented towards genuine products. Farmers who in the past have dealt with the large-scale distribution system have emphasized how it imposed intensive practices and high yields, which is why they have chosen to abandon it, also for a question of economic sustainability. Most of the interviewees said they were satisfied with their reference market and did not want an expansion, precisely to maintain control over the quality of the product and the relationship with loyal customers.

At the same time, it emerged that the majority of the interviewees do not know the CAP in detail and the opportunities offered by eco-schemes. Many farmers admitted that they do not personally deal with these issues, while those receiving subsidies stressed that these are insufficient to cover the real costs of the sustainable transition. Only one interviewee showed in-depth knowledge of European funds, highlighting, however, that the available resources are limited and that not all farmers can access eco-schemes, whose criteria are often too selective.

Finally, some cross-cutting critical issues emerged that were shared by almost all interviewees: the need to better valorise local products, the insufficiency of available subsidies, the excessive tax burden, the shortage of manpower, and the lack of adequate protection for workers. Added to this is a serious generational difficulty. The presence of young farmers is very limited and represents one of the main barriers to the sustainable transition. Older farmers, often close to retirement, show no interest in investing in innovation. On the contrary, young people who approach the sector tend to look for working conditions compatible with a balanced private life, including free weekends; a condition that is difficult to reconcile with the rhythms and needs of agricultural activity.

5.2. Policy recommendations

In light of the critical issues that emerged in this thesis, a set of recommendations aimed at improving the current European legislative framework on agricultural matters has been outlined to more effectively support the transition towards sustainable and socially just agriculture.

In particular, to strengthen environmental protection, it is proposed to redirect subsidies towards non-tradable public goods (e.g., biodiversity, soil fertility, carbon sequestration) and introduce subsidies based on characteristics of the soil (presence of grassland or type of crop). Moreover, given the training gap that characterises most small farmers, it is essential to promote structured, continuous training programs. These programs should be supported by specialised consultancy services and networks of model companies, capable of acting as points of reference for the dissemination of good practices and support in innovation processes.

In parallel, it is considered a priority to simplify bureaucratic procedures and the regulatory environment. This can be done through training and education, consulting services, simplification of procedures, and reduction of bureaucracy.

A further area of intervention concerns the presence of low-cost imported agricultural products, where it is suggested to extend the CBAM scope to agricultural products, support local products, and promote the progressive abandonment of imports of goods with a high environmental impact.

To support the profitability of agricultural work, especially in small businesses, it is recommended to reduce production costs (agricultural inputs), incentivise the processing and direct sale of products, and reform the current system of subsidies, replacing those linked to the size of the land with payments based on the number of full-time workers employed. In this way, not only would the surfaces be valued, but also human work, often underestimated in current policies.

Finally, to improve the effectiveness of Member States' action in implementing agricultural policies, it is essential to introduce a system of common indicators (KPIs) and official metrics at the European level, to monitor transparently and comparably. Each State should then translate these objectives into contextualised national action plans, setting intermediate goals and making subsidies conditional on the achievement of measurable results.

5.3. Final remarks

This thesis aimed to highlight the dynamics behind the food that arrives on our tables every day, analysing them from an environmental, social, and regulatory perspective. What emerges is a highly unbalanced global supply chain system in which profit maximization prevails over the protection of human rights and the safeguarding of the environment. In this context, small farmers are penalised and undervalued. Although radically transforming this model is complex, there is room for concrete intervention: more incisive regulation is needed, capable of promoting local and sustainable products, rather than solely favouring the logic of large companies. But citizens also have a central role. Responsible consumption choices (oriented towards quality, transparency, and respect for the environment) can help reverse the trend. Individually, the system cannot be changed, but collectively, bringing food to the table that is also good for the planet can really make a difference.

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Annex I

This attachment contains the questionnaire used to collect data to support the analysis presented in the thesis.

1. Do you use sustainable farming practices? If so, which ones?
2. What are the main sales channels for your products (local markets, supermarkets, direct sales)? If you sell in supermarkets, how are prices determined, and what kind of relationships do you have with distributors?
3. What is the market you would prefer to reach? Are you interested in collaborating with supermarkets to sell your products, or do you prefer to stay on local channels?
4. Do you think that the growing presence of large agricultural companies and multinationals has affected your sales or the dynamics of the local market? In what way?
5. Do you think that agricultural policies and regulations are influenced by large companies?
6. Do you receive subsidies or Government aid? If so, what types of support do you receive, and how does it affect your operations? Are any of these aids specifically aimed at promoting more sustainable farming practices? If so, in what way?
7. Are you familiar with the CAP? If so, what do you think about the recent changes to the CAP and the agricultural protests that have occurred? What changes would you like to see implemented?
8. What do you think about your working conditions?
9. What do you think the state could do more to support the agricultural sector and improve farmers' working conditions?