



The European Green Deal impact on the competitiveness of the agricultural sector in Portugal

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Abstract

Title – The European Green Deal impact on the competitiveness of the agricultural sector in Portugal

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Keywords – European Green Deal; agriculture; sustainability; internationalization;

This dissertation is a pedagogical case study focused on the impacts that the European Green Deal will have at EU level in its primary sector, namely, in Portugal. A variety of concepts such as sustainability, competitiveness and internationalization will be studied and applied to the following hypothesis: how can the Portuguese primary sector companies, in light of the increased cost structure, remain competitive?

The objective of this thesis is to understand, first, at a microeconomic level, the different factors that will have an impact on the cost structure of the farmers, like the higher costs which flow from the investments needed in new technologies. Secondly, at a macroeconomic level, an overview over the current exports and imports and its forecast will be discussed.

It was concluded that the farmers will face some challenges and in order to ensure the success of the European Green Deal, the latter must be addressed by different entities. There will be an increase in costs in the short term which will need to be funded with the respective funding options available, for instance, the CAP and the Horizon Europe. In the long term, it is of extreme importance that the consumer's mindset adapts to more sustainable diets. Further, so that the internationalization of European products thrives, there needs to be a clearer regulation so that the farmers are aware of which products they can export or import to regions which are not in scope of these regulations.

Resumo

Título – The European Green Deal impact on the competitiveness of the agricultural sector in Portugal

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Palavras-chave: Pacto Ecológico Europeu; agricultura; sustentabilidade; internacionalização

Esta tese de mestrado consiste num caso pedagógico focado nos impactos que o Pacto Ecológico Europeu terá a nível da EU no seu setor primário, nomeadamente em Portugal. Diversos conceitos como sustentabilidade, competitividade e internacionalização serão estudados e aplicados à seguinte hipótese: como é que as empresas portuguesas do setor primário, face ao aumento da estrutura de custos, podem manter-se competitivas?

O objetivo desta tese é compreender, em primeiro lugar, ao nível microeconómico, os diferentes fatores que terão impacto na estrutura de custos dos agricultores, como os custos mais elevados decorrentes dos investimentos necessários em novas tecnologias. Em segundo lugar, a nível macroeconómico, será discutida uma visão geral sobre as exportações e importações atuais e a sua previsão.

Foi concluído que os agricultores irão enfrentar alguns desafios e para garantir o sucesso do Pacto Ecológico Europeu, este último deve ser abordado por diferentes entidades. Haverá um aumento de custos a curto prazo que terá de ser financiado com as respetivas opções de financiamento disponíveis, como por exemplo, a PAC e o Horizonte Europa, e a longo prazo é de extrema importância que a mentalidade do consumidor se adapte a dietas mais sustentáveis. Além disso, para que a internacionalização dos produtos europeus prospere, é necessária uma regulamentação mais clara para que os agricultores saibam quais produtos podem exportar ou importar para regiões que não estão no alcance dessas regulamentações.

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Table of Contents

1. Introduction	7
2. Case study	8
2.1. Introduction	8
2.2. Before European Green Deal.....	8
2.3. European Green Deal – How it works.....	9
2.4. Impact of the European Green Deal in Europe.....	9
2.5. Farm to Fork strategy	10
2.6. Available options for funding and advisory	11
2.7. Common Agricultural Policy.....	12
2.7.1. CAP Pillars.....	13
2.7.2. New CAP objectives	14
2.7.3. Solutions CAP promotes.....	17
2.8. The Geopolitics of the European Green Deal.....	18
2.9. Portuguese Agriculture and its International Profile	19
2.10. Plant protection products and the European Green Deal Impact.....	19
2.11. Problems regarding the European Green Deal	21
2.12. Portugal Fresh.....	22
3. Research note	24
3.1. Agriculture Sustainability.....	24
3.2. Internationalization and SMEs	25
3.3. Competitive advantage	26
4. Teaching notes.....	28
4.1. Introduction	28
4.2. Synopsis.....	28
4.3. Teaching objectives	28
4.4. Suggested questions.....	29
5. Final Considerations.....	36
5.1. Limitations.....	37
5.2. Future Research Recommendations	37
6. References list	39
7. Appendix	46

List of Abbreviations

EU – European Union

EGD – European Green Deal

CAP – Common Agricultural Policy

GHG – Greenhouse Gas

GAEC – Good Agricultural and Environmental Condition

List of Figures

Figure 1: Evolution of the population residences in Portugal from 2001 to 2020

Figure 2: Population practicing agriculture by age groups in Portugal

Figure 3: Three pillars of sustainability

Figure 4: Porter Diamond

1. Introduction

This is a pedagogical case study focused on the European Green Deal and the agriculture industry.

Therefore, the objective of this dissertation is to provide students with an opportunity to understand what is at stake under this agreement and apply management concepts to a sector that requires fast changes in a dynamic and evolving world.

The agricultural sector in Portugal has been expanding, as it can be seen through the exports, which have increased by 11,4% in 2021 compared to 2020 (7709 million euros). The latter shows how relevant the industry is to the Portuguese economy and its potential competitiveness. In light of this, we must inquire how the agriculture industry in Portugal can remain competitive after the European Green Deal.

It should be noted that this agreement aims to reduce the carbon emissions in Europe, thereby affecting the agriculture industry by potentially increasing its costs. Alongside this objective raises concerns about the loss of competitiveness that the agricultural sector will suffer.

In order to understand the outcome of this reform, this paper introduces the main consequences which will happen at Portuguese and European level, what is at stake and the future challenges that it might face. Lastly solutions are presented based on the current state-of-the-art discussions taking place about the Common Agriculture Policy (CAP).

Finally, the case enables to understand how the European Green Deal will affect the internationalization of Portuguese products while these are subject to sustainable practices.

2. Case study

2.1. Introduction

The current climate and environmental challenges are urging for action, as it can be seen through recent events such as the 2021 European Floods or the current Portuguese drought.

Nonetheless, this was already foreseen in 2019, when the European Commission presented the European Green Deal (EGD). According to them, the future and success of the European Union (EU) relies on the sustainable use of resources.

As a result, the EU's core growth strategy is to transition the EU into a sustainable economy, which can be described as an economy that is resilient and provides a good quality of life for everybody (WWF, 2022), and to transform itself into the first carbon neutral continent by 2050, which means that by that year, the amount of CO₂ emissions that Europe puts into the atmosphere is the same as the amount of CO₂ emissions that Europe removes from the atmosphere, making a neutral impact (European Parliament, 2021). Thanks to this program, the EU intends to be at the forefront of international climate action. It should be noted that there are different funding mechanisms in place to ease this transition, which total over €1 trillion. This measure will fund the new policies which aim to lead Europe to economic growth and climate neutrality. (Norton Rose Fullbright, 2021)

2.2. Before European Green Deal

In the late 20th century, wide concerns regarding sustainability started among countries and their population, because it was seen as the only way to ensure that future generations would be able to have the same resources and the same quality of life as the current generations.

For those reasons, agreements started to be concluded all over the world. In 1994, the United Nations Framework Convention on Climate Change (UNFCCC) entered into force, being an intergovernmental treaty developed to address the problem of climate change. (UNFCCC, 2022) Parties of the convention later negotiated the Kyoto protocol, in 1997. Kyoto protocol was adopted with the objective of committing industrialized countries and economies in transition to limit and reduce greenhouse gases in accordance with agreed individual targets. (UNFCCC, 2022)

In 2000, UN Member States have agreed on the Millenium Development Goals (MDG). These goals aim to commit leaders around the world to combat poverty, hunger, disease, illiteracy,

discrimination against women, and environmental degradation. (WHO, 2018) Later in 2015, the Paris Agreement was adopted by 196 parties at COP 21 (Paris Climate Conference). This treaty on climate change has the goal of reducing the greenhouse gas emissions as soon as possible to achieve a climate neutral world before the end of the century. (UNFCCC, 2022)

2.3. European Green Deal – How it works

EU Member States have committed to making the EU the first climate-neutral continent by 2050, and to achieve this they have pledged to reduce emissions by at least 55% by 2030 compared to 1990 levels. Notwithstanding this, it should be noted that new opportunities for innovation, investment, and jobs are to be created, which is a major opportunity for the European industry to lead by example in the fields of clean technologies and products. (European Commission, 2022)

So far, greenhouse gas emissions have decreased 31% between 1990 and 2020. The main reasons for this to happen were strongly driven by the fossil fuel prices and policy measures in 2019, and the Covid-19 in 2020 (European Environment Agency, 2021). However, so that Europe and Portugal can keep track and comply with the current objective of reducing to 55%, they will need to adapt the current businesses to greener ones, which will likely lead to increasing costs for current companies.

2.4. Impact of the European Green Deal in Europe

One of the sectors that will be strongly impacted by the EGD is the agriculture sector. People need to bear in mind the positive link between a healthy planet and society, and for those reasons the sustainable food systems are set as a priority goal of the EGD. And it is not only a concern for the consumers, but also for the producers since recent research shows that, for example, pesticides exposure is linked to serious and deadly illness among farm workers, including Parkinson's disease and cancer. (Sabarwal, 2018)

The goal of EU is to ensure food security to all people, while minimizing the impact it has on the environment, such as climate change and biodiversity loss. Furthermore, the EU intends to reduce the climate footprint within the food system, whilst strengthening its resilience, and leading it into a global transition towards a more competitive sustainability from farm to fork. (European Commission, 2019)

In order for this to happen, a wide range of trends need to be reversed so they can meet the new EGD agricultural objectives. In fact, between 2005 and 2019, the EU's agriculture related greenhouse gas (GHG) emissions have changed very little, and the trend is expected to continue for the next years, with Member States projections pointing to a modest decline of 2% in agricultural GHG emissions until 2030, compared to 2005 levels (European Environment Agency, 2021). The sales of pesticides in Europe also remained stable over the period of 2011-2018. (Eurostat, 2020). Additionally, the surface area devoted to organic farming, which currently accounts for 8.5% of Europe's utilized agricultural area (UAA), at the current rate would increase 12 to 13 percent by 2030, knowing that the current target is 25%. (INRAE, 2021)

To achieve the desired greenhouse gas emissions reductions to the levels desired by 2030, Europe will need to invest an estimated €336 billion more each year than it did during 2011-20. In addition, it is foreseen that the investment will need around €130 billion per year to accomplish the environmental objectives. The European Green Deal Investment Plan (EGDIP), also referred to as Sustainable Europe Investment Plan (SEIP), is the financial pillar of the EGD. It has as main objective mobilizing public and private financial resources to support around €1 trillion in green investment over the next decade. (European Union, 2022)

However, the focus cannot only be on the current agriculture practices and how they can be changed, but also on the consumers mindsets and decisions. The Impact Assessment study carried out for the EGD shows that *“by 2030 emissions reductions stemming from changing consumer choices towards healthy diets could be of the same order of magnitude as technical options available to reduce emissions in the sector. In line with the Farm to Fork Strategy, consumers should have financial support to choose sustainable and healthy food and diets. This would not only help the agricultural and food sector to reduce emissions, but also improve consumers' health and reduce health-related externalities for society and food waste”*. (European Commission, 2020)

2.5. Farm to Fork strategy

The EGD's Farm to Fork approach aims not only to make food systems fairer and healthier, but also to make them environmentally friendly. This strategy is at the heart of the European Commission's goal for achieving the Sustainable Development Goals (European Commission, 2020). Food systems in Europe must be redesigned because they currently account for nearly

one-third of global GHG emissions. Furthermore, they consume large amounts of natural resources and cause adverse effects on people's health, both due to under and over nutrition.

One of the first deliverables of the Farm to Fork strategy and a part of its plan is the EU Code of Conduct on Responsible Food and Business Marketing Practices. It outlines the actions that the actors in the process of "farm to fork", from the food producers to retailers, can voluntarily commit to improve and communicate their sustainability performance. (European Commission, 2021)

The latter can be seen in Portugal through the new communication set forth by Jerónimo Martins, for example. Jerónimo Martins is one of the Portuguese retail companies that signed this agreement and is set to compromise to improve their sustainable practices. Some examples of practices that Jerónimo Martins will adopt are (1) promoting healthy food by making sure that by 2023 at least 90% of their own label products do not contain artificial coloring in their direct ingredients, (2) fighting plastic pollution by reducing their plastic packages, (3) fighting the food waste, and (4) promoting the animal wellbeing, by eliminating the sales of eggs that come from caged hens, for example.

However, the transition is not going to happen without a shift on people's diet. So far, in the EU in 2020, 38.5 million people could not afford a quality meal every second day, and that includes meat, chicken, fish, or a vegetarian equivalent. As a result, food assistance is imperative to many parts of the population in different Member States. (Eurostat, 2020) Notwithstanding the latter, about 20% of the food produced is wasted. (European Commission, 2022)

To make this transition to an environmentally friendly food system possible, advisory services, financial instruments, as well as research and innovation are critical as they can help resolve tensions, create new solutions, and overcome the new challenges that will be faced. (European Commission, 2022)

2.6. Available options for funding and advisory

Farmers, foresters, and rural communities will need to rely heavily on knowledge and innovation. The Agriculture Knowledge and Innovation System (AKIS) is required across Europe to ensure that everyone is connected and that all the knowledge is shared among the different stakeholders. (EIP-AGRI, 2021) Currently, all countries in the European Union have

a farm advisory system (FAS). The FAS helps farmers to better understand and meet the EU rules for the environment and the Good Agricultural and Environmental Condition (GAEC). The FAS provides information about the obligations at farm level and the different agricultural practices farmers can pursue.

In Portugal, the management of the EU-FAS is under the authority of the Directorate of Agriculture and Rural Development (DGADR). Although it has been legally established in 2016, the implementation only started in 2018. The latter explains the low execution rate in the M02 (Advisory Services), which in September 2019 was just 12% of the allocated amount concerning this subject. Out of the 33 million euros funded by EU to Portugal to the M02, 25% were allocated to creating new advisory services and to train new advisors, thereby the implementation process is still on going. It is also important to note that the EU-FAS only covers the continental area of Portugal, since the islands of Azores and Madeira have their own farming advisory systems. (Madureira, 2020)

Another important program to help on the transition to a greener Europe is the Horizon Europe. With a budget of €95.5 billion, it is the EU's main funding initiative for research and innovation, tackling climate change and helping to achieve UN's Sustainable Development Goals. (European Commission, 2022) Any type of organization can apply to Horizon Europe as long as they have the operational and financial capacities to perform the tasks proposed. (European Commission, 2022)

2.7. Common Agricultural Policy

The most important program that will help funding the farmers and that will help the countries overcoming the challenges imposed by the EGD is the Common Agricultural Policy (CAP).

In 1957, the Treaty of Rome was signed to work towards integration and economic growth, through trade (EUR-Lex, 2017). It led to the creation of CAP which was founded in a context of economic recovery and construction of European solidarity. Its main objective is to support the agricultures and increase their productivity by ensuring a stable supply of food at accessible prices. Simultaneously, it helps the farmers to have a good standard of living and helps them to address climate change and do a sustainable management of resources. (European Parliament, 2021)

CAP is a policy common to all EU countries, and it is managed and financed at a European level based on EU budget resources. It is financed through two funds as part of the EU budget, the European Agriculture Guarantee Fund (EAGF) which provides direct support and funds market measures, and the European Agricultural Fund for Rural Development (EAFRD) which finances rural development.

In the new CAP, payments are managed at national level by each EU country and information about the recipients of CAP payments is published by each country, in accordance with EU transparency rules. (European Commission, 2022)

2.7.1. CAP Pillars

The CAP is composed by two pillars, and with the EGD, there are new features that are worth mentioning.

- Pillar 1: Direct payments and market measures

Pillar 1 concerns to direct payments, and in the new CAP, the new instrument is the eco-schemes.

Echo-schemes

Echo-schemes are one of the very few novel instruments available in the toolbox of the future CAP. These are payment schemes for environmental and climate protection that will be supported from direct payment budgets of Member States. These will be required to make one or more eco-schemes available, but the farmers will be free to participate or not. Rather than using CAP direct payments as a source of income, the goal of echo-schemes is to reward farmers who manage their land in a climate-friendly manner, as well as to incentivize the adoption of specific farming practices that have higher environmental and animal welfare benefits.

Eco-schemes also involve annual (“one-year-at-a-time”) rather than multi-annual commitments, which may appeal to farmers in particular. Please note that the Member States have complete control over the scheme’s content and funding, and as a result they ensure the execution of the program, while also complementing the CAP’s other environmental features.

Farmers will also have the possibility to sign up for an echo-scheme as a *trial basis*. For example, a farmer in Portugal could test a certain water usage for a year or more, and then deciding whether to continue participating. (European Commission, 2019)28

- Pillar 2: Rural Development

The “second pillar” of the CAP refers to support for rural development. It will continue to be paid to farms in the form of per-hectare, or per-animal if it is the case. Payments for environmental and other management obligations, which include what are now known as “agri-environment-climate commitments”, are an important category. These payments reward farmers and other land managers that voluntarily commit themselves for several years to practices (as determined by the Member State) that are good to the environment and climate.

Many different sorts of payments will be available in CAP Pillar II to promote environmental and climate protection. These include support for knowledge building (e.g., farm-specific advice on reducing greenhouse gas emissions), investments (e.g., in more water efficiency), innovation (e.g., projects to implement precision agriculture techniques to areas where they are not currently being used), and collaboration (e.g., farms to jointly supply waste for sustainable energy production).

Pillar II will also become less complex. The present rules, which account for 20 “measures” and 64 “sub-measures”, will be trimmed down and merged into eight major forms of intervention, which will increase the flexibility of each Member State. (European Commission, 2019)

2.7.2. New CAP objectives

The new CAP, which will take effect on 1st of January 2023, will be based on a more flexible performance and results-based approach that takes into account local conditions and needs, while satisfying the EU’s sustainability aspirations. It is organized around objectives, which serve as the foundation to the Member States’ CAP strategic plans.

Portuguese Strategic Plan

In the Portuguese plan, which was filed in late 2021, ecological schemes account for 25% of direct payments and measures that contribute to the environment, and climate account for more than 40% of the Rural Development pillar (second pillar), indicating the country’s ambition in this area. When it comes to Redistributive Assistance, it accounts for 10% of direct payments,

plus Payment for Small Farms (9%). The income assistance for young and new farmers will be equivalent to 3% of direct payments, promoting generational renewal. The LEADER strategy (Links Between Rural Economy Development Actions) accounts for 6% of the Rural Development package, indicating the importance of territory management.

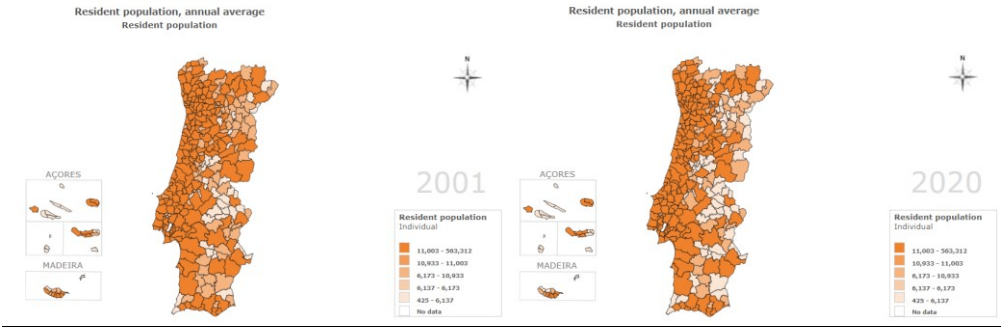
The CAP Strategic Plan will be executed from 2023 to 2027, with Portugal receiving a budget of more than 6.8 billion euros to do so. Other support instruments, such as the Recovery and Resilience Plan and the National Irrigation Plan, will be added to it. The current Rural Development Programs are expected to operate until year 2025. (Portuguese Republic, 2021)

Issues regarding the Portuguese proposal

The Confederation of Farmers of Portugal (CAP) general secretary considers that the Portuguese strategy has no ambition and does not take advantage of the room of maneuver that the European Union has opened with the new CAP, to adapt it to the particularities of the Portuguese country. He also mentions that there is lack of rigor in the document and exemplifies with the new support regime for small agriculture, which creates three tiers and raises support to 1050 euros per hectare, but it does not explain why in recent years there has been a 38 percent drop in this area. (Mira, 2022)

Concerning the investments in innovation, it is necessary to invest in smart farming and in 5G technology in less dense territories to promote agriculture and attract younger generations. (Andrade, 2022) We can see how the population distribution in Portugal has changed over the last 20 years by looking at the graph below. People are migrating from the country’s interior to the coast’s more urbanized areas.

Figure 1- Evolution of the population residences in Portugal from 2001 to 2020. (PORDATA, 2020)



This is a problem because if the population and new generations begin to migrate to urban areas, leaving elderly people in rural areas, there will be no population renewal in cities where

agriculture is mostly practiced. We can see from the graph below that the agriculture work force has been declining, particularly among younger generations.

Figure 2 - Population practicing agriculture by age groups in Portugal (PORDATA, 2019)

Individual						
Age groups						
Years	Total	Less than 24	25-34	35-44	45-54	55 or more
1999	1,083,838	159,368	111,047	135,173	178,554	499,696
2019	648,252	29,253	43,717	76,829	111,599	386,854

One of the reasons that can explain this decrease is the fact that there are no incentives for younger generations to stay on the interior of the country due to the lack of innovation.

Irrigation Issues

The shortage of funds available for Portuguese investments in rural development is a pressing concern. There are 337 million euros to invest in public irrigation, which considering the total necessities of investment in public irrigation (2.257 million euros), the investment only covers 15% of the total necessities, as stated on the study “Regadio 20|30” made by the Portuguese government.

Irrigation is essential for Portugal to remain competitive, to combat desertification and to adapt to climate change. That way, one of the priorities should be to increase the capacity of water storages, as the dams in Portugal only gather 20% of annual water inflows and are over 40 years old. In addition, private irrigation is significant because it accounts for 49% of total irrigation in the Portuguese territory. The investments in new technologies are necessary to remain competitive, attract younger generations, promote sustainability, and meet the difficulties posed to famers by the EGD. Irrigation enables for larger systems of production, as well as the economic viability and growth of some areas that would otherwise be abandoned. Portugal needs public policies that support a modern agriculture, competitive, and environmentally friendly. (Agricultura e Mar, 2022)

One other issue that might arise regarding the subsidies paid to farmers is that it focuses more on the short term impact but does not consider the long term costs that the new technologies will have. In the short term, the subsidies given to farmers will help them investing in new technologies to help on the irrigation issues, for example, as a result they will produce more efficiently and sustainably. Simultaneously, it decreases the overall costs of the farmers, which

will in turn not affect the current prices paid by the final consumer or even decrease the prices paid by the final consumer incentivizing them to buy these sustainable products.

However, if the subsidies do not continue for the long term, how are the farmers supposed to keep the higher costs and the same selling prices? It will eventually not be sustainable, and the prices will increase, being the consumer the one paying for the higher prices, and with no other options since in Europe all products will end up being sustainable.

2.7.3. Solutions CAP promotes

2.7.3.1. The polluter-pays principle

Price is still the main driver for most consumers, also when buying food. However, nowadays, the final consumer is the one that pays the price for sustainable food. These costs cannot be taken by farmers unless they are compensated in for the higher costs they are incurred. In the new CAP, various types of Pillar 1 direct payments currently account for three quarters of the CAP expenditure. Such help is necessary to keep farmer's wages afloat, but payments are conditional upon compliance with certain regulations and directives, as well as the adoption of a set of good practices known as GAEC. Because it deals with cost overruns, this conditionality follows a polluter-pays logic, and in the event of non-compliance, the amount of aid received may be reduced. (INRAE, 2021)

The polluter pays principle states that the polluter should bear the expenses carried out for the pollution prevention and the measures imposed by the public authorities. (European Court of Auditors, 2021) For this reason, the polluter pays principle may need to be preserved in food prices to reflect all costs, because only this way there can be a fair competition between sustainable food and unsustainable. (European Court of Auditors, 2021) However, does it make sense to try to remove all the non-sustainable food chains from the market?

The subsidies farmers will receive to be able to implement sustainable practices, and this way to sell their products for a reasonable price, are only meant to help, for now, in the short term (period of 2021-2027). The issue might arise then in the long term. After helping most of the farmers to become sustainable through these subsidies, when we get to 2027, most of the food chains will be sustainable and less non-sustainable products will exist. However, if we look at the economic theory, we can see that the Total Costs = Fixed Costs + Variable Costs. It makes sense that for now farmers need monetary help to support the variable costs that will arise from changing to a sustainable way of farming. Yet, in the long term, the fixed costs can become the

main issues for farmers. When the subsidies come to an end, farmers with sustainable practices will keep their higher costs of production due to the new technologies and ways of practicing agriculture. However, the farmers will not be receiving the subsidies that were helping them keeping the low prices to consumers. In the case that this happens, it might happen that the prices increase, and consumers will be left with no options but to buy these products, since non-sustainable products will become rare in the market.

It is relevant to make sure that the subsidies farmers receive are enough to support the changes in the short term, and the continuity in the long term. If the subsidies are not enough, transformation in the sector will not happen.

2.7.3.2. Subsidies to farmers

In contrast to the polluter-pays principal, the CAP employs tools based on the provider-gets principle, which provides subsidies to farmers who go above and beyond the minimal conditionality required in terms of environmental efforts. As part of the future CAP, this idea applies to both present Agri Environment Climate Measures (AECM) and the new eco-schemes (INRAE, 2021) This will incentivize farmers to not only comply with the minimum requirements by law, but to also exceed the needs.

The new CAP will spend 387 billion euros on payments to farmers and support for rural development, accounting for over a third of the EU's budget for the years 2021-2027. The reform will demand that 20 percent of payments to farmers are spent on eco-schemes from 2023-2024, rising to 25 percent in 2025-2027. The cash might be used, for example, to restore wetlands to absorb CO₂, or to improve organic farming. At least 10% of CAP funds will go to smaller farms, and all payments to farmers will be conditional on them adhering to environmental regulations. In the event that agricultural markets are affected by an emergency, the reform also provides a 450-million-euro crisis fund. (Reuters, 2021)

2.8. The Geopolitics of the European Green Deal

The Green Deal aspires to reshape the European economy and consumption habits, but it will redefine Europe's global policy priorities because it implies a substantial revamp of the European energy system and because it ranks so high on the EU and its neighbors. As such, it is a significant geopolitical development in foreign policy.

The EGD will have an impact on geopolitics through its impact on global markets, such as global trade patterns, which will influence how agriculture is produced around the world, particularly through the Carbon Border Adjustment Mechanism (CBAM). In order to maintain strong relationships with partnership nations, the EU must address the international ramifications of its domestic actions and prepare to assist in managing the geopolitical aspects of the EGD. The EU should work with these countries to promote economic diversification, including renewable energy and sustainable agricultural practices, so that they can import sustainable food into Europe in the future. Internationalizing the EGD and mobilizing the EU funds to other nations outside Europe in one approach to help with this. It would also be interesting to develop climate change coalitions between European suppliers and European businesses. (Leonard, et al, 2021)

2.9. Portuguese Agriculture and its International Profile

Portuguese agriculture has always been one of the main sectors in the Portuguese economy and of great importance in its economic growth and country's history until the end of the 20th century when it started to lose some strength. By now, in Portugal, the agriculture industry represents only 2.11% of the Portuguese GDP. Even though it is a low percentage, it is still significant and represents a small increase compared to 2010 levels of 1.94%. (Statista, 2020) Currently, the population of Portugal is about 10.3 million people, and the average age of a Portuguese farmer is the oldest in the European Union, being 65 years. Also, 71.4% of the farmers only have elementary school studies. (Almeida, 2020)

The European Union is the main importer of national fruit, vegetables, and flowers, being worth 82% of sales in the first seven months of 2021. Spain was the main market with a weight of 29% of exports, followed by France (15%), Netherlands (14%), Germany (9%) and United Kingdom (7%). (Portugal Fresh, 2021)

2.10. Plant protection products and the European Green Deal Impact

Pesticides are used in agriculture to protect plants from diseases and pests, but their use poses risks to the environment. That is why the Farm to Fork strategy targets pesticides and fertilizers, indicating a desire in Europe to reduce their usage, reducing as a result negative environmental, climate, and human health impacts. However, these reduction goals place current European agricultural and land management systems with a dilemma on how they will be able to reduce their consumption while maintaining the same amount of production required to meet societal

needs. To address this topic, a greater focus on research and innovation in this area is needed and will be done by investing through Horizon. (BASIC, 2021) The Horizon program will help on the research and innovation of new pesticides, for example, that can be used in agriculture without the negative impacts that some of the actual pesticides bring to the environment. New sustainable plant protection products are needed by the farmers, which currently are not sufficient, as a result, farmers trying to be sustainable are losing a lot of production due to the organic pesticides. The development of new efficient organic plant protection products is essential for farmers to turn their practice green.

Regarding Portugal

AGRO.GES, which is an organization that provides support services to rural development, and to the agro-forestry and food sectors, conducted a study to look at the economic impact of removing more than 80 substances used in production in Portugal. It concluded that without new solutions, it will cause the loss of 7% of the total national agricultural revenues. The abandon of lands put in risk 900 jobs, increasing the dependence of Portugal in other countries. The annual losses could reach 330M€ of agricultural revenues. (AGRO.GES, 2021)

The decision to exclude the use of synthetic fertilizers of some of the certified models in agriculture, and the consequent legislative pressure that exists on conventional modes of production is inconsistent with the scientific knowledge that currently exists. The reduction in agriculture production expected will have as consequences the rise of prices of the main agricultural products and the decrease in agri-food trade.

Issues with organic pesticides

The use of organic compounds as fertilizers carries advantages and opportunities widely recognized, namely in terms of the circulation of resources use, the use of by-products and the integration between animal production and vegetation, either through grazing systems or by the use of waste from unit's intensive livestock. (Silva, 2021) However there are a few issues. One example is the fact that, because the accumulation of organic matter is a slow process, profoundly variable and limited in diverse soil and climatic conditions, it requires contextualized approach that does not favor generalist observations or conclusions. Different soils might need different nutrients. (AGRO.GES, 2021)

To keep agricultural output competitive and productive, scientific research must be scaled up and executed on the ground. Development of enhanced indicators and monitoring that could feed into decision support systems are two examples. Biocontrol and alternative farming approaches like agroecology would benefit from a greater understanding of ecosystem interactions. Alternative inputs (low-risk herbicides and bio-fertilizers) should be investigated further in conjunction with crop breeding techniques and more resilient crop combinations on agricultural areas. (Schefer, G., 2020)

2.11. Problems regarding the European Green Deal

According to a USDA (US Department of Agriculture) study, the Green Deal's implementation would reduce Europe's agricultural production (from 7 to 12%, depending on the products) and exports, while increasing prices and imports. According to the study, the average European farm income would decline by 16%. (INRAE, 2021)

The EU is heavily reliant on agricultural imports, with China being the only country that imports more. Despite being the world's largest agricultural importer, China is still the world's largest consumer of agricultural chemicals, using 30% of global fertilizers and pesticides on only 9% of worldwide cropland. (Wu, et al, 2018)

In 2019, EU imported one-fifth of the crops consumed inside its borders, as well as 1% of the meat and dairy products. The issue is that the imports come from other countries with less stringent environmental standards than Europe, while EU trade agreements do not demand that imports are produced in a sustainable manner. As a result, EU members are outsourcing environmental damage to other nations while simultaneously receiving credit for green efforts at home. (Fuchs, 2020)

Carbon Border Adjustment Mechanism (CBAM)

To fight this issue, the European Commission proposed the CBAM, which would help addressing this problem. It deals with the possibility of "carbon leakage" as a result of the EU's heightened climate ambition. Carbon leakage refers to the hypothetical circumstance in which European producers competing in worldwide markets move their production and pollution to countries with less stringent or no climate legislation in order to reduce their compliance costs. On certain goods, it will provide an equal carbon pricing for domestic and imported production.

With the European Commission proposal, it intends to encourage trading partners to also reduce their emissions. The way it will work is that the companies that want to import goods produced outside the EU into the EU will have to purchase certificates corresponding to the amount of emissions generated in the production of those goods. (Carbon Market Watch, 2021) Only goods in compliance with the EU restrictions will be able to enter Europe. However, some issues might arise.

The issue with CBAM is that it may be incompatible with the most favored nation agreement rule, which states that any advantage granted to imported items from one WTO member must be given to similar products from all other WTO members promptly and unconditionally. (General Agreement on Tariffs and Trade, Article I). If the CBAM discriminated between and among like imported items from different WTO member nations based on their carbon content, it would be in violation of this agreement.

Second, because the CBAM could impose a charge on imported goods that exceeds the EU's WTO schedule of commitments-agreed ceiling on customs duties and other imported-related costs, the CBAM could also be in violation of another core WTO regulation. (General Agreement on Tariffs and Trade, Article II)

2.12. Portugal Fresh

In 2010, Portugal Fresh was founded due to the necessity felt by the Portuguese companies focused on the primary industry of showing to consumers the potential that national products can offer. The focus of the association is to create a new promotional approach of the Portuguese products, by joining companies of this sector to work together with the same objective of valuing what is made in Portugal. Nowadays, this association represents 40% of the value of production of fruits, vegetables, and flowers.

One of the objectives set by Portugal Fresh is to reach 2500 million euros of exports by 2030. If this objective manages to be successful, it will mean an increase of more than 48% just in a decade. At the same time Portugal Fresh set this goal, they also intend to increase the value of production to 4 billion euros in the same period, an increase compared to the actual 3 billion. To reach these objectives, one of the strategies is to implement new irrigation perimeters, by reinforce the irrigation conditions. The consumers have been changing their habits with the increase in search for fruits, which needs to be complemented by the increase in the irrigation.

This way, we can say that Portugal Fresh will have an important impact on the Portuguese agriculture and the EGD new impositions. Portugal Fresh will have the mission of promoting national products and reveal them to the world, by highlighting the positive aspects of Portuguese products and increase their sales among other nations. It is needed that Portugal Fresh promotes the advantages of sustainable products to consumers. Since the consumers will have one of the most important roles because they will be the ones paying for the higher prices, it is important that they are aware of the benefits of buying national sustainable products.

It is also important that Portugal Fresh helps farmers to update their farming facilities, such as the irrigation, to other with more advanced technologies to help on the transition. It is needed that farmers are guided on what to do and where to get help so they to this transition in the most efficient way.

3. Research note

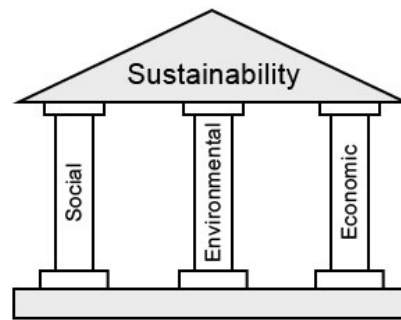
3.1. Agriculture Sustainability

Agriculture sustainability was not a major issue in the 1960s and 1970s because food production resources did not appear threatened by overuse (Brady, N., 1990). Only later in the 21st century, the population started to become aware of the difficulties to meet the desired productivity without deteriorating the environment (Feher & Beke, 2013), which came after impressive results from the Green Revolution, but which encountered major problems of equity, stability, and sustainability, calling for a “new phase” of agriculture research and development (GR Conway, EB Barbie, 1988).

In face of these challenges, the idea of sustainable agriculture started gaining prominence. Yet, the concept of sustainable agriculture is very vague and ambiguous in its meaning, which renders its use and implementation extremely difficult, leading to the emergence of a great variety of different discourses, views, or paradigms of sustainable agriculture (Velten, S., Leventon, J., Jager, N., & Newig, J., 2015).

According to Reganold, Papendick and Parr, for a farm to be sustainable, it must produce adequate amounts of high-quality food, protect its resources and be both environmentally safe and profitable (Reganold, J. P., Papendick, R. I., & Parr, J. F., 1990). Another definition for sustainable agriculture is when it comprises “management procedures that work with natural processes to conserve all resources, maximize waste and environmental impact, prevent problems and promote agroecosystem resilience, self-regulation, evolution, and sustained production for the nourishment and fulfillment of all” (MacRae, R. J., Hill, S. B., Henning, J., & Mehuys, G. R., 1989). FAO, the Food and Agriculture Organization, defines sustainable agriculture as the management and conservation of natural resources and technological evolution to maintain humans present and future needs, while being economically viable and socially acceptable (FAO, 2014). There are different definitions for the concept of sustainable agriculture, but we can converge them into three pillars.

Figure 3 - Three pillars of sustainability (Purvis, et al, 2019)



There is no single point of origin of this three-pillar conception, but rather a gradual emergence of different ideas and problems faced, as it is mentioned in the article from Purvis, Mao and Robinson, “Three pillars of sustainability: in search of conceptual origins” (Purvis, B., Mao, Y., & Robinson, D., 2019).

3.2. Internationalization and SMEs

According to Welch and Luostarinen (1988), internationalization is the process of increasing involvement in international operations.

Traditionally, services were thought of as locally generated solution, and service companies were thought of as local businesses. Despite the fact that services are still largely generated by small and local businesses, the internationalization of businesses has increased. (Grönroos, 1999) And in a global environment, small firms cannot continue to believe that international competition will not affect them because they are simply focused on local markets. As a result, one of the more apparent responses to the continuously shifting dynamics of this new environment has been rising engagement of enterprises in export activities. (Pla-Barber & Alegre, 2007) Nowadays, internationalization is not only representing an option for companies to follow, but it is becoming a necessity for them to survive and compete. (Majocchi, et al., 2005)

For companies, when it comes to going international, they tend to change their methods and adapt to new foreign markets, with an increasing commitment. A typical pattern can be from starting to export through an agent, to installing a production subsidiary in another country. This can appear to be a great opportunity, but it also represents threats. It can happen that by exporting, it can lead to building of import obstacles by a foreign government, mandating a transition to another form of business, such as licensing. (Welch & Luostarinen, 1988) Then, the long-term competitive advantage will depend on the firm’s ability to consistently adapt and

develop its strategic assets to satisfy market-specific demands, as well as create new strategic assets that it may exploit in existing or new markets. (Markides, et al., 1994)

Understanding the sources of a firm's long-term competitive advantage has become a prominent research topic in strategic management. (Porter, 1985) Since the 1960's, a framework has been used to structure this research. This framework suggests that "firms obtain sustained competitive advantages by implementing strategies that exploit their internal strengths, through responding to environmental opportunities, while neutralizing external threats and avoiding internal weaknesses (Barney, 1991)

3.3. Competitive advantage

Competitive advantage grows from a company's ability to provide value for its customers that is greater than the expense of doing so. Superior value comes from giving cheaper pricing for equal advantages than competitors or providing unique benefits that more than offset a higher price. (Porter, 1985)

Porter Diamond

The ability of a country's industry to innovate and upgrade determines its competitiveness. Because of the pressure and challenges, businesses gain advantage over the world's greatest competitors. Strong domestic competitors, aggressive home-based suppliers, and demanding local customers help them succeed. (Porter, 1990).

Nations have become essential in a more globalized world. The nation's role has expanded as the basis of competitiveness and has turned more and more to the generation and assimilation of knowledge. A highly localized process is used to establish and maintain competitive advantage. Competitive success is influenced by differences in national values, culture, economic structures, institutions, and history. Every country's competitiveness patterns differ dramatically; no country can or will be competitive in all, or even most, industries. In the end, nations flourish in specific industries because their local environment is the most forward-thinking, dynamic, and demanding. (Porter, 1990).

According to Porter, for certain nations to be consistent on innovation, and to seek for competitive advantage, they need to focus on the industries where they have higher productivity. The Porter Diamond suggests that by analyzing four different dimensions.

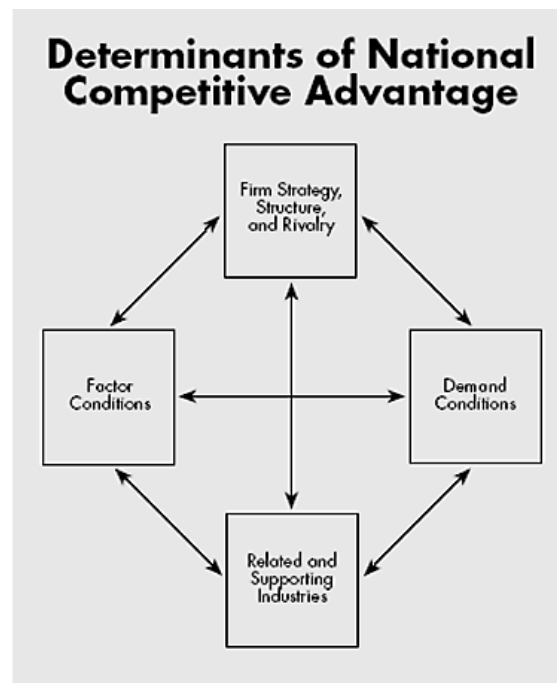
Factor conditions: The position of the country in terms of production variables, such as skilled personnel and infrastructure, that are required to compete in a certain industry.

Demand conditions: The nature of demand for the industry's product or service in the home market.

Related and supporting industries: The existence of internationally competitive supplier industries and other connected businesses in a country.

Firm strategy, structure, and rivalry: The factors in the country that influence how businesses are formed, organized, and managed, as well as the type of domestic competition.

Figure 4 - Porter Diamond (Porter, 1990)



Companies acquire a competitive advantage when a national environment allows and promotes the rapid accumulation of specialized assets and skills, by providing greater continuing information and insight into product and process needs. When the national environment forces businesses to innovate and develop, they gain a competitive advantage that they can enhance over time. (Porter, 1990)

4. Teaching notes

4.1. Introduction

This case study elaborated in 2022, has the objective of providing a strategic analysis of the primary sector industry, mainly agriculture, and the impact that the European Green Deal will have. The purpose of this paper is to be provided in class, where the students have access to the case study, literature review, and questions enumerated, while the teaching notes are only for teachers.

In addition, the answers provided are suggestive and might be subject to different interpretations, and therefore the lecturer is free to make its own interpretations and opinions, and even to approach a topic not covered in this paper.

4.2. Synopsis

The case study approaches the European Green Deal and how it will impact the agriculture industry in Europe, and more precisely in Portugal. Portugal will face an increase in costs in production, with a loss of competitiveness if the European Green Deal does not update their measures and ambitions. The question is, how can the Portuguese farmers reverse this situation and keep being competitive, and in what is the European Green Deal needing to be more precise and coherent to not lead farmers to a big loss of revenues? One of the solutions is the Common Agriculture Policy that has shown, and has the potential to show, that they can lead to a solution and help farmers to face the challenges they will have ahead in the next years.

4.3. Teaching objectives

This case study provides an opportunity to put academic concepts into practice in the view of the European Green Deal and the new rules the industry will have to comply with. It is mainly focused on what sustainable agriculture represents, how they can remain competitive, and the internationalization steps the players in the industry will have to climb to make the European Green Deal successful.

In general, the key points are:

- Identifying what solutions farmers have;
- Identify the challenges presented by the EGD;
- Understand how it impacts the imports and exports of European farmers.

4.4. Suggested questions

What solutions can be done to help farmers?

It is clear that the European Green Deal will cause farmers the loss of revenues due to the higher costs of production. This way, solutions need to arise to help farmers on this transition, so the EGD is possible to work in the near future.

- One of the ways of achieving EGD goals is to provide farmers with a transitional plan. Farmers are worried that the drastic change in the methods of production may cause a sudden loss of revenues that might become unsustainable in the long term. For example, instead of immediately outlawing a set of pesticides, there should be a gradual plan setting forth until when their usage is legal. In this vein, a desirable sustainable agriculture, should be set out to align farmers' expectations and to allow them to develop further their business. Thanks to the latter, the supply will align to the EGD's expectations and, hopefully, the output in the future will be in line with the output of today, using the non-sustainable friendly methods.
- The investments in new technologies to use in agriculture is also of extreme importance. As we have seen, the distribution of the money to be used is flexible and can be adapted to the needs of each country. In Portugal, the statistics show that the new generations are not so interested in working on this industry, and the population in the industry is getting older, needing a new renovation. This way, some examples of what the Portuguese government needs to invest are, in genetics and precision agriculture, as well as investing in 5G wi-fi to convince new generations to stay in the interior of the country.
- Another topic of extreme importance in Portugal is the water shortage that the territory has been suffering. The money allocated to CAP in Portugal should have the usage of water as a center topic since the current resources Portugal has to gather water are getting older and inefficient. Spain, which has the same issue, has already invested in new structures to fight this problem, and Portugal should take advantage of the EGD and CAP to use the resources available to address the water shortage it is currently dealing with. It also represents extreme importance to practice a sustainable agriculture.
- To protect smaller farmers who are likely to be more harmed by the changes they will be required to make due to the EGD, either because they have fewer resources or because their crops are more affected than other farmers' crops, Portugal should ensure

that the extra costs coming from the EGD impositions are shared among different agricultural sectors and promote solidarity between farmers.

- The shift in the consumers mindset has proven to be as crucial as the changes farmers will have to make in their farming practices, because customers will have to pay more for the increase in prices. Otherwise, farmers will be the ones absorbing all the extra costs which might become unsustainable in the long term even with the help of CAP funding. For those reasons, there is a need to improve communication and alert consumers of the benefits of a healthier feeding. This way consumers will care more about food and the benefits of sustainability and will be incentivized to pay more for the same kind of products.

What are the needs for complementary policies to the EGD?

To make the EGD possible to work, other policies need to be reinforced and clearly defined. Three topics are relevant to be addressed (this answer is flexible since it can have different answers, but we should focus on these ones):

Research and Innovation

The topic of research and innovation is extremely important since without it, farmers cannot transform their current businesses to sustainable ones. It is needed for them to make changes to their production while remaining competitive with other regions producing non-sustainable products. For those reasons, one viable option is to invest in nature-based solutions in conjunction with agroecology, which is a sustainable farming that works with nature, and regenerative agriculture, which refers to farming and grazing strategies that, among other benefits it has, it reduces carbon emissions and improves the water cycle by rebuilding soil organic matter and recovering degraded soil biodiversity.

The potential of Agriculture 4.0 needs to be explored since it can result in significant cost savings and in the reduction of GHG emissions. The current agricultural revolution must be environmentally friendly, with science and technology at its core. Agriculture 4.0 will need to include both the demand side and the value chain/supply side of the food-scarcity equation, using technology not only for the sake of innovation but to improve and answer the real consumer requirements and reengineer the value chain. It is based on precision farming, smart farming and digital farming that will help improving yields and the quality of the crops.

Implementing 5G in rural areas would also be relevant to help attracting new younger generations to the area which is now a challenge in Portugal.

All of this research needs to be strengthened and brought together in order to propose alternatives to today's too chemical-based agriculture on which most farmers rely. The plan to invest under Horizon Europe on food, agriculture, the environment, as well as the use of digital technologies and nature-based solutions for agri-food, is a good start, but it needs to be reinforced at the national level.

Trade pressures

Some of the extra costs that farmers will have due to changing to a sustainable business will be able to be regained from the marketplace, depending on the response that consumers will have and the variations on the supply and demand. The extent to which this will be practicable will be determined with time and the level of international trade competitiveness. In other nations, the respective producers may not be held to the same standards as the ones in Europe, and for those reasons, these farmers may be able to produce more cheaply, resulting in production relocating elsewhere.

It is not possible to tell if production outsourcing will happen or not, since it will also depend on the consumers. Consumer loyalty and willingness to pay a premium for European products may be rewarded by producing to better standards. Higher standards will encourage technological innovation, which may lead to the adoption of more efficient and profitable production methods. International agreements can urge trading partners to increase their own standards.

Finally, there may be a dispute about whether third-country access to the EU market should be conditional on exported goods meeting EU criteria, not just for product safety and quality (as it is now), but also for production processes. The proposal for the CBAM is an example of such a measure. However, for now, it is still limited to a selected number of goods at high risk of carbon leakage.

Funding the transition

Despite the fact that the polluter pays principle is written in the EU Treaties, where to draw the environmental baseline is still not defined. There is a case to be made for lowering producer costs and providing financial assistance for the green transition. The CAP is the most obvious

source of funding at EU level, but other national funding streams, such as carbon tax income, will also be important.

The funding from CAP will be substantial over the next years, but the question is how it is going to be used. It is important that the money is spent in the most efficient way and that each country, including Portugal, complements it using the best strategy, focusing on the needs of the country and allocating the funds accordingly.

What are the concerns for farmers around production under the European Green Deal?

Many farmers will support the EGD's goals but are concerned that meeting the targets will raise their output costs. Continuing with business as normal will eventually jeopardize the ecosystem health that is necessary for a productive and successful agriculture. From a farming standpoint, these are of excellent potential, but in the near-term limits on input use. The necessity to set aside land for nature, and tougher animal welfare standards will boost costs and put pressure on farmers.

We can better understand this by looking at the concept of externalities as defined by economists. Negative externalities are costs incurred in agricultural production that are not paid by farmers, but by society instead. In this situation, standard economic theory predicts that production will surpass the social optimum. In this case, either the Member State imposes a tax over the non-sustainable production which will eventually impact the final consumer that opts for these kind of products, or it creates a law that bans certain methods of production with the objective of protecting the sustainable farmers.

What are the issues between the EGD, GHG emissions and population growth?

With the increase of demand of agricultural products, mainly some products connected with a healthier eating, and also the increase of the world population (mainly in the Asian market), it will be necessary to pressure farmers to produce more food. The EGD ambitions and the Farm to Fork strategy are very positive, however it needs to be balanced. There needs to be an equilibrium between environmental sustainability and social sustainability, but never forgetting the economic sustainability because this is the one that generates jobs and richness, and which motivates companies to invest more in this sector.

Currently the EU is only the third most polluting region in the world, and with the emissions in agriculture being around 20% of the European Union emissions, it only represents 2% of global

emissions. If we start to make too many restrictions in the EU and in the production of food, Europe, being one country that already imports large quantities of food, is going to need to import even more. This will lead to more expensive products, while hardly affecting the reduction of emissions (it can even help it to get worse), since the production in other countries outside European Union that will not have strict restrictions as Europe, will need to increase their production so they can manage to supply Europeans.

The likelihood that achieving the EGD goals may result in reduced production levels in Europe in the short term, can also be one of the reasons why the EGD implementation is being delayed. One of the important goals is to ensure food security in Europe in face of pandemics and other emergencies, as well as increasing food production to feed a global population expected to be of 9.7 billion by 2050, up from 7.8 billion currently. Agriculture in Europe should help achieve these goals, but only within the boundaries of the environment and without endangering human or animal health.

How does the European Green Deal impact imports to Europe?

Imports to Europe will be affected in different manners due to the EGD. One of the changes the EGD will do to existing norms is the higher standards that production will have to meet, regarding social and environmental sustainability practices. We can see it through the new law of CBAM which shows that Europe is trying to not only change the production in Europe, but also incentivize the rest of the world to do it, although it may cause some geopolitical constraints and issues with current regulations, such as the WTO.

Anyways, even if these laws take time to be put into practice, the market nowadays is shifting into products that are proven to be made in a sustainable way. It means that buyers, especially bigger corporations, are looking into products that are produced using higher standards of sustainability. An example is the large food brands that have made commitments to buy agricultural products responsibly. The demand for sustainably produced goods is increasing, but with the EGD, the demand is probably going to be even stronger.

This means that SMEs exporting goods to European buyers will have to adjust and provide more information regarding how their goods are produced, and these will potentially be audited on this information. For SMEs, this means that they will need to put in place systems to collect information from their suppliers about production and to know where their goods are coming from.

Short term:

In the short term, there will be increased costs of transitioning to new models of sustainable production, however, there is still some debate regarding who is going to be responsible for these costs. Overall, it is too early to know how the EGD will work regarding this matter and what exactly are going to be the investments that producers exporting goods to Europe will have. What we know for now is that the EU has promised a transition, which means that it will account for the impacts on small businesses and people they employ, with needed time to adjust for these transition costs. This means that the EU will probably need to create support programs through supply chains and funding agreements, more notably in Africa.

Long term:

In the long term, the objective of the EGD is to create a sustainable global market. The European Commission recognizes that just Europe will not be enough to meet the EGD goals. Europe will still need to import but expects that the outside countries will adapt and become sustainable producers over the long term. For that to happen, some geopolitical concerns will arise and international trade laws will have to be discussed.

What will be the main obstacles and opportunities to exports to/from Europe caused by the EGD?

Regarding the main impact in terms of the exports from Europe, the major problem for farmers will be the increased costs, which subsequently will increase their selling prices. It can lead to the loss of competitiveness of European products when competing with regions not subject to the EGD and lead to a substantial reduction of exporting products, and therefore a decrease in overall sales.

In what concerns to exports to Europe, there are going to be some obstacles but also opportunities to thrive:

Obstacles:

- In the short term, some issues will arise due to the uncertainty in some regulations. The lack of consistent information about the new rules and policies probably will continue for some time. This will be a challenge not only to non-EU SMEs that want to export to Europe, but also to their EU-based buyers who will also be struggling with this.

- Buyers now have different ways of collecting sustainability information regarding their processes of production. With the current needs to answer many demand information when exporting to the European Union, all in different formats, it will probably be a problem in the short term until Europe has an harmonized system put into place.
- The costs of transitioning the current processes of production will most likely increase through the adoption of new technologies and new materials that meet the EGD standards.
- Companies outside Europe will face increased competition from EU based producers, since the last ones are going to benefit from institutional support (such as CAP or Horizon Europe) and will likely adapt faster to new regulations compared to non-European producers, since the budgets destined for programs overseas are much lower than the ones for EU based enterprises.

Opportunities:

- Big buyers in Europe will now be responsible for ensuring that products entering the European market comply with the EGD principles. Buyers in Europe are already looking into forming supply chain partnerships with the objective of improving the environmental and social practices. These buyers will be willing to help the suppliers outside Europe to transition to sustainable practices that will eventually be needed by law.
- SMEs could benefit from the European increasing efforts for international cooperation and research and innovation, as these are central elements of the EGD and the Farm to Fork.
- The EU and each country could create programs directed to the SMEs in order to help them being compliant with the EGD regulations.
- For companies to have to comply with all these different regulations, it would be an opportunity to improve the production processes by creating a digital passport that informs the different buyers whether the product in question is compliant with all the steps required by them.

5. Final Considerations

During these times of uncertainty, the EGD is one of the major topics in Europe which needs to be discussed. It surely has its own advantages, such as promoting a healthier EU whilst reducing the GHG emissions so that these are below the levels that would put mankind's future at risk. However, it can make some industries, such as agriculture, economically unsustainable while also not viable in terms of production with the current growth of population.

The increase of GHG emissions is putting in risk our planet, and for those reasons, changes had to be put into practice to avoid a worse scenario. If not, companies would keep focusing on profits and not on the environment, which could be catastrophic in the long term. Luckily, most of the population, and mainly millennials, are aware of the current situation and are worried about their future. That way, the concerns regarding sustainability practices have been increasing since the beginning of the 21st century, with companies starting to deliver sustainable products, and the consumers shifting their consuming habits to more sustainable ones.

In a way to prevent the worst, Europe decided to be the leading example by developing the EGD. It has some advantages since it will change the way farmers produce their outputs to more sustainable practices and with more advanced technologies. However, for these changes to happen, farmers will face higher costs of production, due to the prohibition of some pesticides, or through the investments in new equipment. These costs will be shown on the higher prices' consumers will have to pay for these products, since farmers will not have the capacities to absorb them, and this might lead the farmers to lose competitiveness and reduce their sales, mainly exports to other continents. For those reasons, not only the farmers practices need to change, but also the mindset of consumers that will have to accept the need to pay higher prices to help the environment being sustainable.

The increase in production costs arises then an extra concern. There is the worry that, due to the increase in production costs in Europe, the production shifts to different continents where the restrictions are lower than in Europe, which would eventually make the EGD have no impact since the GHG emissions would be the same, but just in different proportions between Europe and other continents. To avoid this situation, the European Commission implemented the CBAM which prevents goods to be imported into Europe from other continents, if these are not produced in sustainable ways.

At last, so that EGD is able to be implemented and to surpass these issues that it will face, funds need to be efficiently allocated to farmers, either through CAP, Horizon Europe, or other funds available in Europe or regionally, to help them with the increase in costs. Only this way they will be able to make the changes in the short term and keep being economically sustainable in the long term. Although all the challenges it faces, EGD represents a great opportunity of change for a better future.

5.1. Limitations

Some limitations were identified during the writing of this dissertation which are worth mentioning.

First, the available information regarding the EGD is still vague, with the European Commission being the main source of information at this time. The assumptions regarding the future consequences and lack of resources are made with no concrete explanations why some fundings are not enough. Also, only one interview was made due to the lack of information available, which does not allow for people in the industry to tell exactly what the future plans and consequences are.

Second, there is a lack of data available at a national level which restricted the dissertation to have a more open approach with most information being related to Europe, which was a barrier to characterize the issues present in Portugal.

Third, the EGD is constantly being updated with new information and changes in the regulation coming out very often, which can lead to changes in the current regulations mentioned on this dissertation. There is a need to keep updated to new EGD releases.

5.2. Future Research Recommendations

In the last couple of years, unlikely events have happened, such as Covid-19 and the war in Ukraine, which can change the EGD timelines and laws. It would be interesting to keep track of the situation and look out if the EGD is going to suffer a delay of implementation or not. Also, the laws are in constant updates which makes it important to keep track of it in future research.

It is relevant in the future, after there is concrete data regarding the rising costs of the EGD, to study if the funding programs are actually enough to keep companies competitive while being sustainable, and if they are able to export and import products with the same ease as nowadays.

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7. Appendix

Appendix 1: Interview

An interview was conducted in order to help on the development of this thesis. The interview was with the President of Portugal Fresh and vice president of CAP (Confederação dos Agricultores de Portugal). The questions and respective topics discussed were the following ones:

Question 1: What is the role of Portugal Fresh in terms of national agriculture and what are Portugal Fresh's value propositions?

- Discussed about Portugal Fresh and what it represents.

Question 2: The EGD will make the costs increase in Europe and increase the imports from other countries?

- Concern about the equilibrium between the environmental sustainability and the economic sustainability.

Question 3: Agriculture is now more concentrated?

- Companies are gaining dimension and cooperating with each other's.

Question 4: What are Portugal's competitors and what are the competitive advantages of agriculture in Portugal?

- Portugal needs to differentiate since as a small country it is hard to compete directly with others.

Question 5: How relevant is the impact of the climate change in Portugal?

- It provides the opportunity of exploring new products due to the new warmer climate; it is worrying the lack of water available for farming.

Question 6: What do you feel on the part of the technicians and the people more connected to the production?

- People are aware of the need to change but confess that nowadays it is not economically sustainable to change production with the current options.

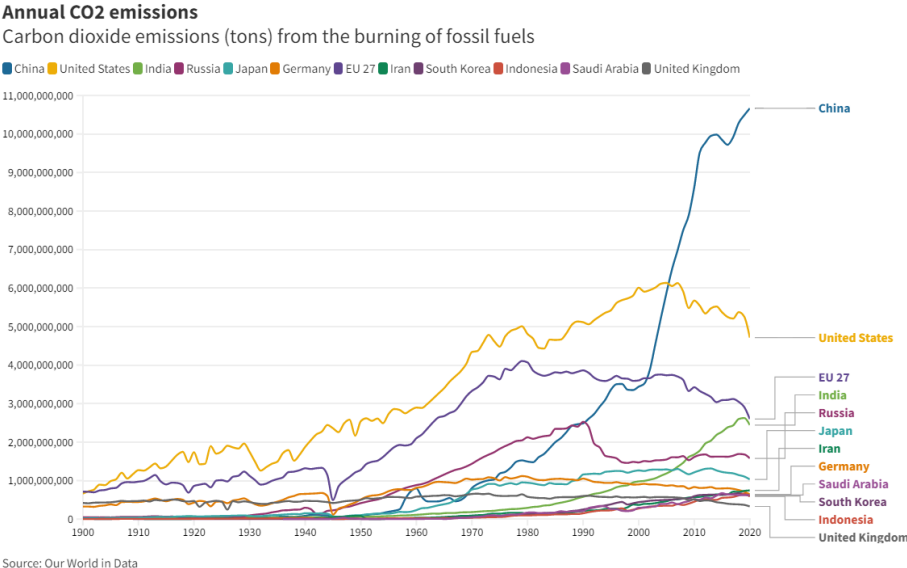
Question 7: Are agricultural companies aware of the fund programs available and who can use these programs?

- The companies are aware of the current funding programs.

Appendix 2: Farm to Fork (European Commission)



Appendix 3: Annual CO2 emissions



Appendix 4: Share of economic sectors in gross domestic product (GDP) from 2010 to 2020 in Portugal

