Environmental Taxation on the Agri-Food Sector and the Farm to Fork Strategy: The Portuguese Case

Ana Clara Borrego 1,2,* , Rute Abreu 3,4,5, Francisco Alegria Carreira 4,6 , Filipe Caetano 3 and Ana Lúcia Vasconcelos 7

1 Department of Economic and Organizational Sciences, Polytechnic Institute of Portalegre, Lugar da Abadessa, Campus Politécnico, 10, 7300-555 Portalegre, Portugal
2 VALORIZA—Research Center for the Enhancement of Endogenous Resources, Polytechnic Institute of Portalegre, 7300-555 Portalegre, Portugal
3 Escola Superior de Tecnologia e Gestão, Instituto Politécnico da Guarda, Av. Dr. Francisco Sá Carneiro 50, 6300-559 Guarda, Portugal; rat@ipg.pt (R.A.); caetano@ipg.pt (F.C.)
4 CICF—Center for Research in Accounting and Taxation, Instituto Politécnico do Cávado e Ave, 4750-810 Barcelos, Portugal; francisco.carreira@esce.ips.pt
5 CISeD Research Center in Digital Services, Instituto Politécnico de Viseu, 3504-510 Viseu, Portugal
6 Escola Superior de Ciências Empresariais, Instituto Politécnico de Setúbal, Campus do IPS—Estefanilha, 2910-761 Setúbal, Portugal
7 Department of Accounting and Actuarial Sciences, Federal University of Pernambuco, Recife 50670-901, Brazil; ana.svasconcelos@ufpe.br

* Correspondence: anaclara@ipportalegre.pt

Abstract: This research focuses on the environmental taxation applicable to the agri-food sector and aligns with the objectives of the Farm to Fork (F2F) Strategy of the European Green Deal context. Indeed, the methodology of the research develops a theoretical analysis through a literature review to assess environmental taxation and documental analysis of Portuguese tax codes. Furthermore, the Portuguese context of the empirical analysis assesses the contribution to the desired sustainability of the agri-food sector. The results show that the existing tax rules applicable to the agri-food sector are scant, with a few existing rules being misaligned with the objectives of the F2F strategy, because their potential impact on its objectives has been mostly negative or null. Most regulations predated the definition of the F2F strategy, seeking to respond to the need to minimise the price of basic food products, namely agri-food products, without considering concerns such as welfare and sustainability. It is worrisome, however, that a tax rule that does not conform to the F2F strategy has been approved after its definition, indicating that the Portuguese government does not envisage using taxation as an environmental tool in favour of the objectives outlined in the F2F strategy.

Keywords: agri-food sector; F2F strategy; environmental taxation

1. Introduction

The genesis of environmental concerns dates to the first industrial revolution, related to the intensive use of coal and its impacts on health and the environment [1]. However, the assumption of environmental issues as a global problem [2] with a prominent place on the agendas of the main political [3], economic [4], and social forums [5], only occurred at the end of the 20th century, when some international bodies [6], such as the United Nations (UN), integrated these concerns [7] and the search for their resolution on their agendas [8]. Thus, it was under the aegis of the UN that the main world forums debated environmental issues [9,10], of which the authors highlight the «Report of the United Nations Conference on the Human Environment» [11], the «United Nations Framework Convention on Climate Change» [12], including its annex B entitled the «Kyoto Protocol» [13], as well as the «2015 Paris Climate Conference» or «COP21» as the 21st objective of the annual Conference of Parties (COP) where the Paris Agreement [14] was signed, and, more recently,
invoking the relationship between environmental sustainability and the food system, the «Science and Innovations for Food Systems Transformation and Summit Actions» from the UN Food Systems Summit 2021 [15].

The European Union (EU) and the European Council (ECL) were not unaware of this issue and, in 1972, following the UN Earth Summit, during the ECL held in Paris, the EU accepted this issue within its concerns and policies, defending, for the first time, the need for a community environmental policy [16]. Since then, many legislative and other initiatives have been undertaken by the community in this scope, of which, due to their relevance and relationship with the goals of the «Paris Agreement» [17], as well as the achievement of the Sustainable Development Goals (SDGs) for the UN Horizon 2030 [18], the authors highlight the «European Green Deal» [18]. Indeed, the European Green Deal is an initiative of the European Commission (EC), created in 2019, which aims to be a roadmap to guide the EU towards becoming the first climate-neutral region by 2050, with an interim target of reducing greenhouse gases (GHG) in Member States (MSs) by between 50% and 55% by 2030. The measures foreseen in the European Green Deal focus on several sectors of activity; however, the agri-food sector, especially agricultural production, is one of its key factors, the strategy of which is laid out in the «Farm to Fork Strategy» (F2F strategy), created in May 2020, which “is at the heart of the European Green Deal” [19] and aims to build a more sustainable and healthier food system [20].

This focus on the food system and on the environmental footprint of agriculture [21] is due to the realisation of the negative environmental impact of that sector of activity [22], mainly due to the excessive use of fertilisers and pesticides [23], and its high direct and indirect contributions to GHG emissions [24]. According to the EC [19] and the UN [25], the food sector, of which agriculture is the focal point [26], was responsible for approximately one third of GHG emissions in the EU by 2020. Moreover, other climate change issues include soil transformation [27], biodiversity loss [28], pollution due to exhaust emissions [29], and agrochemical liquid waste [30], which extends the problem of pollution from the agri-food sector to water reserves [31], including groundwater [32–37].

One of the tools provided in the F2F strategy for the agri-food sector, particularly for agriculture, is technological innovation [38], namely Precision Agriculture Technologies (PAT), whose application, “in agricultural field operations could positively contribute to GHG emission reduction” [39] (p. 1339). However, it also advocates for the use of taxation to achieve the outlined goals, among other tools [40,41]. Portugal shares the EU’s problems and concerns regarding the sustainability of the food system [42] and, in particular, the level of pollution associated with the agri-food sector [33–35,37].

As an MS, Portuguese environmental policy merges with Community policy, as it largely results from the transposition of its legislation [43]. In the case of the use of taxation as an environmental tool [44], the EU’s action in relation to MSs [45], due to the unanimity rule, has occurred at the level of recommendations, giving freedom to MSs to adopt this type of tool and adapt it to domestic needs [40]. In the past, Portugal was one of the countries that complied with the EU’s recommendations in this area from the outset.

In the context of environmental taxation, it should be noted that, in 1993, the EU, at the time of the publication of the White Paper on Growth, Competitiveness and Employment [46], recommended that its MSs implement Green Tax Reforms in their domestic legislation, a recommendation that Portugal, like other MSs [47], welcomed. Portugal currently has a diverse set of tax rules impacting the environment, spread across its tax codes, and applicable to a wide range of situations and sectors of activity [48].

As previously mentioned, the F2F strategy provides, among other types of measures, the use of taxation to achieve the objectives set out therein, so it would be expected that Portugal would comply with that recommendation, as it had previously. However, in 2020 Portugal approved the Agenda for Innovation in Agriculture 20–30 [49], hereinafter called the Agenda [50], which provides for the creation of a set of initiatives for the agricultural context that permit the achievement of the European Green Deal and, more specifically,
the F2F strategy for the agricultural context, in which taxation, as an environmental tool, is omitted.

In this context, the following research questions then arise:

**Q1**: To what extent are tax rules in Portugal applicable to the country’s agricultural sector?

**Q2**: To what extent are the existing Portuguese tax rules used in the agri-food sector aligned with the objectives of the F2F strategy?

This paper is structured into five sections. In addition to the introduction presented in Section 1, Section 2 explores the theoretical analysis based on the F2F strategy and the Innovation Agenda for Agriculture 20–30. Section 3 establishes the relationship between taxation and the environment, in general, as well as the agri-food sector in particular; this approach to the literature review aims to answer the research questions. Section 4 presents the materials and methods, while Section 5 presents the results of the documentary analysis of Portuguese tax rules, specifically related to the agri-food sector. Finally, Section 6 presents the conclusions of the study and explores the limitations and suggestions for future work.

### 2. The F2F Strategy and the Innovation Agenda for Agriculture 20–30

Before developing the F2F strategy, it is important to define the agri-food sector and, as Karwacka et al. [51] (p. 6463) argue, “the agri-food sector includes two inseparable sectors of the economy: agriculture, which is a source of plant and animal raw materials, and food processing, which is the main recipient of agricultural crops, also responsible for stimulating and directing the production of agricultural raw materials”.

Indeed, the F2F strategy is a comprehensive 10-year strategy [19,52], directed at the agri-food sector, which improves the European food system so that it becomes fair, healthy, and environmentally friendly; reconciling what we eat within the capacity of our planet [53–55] also demonstrates strong concerns with food security [56]. Furthermore, the F2F strategy aims to achieve the following specific objectives in the context of the agri-food sector:

- Encouraging the sustainable consumption of healthy food at affordable prices for all;
- Reducing environmental impact throughout the food chain;
- Expanding organic farming;
- Reducing the dependency, risk, and use of chemical pesticides and antibiotics;
- Developing innovative agriculture that protects animal health;
- Combating food fraud and reducing food waste;
- Ensuring an equitable and inclusive transition for farmers that allows them to be valued within the value chain.

To achieve those objectives, the F2F strategy sets specific and ambitious concrete targets:

- Reducing the use of chemical pesticides and the risk posed by 50% and the use of the most hazardous pesticides by 50% by 2030;
- Reducing nutrient losses by at least 50% while ensuring no deterioration of soil fertility, which will reduce fertiliser use by at least 20% by 2030;
- Reducing sales of antimicrobials for farm and aquaculture animals by 50% by 2030;
- Extending organic farming to 25% of agricultural land by 2030.

According to the Information Bulletin of the EC [57], to achieve these objectives for the agri-food sector, the strategy provided for in the F2F is integrated, seeking to work on several fronts, including the revision of the Directive on the sustainable use of pesticides by the European Parliament and European Council (EP&ECL) [58], as well as new rules on veterinary medicines [59], and plans for nitrate and phosphorus management and for organic farming and controlling food supply [60].

The F2F strategy also foresees the need to create conditions to put new feed additives on the market, which will contribute to the reduction of GHG production in livestock. It will also establish and finance the greening schemes, which will foster sustainable practices.
such as precision farming, agro-ecology (including organic farming), creation of landscape elements, carbon storage in agricultural soils, and agroforestry.

As discussed, the F2F strategy focuses on PAT in particular but also provides tax action, advocating that “Tax incentives should also drive the transition to a sustainable food system and encourage consumers to choose sustainable and healthy diets. The Commission’s proposal on VAT [Value Added Tax] rates (currently being discussed in the Council) could allow Member States to make more targeted use of rates, for instance to support organic fruit and vegetables. EU tax systems should also aim to ensure that the price of different foods reflects their real costs in terms of use of finite natural resources, pollution, GHG emissions and other environmental externalities” [52] (p. 15).

Among the authors who analysed the F2F strategy, some referred to taxation as one of the relevant tools it provides [22,40,41,61]. There are, however, some authors who make a more critical analysis of the strategy [40,61,62]—For example, Schebesta and Candel [61] detected the existence of some essential problems to overcome to facilitate the success of the F2F strategy, which, in part, impact on taxation: (i) reconciling opposing interests between MSs, political groups, and interest groups; and (ii) the fact that not all MS are willing to make major changes (in the taxation field and others), which impacts a sector as strategic as agri-food.

In this context, some MSs, such as the Netherlands, have already shown considerable reticence in implementing some measures, namely tax measures, and have argued for issues of subsidiarity of EU action in relation to MSs [61].

Portugal, in turn, has already taken the first steps towards the implementation of the F2F strategy, having approved, through the Resolution of the Council of Ministers No. 86/2020, on 13 October [49], the Agenda, under the motto: “Future Earth|Growing Agriculture, innovating it and delivering it to the next generation”, which is aligned with the domestic agricultural policy with the UN’s SDGs [62], the European Green Deal, and, more specifically, the F2F strategy (Figure 1).

![Figure 1. Aligning the Agenda. Source: PCM [49].](image-url)

Accordingly, the Agenda “aims to make its contribution to modern and innovative agriculture, which is efficient and concerned with the health and welfare of society, values its endogenous resources and takes into account the specificities of the entire national territory and the different typologies of farmers, from small family farming to corporate agriculture, as well as the major challenges that Portugal will face in the next 10 years, regarding agriculture and food” [49] (p. 45).

The Agenda is divided into four pillars, which represent each of the recipients of the actions to be developed: citizens, territorial agents who protect the planet and value natural resources, innovative and competitive producers (farmers, landowners, and industry), and public policy agents who support agriculture and promote its development [49]. The pillars are divided into ten strategic axes, which in turn give rise to fifteen flagship initiatives (Table 1).

The analysis of the content of the Agenda, namely its strategic axes and flagship initiatives detailed in the original document, allows us to observe that, although taxation is foreseen as a tool in the F2F strategy, it does not make any reference to it, nor is taxation explicitly associated with any planned flagship initiative. This reinforces the importance of analysing the environmental taxation rules already existing in the Portuguese tax system.
Table 1. Strategic axes and initiatives of the Agenda.

<table>
<thead>
<tr>
<th>Agenda’s Strategic Axes</th>
<th>Agenda’s Flagship Initiatives to Achieve the Strategic Axes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axis I.I Promotion of the Mediterranean Diet and a balanced, diversified, and sustainable diet</td>
<td>Sustainable food</td>
</tr>
<tr>
<td>Axis I.II Promoting animal and plant health</td>
<td>One Health</td>
</tr>
<tr>
<td>Axis II.I Combating climate change</td>
<td>Mitigation of climate change</td>
</tr>
<tr>
<td></td>
<td>Adaptation to climate change</td>
</tr>
<tr>
<td>Axis II.II Valorisation and sustainable management of natural and genetic resources</td>
<td>Circular agriculture</td>
</tr>
<tr>
<td></td>
<td>Sustainable territories</td>
</tr>
<tr>
<td>Axis II.III Strengthening the socio-economic fabric of rural territories</td>
<td>Revitalisation of rural areas</td>
</tr>
<tr>
<td>Axis III.I Innovation and digitisation in agriculture</td>
<td>Agriculture 4.0</td>
</tr>
<tr>
<td>Axis III.II Internationalisation of value chains</td>
<td>Promotion of Portuguese agri-food products</td>
</tr>
<tr>
<td></td>
<td>Excellence in production organisation</td>
</tr>
<tr>
<td>Axis III.II Sustainable energy management</td>
<td>Agro-energy transition</td>
</tr>
<tr>
<td>Axis IV.I Stimulating the national agricultural research network</td>
<td>Promoting research, innovation, and capacity building</td>
</tr>
<tr>
<td></td>
<td>Innovation Network</td>
</tr>
<tr>
<td>Axis IV.I Modernisation and simplification</td>
<td>Single Agriculture Portal</td>
</tr>
<tr>
<td></td>
<td>Reorganisation</td>
</tr>
</tbody>
</table>

Source: PCM [49].

3. Taxation as an Environmental Tool

The perception that taxation could be a solution that has great potential at the environmental level to apply the “Polluter Pays Principle”, making the polluter responsible for the consequences of their actions affecting public natural resources or encouraging more sustainable behaviours, only began to gain weight in the 1980s/1990s. Indeed, some Nordic countries created the first environmental taxes, and the EU launched the White paper on growth, competitiveness, and employment, with recommendations on environmental tax policy for its MSs, which became known internationally as the Green Tax Reform or Environmental Tax Reform (ETR) [63]. The recommendations were also adopted by other countries outside the EU, mainly based on the recommendation of the UN and the Organisation for Economic Cooperation and Development (OECD).

The Green Tax Reform advocates the introduction of environmental taxes to replace (a large) part of the traditional taxation on companies (income and capital) and on labour income and contributions to social security systems, thus also aiming to reduce unemployment levels, in a double-gain mechanism known as the “double dividend” [64–67].

Since taxation began to be considered a tool for environmental intervention [68], this topic has given rise to many political and academic debates, mainly on the (dis)advantages of its use to achieve environmental goals, compared with direct environmental action mechanisms [69]. This gave rise to a set of studies that concluded that the application of environmental taxation was positive for the environment and economy, and that it proved to be a more advantageous means of achieving environmental results with lower implementation costs [70–77].

It has also given rise to another line of studies arguing that the effect of Green Tax Reforms on the economy is negative, due to the increase in negative distortions, namely on
the purchasing power of households when the environmental taxes introduced took the form of consumption taxes [65,78].

In recent years, studies linking environmental taxation to the circular economy have also started to emerge, advocating that taxation can be the driver of the paradigm shift from traditional (linear) production systems to new circular production systems [79–84]. Indeed, Andersen [79] and Leitão [85] argued that environmental taxation, provided it is properly “designed”, has the capabilities to act on most of the circular economy strands enunciated in the literature: (i) preventing/minimising waste and waste production; (ii) waste management and the use of waste (as well as recycled waste) as raw materials in other industries; (iii) use of less polluting production and extraction methods; (iv) use of clean or less polluting energy; (v) use of eco-design to increase products’ lifecycle and the possibilities of repairing goods as a substitute for disposal in minor breakdowns; (vi) sharing of common goods and services; and (vii) leasing of some goods/equipment as a substitute for their purchase. It should be noted that many of these circular economy paradigms, which can be encouraged through taxation, can be adapted to the agri-food sector.

Considering that the agri-food sector, with a particular emphasis on agriculture, has long been considered a major contributor of GHG emissions to the atmosphere [39,51,86–88], it is understandable that it has been one of the sectors in which there have also been studies on the use of environmental taxation to decrease its negative impacts.

Thus, in an application to the agri-food sector, Goodland [89] defended the need to change the human diet to decrease the environmental footprint, particularly regarding livestock and advocated the use of environmental taxation to achieve that goal, defending the taxation of agri-food products according to their environmental footprint. Miceikiene et al. [90] proposed the use of taxation to achieve environmental goals in the agricultural sector, identifying three advantages of using taxation in this context: (1) permanent incentive to reduce pollution; (2) increased competitiveness of less polluting products; and (3) incentive for innovation by improving manufacturing processes to reduce pollution. In an application to the agri-food sector, Kasterine and Vanzetti [91] and Karwacka et al. [51] supported the use of carbon taxes as an effective measure for controlling its carbon footprint. Miceikiene et al. [90] (p. 267) also proposed environmental taxation in the agri-food sector, noting that “These taxes urge the taxpayers to conserve water resources, soil, air and nature by making efforts to limit waste, and reduce energy consumption and emission of pollution”.

Not all studies advocate the success of environmental taxation in this area. In this context, Miller [92] argued that direct interventions, namely support for farmers, have better results in the context of sustainability than the creation of environmental taxes. Forero-Cantor et al. [93] also raised doubts about the success of environmental taxation in reducing the environmental footprint when applied to agri-food products to reduce their consumption, because its success is highly dependent on consumer preferences.

Moreover, Bosquet [94] and Falconer and Hodge [95] focused on the use of environmental taxation to reduce GHG emissions without a negative impact on economic growth (with the former being more generic and the second focused on the agricultural sector), and, according to the authors, the application of environmental taxation, namely to reduce GHG, must be carefully executed and well planned, since taxes on carbon emissions increase the cost of activities that give rise to GHG emissions. Similarly, Buchholz and Musshoff [96] found that taxation on pesticides can be problematic because it can significantly decrease farmers’ profits.

In this context, Balafoutis et al. [39] and Karwacka et al. [51] highlighted that, although the agricultural sector is one of the economic activities that contribute most directly and indirectly to the emission of GHG, thus contributing negatively to climate change, it is a fundamental sector and any changes that may be made cannot harm productivity; otherwise, it will not be possible to meet world food needs. In this regard, and in the context of the impact of the implementation of the F2F strategy, Beckman et al. [22] estimated that, because of its implementation, agricultural production in Europe may decrease by 7%
to 12% and that the prices of agricultural production may increase by 9%, which would contradict the basic objective of sustainable food that is accessible to all. Although there are some in favour of and others against the use of environmental taxation in the agri-food sector, in the Portuguese case this tool has already proven successful, either by using tax benefits as an incentive to environmentally friendly behaviours, or by penalising the polluting behaviours through taxes and fees [48].

Moreover, as already mentioned, the F2F strategy relies on the use of PAT in agriculture; however, as Daberkow and McBride [97] and Fountas et al. [98] warned, one of the requirements for its economically sustainable application is the size of the farms, a characteristic that most Portuguese farms do not have. Consequently, the authors return to the importance that taxation can have as an environmental tool in the context of the F2F strategy, specifically in what concerns the «re-education» of consumers’ food choices.

4. Materials and Methods

The research methodology develops a theoretical analysis through a literature review and document analysis [99–102] of Portuguese tax codes and other tax legislation. In the context of Portuguese environmental taxation, qualitative studies that analyse legislation, and classify environmental taxation and/or its impacts on the economy are the most common [43,48,66], because there is a shortage of official statistical data available.

The qualitative approach method was chosen because our analysis was based on legislative texts, and their analysis and classification [102]. Bardin [103] argued that the document analysis technique is used for classification and indexing.

In the scope of document analysis, the authors used the applied thematic analysis (ATA) approach [100,101,104], with a pre-existing data source [102], which is an approach supported by the scientific literature.

The authors also adapted the method proposed by Bergek et al. [105] to understand the ability of taxation to influence stakeholders that defend the system (e.g., environmental tax) and then determine its direction (for example perceived the desired clarity of this controversial discussion).

The study database consisted of the following tax codes and other tax legislation: Assembleia da República (AR) [106–110], (EC) [111], EP&ECL [58,112], Ministério das Finanças e do Plano (MFP) [113], and Ministério das Finanças e da Administração Pública (MFAP) [114,115]. The definition of the research sample of legislation aimed to encompass the set of tax legislation where could be found tax rules with a potential impact on agricultural production, agri-food industries, and the final prices of these types of products. Thus, we used secondary data (tax legislation) and analysed it under a qualitative paradigm [100–102,104].

The sample, as well as the fact that authors are analysing legislative texts published by the government and by the Assembly of the Republic, allows them to confirm that the data fulfilled all the requirements pointed out by Kridel [116] and Flick [117]: (i) authenticity; (ii) credibility; (iii) representativeness; and (iv) meaning (significance of the content of the documents for the study).

Regarding the research process, as mentioned by Mackieson et al. [101] (p. 965) “Document analysis involves an iterative process of superficial examination (skimming), thorough examination (reading), and interpretation”.

In the skimming phase, the authors identified the tax rules on the research topic in the selected legislation. In the reading phase, they grouped the data collected into established units of the F2F strategic objectives [19,52], forming the corpus of the research, and proceeded with the first codifications. The analysis was conducted using key vectors, whose strategy is contained in the F2F strategy created in May 2020. In the interpretation phase, the authors adjusted coding and attempted to obtain a holistic view of all the collected data.
Regarding classification, two different codifications were defined: one in relation to the moment when the tax rules were approved and the other in relation to their potential impact on the F2F strategy.

In the Portuguese context, the empirical analysis evaluated the contribution to the desired sustainability of the agri-food sector, signalling two positions: 0 (before) and 1 (after) the F2F strategy.

The tax rules applied to the agri-food sector’s impact on F2F objectives were codified as follows:

- **Positive**: When a tax rule is aligned with the achievement of at least one of the objectives of the F2F strategy presented in Part 2 and Table 2;
- **Negative**: When a tax rule is misaligned with the achievement of at least one of the objectives of the F2F strategy presented in Part 2 and Table 2;
- **Null**: When a tax rule impacts, simultaneously, as positive and negative, that is, is aligned with at least one of the objectives of the F2F strategy presented in Part 2 and Table 2, and simultaneously misaligned with at least one of those objectives.

<table>
<thead>
<tr>
<th>Codification</th>
<th>Tax Rule Impact</th>
<th>F2F Strategy Objectives</th>
</tr>
</thead>
</table>
| Positive     | Tax rule as incentive | Sustainable consumption of healthy food   
Food at affordable prices for all   
Low environmental footprint of the food supply chain   
Food organic production   
Use of PAT   
Animal health protection   
Valuing farmers in the value chain |
|              | Tax rule as disincentive | Use of chemical pesticides and antibiotics   
Food waste |
| Negative     | Tax rule as disincentive | Sustainable consumption of healthy food   
Food at affordable prices for all   
Low environmental footprint of the food supply chain   
Food organic production   
Use of PAT   
Animal health protection   
Valuing farmers in the value chain |
|              | Tax rule as incentive | Use of chemical pesticides and antibiotics   
Food waste |

Previous codification is supported by the following: (i) there are studies that identify tax rules, mainly on consumption taxation, as potentiators of changes in the behaviour of consumers/users, with an inverse relationship between changes in taxes and the propensity to purchase certain products [118–124]; and (ii) the main objectives of the F2F strategy are to increase healthy food consumption at affordable prices for all and to increase the consumption or use of less polluting products.

Figure 2 presents the study design.
5. Qualitative Analysis Results and Discussion

The authors analysed the selected secondary data, using the ATA approach, and extracted the results presented in this section.

Before explaining the results of the empirical research, the authors aim to highlight that this research presents longstanding efforts of researchers and agricultural organisations to measure and assess the impact of tax rules on agri-food sector sustainability, currently focusing on the F2F strategy. However, it is important to note that the key factors in the success of the F2F strategy are public opinion and citizen action [125].

Indeed, this research focuses on Portuguese environmental taxation (currently in force), specifically directed towards the agri-food sector, to understand whether the tax rules are aligned with the objectives of the F2F strategy, as well as which type of impact they potentially have on its compliance and in accordance with the objectives defined in this research.

The results of this empirical analysis are presented in Tables 3–5.

Table 3 presents the agri-food sector specific tax rules with a potential positive impact on the F2F strategy (currently in force).

From the codification, the positive impact was attributed, for example, to the creation of the Temporary Solidarity Contribution for the Food Distribution Sector, despite being surrounded by some controversy, namely its scope and calculation format, its creation, or another norm with the same impact, which may prove to be extremely useful in seeking to guarantee affordable consumer prices for all, as well as to ensure decent incomes for farmers.

Table 4 presents the agri-food sector specific tax rules with a potential negative impact on the F2F strategy (currently in force).

Based on the codification, the negative impact was attributed, for instance, to the salt case, because it is the case of a tax benefit applied to the sale of a product whose excessive use is associated with a public health problem, due to its association with cardio-vascular diseases [126]. Portugal needs to mitigate its consumption [126]; increasing its price through taxes can be a solution; however, Portugal is doing the opposite.

Table 5 presents the agri-food sector specific tax rules with a potential null impact on the F2F strategy (currently in force).

The null impact was attributed, for example, to the meat case, because the tax benefit is equally attributed to all types of meat, as well as to their substitutes; thus, the tax benefit effect on consumer behaviour is lost.
It is important to note that the maintenance, in Portugal, of the lowest VAT rate on meat, regardless of the environmental footprint, as well as on dairy products, contradicts the trend that emerged in the EU MSs (for example, in Germany, France, and Spain), after the COP26 (Conference of the Parties) Climate Conference, in Glasgow, of adopting a meat tax [127,128].

Table 3. The agri-food sector specific tax rules with potential positive impact on the F2F strategy (currently in force).

<table>
<thead>
<tr>
<th>Objectives (F2F Strategy)</th>
<th>Specific Tax Rule(s) Applicable to the Existing Agri-Food Sector</th>
<th>0 (Before) and 1 (After) F2F</th>
<th>Impact on F2F Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stimulating the sustainable consumption of healthy food at affordable prices for all</td>
<td>Application of the lower VAT rate to all unprocessed agricultural products for human consumption (e.g., fruit and vegetables), as well as to some agro-industry products, that are considered to form the basis of food (e.g., bread and olive oil).</td>
<td>0</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td>Application of the intermediate VAT rate to plain pressed flakes of cereals and legumes with no added sugar.</td>
<td>0</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td>Temporary Solidarity Contribution for the Food Distribution Sector in 2023.</td>
<td>1</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td>Application of lower rates of tax on petroleum products (Special Consumption Taxation) to diesel and petroleum for agricultural use in stationary motors used in irrigation and equipment used in agricultural and forestry activities.</td>
<td>0</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td>Application of lower rates of tax on petroleum products (Special Consumption Taxation) to diesel and petroleum used in autonomous refrigerated engines installed in heavy vehicles for the transportation of perishable goods.</td>
<td>0</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td>Application of the intermediate VAT rate to agricultural diesel and petroleum.</td>
<td>0</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td>100% deduction of the VAT borne on the purchase of all types of fuel (irrespective of their level of pollution) used in agricultural production.</td>
<td>0</td>
<td>Positive</td>
</tr>
<tr>
<td>Reducing environmental impact throughout the food chain</td>
<td>Contribution of 30 cents to be applied on single-use plastic or aluminium packaging in ready meals.</td>
<td>1</td>
<td>Positive</td>
</tr>
<tr>
<td>Expanding organic farming</td>
<td>For the purposes of corporate taxation, the Statute of Tax Benefits provides a tax benefit of 40% of the costs of organic certification for organic farms.</td>
<td>0</td>
<td>Positive</td>
</tr>
<tr>
<td>Reduce the dependence, risk, and use of chemical pesticides and antibiotics</td>
<td>Fee for exceeding Maximum Residue Levels (MRL) in the application of plant protection products.</td>
<td>0</td>
<td>Positive</td>
</tr>
<tr>
<td>Ensure an equitable and inclusive transition for farmers that allows them to be valued in the value chain</td>
<td>For the purposes of corporate taxation, the Statute of Tax Benefits provides an exemption for Agricultural Cooperatives, subject to the requirements defined.</td>
<td>0</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td>The most reduced VAT rate applies to most goods and services used in agriculture, except for agricultural implements, to which the intermediate rate applies.</td>
<td>0</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td>Temporary Solidarity Contribution for the Food Distribution Sector.</td>
<td>1</td>
<td>Positive</td>
</tr>
</tbody>
</table>

Source: AR [106–110], EC [111], EP&ECL [58,112], MFP [113], MFAP [114,115].
Table 4. The agri-food sector specific tax rules with potential negative impact on the F2F strategy (currently in force).

<table>
<thead>
<tr>
<th>Objectives (F2F Strategy)</th>
<th>Specific Tax Rule(s) Applicable to the Existing Agri-Food Sector</th>
<th>0 (Before) and 1 (After) F2F</th>
<th>Impact on F2F Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stimulating the sustainable consumption of healthy food at affordable prices for all</td>
<td>Application of the lower VAT rate to salt.</td>
<td>0</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>Application of the lower VAT rate to chocolate and flavoured milks.</td>
<td>0</td>
<td>Negative</td>
</tr>
<tr>
<td>Reducing environmental impact throughout the food chain</td>
<td>Application of lower rates of tax on petroleum products (Special Consumption Taxation) to diesel and petroleum for agricultural use in stationary motors used in irrigation and equipment used in agricultural and forestry activities.</td>
<td>0</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>Application of lower rates of tax on petroleum products (Special Consumption Taxation) to diesel and petroleum used in autonomous refrigerated engines installed in heavy vehicles for the transportation of perishable goods.</td>
<td>0</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>Application of the intermediate VAT rate to agricultural diesel and petroleum.</td>
<td>0</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>100% deduction of the VAT borne on the purchase of all types of fuel (irrespective of their level of pollution) used in agricultural production.</td>
<td>0</td>
<td>Negative</td>
</tr>
<tr>
<td>Reduce the dependence, risk, and use of chemical pesticides and antibiotics</td>
<td>Application of the lower VAT rate to fertilisers, soil improvers, copper and iron sulphates, and plant protection products.</td>
<td>0</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>Extraordinary support regime for expenses incurred in agricultural production, which allows the recognition, for the purpose of corporate taxation, of a 40% tax benefit of the expenses with the acquisition of fertilisers and soil corrective minerals (applicable for the years 2022 and 2023).</td>
<td>1</td>
<td>Negative</td>
</tr>
</tbody>
</table>

Source: AR [106–110], EC [111], EP&ECL [58,112], MFP [113], MFAP [114,115].

Table 5. The agri-food sector specific tax rules with potential null impact on the F2F strategy (currently in force).

<table>
<thead>
<tr>
<th>Objectives (F2F Strategy)</th>
<th>Specific Tax Rule(s) Applicable to the Existing Agri-Food Sector</th>
<th>0 (Before) and 1 (After) F2F</th>
<th>Impact on F2F Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stimulating the sustainable consumption of healthy food at affordable prices for all</td>
<td>Application of the lower VAT rate to all meat, regardless of its environmental impact, namely GHG emissions.</td>
<td>0</td>
<td>Null</td>
</tr>
<tr>
<td></td>
<td>Application of the lower VAT rate to food products that are meat substitutes (e.g., tofu and seitan).</td>
<td>0</td>
<td>Null</td>
</tr>
<tr>
<td></td>
<td>Application of the lower VAT rate to dairy (e.g., milk) and, also, to dairy substitutes (e.g., soya and nut drinks).</td>
<td>0</td>
<td>Null</td>
</tr>
<tr>
<td></td>
<td>Application of the lower VAT rate to margarine and vegetable spreads obtained from fats of vegetable origin, and, also, to their substitutes (e.g., butter).</td>
<td>0</td>
<td>Null</td>
</tr>
</tbody>
</table>

Source: AR [106–110], EC [111], EP&ECL [58,112], MFP [113], MFAP [114,115].

It is also important to point out that the tax benefits associated with diesel and petroleum are identified, simultaneously, as shown in Tables 3 and 4, because they have a potential positive effect on the affordable prices of agri-food products; however, they, also, have a negative effect on the environmental footprint of the agricultural sector, due to their levels of pollution. In the context of the F2F strategy, the impact of taxation on these products is null.

Finally, the joint analysis of the data in Tables 3–5 verifies that, in the Portuguese context, there are a small number of tax rules for specific application to the agri-food sector; therefore, there are some objectives of the F2F strategy with which it was not possible to associate any tax rules. More worrying than the reduced number of regulations is that many
(more than half) of the existing tax rules have a negative or null impact on the objectives of the F2F strategy, thus not being in accordance with it.

It is worrying that, after the approval of the F2F strategy, a tax rule was created in the Portuguese State Budget for 2023 [110], which had a negative impact on F2F, since a 40% tax benefit was created, for corporate tax purposes, and for expenditure on the acquisition of fertilisers and soil correctives, that is, a recent and counterproductive measure in relation to the F2F objectives.

Most of the analysed rules are based on tax benefits; only three tax penalty situations were detected, which corroborates the conclusions of previous studies regarding the type of environmental tax rules in Portugal [48].

Most existing rules are associated with indirect taxation, that is, value-added taxes and petroleum products [129] or electricity [130]. Therefore, a possible revision of these rules, particularly those that currently have a negative impact, requires an adequate strategy and planning, because it can jeopardise farmers’ profit [94–96], affect productivity, jeopardise the availability of food products to the population [39,51], and dramatically increase the price of consumer goods [22]. Furthermore, as value-added tax rules are at stake, their amendments will have to comply with the limitations imposed by the EU regarding changes to this tax.

It should be noted that, in the Portuguese case, the specific tax rules applicable to the agri-food sector, mainly concerning agricultural production (either by taxing agricultural products or by taxing the goods and services needed for their production), have sought to create positive discrimination for that sector, mainly in the VAT context [131].

It is, also, important to note that many of the situations detected, such as the taxation of all types of meat at the lowest VAT rate, are justified by political decisions and the rules of operation of VAT in the European Union (EU). The EU is aware of the need to align VAT with sustainability policies and with the European Green Deal, which is why the EU prepared a VAT reform package in 2022 that provides, for example, the abolition of VAT tax benefits contrary to European Green Deal principles by 2032 [132].

Indeed, the overall tendency of green tax rules is to aim to re-educate citizens’ behaviours, in this case, aiming to impact food system sustainability, by the reduction of products rich in saturated fat (animal-based food), sugar (ice creams, chocolates, sweets, soft drinks, and fruit jam), and salt levels (condiments and salty snacks), as has occurred, for example, in Denmark, Finland, France, and Hungary [133]. In the authors’ opinion, it should be the line to be followed, also, by Portugal, in order to achieve the objectives of the F2F strategy, because, currently, Portuguese environmental taxation is not aligned with it.

6. Conclusions

This study analysed environmental taxation on the agri-food sector resulting from the Portuguese tax policy of the last two decades to verify their alignment with the objectives outlined in the F2F strategy. From the documentary analysis carried out in this study, we verified that, in the Portuguese case, there are tax rules related to the agri-food sector, but these generally predate the F2F strategy and do not arise in its wake.

Thus, most of the rules identified are related to tax rates of value-added and petroleum products, and were created with the aim of minimising the sale price of consumption, particularly agricultural production, in two ways: lower production costs and lower taxation on the sale of products, that is, positive discrimination of agri-food, particularly agricultural production. It should be noted, however, that such positive discrimination, implies, in most cases, a negative impact on the F2F strategy and an increase in the sector’s environmental footprint.

Thus, the authors conclude that, in the Portuguese case, most of the existing taxation rules applicable to agri-food are not aligned with the F2F strategy and therefore do not contribute to the sustainability of the food system, with the need to readjust them to the sustainable paradigm.
Furthermore, as some authors have mentioned, the readjustment of these rules, mainly because they are essentially concerned with consumption tax rules, will have to be carried out very carefully, so as not to jeopardise productivity or the economic sustainability of the activity or production prices. In other words, it is necessary to find a balance between the positive contributions of the F2F strategy and the possible negative impacts highlighted by some authors.

It is also important to mention the approval of a tax rule with a negative impact on the F2F strategy after the creation of the strategy, which, together with the fact that the Agenda is omissive in relation to the use of environmental taxation, means that the Portuguese government may not consider environmental taxation as a tool to achieve the goals outlined in the F2F strategy.

Although Portugal has already completed some work since the creation of the Agenda, it is expected that the EC will define a legislative framework for sustainable food systems before the end of 2023. Accordingly, it will be important to understand the role that this framework will allocate to taxation [61]. Considering the potential importance of this tool for sustainability, it is expected to play an important role. From this perspective, this paper is highly useful for Portuguese policy-makers, mainly in its identification of areas with gaps, as well as areas where intervention is urgent, as they have a negative impact on the objectives of the F2F strategy. It should be noted that the EU understood the need for tax readjustment, namely in the VAT context, having already foreseen the abolition of tax benefits contrary to European Green Deal principles, by 2032 [132].

However, it is important to note this limitation because environmental tax rules in Portugal are scattered across several tax codes as well as in separate laws. This dispersion does not allow the authors to ensure that all legislation applicable to the context under research has been collected, but the paper provides valuable insights into the development of policies and regulations in this area, in which the current literature is scarce. With regard to the consumer price of agri-food products, our study only considers the potential tax contribution to the formation of these prices; however, it is necessary to understand whether the final price of healthy products with lighter taxation remains higher than the less healthy with heavier taxation, which is why further research is needed in addition to this study. The loyalty of consumers to less healthy products, regardless of price, is also an aspect that needs to be studied.

For future research, the authors consider it pertinent to extend this study to other MSs. However, as it is a culturally sensitive topic, it is necessary to collaborate with other MSs’ stakeholders and researchers, which will help to guarantee that the research will be conducted using a suitable scientific method.

**Author Contributions:** Conceptualisation, A.C.B., R.A., F.A.C. and A.L.V.; Data curation, F.C.; Formal analysis, A.C.B.; Funding acquisition, A.C.B.; Investigation, A.C.B., F.A.C. and F.C.; Methodology, R.A. and A.L.V.; Project administration, A.C.B., R.A. and F.A.C.; Supervision, A.C.B. and F.A.C.; Validation, R.A. and F.C.; Writing—original draft, A.C.B. and R.A.; Writing—review and editing, F.C. and A.L.V. All authors have read and agreed to the published version of the manuscript.

**Funding:** This work was supported by national funds through the Fundação para a Ciência e a Tecnologia, I.P. (Portuguese Foundation for Science and Technology) by the project UIDB/05064/2020 (VALORIZA—Research Center for Endogenous Resource Valorization).

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** This article analyses legislation, which can be found in publicly available references.

**Acknowledgments:** The authors wish to thank the anonymous reviewers for their scientific support of this research and the support of José Ángel Pérez López of Seville University.

**Conflicts of Interest:** The authors declare no conflict of interest.


75. Wang, Y.; Yu, L. Can the current environmental tax rate promote green technology innovation?—Evidence from China’s resource-based industries. *J. Clean. Prod.* 2021, 278, 123443. [CrossRef]


79. Andersen, M.S. An introductory note on the environmental economics of the circular economy. *Sustain. Sci.* 2007, 2, 133–140. [CrossRef]


128. Roosen, J.; Staudigel, M.; Rahbauer, S. Demand elasticities for fresh meat and welfare effects of meat taxes in Germany. *Food Policy* 2022, 106, 102194. [CrossRef]


132. Geringer, S. The EU VAT Rate Reform 2022 from an Environmental Policy Perspective. *EC Tax Rev.* 2023, 32, 16–25. [CrossRef]


Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.