

Article

Geographical Indications and Sustainable Viticulture: Empirical and Theoretical Perspectives

Tilman Reinhardt * and Yasmine Ambrogio

Faculty of Life Sciences, University of Bayreuth, 95447 Bayreuth, Germany; yasmine.ambrogio@uni-bayreuth.de
* Correspondence: tilman.reinhardt@uni-bayreuth.de; Tel.: +49-176-786-31-838

Abstract: Wine production faces numerous sustainability challenges. The backbone of European wine regulations is the framework for Geographical Indications (GIs), which is currently being reformed as part of the EU's Farm-to-Fork Agenda. An important aspect of the reform is to strengthen the sustainability performance of GIs by allowing the integration of "sustainability undertakings" in GI product specifications. Our paper evaluates this policy approach based on the assessments of stakeholders from the German wine region Franconia and the Italian region of South Tyrol. We use a mixed-methods approach, combining semi-structured interviews and a quantitative survey among wine producers. We interpret our findings through the analytical lens of Elinor Ostrom's Design Principles for the sustainable governance of common-pool resources. Our results show that localized "bottom—up" regulation in the framework of GIs corresponds to many practical and theoretical demands regarding sustainability governance. However, GIs seem to address certain sustainability aspects better than others. Sustainability undertakings in GIs should also avoid adding administrative burden to the already quite rigid GI regime and must be sufficiently inclusive and gradual. Overall, sustainability undertakings in GIs can only be considered as part of a broader policy mix.

Keywords: sustainable wine production; geographical indications; institutional economics



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1. Introduction

Global wine production faces numerous sustainability challenges, including ecological aspects such as pesticide use and GHG emissions [1,2] as well as social and economic aspects, for example, labour standards and producers' income [3]. Also, climate change poses complex challenges, as viticulture is highly terroir- and climate-dependent [4–6]. Soil degradation and extreme weather events, in particular, pose serious threats to the sector [7]. The impact of climate change is felt not only by wine producers but also by adjacent sectors, such as wine tourism [8].

Addressing these challenges requires action on all levels and along the entire value chain. An overarching political framework is provided by the OIV General Principles of Sustainable Vitiviniculture (Resolution CST 518-2016). Many countries and regions have started implementing sustainability frameworks, such as the French "Terra Vitis" scheme or the more general ISO 14001 standard [9], and various assessment tools have been designed for producers and regions [7]. Wine producers are increasingly aware of the necessity to adopt sustainable practices, both to ensure their future competitive advantage and for rendering their companies future-proof [10]. Sustainability certifications, such as the EU's organic label or other private labels, are receiving increasingly more attention from producers and consumers. While aiming to reduce information asymmetry for the consumers and give producers further marketing options [11], experimental and empirical results point to the limited effectiveness of such certifications. Some producers do not explicitly advertise sustainability certifications, even if they have them. Empirical studies have shown a clear price effect of labels only for some market segments [12,13]. Many consumers are not willing to pay a premium for organic products [14], and even consumers who normally purchase organic food products do not necessarily buy organic wine [15].

The sustainability transformation of the wine industry, therefore, requires further public intervention and regulatory changes. In the EU, the Farm-to-Fork Strategy of 2020 (COM (2020) 381 final) provides a comprehensive agenda for a sustainability transformation of the food system, setting ambitious targets such as a 50% reduction of chemical and hazardous pesticides by 2030 and total climate neutrality, i.e., achieving net-zero greenhouse gas emissions [16], by 2050. It also includes a catalogue of concrete regulatory actions, including a reform of the legal framework for Geographical Indications (GIs).

1.1. Geographical Indications

Reforming the legal framework for GIs can be considered of particular importance for the sustainability transformation of the wine sector. GIs form the backbone of wine regulation and marketing in the EU. Their relevance is evident in the number of entries in the official EU database eAmbrosia: as of the 9th of September 2023, there were 1182 Protected Designations of Origin (PDOs) for wine in the EU and 440 Protected Geographical Indications (PGIs). According to Eurostat, in 2022, around 68% of all wines produced in the EU were sold under a protected GI. The share of GI wines in monetary value is even higher, as most high-priced wines are sold under protection in the EU, and PDOs and PGIs essentially cover all the main production areas in the EU [17].

GIs constitute a hybrid, *sui generis* regulatory system in which rules are set bottom-up by the affected stakeholders in so-called product specifications. The general rules are included in the Common Market Organisation (CMO) Regulation (EU) No 1308/2013, Commission Delegated Regulation (EU) 2019/33, and Commission Implementing Regulation (EU) 2019/34. GIs are also protected internationally, notably through the Lisbon Agreement of 1958 and the 2020 Geneva Act, Art. 22 of the TRIPS Agreement, and various bilateral trade agreements [18]. The GI system originated from “Roman” countries, notably the three largest European wine-producing countries Italy, France, and Spain, where it is especially well-established [19]. Despite the common European framework, significant differences exist regarding the implementation of the system, the internal governance and, of course, the concrete specifications and the economic value of GIs [20]. Germany, as the EU’s fourth largest wine producer, followed a different approach for a long time and only fully implemented the GI system through its most recent reform in 2021 (new *Weingesetz*) [21]. Before this reform, German quality regulation mainly focussed on other attributes, notably grape variety and sugar content, and the rules for using GIs were defined by law rather than producer groups.

Given its bottom-up and polycentric character, the GI system has itself been described as a sustainable policy instrument [22]. Indeed, empirical studies have highlighted the potential of GIs to contribute to different dimensions of sustainability [23–26]. However, some cases, including some of the most notorious GI “success stories” have shown that introducing GIs can also negatively affect various sustainability dimensions in the respective areas [19,27,28].

Given the importance of GIs for the European and global wine economy, policymakers on all levels are trying to maximize the sustainability potential of GIs: OriGIN, an international Non-Profit-Organisation (NPO) for the promotion of GIs, and FAO are cooperating on a sustainability strategy for GIs [29]. In France, the *Institut National de l’Origine et de la Qualité* (INAO) started an initiative in 2016 to integrate agroecological targets into all official signs of quality and origin, including wine indications [30]. A prominent example in this regard has been the ban of Glyphosate and all other pre-emergent herbicides by the producers of “Champagne” (OJ 2020/C 432/08). Similarly, the Consejo Regulador for Spanish “Cava” has recently registered a standard amendment, according to which the entire premium segment (“Guarda Superior”) has to be produced according to organic standards from 2025 (OJ 2021/C 369/02). Most recently, a wave of GI specification amendments has concerned the use of fungus-resistant varieties (so-called “Piwis”), since the EU has permitted the use of GIs for interspecific crossings in its latest reform of the CMO through Regulation (EU) 2021/2117 [31,32].

1.2. EU Reform Proposal

In its latest reform proposal, the EU Commission explicitly seeks to leverage the sustainability potential of GIs. The proposal responds to an assessment of the existing GI regulations initiated by the European Council (SWD(2021) 428 final) which called for a “systematic” integration of sustainability aspects into GI policies.

The initial reform proposal from May 2022 explicitly sought to encourage “producers of GIs [...] to adhere to sustainability standards that are more stringent than the mandatory ones and go beyond good practice” (COM(2022) 134 final/2). Art. 12 of the draft regulation sets a legal framework for “sustainability undertakings” in GI product specifications. The article would have also given the European Commission the power to define sustainability standards through delegated acts.

This last aspect was met with resistance from GI interest groups and the parliamentary Committee on Agriculture and Rural Development (AGRI). At the initiative of the EU parliament and its special rapporteur, the proposal was changed before entering the ordinary legislative procedure (trilogue) in June 2023. The new proposal still provides a legal basis for “sustainability undertaking” and even names examples such as “improving soil fertility”. However, it now explicitly mentions social and economic goals and animal welfare besides the environmental sustainability pillar. At the same time, the Commission’s power to adopt delegated and implementation acts that define sustainability was deleted. Instead, a new sustainability report is proposed that collects information about internal sustainability audits performed by the producer groups. This report could be used to create a platform where sustainable practices are shared with other interested parties. Whilst concrete details, including article numbers have not been published, it seems that this updated proposal has passed the trilogue and will not change anymore.

Our article seeks to analyse the new policy approach from two angles. First, it presents nuanced qualitative and quantitative stakeholder assessments on sustainable viticulture, regulatory approaches, and the GI system. Second, it relates these assessments to insights of institutional economic theory, notably Elinor Ostrom’s Design principles for common pool resources. The structure of the article is as follows. Section 2 explains our methodology and the choice of the case study. Section 3 presents the results from the qualitative interviews and the survey. Section 4 (Discussion) interprets the results through the analytical lens of Ostrom’s theory on sustainable self-regulation. In Section 5, we draw tentative conclusions.

2. Materials and Methods

For our empirical analysis, we used a mixed-methods approach, combining semi-structured expert interviews with producers and institutional representatives (e.g., regional associations) and a quantitative survey amongst producers. The mixed-methods approach follows an exploratory sequential design, consisting of a hypothesis-generating qualitative phase and a hypothesis-testing quantitative questionnaire survey [33].

2.1. Case Study

Germany was chosen for the case study to obtain an unbiased stakeholder perception of the new policy approach. As described in Section 1, Germany fully implemented the GI system in 2021. Only since then have producer organisations been able to change the product specifications for their GIs, which were previously defined by law. German producers can, thus, provide a fresh view on the new EU proposal that is not influenced by the previous concrete performance of “their” GIs.

The central case study region, Franconia, is the sixth largest of the twelve traditional wine-growing regions in Germany. In 2023, it covered 6.287 hectares and 2.877 producers, of which 1946 producers operated up to 1 hectare [34]. Given its specific location in Germany (Northern Bavaria, away from the main production areas along the Rhine, Sarre, and Moselle rivers), it has a developed distinct regional identity. It is most famous for the “Bocksbeutel”, an ellipsoid wine bottle, which is specifically protected under Annex VII of Commission Delegated Regulation (EU) 2019/33. It is the first traditional wine region in

Germany for which producers decided to set up a recognized producer organisation. The Franconian Winegrowers' Association is in charge of developing the product specification of their PDO under the new legal framework.

To rule out the stakeholder assessment being influenced by a lack of knowledge or understanding of the GI system, some qualitative interviews were also conducted in the Italian region of South Tyrol, which is also German-speaking, comparable in size and winery structures, and where the GI system has already been fully established for several decades.

2.2. Qualitative Interviews

Altogether, ten interviews were conducted with both wine producers and institutional representatives: five interviews were conducted in Franconia (FR1–FR5) and five interviews in South Tyrol (ST1–ST5). Four interviewees were questioned in their sole capacity as wine producers, whilst three were interviewed in a double capacity as institutional representatives and wine producers. Institutional representatives gave the remaining three interviews. The interviews were conducted in spring 2022 either in person or as a videoconference, depending on the preference of the interviewees. On average, the interviews took 45 min. Semi-structured interviews were chosen to allow for greater flexibility to react to each participant and pursue appropriate clues.

The interviews consisted of three thematic parts: (i) the person's understanding of sustainable viticulture, (ii) the understanding of the GI system, and (iii) questions about regulatory instruments, such as certifications and their estimated effectiveness. In South Tyrol, questions in the second part of the interview were framed slightly differently than in Franconia, considering the different situations concerning the GI system.

The interviews were recorded and fully transcribed to allow for coding and subsequent analysis. Coding and analysis were inspired by the methodological approach of "grounded theory": open coding entailed multiple readings of the interviews and an in-depth, line-by-line data analysis. Data were coded under various headings based on their content to consistently compare incidents and categories that emerged from subsequent interviews. Categories were linked in the axial coding, with subcategories describing the specific category. The final selective coding linked the categories into core categories. In line with the overarching research question, the following categories were deduced from the interviews: (1) regulation, (2) obstacles to sustainability, (3) certification, (4) organic, (5) sustainability, (6) Franconia, and (7) South Tyrol.

In the framework of our mixed-methods design, this inductive, open approach to the interview data provided the basis for designing the questionnaire for the quantitative survey.

2.3. Quantitative Research

The questionnaire was in German language and pre-tested with representatives from wine businesses and wine administration, including the Franconian state agency LWG and the wine producers' association. It was online for six weeks and promoted through active calls in two industry-specific newsletters.

After excluding invalid cases, 56 questionnaires out of 60 were considered analysable. Participating wine businesses had an average size of 12 hectares, with the smallest having 0.4 hectares and the largest 200 hectares. The businesses had an average age of 60 years (between 10 and 200 years). On average, the businesses had three permanent and five seasonal employees.

We consider the survey response rate acceptable as respondents represented more than 10% of wine businesses with a size > 5 hectares and more than 10% of the total winegrowing area in Franconia. Acceptability was confirmed by representatives of the Franconian Winegrowers' Association who had conducted surveys in the past with similar response rates. Given our research objective, the data analysis was mainly descriptive.

3. Results

3.1. Relevance, Dimensions, and Challenges of Sustainable Wine Production

Both in the survey and in the interviews, producers showed a nuanced understanding of sustainable wine production in all three dimensions (i.e., ecological, economic, and social) and a keen awareness of the challenges affecting their own operations (Figure 1).

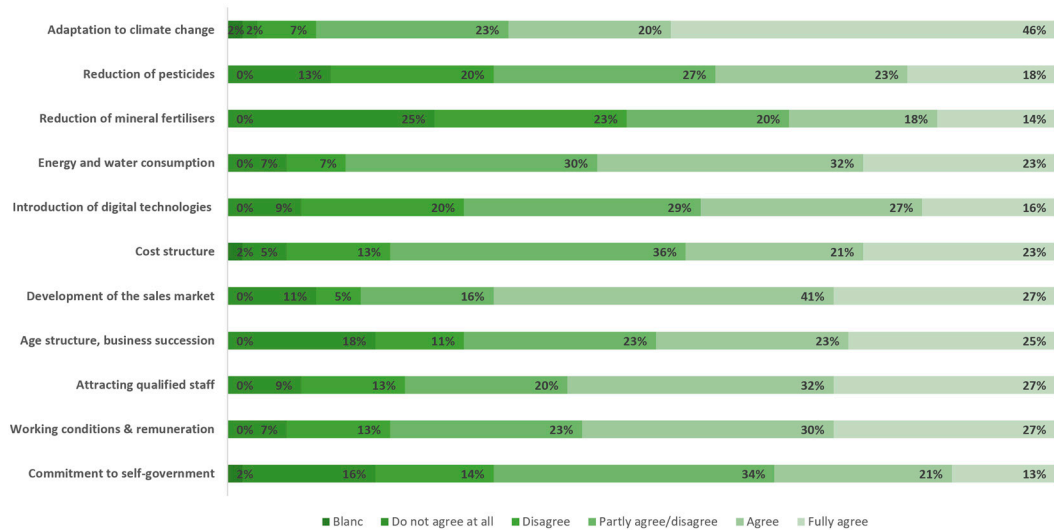


Figure 1. Need for sustainability action within the company (survey results).

Regarding ecological concerns, more than 85% of participants saw at least some need to act on climate change adaptation, water, and energy efficiency. A need to reduce pesticides and fertilisers was considered less often but still admitted by a majority of the participating Franconian wine businesses (68% and 52%).

Producers also saw a high need for action regarding economic and social sustainability aspects. Around 80% of respondents saw at least some need for action on cost structures, sales development, attracting qualified staff, and improving working conditions, including remuneration; around 70% saw some need for introducing digital technologies, achieving a more sustainable age structure, and committing more to the sector's self-governance.

Obstacles to sustainable change were seen in high costs and bureaucracy (88% at least partly agreeing) but also in low acceptance by producers (76% at least partly agreeing) and low awareness by consumers (80% at least partly agreeing). The qualitative interviews provided a more nuanced picture of producers' vision of sustainable winemaking. Interview partners consistently elaborated on all three dimensions of sustainability. For example, they showed great concern for ensuring socially sustainable working conditions for qualified staff, who are often family members. In this regard, interview partners repeatedly pointed out the growing administrative and bureaucratic workload. As one interview partner put it: *"This is part of Sustainability, because we are burning up human resources and it simply doesn't work, because the fun is gone. It has been proven that the rate of depression and suicide among farmers is above average. [...] And that is also a part of Sustainability that should be taken into account. We have to see which way, but (...) bureaucracy must decrease (FR3)"*.

Further challenges result from the complex nature of sustainability. Trade-offs already concern different ecological objectives: *"At some point, you have a magic triangle that you cannot necessarily resolve. Because if I turn that corner, I need more water but for less energy. On the other hand, if I turn there, I need more energy and less water. That's just the way it is."* (FR1). The complexity becomes even greater when integrating the economic and social dimensions, which producers see as intrinsically connected. Interview partners regretted that most consumers only consider ecological aspects and disregard social and economic factors. Several interviewees pointed out how cheaper wines are less complicated to grow and more competitive in the market. One participant wondered *"how some of the winegrowers*

can keep their prices and still make a living from it because many certainly make mixed calculations with holiday flats and others. (...) But it's so difficult to raise prices because you're simply compared to supermarket (prices) and in the supermarket, they're selling for 2.99 Euros and then you have to explain to them why... ours here should actually cost at least 8 euros" (FR3).

The discussion about sustainability, thus, also reflects the economic interests of different market participants: whilst some participants stated that economic profits may follow ecological sustainability (for example, through efficiently reducing crop protection), most interviewees also stated that a narrow, ecological vision of sustainability favours large-scale producers who cannot "really" be sustainable [ST3]. Multiple interviewees stated that, in their opinion, small and medium-sized enterprises are sustainable (ST1, FR2) and that "the whole discussion, sustainable or not, is not led by the little ones, but really by the big ones who decide what is sustainable" (ST5).

In this regard, many interviewees also showed a distrust towards using sustainability as a marketing tool (FR4, ST1) and deplored widespread greenwashing (ST1, ST5, FR2). As one interviewee pointed out: "Sustainability is certainly also something that functions over a long time, over decades or centuries. It is quite modern to say to practice Sustainability now when you do not even know yet whether the system will last that way" (ST1). A great marketing team was seen as helpful in selling the sustainability story, which is difficult for producers who do not have the funds to spend on extensive marketing campaigns (FR3).

While acknowledging that changing production methods is important, product quality remains most producers' top priority (ST2). Still, sustainability could be increasingly considered an inherent part of wine quality, as wine quality is not infinite and, therefore, also feeds off perceived quality aspects (ST3). This thinking was confirmed in the survey, where 43% of participants believed that consumers and traders would see sustainability as part of wine quality, and another 42% considered such a change of perception desirable (Figure 2).

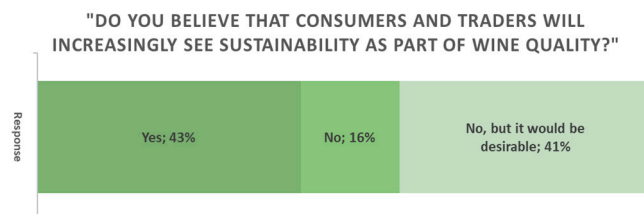


Figure 2. Sustainability as part of wine quality (survey results).

3.2. Regulatory Approaches

Producers expressed mixed expectations concerning regulatory approaches towards sustainability. On one side, many deplored a lack of clear regulatory guidance on sustainability labelling and pointed out that consumers may be confused by different sustainability certifications that focus on different criteria (FR4). At the same time, they were doubtful about any attempts for a uniform definition. As one interviewee put it: "At the moment, anyone can write "sustainable" on it, but no one can check it as long as the EU doesn't regulate it (...). But can it be regulated at all? If yes, how do you compare the sustainability criteria of winegrowers in Spain (...) in the Rioja or somewhere, with no greenery, nothing, no stakes, with our methods. That's a completely different dimension. It would have to come from the EU, which I think is very difficult. I don't understand how that is supposed to work" (FR1). The EU could define sustainability only in the broadest terms whereas the detailed work can and should only be performed within the regions and on the producer level (FR4).

Interview partners also emphasized that any initiative towards sustainability cannot be forced by political institutions and has to happen from the inside. "Dictating criteria from above, reaching percentages and ticking off lists will not aid in convincing the wine producers". Sustainability should also be seen as a continuously ongoing process rather than a completed process with fixed criteria (ST2, FR1). Therefore, any frameworks should be inclusive to ensure everyone can participate no matter the stage they are currently at (ST3, ST4). This

was confirmed in the survey, with almost 81% of the participants agreeing that a stepwise sustainability system would be preferable.

When asked which political institution would be best suited to regulate and promote sustainable viticulture, producers showed a preference for regional and national institutions. Around 75% of the participants saw at least some role for the regional (i.e., Bavarian) State Ministry of Food, Agriculture and Forestry, the Bavarian State Institute for Viticulture and Horticulture, and the Franconian Winegrower's Association as well as the German Federal Ministry of Food and Agriculture (72%). The Organisation International de Viticulture et du Vin (OIV) (62%), the EU (52%), and other private associations (47%) were seen as less essential.

3.3. Organic

The organic framework according to Regulation (EU) 2018/848 was generally not seen as a viable regulatory approach by Franconian producers (Figure 3). In the survey, only one participant (2%) agreed that the EU certification responds to current challenges in viticulture, whilst most participants (62%) disagreed with the statement. Only 18% thought that the EU certification covers all relevant areas, and only 9% agreed that the certification fit within the Franconian conditions. Less than 30% agreed that the EU certification is demanding in content, and only 4% (i.e., two participants) agreed that it is economically worthwhile. Strikingly, only 13% fully agreed that the organic certification promotes sustainable viticulture, and 40% actively disagreed.

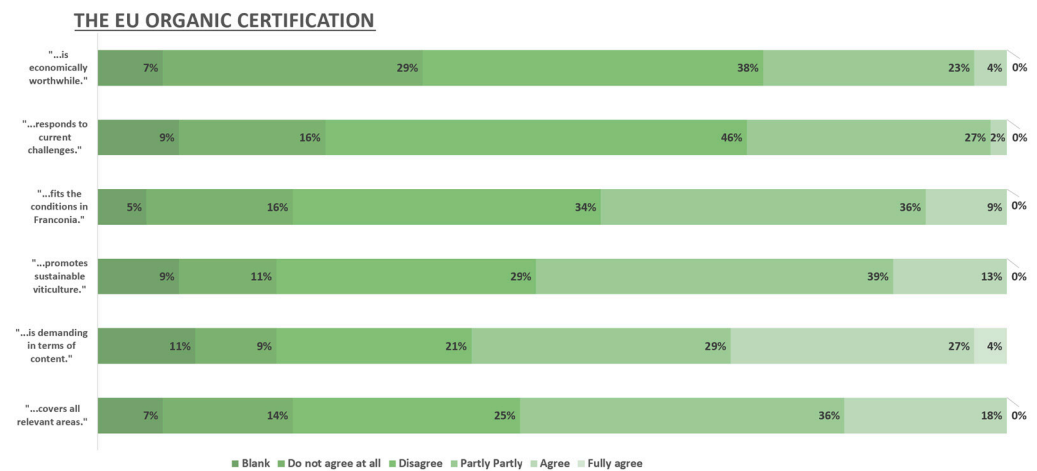


Figure 3. "How do you rate the EU Organic Farming Regulation?" (survey results).

Interview partners specified that they felt that the development got stuck 30 years ago, and no true innovations had been brought forth to render it more efficient (FR1, FR3). Multiple interview partners agreed that producing a permanent crop, such as vine, organically is difficult per se, especially in strenuous climatic years (FR1). The permitted crop protection methods are not sufficient and even contribute to a higher CO₂ footprint (FR2, FR3, FR4, ST2, ST5). Most producers would like to remain flexible, as their primary goal remains quality and achieving a minimum guaranteed yield per year to survive (FR4, ST2, ST3). It was also pointed out that consumers are unwilling to pay a premium for organic wines but automatically expect expensive wines to be organic (ST1).

3.4. Integration of GI System

Given the novelty of the GI system in Franconia, interview partners and survey participants were first asked about their general appreciation of GIs before diving into the topic of sustainability undertakings in GIs. To rule out any specific biases related to the German reform, the same topics were also discussed with stakeholders from South Tyrol.

3.5. General Appreciation of GIs

In general, producers showed an ambivalent stance towards the GI system. In the survey, only 27% agreed that the PDO would bring a positive economic impact, whilst 38% actively disagreed. Participants were more evenly distributed when asked if the PDO would bring a better image for Franconian wine, with 32% agreeing and 39% disagreeing. The outlook on whether the PDO Franconia would allow for the development of new markets outside the region was divided again, with 34% seeing the potential and 32% disagreeing.

Interview participants (who were mostly also engaged in the producer organisation) were generally more optimistic. They welcomed the introduction of the GI system as an important step away from the “sugar pyramid” in determining quality and highlighted the importance of terroir (FR1). Whilst acknowledging the challenge of convincing the consumers that are accustomed to the “old” quality parameters (grape variety, brand), they pointed to a strong and even increasing demand for regional wines (FR1, FR3). Interviewees also agreed that GIs offer a better opportunity to compete internationally (FR1). Nevertheless, many saw the new German law as unnecessarily complicated and restrictive due to a lack of compromise throughout German wine regions and the attempt to merge the new and the old system. Participants were also concerned about losing well-known vineyards and how PDO Franconia would mean uniformity in the Franconian wine industry.

The interview partners from South Tyrol largely confirmed this ambivalence towards the GI system: the appreciation of GI was far from unanimous, even though more than 95% of South Tyrolean producers participate in the PDO or the “lesser” PGIs Mitterberg and delle Dolomiti (ST3). Some participants implied that the PDO certification was losing prestige and value, with more producers choosing to market the brand they have developed over the years (ST4) and retain the flexibility that comes with the PGI certification (ST4, ST3). Grapes are becoming more expensive due to the struggle with climate change and decreasing yields of older vines, leading to a rejection of the certification for economic reasons as well (ST3). The criticism also concerned the rigidity of the sensory testing, which is put in place to safeguard a traditional product (ST1, ST2, ST4). Small producers, particularly, often do not have access to a professional oenologist and struggle with the added bureaucracy (ST4). The harshest critique concerned the control mechanisms and the handling of the PGI wines on the market (ST3). Participants regretted that whilst they work hard for “typical” South Tyrolean wines, other producers are profiting from the reputation they established nationally and internationally (ST3, ST4, ST5).

3.6. Introduction of Sustainability Undertakings into GI Product Specifications

Despite the ambivalent stance towards GIs in general, 68% of survey participants agreed at least partly that integrating sustainability criteria into the GI makes sense. The interview partners (many of whom were involved in developing the specification PDO Franconia) also generally welcomed the idea. However, they considered it too early to implement now, as producers are just familiarizing themselves with the GI system (FR1, FR2, FR5), and they also highlighted practical challenges, especially concerning agreement on concrete criteria (FR1). Some producers would prefer a detailed framework while others would feel patronised immediately (FR5). Whilst certain ecological criteria could be defined on a general level, the other two pillars would be more difficult to include (FR2). Uncertainty also concerned the specificity of criteria and their adaptability to different vineyards and vintages as well as the expected sanctions in cases of non-compliance (FR3). Many feared that producers would reject a “sustainable GI” on the grounds of added costs and bureaucracy (FR1, FR2, FR3). Also, certification companies might oppose the inclusion, as they would become superfluous if everything was certified by one company (FR2). Ultimately, producers would decide on the most recognisable label with more significant monetary benefits (FR5). It was not clear whether consumers would understand what including the sustainability criteria in the product specification meant if they already did not know what a PDO was (FR4, FR2).

In South Tyrol, the PDO consortium had initiated a process called Agenda 2030 in line with the Italian certification and subsidy program “Systema di Qualità Nazionale Produzione Integrata” (ST2, ST3). The idea behind the agenda was to speed up the process of establishing an overarching sustainability system for the whole region in response to market demands and to avoid confusion and difficulties among grape growers using different sustainability certifications (ST1, ST2). The criteria specified in the agenda are not fixed but adapted and evolved throughout time; an example is herbicides which are not outright forbidden, but the allowed maximum is narrowed over time (ST2). While the agenda is designed to incorporate the three pillars of sustainability, a participant pointed out that it mainly focuses on ecological aspects, such as residue monitoring and crop protection (ST5). It is intended to be “*as tightly knit as possible, but not very, very tightly because it has to be able to take everyone with it somewhere*” (ST3). Every producer can set up stricter rules or become bio-dynamic or organic but under the umbrella of the agenda (ST3). In fact, for producers who are already more advanced, a future “Agenda Plus” will allow them to certify their more advanced sustainability efforts (ST3). It will be controlled by the local “Südtiroler Qualitätskontrolle” and the national certifier Abicert (ST3).

The interview partners were generally happy with the agenda, which they saw as a compromise between an expensive external certification and a regional one (ST2, ST3). With the agenda in place, they found the idea of integrating the sustainability criteria in the GI product specification interesting but not necessary (ST2). Other participants cautioned that it would not be wise to mix two different things, as the designation of origin stands for a guaranteed origin, with certain qualitative restrictions and maintaining the freedom of choice without having to renounce the certification being essential (ST3, ST4). Finally, a practical concern regarding the control of the sustainability criteria was raised, since in both PDO and PGI, a fixed number of grapes can be purchased from elsewhere (ST3, ST5).

4. Discussion

The empirical analysis yielded the following key findings:

Producers show a nuanced understanding of sustainable viticulture and are keenly aware of many sustainability challenges that affect their own operations. Besides ecological aspects, however, they strongly emphasize the social and economic dimensions of sustainability. They are rather suspicious of the outward marketing of sustainability, fearing greenwashing and a disregard for small producers’ realities. Still, many producers see a direct link between sustainability and quality.

Regarding regulation, many producers deplore the lack of clear rules, which facilitates greenwashing and a proliferation of certification schemes. At the same time, they are afraid of centralised and uniform definitions of sustainability. The organic framework is largely seen as unsuitable. Producers prefer a bottom-up process of rule setting and a stepwise process towards more sustainable practices.

Integrating sustainability aspects into the specification of a GI is generally seen as an interesting idea. However, many producers are afraid of even more rigid GI rules and added bureaucracy. In general, producers have an ambivalent stance towards the GI framework. Only some see a clear economic potential. At the same time, many are afraid of the loss of flexibility, cost, and bureaucracy that GI protection entails.

In the discussion, we now connect these empirical perspectives to theoretical insights from new institutional economics (Section 4.1) in order to make some general inferences on designing “sustainable GIs” (Section 4.2).

4.1. Ostrom’s Design Principles

Given the bottom-up nature of GIs in a polycentric governance framework, the theoretical work of Elinor Ostrom seems to provide a fitting analytical framework [24,25,35]. In particular, the empirically derived “design principles” for collective choice arrangements provide an intuitive yet comprehensive framework to analyse situations where stakeholders themselves develop institutional arrangements to overcome common challenges. They

have been used to analyse the commons' challenges at various scales [36–38], including wine GIs [39,40]. Ostrom [41] describes the principles as follows:

1. Clearly defined boundaries: The boundaries of the resource system and the individuals or households with rights to harvest resource units are clearly defined.
2. Proportional equivalence between benefits and costs: Rules specify the amount of resource products that a user is allocated, related to local conditions and to rules requiring labour, materials, and/or money inputs.
3. Collective-choice arrangements: Many of the individuals affected by harvesting and protection rules are included in the group who can modify these rules.
4. Monitoring: Monitors, who actively audit biophysical conditions and user behaviour, are at least partially accountable to the users and/or are users themselves.
5. Graduated sanctions: Users who violate rules-in-use are likely to receive graduated sanctions (depending on the seriousness and context of the offence) from other users, from officials accountable to these users, or from both.
6. Conflict-resolution mechanisms: Users and their officials have rapid access to low-cost, local arenas to resolve conflicts among users or between users and officials.
7. Minimal recognition of rights to organise: The rights of users to devise their own institutions are not challenged by external governmental authorities, and users have long-term tenure rights to the resource.
8. Nested enterprises: Appropriation, provision, monitoring, enforcement, conflict resolutions, and governance activities are organised in multiple layers of nested enterprises.

From the outset, the GI system generally seems to correspond well to most of Ostrom's principles. It provides clear legal boundaries (principle 1) through the respective product specification and the overarching national, European, and international regulations. These regulations also provide a strong recognition of rights (principle 7) at every level.

As for the internal governance structures of GI (principles 2 to 6), the EU regulations only provide a general frame in which the concrete rules are defined by the respective producer groups. Philosophies vary amongst producer groups and countries: a comparative study, for instance, found a "territorial heritage approach" towards GIs prevailing in France, a "rural development approach" in Italy, and an "intellectual property approach" in Austria [20]. Even within countries, GI structures show a large heterogeneity and perform differently, especially when several performance criteria are considered [42]. Product specifications range from minimal delineations of production territory and base products to detailed rules that are actively managed and developed by strong producer organisations and consortia [20]. A crucial mediating role may also be played by intermediate organisations that support the individual producer organisations and provide guidance (see principle 8 below).

Specific challenges seem to arise with regard to principles 2, 5, and 8:

First, the "proportional equivalence between benefits and costs" (principle 2) might be structurally difficult to achieve. Especially for famous GIs, the benefits often accrue to larger producers who sell their wine on the national or international retail market and need the GI to showcase their origin in these markets. Smaller producers who sell most of their wine locally or individually do not depend on the GI as a signal. They contribute but do not necessarily profit from the "collective reputation" [43] of a GI. At the same time, the costs of bureaucracy and certification might be relatively higher for these producers. These dynamics were clearly pointed out by the interviewees in South Tyrol, where some interviewees even claimed to adhere to the PDO standards only for traditional reasons. Similar concerns can also be seen from the survey amongst Franconian producers, even though they did not yet actively participate in rulemaking within the GI.

The skewed distribution of benefits and costs results in different interests regarding sustainability standards. Many interviewees considered the sustainability discourse as something led and framed by large companies. If sustainability standards are integrated into GI specifications, these conflicts are taken inside the producer organisation. At the

same time, bureaucracy and cost are seen as the main concerns regarding the GI and even the willingness of producers to continue with winemaking. Some of our interview partners, therefore, described a risk of disengagement of producers from the GI because of additional restrictions, costs, and bureaucracy. A parallel might be drawn to the famous “Super-Tuscans” who left the Chianti DOC in the 1980s as they considered the product specification too restrictive to develop their quality characteristics [44].

Second, “graduate sanctions” (principle 5) are difficult to realise in the GI framework, which offers strong protection but consequently sets very rigid rules. As described in Section 3.2, most producers called for a stepwise system towards sustainability. The GI system, however, is designed to clearly distinguish between wines inside the product specification and those outside. The introduction of sustainability undertakings into the product specifications puts every producer at risk of losing the PDO status. The interviewed producers and institutional representatives, therefore, expressed concerns about an interference in what they called a “personal business choice”. A forced choice could create internal conflict within the producer organisation that might even lead to legal action (see, to that effect, the pending Case T-732/21, *Asociación de Elaboradores de Cava de Requena v Commission* before the General Court of the European Union). By contrast, the South Tyrol 2030 Agenda was appreciated by producers precisely because it is flexible, avoids hard initial criteria, and provides a framework for stepwise improvement.

Finally, a specific problem in the German context can be seen with regard to principle 8 (“multiple layers of nested enterprises”). In the “Roman” countries, where the GI system is well-established, higher-level structures have emerged that provide know-how transfers between producer organisations, representation of common interests, and mediation of conflicts [19]. The South Tyrol Agenda can be seen as an example of such coherence, as it is inscribed into the national SQNPI scheme (see Section 3.6). In 2022, the agenda also became an integral component of the official agricultural strategy of the Province of South Tyrol, adding a further layer of policy coherence. In France, a public institution, the INAO, provides strategic advice to producer organisations, including general policies to make GIs more sustainable and innovation friendly. Such a solid institutional architecture does not yet exist in Germany, despite some efforts of national and state ministries and the National Wine Association (DWV) to provide counselling to producer organisations. It seems essential, however, to make GIs an effective tool of agricultural policy and to address producers’ doubts that they work for their benefit (see Section 3.5).

4.2. Designing “Sustainable GIs”

Based on the analysis of our empirical results according to Ostrom’s principles, we draw the following main inferences:

First, the challenge of “making GIs sustainable” starts a long way before integrating specific sustainability undertakings in the product specification (as proposed by the new draft EU regulation). It already concerns the general set-up of a GI. Given their long tradition and strong regional ties, many GIs can be seen as inherently sustainable and indeed contribute to its various dimensions (cf. the literature cited in the introduction). Yet, especially for GIs with a high economic value and export potential, there is a risk that the profits and costs of GI protection are not equally distributed amongst the affected producers. This results in specific interests in rulemaking and a potential for conflict and disengagement. In this regard, the idea of implementing sustainability criteria to gain an immediate competitive advantage in the market (as explicitly stated in the “Cava” standard amendment) seems particularly problematic. It exacerbates the potential for internal conflict, increases the risk of greenwashing, and might, thus, even undermine the high trust that GIs generally command in the market.

Second, not all sustainability aspects seem susceptible to being integrated into a GI specification. GI standards seem more pertinent for those aspects which have an immediate connection to the affected region, i.e., socio-economic criteria or ecological criteria related to the preservation of specific landscape or biodiversity features. This is consistent with

the empirical literature that suggests that GIs favour specific sustainability dimensions more than others [24,45]. It is also consistent with the general finding that stakeholder self-regulation along Ostrom's design principles seems most effective for localised sustainability challenges [46]. For global sustainability concerns, such as GHG emissions, other regulatory instruments seem more appropriate. An integration of respective rules into GI specifications seems possible but must always be weighed against the additional cost and administrative burden that it brings to the GI.

Third, the process, i.e., a concentrated bottom-up effort towards sustainability at the GI level, might be more important than the result, i.e., the actual integration of sustainability undertakings into the product specification. The South Tyrol agenda presents an interesting example in that regard. Whilst the agenda process was initialized and organised by the PDO consortium, the agenda is not directly linked to the GI. This allowed for the designing of inclusive and regionally adapted measures that generate more legitimacy, visibility, and support. At the same time, it provides more flexibility, for example, to involve actors from outside of wine production, for example, science, education, and even consumers. It also allows for producer organisations to provide value to their members instead of creating new bureaucratic obligations. Similar sustainability initiatives with no direct links to product specification have also been initiated for other major PDOs such as Prosecco [47]. Such independent processes, carried by the GI producer organisations, might capitalise on the potential of regional sustainability action, including advocating for the necessary paradigm change with producers and consumers (cf. Result Section 3.6).

5. Conclusions

Our results show that bottom-up regulation in the framework of GIs can be a viable tool to promote sustainable viticulture. Wine producers are acutely aware of the ecological and socio-economic sustainability challenges and may prioritise locally adapted measures that integrate local knowledge and correspond to existing capacities. This might create an "ownership" of necessary measures and contribute to the "collective reputation" of GIs.

The EU reform proposal generally fits with these results. It corresponds to general calls for more participatory decision-making as the basis for a food system transformation. It provides a clear legal basis for producer-driven action towards sustainability, without being too rigid or attempting an overarching definition. The proposed sustainability reports and a shared platform may alleviate the risk of using sustainability undertakings as a marketing tool and reflect the collective goal of a sustainable wine system.

However, our results clearly show that the integration of sustainability criteria in GIs is neither easy nor a panacea that relieves policymakers from implementing other effective regulatory instruments. The sustainability transformation of the wine system depends on a policy mix that combines soft and hard as well as bottom-up and top-down regulations. Sustainability criteria in GIs can be an element but need to be integrated into a regulatory architecture that renders them effective. A strict green claims regulation, for example, seems essential in this regard, to create a situation where GIs effectively serve as signals for sustainable production.

As a final thought, we want to emphasize that regulation for sustainability does not necessarily imply more restrictions. On the contrary, in some cases, more flexible rules may be required. Climate change will have a profound effect on viticulture in the coming decades, especially in some of the most well-known and expensive GI territories. The GI system offers extremely strong protection, but it has also become increasingly rigid. An important part of making GIs sustainable may, therefore, consist in making them flexible and open to new realities. The regulation (EU) 2021/2117, which allows for GIs to be used for PwIs, can be seen as a first step in that direction, but further steps may be necessary.

Further research seems necessary to deepen and broaden the empirical basis, especially by including more case studies. Every GI is different, and an increasing number of them are involved in sustainability initiatives. It might, for example, be interesting to compare cases, where "hard" sustainability criteria are included in the product specification with

non-binding processes. Eventually, further research should also consider the consumers' perspective, i.e., investigate whether consumers would prefer GIs as a signal of sustainable production compared to other certifications.

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