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Article

Place-Based Pathways to Sustainability: Exploring Alignment between Geographical Indications and the Concept of Agroecology Territories in Wales

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Abstract: Geographical Indications (GIs) are regarded as important endogenous rural development mechanisms by the European Union. GIs have proven successful for some producers in some regions, delivering higher added value and safeguarding a product's identity and heritage through the notion of terroir. Within the context of a gradual “greening” of GIs, this paper opens up questions about what potential they might have for transitions to agroecology territories, which are spaces engaged in a transition process towards sustainable agri-food systems. Using the Food and Agricultural Organization's 10 elements of agroecology as a lens, we discuss whether GIs can serve as levers in delivering sustainable agri-food transitions, drawing on the case of the devolved nation of Wales. We base our narrative on a content analysis of GI product specification documents and data from interviews with GI stakeholders. Our case study illustrates that the discourse within the regulatory framework of some Welsh GIs has shifted from one of technicality towards the integration of some agroecology elements in more recent GI product specifications. In this respect, we argue that there is evidence of a “first generation” and “second generation” assortment of GIs in Wales. However, any potential for leveraging an overall transition within this scheme towards an agroecology territory remains constrained by the piecemeal embedding of agroecology. The incorporation of agroecology is emerging primarily from the ground-up—driven by independent organizational and place-based collective action, but unaccompanied, as yet, by any parallel shift amongst supporting administrative and regulatory authorities. We also discuss the importance of reflexive governance if GIs are to be viable pathways for sustainability transitions. As such, the capacity for GIs to facilitate quality-led place-based food systems that enhance increasingly threatened environmental resources is contingent upon stakeholders adopting a territorial, reflexive governance approach.

Keywords: geographical indications; agroecology; agroecology territories; Wales; reflexive governance



1. Introduction

Geographical agri-food scholarship and regional studies have seen a renewed focus on the “territory” as the scale at which transitions to sustainability are made possible [1–4]. A territorial approach affords investigation into “alternative” agri-food systems that embrace multiple types and scales of social, ecological and economic relations, and if “considered as a whole they can redirect entire territorial systems as regards the quality of food” [5] (p. 640). Within the European Union (EU), there have been efforts to instigate the development of territorial agri-food systems. For example, there are various territorially focused agri-environment schemes borne out of Common Agricultural Policy (CAP) reforms, such as regulation 1305/2013, which contained measures to support short food supply chains and local food markets and encourage farmers to join producer groups and quality schemes.

One of the most established governance mechanisms to achieving a more place-based, quality-led agri-food system is the Geographical Indications (GI) scheme. In the EU, GIs were incepted during the 1990s to “encourage the production of quality foods, assist poorer lagging regions, allow producers to charge higher prices and inform consumers about the origin of their produce” [6] (p. 2). The World Intellectual Property Organisation (WIPO) states that “the qualities, characteristics or reputation of the product should be essentially due to the place of origin. Since the qualities depend on the geographical place of production, there is a clear link between the product and its original place of production” [7]. The EU has invested considerable funds into promoting and supporting GIs and regards them as important endogenous rural development mechanisms. Indeed, there are over 1400 GIs in the EU (excluding wines and spirits, which are subjected to separate regulations), a steady rise from 450 in 2000.

GIs are social constructions embedded within an intellectual property regulatory framework [8]; they enable relations between food and place to be constructed through specific endogenous attributes [9]. They are inextricably linked with a territorial development paradigm, as territory can be defined as “a space that is socially constructed, culturally marked and institutionally regulated” [10] (p. 326). In Europe, GI status is administered through one of two schemes: Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI). These schemes require different production, processing and geographical criteria to be adhered to in order to qualify for GI status (Table 1).

Table 1. Overview of the PDO and PGI schemes.

Type of GI (Geographical Indication)	Logo	Specification
Protected Designation of Origin (PDO)		Every part of the production, processing and preparation process must take place in the specific region (e.g., all ingredients used must originate from a specific region and the PDO product will be made in this same region).
Protected Geographical Indication (PGI)		For most products, at least one of the stages of production, processing or preparation takes place in the region (e.g., some ingredients used may not originate from or be sourced from the region where a PGI product is made).

Source: adapted from [11].

GIs have been successful levers to safeguard and promote terroir, a French term describing how specific, unique place-based characteristics, such as climate, topography, (artisanal) production and processing methods are inherently linked to the heritage and quality attributes of certain food or drink products. GIs have improved the economic returns for producers of certified products in some regions [6,12]. However, this paper addresses the emerging debate about the extent to which GIs contribute to holistic, socially and ecologically embedded, sustainability transitions [10,13,14]. The key question that we investigate is: to what extent are GIs facilitating place-based transitions to sustainability?

We explore this question by conceptualizing sustainability through the lens of agroecology; the application of ecological concepts and principles to the design and management of sustainable agro-food systems [15]. Agroecology is gaining international recognition as a solution to address environmental challenges and to adapt to crises such as climate change, resource depletion and injustices within conventional food systems [16,17]. We argue that the framework of agroecology territories, defined as “places engaging in a transition process toward sustainable agricultural and food systems” [18] (p. 135), can assist in further aligning GIs to sustainability policy objectives and agri-environment schemes. In doing so, quality-led place-based food systems that enhance increasingly threatened environmental resources can be realized.

The paper is structured as follows. Firstly, we deepen the discussion about why agroecology is fundamental for sustainability transitions, critically review the concept of agroecological territories, and

consider further its applicability to GIs. Secondly, we introduce our case study of Wales and outline our methodological approach, consisting of interviews and a qualitative content analysis. Our qualitative content analysis was used to understand the extent to which the institutionalized rhetoric of Welsh GIs aligns with agroecology as defined by the Food and Agriculture Organization (FAO) of the United Nations. Thirdly, we critically examine our results through the agroecology territories framework. We find that the discourse within the regulatory framework of Welsh GIs has shifted from one of technicality and regulation towards greater integration of some elements of agroecology in more recent GI Product Specifications. In this respect, we argue that there is evidence of a “first generation” and “second generation” assortment of GIs.

Finally, for GIs to be viable pathways for sustainability transitions in practice, they need to be reflexively governed [19–22]. As such, we argue that the capacity for GIs to facilitate sustainability transitions is contingent upon a territorial and reflexive governance approach to agri-food systems and biophysical resources. Since this is the first piece of research, to our knowledge, where the nexus between GIs and agroecological territories has been addressed, we close the paper by proposing important future research trajectories and questions.

2. Literature Review: Agroecology and Sustainability Transitions

Agroecology is increasingly regarded as viable and necessary to mitigate climate crises and deliver truly sustainable and resilient agri-food systems—something that the corporate-led food regime characterized by industrial practices has failed to do [23]. Historically, agroecology is borne from the agronomy, ecology and horticulture disciplines, and is closely linked to organic agricultural principles [24,25]. Agroecology is a global project transcending international boundaries and gaining traction in North America [26], Africa [27] and Europe [28–30]. Initially articulated as an applied agricultural science, it is increasingly depicted in social and political terms [31,32] or as “a movement seeking a new way of considering agriculture and its relationships with society” [33] (p. 4).

Contemporary definitions of agroecology tend to articulate it as a science, practice and movement [34]. There are thus multiple interpretations, which are “often linked to differences in the historical development of agroecology in different countries and regions of the world” [32] (p. 666). For example, some interpretations have emphasized agroecology as a means to bring about radical, structural transformations of agri-food systems [35]. Others emphasize the historical context and specific practices in place [36]. While the plurality of definitions and interpretations of agroecology are important, the universal framework recently devised by the FAO provides a lens to understand and apply the 10 fundamental elements of agroecology (Table 2).

Table 2. The 10 elements of agroecology as defined by the FAO (Food and Agriculture Organization) (2018).

Agroecology Element	Brief Description and Justification of Agroecology Element
1. Diversity	Diversification is key to agroecological transitions to ensure food security and nutrition while conserving, protecting and enhancing natural resources.
2. Co-creation and sharing of knowledge	Agricultural innovations respond better to local challenges when they are co-created through participatory processes.
3. Synergies	Building synergies enhances key functions across food systems, supporting production and multiple ecosystem services.
4. Efficiency	Innovative agroecological practices produce more using less external resources.
5. Recycling	More recycling means agricultural production with lower economic and environmental costs.
6. Resilience	Enhanced resilience of people, communities and ecosystems is key to sustainable food and agricultural systems.
7. Human and social values	Protecting and improving rural livelihoods, equity and social well-being is essential for sustainable food and agricultural systems.
8. Culture and food traditions	By supporting healthy, diversified and culturally appropriate diets, agroecology contributes to food security and nutrition while maintaining the health of ecosystems.
9. Responsible governance	Sustainable food and agriculture require responsible and effective governance mechanisms at different scales—from local to national to global.
10. Circular and solidarity economy	Circular and solidarity economies that reconnect producers and consumers provide innovative solutions for living within our planetary boundaries while ensuring the social foundation for inclusive and sustainable development.

Source: adapted from [37].

In practice, the combination of the above 10 elements sees agroecology providing a connective, political space where scholar-activists, academics, farmer groups, politicians and other agri-food stakeholders, such as non-governmental organizations and self-organised citizen groups or movements collaborate in the interest of fair and just food system transformations [26,38–40]. The concept of territory is pertinent here, because as noted by Anderson et al., “territory” is increasingly acknowledged as the critical spatial dimension where agroecological transformations—and therefore what we interpret as sustainability transitions—materialize [41]. The territory is where social-ecological domains of health, food, environment and agriculture intersect and where agri-food system transitions can be realized [42]. Territories are not fixed entities or consistently defined. They need to be understood as “socially-produced, place-based sources of identity created through collective productive transformation and institutional development” [43] (p. 412).

2.1. “Terroir Niche” Innovations: Geographical Indications

Various terms have been used to describe the types of products that arise from territories. For example, food and drink products borne of these systems have been referred to as “terroir products” [44], “speciality foods” [45,46] and “niche products” [47]. The GI framework represents a form of governance and institutionalization of these goods and “terroir niche” innovations [14]. Terroir niches such as GIs draw on the biophysical environment, local resources and accumulated knowledge, and are loci for collective forms of governance [14,48]. GIs have been an important lever for connecting “the local” with “the global” [44] and for formalizing the concept of terroir. This occurs by embedding “a set of specifications that define and protect the cultural practices, farmer knowledge, and local environmental resources that have interacted in the evolution of the product” [13] (p. 210).

The objective of GIs is to assist producers by securing fair returns for the qualities of their products, ensuring protection as an intellectual property right, and by providing clear information on the value-adding attributes of the product to consumers [49]. From a consumer perspective, GIs provide assurances about the integrity, quality and authenticity of food and drink, enabling consumers to differentiate from non-GI products. It has been estimated that GI products retailed on average for 2.23 times more than the same type of non-GI goods across the EU, whilst in the United Kingdom (UK) this was 1.86 times higher [6]. GIs can be an important mechanism for the development of territorial food systems, as they can sustain producer livelihoods through the creation of added value and preservation of cultural and gastronomic heritage [50]. They have also been described as a “double-edged tool” [51] that can deliver benefits for small-scale growers and businesses, but also catalyse otherwise dormant territorial disputes about historical claims to authenticity [6].

GIs in their existing form have continued to receive critique as transformational mechanisms. This is due to the largely piecemeal delivery of sustainability goals, variable levels of consumer understanding [12] and competing public and private interests [8,51]. However, there is evidence to suggest that broader sustainability goals are materializing and becoming embedded into the GI framework across European territories [52,53]. For example, Palma argues that the PDO French cheese Comté “stands out for an entire set of environment-friendly practices” [54] (p. 80), which, as alluded to by Bowen, resonates with the traditionally and locally embedded, small-farm-led cooperative management approaches that characterize aspects of agroecology [10,13]. However, established certifications, such as the EU PDO and PGI schemes, continue to be largely framed as instrumental regulatory mechanisms rather than as conduits for wider social-ecological transformations and place-based, quality-led territorial development [55].

It is important to note that the original mandate of GIs was not necessarily to fulfil such transformations. However, there has been a stronger emphasis on the wider possibilities offered through GIs in the last decade, and as noted, there is growing interest about the role that GIs can have in achieving broader sustainability goals [52]. It is for this reason that we explore GIs through the lens of agroecology, which is emerging as a viable pathway to mitigate crises and deliver sustainable transformations [17].

2.2. Agroecology Territories and Governance

Achieving a more holistic, transformational vision for terroir niches demands that they be more closely aligned to agroecology. This is because agroecology endorses a social-ecological systems approach to food and agriculture, places value upon multifunctionality and a variety of knowledges, and galvanizes trans-local agrarian social movement building and the nurturing of consumer solidarity initiatives.

Yet the nexus between agroecology, terroir niches such as GIs and the territory as an analytical lens remains under-researched and lacking a conceptual frame. The Multi-Level Perspective (MLP) has been drawn upon to explore the relationships between terroir niche innovations and some aspects of agroecology and sustainability transitions [14,41,56]. The notion of agroecology territories developed by Wezel et al. (Figure 1) provides a lens to develop this work by integrating a more nuanced understanding of agroecology and the role of stakeholders in governing terroir niches.

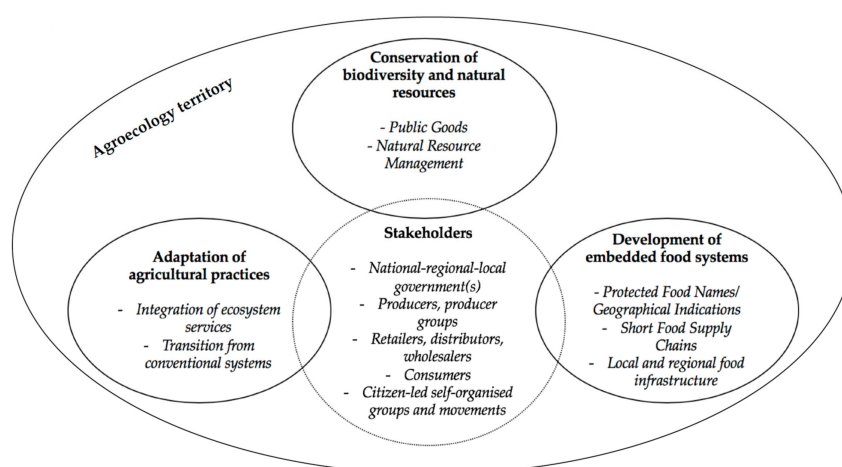


Figure 1. Agroecology territories framework. Source: adapted from [18].

This framework and the examples within Figure 1 are by no means exhaustive, but rather illustrative of the key stakeholders, types of practices, policies and institutional mandates that are inherently related to the materialization of agroecology territories at a range of scales. The “adaptation of agricultural practices” domain involves shifting farm and regional level practices and policies to more sustainable and integrated systems [15]. Similarly, the “conservation of biodiversity and natural resources” domain requires that niche innovations serve to maintain or improve the material resources and flows, such as nutrient cycles and water quality [18].

The domain of “development of embedded food systems” broadly reflects the substantial literature around the “quality turn” in rural sociology and geography. This incorporates terroir niches such as GIs, as well as citizen-led food initiatives and supply chains configured around shorter geographical and proximity relations between producers and consumers [57–63]. Each domain is influenced by the institutional and spatial landscape, ranging from local or regional to national and international policies. As indicated by the central position within the framework, stakeholders play an important role in creating agroecology territories. More specifically, it is the *ways* in which stakeholders embedded within a territory interact and govern terroir niches that can determine the nature and extent of transition (or indeed the stasis and the status quo).

Reina-Usuga et al. argue that if agri-food governance mechanisms, such as the GI regulatory framework, are to successfully facilitate sustainability transitions, then “the empowerment of all stakeholders, from production to consumption, including the role of civil society organizations, public institutions and academia is essential” [64] (p. 238). Similarly, Torres-Salcido and Sanz-Cañada emphasize the importance of territorial governance in achieving sustainability transitions, as this is about the capacity to construct a public agenda, decentralized management and stakeholder autonomy,

multi-level forms of coordination and, finally, forms of ecological and social management [4]. This is what Kirwan et al. describe as “reflexive governance”: inclusive arenas with the potential to open up debates that may otherwise have been dominated by powerful actors whose interests lie in ensuring the continuation of the status quo [65].

As such, there is debate about the extent to which GIs can facilitate the reflexive production and consumption politics needed for sustainability transitions to materialise at a range of scales [19]. Our focus, then, is to examine how agroecology elements are embedded into the governance framework of GIs. Moreover, part of this aim is to explore how stakeholders interact and the extent to which reflexive, collaborative processes “play out” through terroir niches in terms of how shared social and ecological problems are collectively addressed [66]. In doing so, we consider the extent to which GIs can facilitate sustainability transitions commensurate with agroecology, and promote quality-led, territorially-scaled food systems.

2.3. Case Study: Wales

We situate our analysis through a case study of the devolved nation of Wales in North-Western Europe (Figure 2). Wales is a predominantly rural country covering over 20,000 km² and is hilly and mountainous in many of its regions. In 2017, the population of Wales was 3.125 million people [67], which was around 5% of the total UK population [68]. The type of agriculture that has developed reflects this terrain and topography, as livestock farming, namely sheep and cattle, dominates much of the landscape. In 2018, Wales accounted for nearly a third of all UK sheep numbers (29%, 9.5 million) and 11% of UK cattle [69]. Beef and sheep farming incomes have been heavily reliant on funding from the CAP Basic Payment Scheme, particularly in upland Less Favoured Areas [70,71].



Figure 2. Map of Wales, showing relation to the UK. Source: adapted from [72].

As a devolved nation of the UK, the Welsh Government (WG) has control over various types of legislation and spending in a number of public domains, including health, education, public services

and the environment. Welsh identity continues to be strongly embedded in public and political discourse. For example, the notion of “Wales” pre-dates the middle-ages [73], and 29% of the Welsh population (896,900 people) are Welsh language speakers [74]. It is for these reasons that Wales can be considered a territory, as the devolved governance of health, food, environment and agriculture intersect in a geographically bounded space [42].

2.4. Agri-Food Policy and Geographical Indications in Wales

Place-based developmental mechanisms have attracted increased support across Welsh public and private institutions, such as local and regional government departments, tourism boards and businesses. Indeed, whilst GI registrations in the UK number 84 (as of April 2020), within Wales growth has been relatively prolific—almost quadrupling since 2015 from 4 to 15. Welsh GIs (Table 3) include products of high economic significance to Wales, such as Welsh beef and lamb, but also lesser-known products, such as Conwy mussels. The majority of economic benefit from the EU GI schemes has been derived from Welsh beef and lamb, which were the first to be awarded PGI status in 2003. For example, the supporting body for these two GIs (Welsh beef and Welsh lamb), Hybu Cig Cymru (HCC), reports that 25% of the cumulative growth in exports for PGI Welsh lamb from 2003 to 2012 can be attributed to PGI status. This is equivalent to 11,000 tonnes of sheep meat from Wales, or £42.5 million of additional export sales between 2004–2011 [75].

Table 3. List of Welsh GIs by designation, location and year certification awarded.

Geographical Indication	Type of Product/Sector	Type of EU Protection	Year Registered by EU	Location
Welsh beef	Fresh meat and offal	PGI	2003	Wales
Welsh lamb	Fresh meat and offal	PGI	2003	Wales
Welsh Regional Wine	Wine	PGI	2007	Wales
Welsh Wine	Wine	PDO	2007	Wales *
Pembrokeshire Early Potatoes/“Pembrokeshire Earlies”	Fruit, vegetables and cereals	PGI	2013	Pembrokeshire, West Wales
Halen Môn/Anglesey Sea Salt	Other	PDO	2014	Ynys Môn/Anglesey, North West Wales
Carmarthen Ham	Meat	PGI	2016	Carmarthenshire, West Wales
Conwy Mussels	Fresh fish, molluscs and crustaceans and products derived from them	PDO	2016	Conwy, North Wales
Welsh Laverbread	Other	PDO	2017	Welsh coastline
West Wales Coracle Caught Salmon	Fresh fish, molluscs and crustaceans and products derived from them	PGI	2017	West Wales (River Tywi, the River Taf and the River Teifi)
West Wales Coracle Caught Sewin (sea trout)	Fresh fish, molluscs and crustaceans and products derived from them	PGI	2017	West Wales (River Tywi, the River Taf and the River Teifi)
Traditional Welsh Cider	Ciders	PGI	2017	Wales
Traditional Welsh Perry	Ciders	PGI	2017	Wales
Traditional Welsh Caerfilli/Caerphilly	Cheeses	PGI	2018	Wales
Vale of Clwyd Denbigh Plum	Fruit, vegetables and cereals	PDO	2019	Vale of Clwyd in Denbighshire, North Wales
Gower Salt Marsh Lamb	Fresh meat and offal	PDO	TBC	Gower Peninsular, South Wales
Cambrian Mountains Lamb	Fresh meat and offal	PGI	TBC	Cambrian Mountains, Mid-Wales

Note: * Wine produced from vines growing below a height of 220 metres above sea level are eligible for this Scheme. Source: adapted from [76].

As reflected in Table 3, Welsh GIs span different geographical areas and industry sectors. This indicates that self-organization, along with support from the WG to complete and submit applications to acquire GI status, has been relatively widespread [77]. In terms of Welsh GIs, then, where significant investment has been apparent, it is necessary to understand what has driven this recent proliferation and interest and to explore the ways and extent to which GIs align with agroecology. Moreover, it is essential to explore the nature of relations between governance stakeholders, such as the WG, producers and associations who have applied for, or have been awarded, GI status. In doing so, we can elicit greater understanding about the ways in which the development of GIs in Wales is commensurate with sustainability transitions underpinning the agroecology territories framework.

3. Methods

We draw on data collected in 2018–2019 via interviews and a product specification document analysis of Welsh GIs. In order to identify interviewees, 35 questionnaires were returned from farmers, producers, coordinators and administrators of either a GI scheme or association, including policy stakeholders, throughout the UK. The questionnaire sought data on details of the production operation and the financial and environmental impact of producing a GI product, as well as views about how customers perceive GI products.

Respondents were also asked if they would consent to an interview and 23 agreed. Seventeen of these interviews were specifically with Welsh-based organisations, which was where we deepened our focus for this study. For example, we conducted policy stakeholder interviews with representatives from divisions of the WG and with producers of Welsh GI products. During the interviews, discussion centred around the process of initiating, acquiring, administering and governing GI status, the production methods of GI products and what made them suitable for GI status (i.e., discussion about the heritage and terroir). Interviewees also elaborated on details about operational, financial and environmental impacts identified in the initial questionnaire, and addressed what the UK's exit from the EU might mean for the future regulation and development of GIs.

Secondly, qualitative content analysis of 15 existing and two prospective (i.e., registration for GI status pending) Welsh GI product specification documents was undertaken, using a software package called Nvivo. This software enabled the classification, sorting and arrangement of data (i.e., product specification documents). We used a pre-defined coding framework to assign codes within Nvivo, which correlated with the 10 elements of agroecology defined by the FAO (Table 2). This framework provides a means to understand agroecology, and enables our following discussion about agroecology territories to be substantiated [37]. Moreover, the 10 agroecology elements were selected because of their applied significance, as the “10 Elements are a guide for policymakers, practitioners and stakeholders in planning, managing and evaluating agroecological transitions” [37] (p. 1). The qualitative content analysis method was used to understand the extent to which the institutionalized rhetoric of Welsh GIs aligns with agroecology, and also to triangulate our interview data that elicited more detail about governance and the complexities associated with GI registration.

Our approach to the qualitative content analysis is a form of deductive and “structural coding”, as opposed to a more “open” and inductive approach whereby codes and themes emerge during the iterative analytical process [78]. In practice, lines of written text within the product specification documents were interpreted and then assigned (if applicable) to one or more of the 10 elements. This meant that not every piece of text within the product specification documents was coded, only the text that related to our pre-defined coding framework. This approach to the coding was more thematic and interpretive, as rather than counting the frequency of a particular word or phrase, for example, it enabled the researchers to interpret the text within each document, and to code accordingly to one or more of the 10 agroecology elements (i.e., our pre-defined coding framework). Two of the authors coded the data and agreed on a shared understanding of the coding framework and meanings of each agroecology element so as to ensure consistency and rigour. Making further use of Nvivo, we were then able to quantify our qualitatively coded data, so as to determine the amount of coverage that each agroecology element has relative to each of the product specification documents. The utility of this is twofold, as we were able to see the *extent* to which agroecology can be inferred in each of the product specification documents, as well as *how*.

Each document for each GI in Wales differs in length and written content, as they are different products with different technical and regulatory needs, but follow the same structural format; “description of product”, “geographical area”, “proof of origin”, “method of production”, “link (to historical process/place)”, “inspection body” and finally “labelling”. Each document is typically 7–12 A4 pages in length, with the material co-created by producer groups and refined by institutional public stakeholders, such as the UK's Department for Food and Rural Affairs (DEFRA). Their core purpose is to capture the unique characteristics of a GI in terms of the product (such as the unique taste and

composition), process (such as the specific means of production) and place (such as the historical and geographical connection). In sum, the product specification documents can be understood as historically and spatially informed written archives about the terroir of GIs. This was the main justification for conducting a qualitative content analysis of these secondary data sources.

It must be noted that some sections of product specification documents could not be coded using our framework, because they were purely administrative (e.g., “labelling”) and did not relate to any agroecology elements. However, analysis of product specification documents in their entirety enabled each document to be reviewed in a comparable, replicable way. This analysis provided an understanding of discourse, which we were then able to explore further via interviews. Accordingly, we attempted to interview a producer or producer representative from all Welsh GIs (17). In total, we interviewed producer representatives from 15 of the 17 Welsh GIs.

For the coding of our interview data, we applied a more inductive coding strategy associated with grounded theory [79]. We used Nvivo to analyse interview data (i.e., transcribed interviews and notes) such that it was possible to identify and assign descriptive codes, and then iteratively create analytical codes as the process developed. Analysis of interview data differed from the qualitative content analysis of product specification documents, because of the semi-structured nature of the encounters and topic of the discussions, which focused more on the governance and impacts of GIs and not specifically on agroecology.

4. Results

4.1. Extent of Agroecology Elements within Product Specification Documents

As shown in Table 4, the amount of text that referred to agroecology (either implicitly or explicitly) ranged from 33% to 3%, with the average coverage across the dataset being 15%. While these figures are an expression of our qualitative reading, they nevertheless provide initial indications about how agroecology is embedded within and across product specification documents. On average, less than a sixth of the product specification documents, which usually consist of ten or more A4 pages of written text for each GI, refer to agroecology elements as defined by the FAO. For seven of the product specification documents, the coded material about agroecology accounted for less than a tenth of the total document text. Considering the fact that, due to their administrative nature, some sections would not be expected to contain relevant material, this dearth of agroecological coverage is notable. There were only three product specification documents where coded content about agroecology accounted for more than a quarter of all the text within the document. Of these three GIs, two were awaiting the award of PDO/PGI status at the time of analysis (Cambrian Mountains Lamb PGI and Gower Salt Marsh Lamb PDO).

Discursive reference to agroecology is therefore relatively sparse within the regulatory frameworks of Welsh GIs. However, the product specification documents of the three most recent applications for GI status from Welsh producer groups (Vale of Clwyd Denbigh Plum PDO, Gower Salt Marsh Lamb PDO and Cambrian Mountains Lamb PGI) contain the most indicative content about agroecology within this dataset. This trend has not necessarily been through any specific design or explicit “policy drive” towards agroecology amongst the WG, because the key criteria for identifying prospective GIs continue to revolve around the same fundamental principles of terroir as outlined by the earlier work of Barham and Ilbery et al. [44,80]. This is reflected by a policy stakeholder when explaining how recently registered Welsh GIs have been identified and subsequently supported with applications for GI status:

“At the end of the day, it’s got to be a unique characteristic. The product’s got to be in the commercial marketplace and . . . it’s the link section which is the important one, with the geographical, historical, human factors and reputation of the product as well. So, it’s got to meet all those criteria.”

[Policy stakeholder interview respondent]

The extent and type of agroecological elements that are referred to in each document are reflected in Figure 3. The agroecological elements of “culture and food traditions” and “responsible governance” are by far the most frequent ways that agroecology is referred to within the product specification documents. Indeed, these two elements alone accounted for nearly half of all references to agroecology, with “culture and food traditions” accounting for 24% and “responsible governance” for 21% of all coded material within the product specification documents. The next most frequently occurring codes within the product specification documents are far less prevalent, with “efficiency” (13%), “diversity” (11%), “co-creation and sharing of knowledge” (8%) and “circular and solidarity economy” (8%), “human and social values” (5%), “synergies” (5%), “resilience” (4%) and “recycling” (1%) least referred to across the Welsh product specification documents.

Table 4. The percentage of content for each product specification document that was coded to one or more of the 10 FAO agroecology elements.

Product Specification Document of each Welsh Geographical Indication	Year GI Status Awarded	Extent of Coded Text in Product Specification Document that Pertains to One or More of the Ten FAO Agroecology Elements (%)
Cambrian Mountains Lamb PGI	TBC	33
Halen Môn/Anglesey Sea Salt PDO	2014	27
Gower Salt Marsh Lamb PDO	TBC	26
Vale of Clwyd Denbigh Plum PDO	2019	24
West Wales Coracle Caught Salmon PGI	2017	20
West Wales Coracle Caught Sewin PGI	2017	18
Traditional Welsh Cider PGI	2017	16
Pembrokeshire Early Potatoes PGI	2013	16
Welsh Beef PGI	2003	13
Welsh Lamb PGI	2003	13
Welsh Laverbread PDO	2017	10
Carmarthen Ham PGI	2016	9
Welsh Caerfili/Welsh Caerphilly PGI	2018	7
Traditional Welsh Perry PGI	2017	7
Welsh Wine PDO	2007	4
Conwy Mussels PDO	2016	4
Welsh Regional Wine PGI	2007	3
-	-	-

Average coverage per document: 15%

Source: authors.

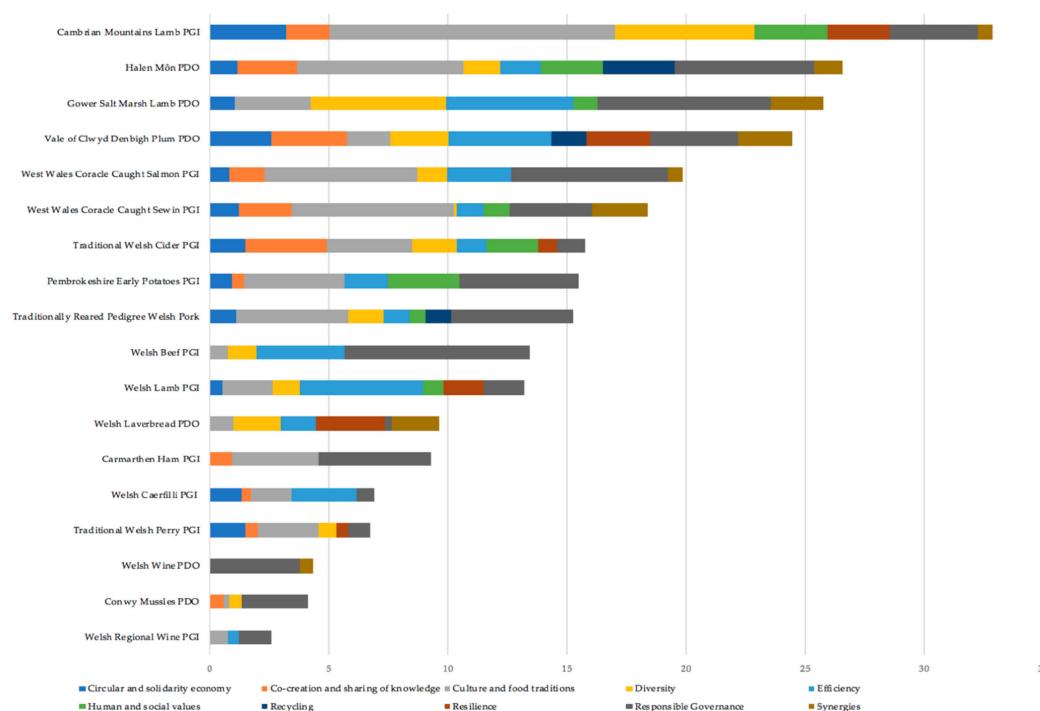


Figure 3. Breakdown of the extent of coded text in the product specification documents (as percentage) for each of the ten FAO agroecology elements. Source: authors.

One of the main roles of the product specification documents is to provide clear legal standards and transparency about how a GI product needs to be regulated to uphold its integrity and authenticity, and to meet health and safety regulations. However, in protecting high quality products with a distinct origin and terroir, the agroecology elements of “diversity”, “human and social values”, and “culture and food traditions” are particularly noteworthy, and could provide a way for the GI scheme and product specification documents to be adapted to support broader sustainability goals.

4.2. First and Second Generation of Welsh GIs

The more recent applications for GI status suggest that agroecological elements have a greater discursive presence, albeit still relatively small, than the initial cluster of applications. Indeed, the first four applications for GI (Welsh beef PGI, Welsh Lamb PGI, Welsh Wine PDO and PGI) between 2003–2007 all contain less than the average coverage across the sample about agroecology within each of the product specification documents. Furthermore, and as indicated in Figure 3, the agroecology element that is most frequently embedded throughout these four product specification documents is “responsible governance”. There is little or no reference to the nine other elements amongst the first four documents when compared to the more recent GI applications since 2013. For example, the agroecology element “co-creation and sharing of knowledge” is not referred to in any of the first four product specification documents (between 2003–2007), but is evident in all but two of the subsequent GIs to have been awarded (or award pending) protected status since 2013.

The data therefore indicate that there are two phases where applications for GI status took place: 2003–2007 and 2013–2019 (Table 4). Moreover, there is a distinction between the discourses within the product specification documents in each of these two phases (Figure 3). For the former, the emphasis is more about technical product requirements and the agroecology element of “responsible governance”. For the latter, a broader array of agroecology elements is embedded across the product specification documents. In this respect, the document analysis indicates that there has been a “first generation” of GIs (2003–2007) and a more recent “second generation” of GIs (2013–2019) in Wales.

Figure 4 illustrates the discursive distinctions amongst first- and second-generation GI product specifications. Drawing on brief extracts from the Welsh Lamb PGI and Cambrian Mountains Lamb PGI, the sections of the product specification document addressing the “link” between product, process and place have a different emphasis. For the “first generation” example, the “link” is articulated in generic terms, emphasizing tradition and Welsh terroir. The “second generation” example goes further by incorporating how the farming systems in a specific region are intertwined with broader sustainability outcomes and preservation of ecosystems, which aligns with agroecology elements of “diversity” and “resilience”, for example.

<p><i>Welsh lamb is a product of the traditional extensive farming practices utilising the expertise built up over generations of producers. Welsh lamb is derived entirely from lambs born and reared in Wales and slaughtered/ processed in HCC verification scheme approved abattoirs/ processors. The unique character of the product arises from the influence of the traditional hardy Welsh breeds that dominate the Welsh flock and also by the lambs feeding on the abundant natural grassland in Wales, which flourishes as a result of the wet and mild Welsh climate and topography.</i></p> <p><i>The unique reputation and qualities enjoyed by Welsh lamb come from traditional feeding on abundant grazing in Wales. Welsh grassland is characterised by heavier rainfall, higher land and poorer quality soils than England.</i></p> <p>Extract from Product Specification Document, Welsh Lamb (PGI)</p>	<p><i>Cambrian Mountains Lamb is a seasonal product, produced from an extensive sustainable traditional system of farming whereby valuable habitats and eco systems are maintained. The grazing of sheep and lamb production by farmers within the Cambrian Mountains plays an important part of this conservation process. 85% of the land in the Cambrian Mountains is used for agriculture, comprising mainly of hill sheep farms</i></p> <p><i>The Cambrian Mountains Lamb is a hardy mountain animal and is allowed to grow and develop naturally at a slow pace on the hills where they roam and feed freely on the unique Cambrian Mountains vegetation. The Cambrian Mountains Lamb grazes the mountainsides extensively during the summer and autumn and at least 75% of the annual dry matter of the animal's diet must be sourced from within the designated area.</i></p> <p>Extract from Product Specification Document, Cambrian Mountains Lamb (PGI pending)</p>
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Figure 4. Extract from the section “4.6 Link” of a “first generation” and “second generation” product specification documents. Source: adapted from [81,82].

This distinction of two generations is further substantiated by Table 5. For the “first generation” (2003–2007), which is comprised of four GIs, the average extent of coded text in these four product specification documents that pertain to one or more of the ten FAO agroecology elements was 8%. This is lower than the average of 15% across all 17 Documents (Table 4). For the “second generation”, of which there are 13 GIs, this figure is 17%—higher than the average across all 17 GIs and nearly double the extent of the “first generation” of GIs. This indicates that when the framework of the ten FAO agroecology elements is applied to the Welsh GI product specification documents, overall there is more discursive reference to agroecology in the GIs that have been registered and have registration pending since 2013 compared to the four GIs registered between 2003–2007.

Table 5. Average extent of the coded text in product specification documents that pertain to one or more of the ten FAO agroecology elements (%) by type of GI.

Type of GI	Years	Number of PDOs	Number of PGIs	Total number of GIs	Average Extent of the Coded Text in product specification documents that Pertain to One or More of the Ten FAO Agroecology Elements (%)
“First generation” GIs	2003–2007	1	3	4	8%
“Second generation” GIs	2013–2019	5	8	13	17%
All PDOs	2003–2019	6	-	17	16%
All PGIs	2003–2019	-	11	17	14%

Source: authors.

Table 5 also shows the difference in overall coverage between the product specification documents of all Welsh PDOs and PGIs. As noted in Table 1, the key regulatory difference between PDO and PGI is that the former demands more stringent product and process specifications, while for PGIs there is greater flexibility, such as being able to source ingredients from outside the region where the product is made. For the six PDOs that have been registered or are pending registration by the EU, the average extent of the coded text that pertains to one or more of the ten FAO agroecology elements is 16%—slightly higher than the average of 15% across all 17 documents. For the 11 PGIs, this figure is 14%, which is slightly lower than the sample average.

The relatively small sample means that conclusions about the differences between PDO and PGIs, based on analysis of the product specifications alone, are limited. As previously noted, the percentages reported here are expressions of a qualitative content analysis, and are indicative rather than precise. Rather, the key result here based on our methodological approach is about a shift over time. Indeed, the temporal differences in discourse across the GIs (“first generation” and “second generation”) are far more pronounced than the discursive differences between the six PDOs and 11 PGIs.

While the overall pattern from this analysis indicates a first and second generation of GIs, the product specification documents of some “second generation” GIs are comparatively sparse in terms of embedding agroecology elements. For example, there are four GIs where the extent of coverage is below the sample average. These are Conwy Mussels PDO, Welsh Caerphilly PGI, Traditional Welsh Perry PGI and Welsh Laverbread PDO. The abovementioned operating context in Wales, in which the uptake of agroecology is seemingly only being passively, rather than actively, endorsed by the supporting administrative bodies and regulatory authorities, may partly account for the level of variation that exists within the first and second generation product specification. In order to better understand this variation (as well as the overall trends), including also the extent to which the depictions of the GIs in the product specifications map on to practice, we turn our attention now to the interview data. To help structure our analysis of the interview data we draw on the agroecology territories framework.

4.3. Adaptation of Agricultural Practices and Conservation of Biodiversity and Natural Resources

As noted in Figure 1, a transition toward agroecology territories requires evolving sustainable agricultural practices and conservation of natural resources in order to maintain or improve the material resources and flows, such as nutrient cycles and water quality [18]. There is some evidence of businesses that produce, distribute and/or retail Welsh GIs actively working to adapt agricultural

practices and better understand the natural resource base linked to the production of PGI certified products. The following respondent outlines measures and adaptations that are being taken within their business in the fresh produce sector:

“We’ve got three or four projects going now and taking the results of the carbon footprint to drive our carbon footprint down by 20% over the next three years. We think that’s easily achievable. There’s that bit, there’s also the water use and environmental nature bits of the Cool Farm Tool as well, so again that’s biodiversity, something to measure biodiversity . . . We’ve done a bit of a trial last year, but this coming year every grower will be doing that.”

[GI Producer interview respondent]

While this biodiversity monitoring is not demanded or strictly attributable to the GI status, the same respondent talked about how the PGI certification has enabled the product to get a “foot in the door” with retailers and to develop a reputable identity and brand, all of which provides a platform for the wider development of a terroir niche innovation. Moreover, in the case of some other GIs, it became evident from interview data that, in practice, attention to elements of agroecology was much more apparent than had been indicated in the product specifications. For example, in the case of one of the “second generation” GI product specification documents (Conwy Mussels), where there was relatively sparse reference to agroecology, the actual practice suggests otherwise. When asked about the traditional harvesting via rake of PDO certified Conwy Mussels and environmental impact, the interview respondent clearly articulated how and why the process is sustainable and ecologically sound:

“There’s no carbon footprint, zero. The mussels feed, have their own habitat down on the mussel beds, there are bird sanctuaries here and there’s habitats and wildlife that survive on the mussel beds as well, so it’s all 200% positive, there’s no negative effects from the mussels whatsoever. It’s as green as you can get, no pollution, no rubbish, no waste, nothing. Plus, they are good for you when you eat them. It’s win-win. All we have is water, which is sea water, that just goes back . . . You’re not dumping waste, like polluted waste, you’re just putting back what you don’t want from the river.”

[GI Producer Interview Respondent]

The agroecology elements of “recycling”, “culture and food traditions” and “circular and solidarity economy” are evident here, even though the rhetoric within the product specification document may not fully reflect the nature and extent of these elements in practice. This example therefore highlights that even when a “second generation” GI is relatively lacking in terms of agroecology elements within its product specification document, exploring what happens in practice supports the broad trend we have identified: recent applications for GI status are more aligned to agroecology than “first generation” GIs.

Conversely, however, for other GIs, the conservation or improvement of natural resources has not been evident since GI certification. At the time of the interviews, for example, there was concern that depleting stocks, thought to be due to a number of combined impacts, such as declining water quality, will render one of the GIs in the fisheries sector “extinct” after several hundred years of practice. As reflected in the following comment, the survival of intrinsic cultural heritage and tradition, which are fundamental components to terroir, are at stake:

“The Welsh people, government, NRW [Natural Resource Wales] are blindsided a little bit, as if this stops here, we’re losing something that is totally unique . . . they’ve got similar things in Korea and Vietnam and things like that but they’re not coracles, with the heritage that we’ve got . . . And once you’ve lost it, you’ve lost it. So, from the PGI aspect, it’s made little difference.”

[GI Producer interview respondent]

The insight about the governance of this GI in practice suggests that irrespective of the extent of agroecological elements that are discursively embedded into a GI's product specification document, joined-up resource management strategies at the territorial scale are necessary for crises to be averted in terms of quantity and quality. Indeed, changes in demand, scale of supply and any increased pressures on local resources (such as overgrazing of livestock, pollution or unsustainable extraction of marine species) can lead to natural resource depletion or "genetic erosion" [83] (p. 168). As such, implementing and enforcing natural resource management is vital to ensure longevity. For example, the following policy stakeholder respondent stated:

"I think the regulatory floor upon which agriculture stands has to be toughened up quite a lot and has to be enforced much more than it currently is, which from a Protected Food Name point of view is probably a good thing, but it's also a good thing from the point of view of broader social outcomes."

[Policy stakeholder interview respondent]

This comment reflects the need for a more interconnected and territorial approach to environmental governance and regulation at the policy level if GIs are to contribute to sustainability transitions.

4.4. Development of Embedded Food Systems

As discussed, GIs have a significant role in the development of agri-food systems that are territorially situated and embedded in place. For example, when asked about the supply chains of a PGI certified product, one producer explained how the "conventional" channel of selling to supermarkets does not align with the more place-based, short food supply chain approach of the business. They stated:

"Do I want to be part of that? It's my business, they don't control me . . . You know, [a large UK supermarket chain] are writing to us because they have just opened a store in Aber... 'we need you, this is the fourth time we've emailed you, fifth time we've emailed you'. They do not figure in our marketing strategy at the moment."

[GI Producer interview respondent]

Similarly, the award of PDO has been an important component in the development of an embedded food system, whereby processes of reconnection and cultivation of solidarity amongst the regional community have been able to coalesce and materialise. One respondent who was engaged in the PDO application and registration process for a GI in the fresh produce sector illustrates this, stating:

"There's been better connection with food and drink producers so that new products have been developed and created by primarily small-scale artisan producers. About 4 or 5 years ago we were approached by a big food producer and they continually tried to bully us wanting fifty tonnes and we've sort of said, no, we can't supply you with that, we want to deal with small food producers. The same goes with the events which we organise. We don't have the big boys in, we have small, small scale producers."

[GI Producer interview respondent]

It is, however, important that the role of GIs is not overly "romanticized" or uncritically regarded as a panacea for developing self-organised embedded food systems. Indeed, products that draw on place-based attributes associated with terroir through the PDO and PGI schemes are ultimately embedded in largely competitive markets [84,85]. The Welsh lamb industry illustrates this point about competing interests that can potentially undermine the development of embedded food systems. For example, all lamb produced in Wales is certified as PGI Welsh Lamb, providing that the product specification is adhered to. Yet, the most recent application for PGI status in Wales, from Cambrian Mountains Lamb, reflects a more nuanced terroir. In contrast to PGI Welsh Lamb, Cambrian Mountains Lamb is tied to a limited region in mid-Wales and, arguably, demonstrates much greater accordance

with the elements of agroecology. This is supported by the data in Figure 3, which show that the product specification document for Cambrian Mountains Lamb contained the most reference to agroecology elements as defined by the FAO compared to any of the other Welsh GIs. However, the PGI application (pending at the time of writing) has been met with some trepidation, owing to the inherent competing interests amongst different stakeholders. A regulatory stakeholder elaborated on the complexities of this situation, while also pointing towards the need for a reflexive and collaborative approach amongst stakeholders to overcome divergence if the territory is to benefit as a whole:

“We have things like organic lamb. We have Salt Marsh lamb. We have Cambrian Mountains lamb and HCC were never that comfortable with those niche brands. My view was always that, “look, it’s complementary.” It can be PGI Welsh Lamb and Saltmarsh Lamb and that has a different niche to PGI Lamb in their own totality . . . they can all co-exist.”

[Policy Stakeholder interview respondent]

An example of the type of approach and governance that can enable the “co-existence” of different terroir niches and the development of the embedded food systems domain is illustrated by the recent Gower Salt Marsh Lamb PDO application, whereby producers and environmental bodies came together to agree on various product specification criteria. This can be an intensive process, as deliberation about the histories, production processes, geographical boundaries and other technicalities of the product require multi-stakeholder discussion [86]. The following respondent reflects this:

“We got the environmental organisations and the producer to sit round the table and, it was quite surprising that actually, although the environmental bodies had these concerns, nobody had actually talked to the producer. They’d talked about it and done their own monitoring and things like that but they actually hadn’t sat down with the farmer, and one of the positives that came out of that meeting was that they’d sat down and, you know, the next step was that they would hold a meeting with the graziers on there and discuss the environmental concerns and look at a way maybe to relay some of those concerns . . . You want to bring people with you and work through those concerns and let people air their views and everything.”

[Policy Stakeholder interview respondent]

While the Gower Salt Marsh Lamb application for PDO had not been officially registered at the time of writing, the *process* in determining the Product Specifications, deliberating about the terroir and environmental impact, indicates that a collaborative approach was taken. This is an important point, because GI applications are subject to scrutiny by the EU and national bodies, who are responsible for registering the GI and handling any amendments to Product Specifications that may arise [87]. Adopting a collaborative approach to the application process as seen in this instance gives space for relevant public and private bodies to collectively discuss how GIs can address the need for possible amendments and deliver on wider sustainability outcomes at the territorial scale.

5. Discussion

There are two key points that have emerged and warrant discussion from this research. Firstly, it is noteworthy that in the Welsh case, two phases, or generations, of GI applications and registrations can be discerned. The first phase, between 2003–2007, saw four GIs registered; the second phase, since 2013, saw the remaining GIs all awarded, or pending award. There has been a greater emphasis in embedding agroecological discourse into the product specification criteria of the “newer”, “second generation” GIs when compared to “older”, “first generation” GI registrations.

As shown in Table 5, this temporal distinction is more prominent than the distinctions between the discourses across the 11 PDO documents when compared with the six PGI documents. It is important to note, however, that this temporal distinction between first- and second-generation GIs is not necessarily fixed, but rather needs to be understood as dynamic and evolving depending on

any specification amendments that may materialise [87]. Moreover, the distinction between “first generation” and “second generation” GIs is not due to any specific agroecological policy strategy in Wales. Rather, our interpretation of the data and application of agroecology as a conceptual lens suggests this to be the case.

The reasons for the increase in GIs and the shift in discourse amongst the “second generation” of GIs may not be due to an intentional or explicit drive towards agroecology per se, but it does resonate with the changing policy landscape in the UK and Wales. For example, the Future Generations Act (2015) and Environment Act (2016) are two key pieces of Welsh legislation incepted at the same time that the “second generation” of GIs were becoming more widespread. With the former, this sets out in law the requirement for public bodies to integrate principles of sustainable development within their organisation and to work towards achieving seven well-being goals. For the latter, the Environment (Wales) Act (2016) sets out targets for the WG to reduce emissions of greenhouse gases in Wales by at least 80% by the year 2050.

Moreover, the WG invested in providing an extension support role specifically to assist producers and producer groups with the intricacies of applying for GI status, starting from 2009. Without this, it is likely that there would not have been the same increase from four to 15 GIs between 2015–2019. It must also be noted that the UK’s initial planned exit from the EU in March 2019 created a “deadline” for prospective GI associations to submit their applications, and this may also account for the increase in submissions for protected status from 2016–2019.

The “second generation” of GI cases within Wales resonates with the direction of travel of the broader international policy landscape around provenance foods and sustainability [52]. Indeed, there has been a “greening” of product specifications over time, which reveals a trend towards a more holistic and sustainable conception of GIs. This is evidenced by, for example, Belletti et al.’s work examining the EU olive-oil sector [88]. Our results show that this trend is reflected both in the Welsh product specification data and in practice.

However, a discursive shift in product specifications does not necessarily mean that more sustainable outcomes are inevitable once PDO and PGI statuses have been acquired. This is because place-based strategies centred around terroir can be stymied or obfuscated if governance strategies are disconnected [89]. Indeed, the case of West Wales Coracle Caught Salmon and Sewin, and the Welsh lamb industry, as discussed, are indicative of this. In this respect, these Welsh cases resonate with the findings of Conneely and Mahon, who argue that owing to the PGI scheme in Ireland being framed as a food quality control and safety mechanism, “[d]iscourses of rural development and sustainability remain marginal . . . PGI certification as a means of adding value to rural livelihoods as a social objective does not find the institutional space to emerge” [55] (p. 20).

The second key point to emerge from our research points to the importance of reflexive governance if terroir niches are to contribute to sustainability outcomes. This is because it is critical for diverse stakeholders in a given space to “feel” collectively attached to a shared problem and future [21]. Reflexive governance, it has been argued, enables this attachment and nurtures stakeholder solidarity—what Everts describes as being part of a “community of fate” [90]. In Wales, there is some indication of this shared future materializing, because, as Marsden argues, Wales has “seized opportunities to develop new and more comprehensive agri-food strategies which promote a more reflexive governance approach” [19] (p. 132). The inception of the Future Generations Act (2015) and the Environment Act (2016), for example, can be regarded as an institutional response to galvanize action and foster a collective sense of shared purpose and common goal. The extent to which this is being realized in practice, and the ways in which GIs can contribute to fulfilling the mandates of such legislation, require further interdisciplinary enquiry. This is where socio-political and pedagogical conceptions of agroecology have much to offer, as agroecology can invite collective attachment and reflexivity to accommodate differences in the process of transition-making and solidarity building [91,92]. This is echoed by Anderson et al., who argue that “experiments with new institutional arrangements in

existing agroecological innovation niches, such as food policy councils, are providing exemplary developments where territorially based organizations are carving out new strategic roles" [41] (p. 19).

Indeed, reflexive politics and participatory governance approaches embedded in place can negotiate contestations and stakeholder divergence that are apparent in some—but not all—of the Welsh GI cases, in the interests of wider regime change [19,65]. Lamine and Dawson argue that collective, territorial approaches, irrespective of scale, need to incorporate "relational reflexivity", which they define as "the capacity to take into account one's own interdependencies to others but also interdependencies between other actors" [93] (p. 634). This is a salient point in the context of transition, because GI systems can be vehicles for the consolidation of market and industrial conventions, and be tainted with highly asymmetrical power relations in much the same way as "placeless" systems [20]. As such, the type of governance and collaborations amongst producer groups, the state and other agri-food stakeholders invested in GIs is vitally important if an enlightened form of production and consumption politics needed for sustainability transitions at a range of scales is to materialise [19].

Reflexive governance of GIs is an important factor in terms of the extent to which they can catalyse and facilitate sustainability transitions in a given territory. Reflexive governance is necessary as stakeholders have agency, in terms of safeguarding public goods and the social-ecological fabric of the territories in which they are embedded [43]. Reflexive governance places emphasis on the "who", such as the various types of stakeholders involved, and the "how", such as the *ways* in which these stakeholders interact and collectively approach GIs. Indeed, reflexive approaches are commensurate with agroecology, as reflexivity can incubate solidarity towards achieving a shared goal, overcoming stakeholder difference and reconnecting agri-food systems to environmental imperatives [93]. In doing so, the intrinsic biophysical landscape and traditional, human knowledge and skill that are vital for the success and longevity of GIs can be more effectively safeguarded [14]. As outlined in the results, the Welsh lamb industry illustrates this point. For example, the "second generation" GI of Gower Salt Marsh Lamb (PDO pending) involved collaborative work amongst a range of stakeholders as part of the application process, and draws on a more specific terroir than the "first generation" Welsh Lamb (PGI) (see Figure 3). However, as our interview data indicate, the interests of stakeholder and regulatory institutions engaged in Welsh Lamb more widely can also inhibit the necessary evolution of a multi-functional, diversified agri-food offer and supply chain portfolio in Wales.

6. Conclusions

It might seem reasonable to expect, from a scheme designed to showcase historical and traditional linkages between product, process and place [80], that evidence of alignment with principles and practices of agroecology would be relatively widespread and easily locatable within the corresponding product specification documents for GIs. The conclusion that we are left to draw from our own analysis, however, is that despite there being some evidence—amongst "second generation" GIs especially—of agroecology elements guiding action "on the ground", alignment with agroecology in the product specification documents remains limited, particularly so in the case of the "first generation" applications. Given the dual role of product specifications as legal documents but also as publicly available points of reference for other businesses and groups interested in pursuing certification for their own products, this absence is significant.

Moreover, the lack of any explicit requirement to embed agroecology in the product specification documents constitutes a missed opportunity when it comes to encouraging reflexivity during the process of preparing an application for submission. This, in turn, further constrains the potential for GIs, at a scheme level, to lead the way in establishing a place-based pathway to agroecology territories. Rather, evidence of a "gradual greening" [88] reflects a situation in which the incorporation of agroecology is emerging primarily from the ground up. It remains, as yet, unaccompanied by any parallel shift from passive to active endorsement of agroecology by supporting administrative bodies and regulatory authorities. As such, we are left to conclude that any transition to sustainable—agroecological—agri-food systems that can be observed within the GI scheme is one

that is being driven by independent organizational and place-based collective action. Building on the research and findings reported here, we close this paper by proposing a future research agenda.

It must be emphasized that our work has focused primarily on the relationships between producers and other regulatory stakeholders. We therefore endorse further work that engages with more “downstream” stakeholders, such as consumers and retailers. This is particularly noteworthy as consumer awareness about the EU GI schemes has been generally very low, especially in Eastern European countries and Northern Europe [12,55]. Indeed, the levels of consumer understanding about PDO and PGI is mirrored by the geography of GI registrations, as the vast majority are located in the Mediterranean region of Europe, such as Italy, France and Spain, and comparatively few in the Eastern and Northern regions [55,94]. It is therefore essential that attention is given to developing deeper awareness and understanding about GIs, and what role various historical, geographical and cultural factors play in this.

Indeed, consumer understanding about the role GIs can play in territorial development strategies is critically important. If the perceived return of investment of time and energy into the scheme is deemed negligible, future producers and applicants for GI status, particularly in countries where there is low awareness, may hesitate to self-organize or dedicate the necessary energy and resources needed to drive the registration process forwards. The registration process can take many months and even years of deliberation, archival research and meetings between different types of producers and stakeholders. Furthermore, it is important that awareness building and consumer-oriented work does not romanticize GIs as being inherently “good”, “alternative” and perhaps even apolitical [95]. Rather, public–private strategies aimed at developing awareness and understanding about GIs need to invite and embrace debate about their *raison d’être*. It is this critical awareness and reflexivity that will determine the extent to which GIs ultimately conform to, or transform, the conventional agri-food regime and thus address deep sustainability issues that are being raised throughout the globe [28].

We therefore advocate for further work that integrates agroecology with the governance of terroir niche innovations. This is an important trajectory because, as noted by Coombe and Malik, for GIs to be considered viable pathways for sustainability transitions, they need to be “envisioned as emerging public goods which must be forged to redress extant forms of social inequality and foster the inclusion and political capacities of the most marginalized actors in commodity value chains” [43] (p. 411). Adopting this critical approach when investigating GIs in other places may also enable discursive shifts to be made apparent in a similar vein to our finding about the “first generation” and “second generation” GIs in Wales.

Finally, the issue of scale warrants further research. For example, in Wales, several GIs, such as Welsh beef PGI, Welsh lamb PGI and Halen Môn/Anglesey Sea Salt PDO are retailed and exported locally, nationally and internationally. For other GIs, such as Welsh Laverbread PDO and Gower Salt Marsh Lamb PGI, the scale of production and demand for niche products is more localized and invariably requires different supply chain configurations. An analysis about the social and spatial proximity relations and types of value chains that GI products draw upon, and how they align with agroecology, is therefore a timely point of departure.

As with other researchers, we suggest that future work “defines the research object by starting from the territory (and the diversity of initiatives) instead of starting from specific initiatives studied in isolation” [22] (p. 162). Theoretical frameworks that address the relationships between value chains, scale, sustainability and GIs [56], as well as concepts born of resilience, offer valuable, interdisciplinary lines of enquiry to continue developing the analyses we have initiated here.

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