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Review

Will Participatory Guarantee Systems Happen Here? The Case for Innovative Food Systems Governance in the Developed World

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Abstract: Participatory guarantee systems (PGS) are locally-rooted agroecological governance mechanisms primarily designed to meet the needs of local producers for product certification and cooperative sales. They have experienced periodic waves of interest in different places throughout the globe. There is a small but rich and growing scholarship devoted to understanding how they are managed, how they are sustained, and what factors predict their success. Interestingly, there is little evidence that they have developed in the United States, which has instead, witnessed the growth of community supported agriculture (CSA), farmer's markets, food hubs and food policy councils (FPC), although many of these mechanisms have failed to sustain interest and support. Here, we explore the factors that drive the creation of systems in the global South, Europe and other regions, and identify the factors that shape a different trajectory for local agriculture in the United States. We discuss the possibilities for more radical food system transformation in the United States, considering a changing climate, an industrial food system that has prioritized profit over health, and the COVID-19 pandemic. Finally, we conclude by identifying some future pathways for policy reform and research opportunities.

Keywords: local food systems; governance; participatory guarantee systems

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1. Introduction

Evidence suggests that the methods we use to produce, process, and distribute our food are deeply implicated in the current climate crisis [1]. One possible solution to industrialized global agriculture is to reconsider the degree to which we can localize our food systems, whereby a population derives more of its own provisions from local sources. In the global North, developed nations tend to lean primarily on more efficient, technology-driven solutions to solve the tangled climate–food nexus, while local food systems remain the primary means of production in many regions of the global South. Participatory guarantee systems (PGS) have evolved as an alternative certification scheme to manage local markets, build relationships with consumers and provide training and education for participants, and are often guided by agroecological principles.

This paper will provide a review of the current state of the literature, sorting the PGS scholarship into themes such as producer incentives, agroecological principles and the nature of cooperative marketing and sales, and the ways in which universities and the public sector have aided in the development of PGS initiatives. Finally, we address the challenges faced by participants and identify those factors which threaten their long-term viability. We then assess those themes against the current state of small-scale agriculture in the United States, identifying research gaps and opportunities for further study with the goal of understanding how insights derived from experimental governance mechanisms in local food systems, and specifically PGS initiatives, might pave the way for more innovative collaboration schemes in the US. Finally, we suggest ways in which research and practice

might produce more effective methods for small and medium scale grower collaboration in the United States and beyond.

Participatory Guarantee Systems: Collaborative Governance of Local Food Systems

Participatory guarantee systems are a fairly recent phenomenon, often designed as a response to a perceived unfairness of burgeoning organic certification schemes, which tend to be nationalized (or globalized) and organized to support large producers. IFOAM -Organics International, Bonn, Germany, founded in 1975, claims to be the only global group tracking and monitoring (as well as training) PGS projects. Their definition of what constitutes a PGS has been adopted by most scholars: "Participatory guarantee systems are locally focused assurance systems that verify producers' compliance to certain organic standards. PGS are based on active participation of stakeholders and are built on a foundation of trust, social networks, and knowledge building and exchange" [2].

In effect, PGS projects are place-based collaborations of farmer-producers, who aim to provide greater production transparency while improving access to local markets. While they have been around for over 40 years, PGS projects have experienced a rise in popularity, and are perceived to be a response to greater market consolidation, particularly in the organic sector because third party certification tends to be too expensive for the smallest and poorest farmers. IFOAM asserts that, in many countries, while the number of acres under third party organic certification is increasing substantially, the population of organic farmers is not, and so those that have the most to gain from entry in broader organic markets often fail to gain access to them.

A confluence of factors, including the growing consumer awareness of the impacts of food production and agriculture on climate, concerns about the health effects of the modern diet, and the perceived benefits of "knowing your farmer" suggest that PGS projects will continue to sustain interest. The degree to which they might further disperse to places like the United States, with its history of industrial agriculture and competitive culture, is a research question we explore here.

2. Materials and Methods

2.1. Search Strategy

Several scholastic databases were selected to search relevant studies, including Business Source Complete, Environment Complete, and Econ Lit. The search term used to identify the broad population of studies was "participatory guarantee system". While larger databases tend to be more comprehensive; for this particular project, they returned similar results, though with more irrelevant or only tangentially related materials.

2.2. Eligibility Criteria

Studies meeting all the following eligibility criteria (see Table 1) are included in the systematic review:

Topics: all papers that focused specifically on participatory guarantee systems.

Study design: our aim was to include all empirical papers, although some reviews are included as well.

Publication status: only international, peer-reviewed journal articles were included, to control the quality of studies.

Language: only studies published in English were included.

Year of publication: most recent ten years (2010–2020). As this is a fairly recent literature, the range is fairly narrow anyway. We occasionally identified additional works not included in the original search but cited within our selection, and we included those as well.

Table 1. Categories of information.

Categories	Information
Basic information	Authors, publication year, title, journal
Settings	Regions, countries
Methods	Quantitative, qualitative, mixed methods
Producer focused	Does the study contribute to an understanding of why producers would join a PGS project?
Agroecological principles	Does the study contribute to further investigation of the agroecological foundations of PGS projects?
Cooperation and collective branding	Does the study address cooperation among market participants or collective branding?
University and public sector support	Does the study address how external support plays a role in PGS success?
Key Challenges	Does the study address key challenges to designing or sustaining a PGS project?

2.3. Selection and Data Collection

Through the searching process, 105 studies are selected after eliminating duplicates. This included 32 articles sourced through Environment Complete, 13 articles sourced through EconLit, and 8 articles sourced through Business Source, with some overlap. Additional articles were sourced through open access directories. To be sure that this literature review was as up-to-date as possible, the authors also maintain Google Scholar alerts to identify newly released studies.

After identifying a broad universe of literature, we screened the studies by scanning their abstracts and titles. Here, we checked if all the inclusion criteria were met (e.g., topics, publication status, etc.). Second, studies were screened by reading the full abstract and the full text, if necessary. Following this screening process, 29 studies were identified to cover a topic that was relevant to the systematic review.

After finalizing the list of studies for the systematic review, the following information was extracted: basic information (authors, publication year, title, journal title), region/location, investigation methods (case study, etc.). We also sorted articles into content categories.

3. Results

In total, 29 publications were deemed relevant as explanatory scholarship about participatory guarantee systems. We identified frequent contributions in the number of relevant publications published after 2010, with 2016 being the peak (6 publications). The two most common countries of study were Brazil (4) and Mexico (4). Several studies involved collaborations between authors from different countries (3). The majority of publications were peer-reviewed journal articles, mostly notably from the journal Sustainability, which offered a special issue in 2016, and which represents the bulk of literature.

3.1. Main Topics: What was Discovered?

Using grounded theory as an exploratory guide [3,4] we assessed the literature thematically, compiling a number of possibilities and categorizing them in Table 2. The search terms of greatest relevance included an interest in better understanding the participants, including assessments of the demographics of participants, descriptions of products and sales, and investigations into their motivations for joining PGSs. Other themes include agroecological principles; collective marketing, distribution and sales; and the impact of university and NGO support. We also included a category for key challenges faced by participants and communities, as it represents a significant component of the literature and shapes our understanding of how well these projects might disperse to wealthier industrialized food systems.

Table 2. Summary table. Many articles appear in multiple categories.

Theme	Article Count	Publications
Producer focused	15	Hruschka, Kaufmann and Vogl, 2021 [5]; Kaufmann, Hruschka and Vogl, 2020 [6]; Marchetti et al., 2020 [7]; Lemeilleur, 2020 [8]; Hirata, 2019 [9]; Kaufmann and Vogl, 2018 [10]; Cuéllar-Padilla and Ganuza-Fernandez, 2018 [11]; López Cifuentes, Vogl, and Cuéllar-Padilla, 2018 [12]; Binder and Vogl 2018 [13]; Rover, De Gennaro, Roselli, 2017 [14]; Home, Bouagnimbeck, Ugas, Arbenz and Stolze, 2017 [15]; Bellante, 2017 [16]; Nelson, Tovar, Gueguen, Humphries, Landman and Rindermann, 2016 [17]; Andres and Bhullar 2016 [18]; Srivetbodee, Igel and Kraisornsuthasinee 2017 [19].
Agro-ecological principles	9	Marchetti et al. 2020 [7]; Hirata 2019 [9]; Cuéllar-Padilla and Ganuza-Fernández, 2018 [11]; López Cifuentes, Vogl and Cuéllar-Padilla, 2018 [12]; Home, Bouagnimbeck, Ugas, Arbenz and Stolze, 2017 [15]; Rover, De Gennaro and Roselli, 2017 [14]; Andres, C., and Bhullar, 2016 [18]; Nelson, Tovar, Rindermann and Cruz, 2010 [20]; Leung, D. S. C. 2021 [21].
Cooperation and collective branding	7	Lemeilleur, 2020 [8]; Home, Bouagnimbeck, Ugas, Arbenz and Stolze, 2017 [15]; Rover, De Gennaro, Roselli, 2017 [14]; Bellante 2017 [16]; Zanasi, Cosimo, Setti and Venturi, 2009 [22]; Vicziany and Plahe 2017 [23]; Si, Schumilas and Scott 2015 [24]
University and public sector support	10	Hruschka, Kaufmann and Vogl 2021 [5]; Marchetti et al. 2020 [7]; Rossing et al 2020 [25]; Lemeilleur 2020 [8]; López Cifuentes, Vogl andCuéllar-Padilla, 2018 [12]; Binder and Vogl 2018 [13]; Home, Bouagnimbeck, Ugas, Arbenz and Stolze 2017 [15]; Nelson, Tovar, Rindermann and Cruz, 2010 [20]; Srivetbodee, Igel and Kraisornsuthasinee 2017 [19]; Leung 2021 [21].
Key challenges	7	Kaufmann, Hruschka and Vogl, 2020 [6]; Montefrio and Johnson 2019 [26]; Kaufmann and Vogl 2018 [10]; Cuéllar-Padilla and Ganuza-Fernandez 2018 [11]; Rover, De Gennaro and Roselli 2017 [14]; Bellante 2017 [16]; Li and Loconto 2019 [27]; Koensler 2020 [28]

3.2. Producers: Incentives for Participation in PGS Projects

PGS projects are intentionally designed systems of local food system governance, aimed at securing the well-being of those embedded in the system. To that end, much scholarship is devoted to understanding how participatory guarantee systems are created and sustained, particularly through descriptions of the participants and their underlying incentives to contribute to the evolving collaboration. Specifically, the literature focused on empirical study of producers is concerned firstly with why they participate, considering the concern on the part of many scholars that securing adequate ongoing participation for necessary functions can be time-consuming and complicated (i.e., [10,11]), and secondly with exploring the particular governance structure that supports their continuing evolution [8].

Broadly, the scholarship suggests that producers are investing in PGS projects based on a need to gain access to markets and to increase small shareholder profit share [9,13,19]; to bolster the well-being of household and consumer communities [14,15]; and as a reaction and response to a global system of industrial agriculture (and, consequently, certification schemes) that tends to leave out small producers [16]. Among the drivers that spur the creation of projects and sustain them over time, this last goal appears most frequently in the literature: the need to develop innovative and participatory governance mechanisms in

order to counteract an industrial food system that is perceived as not effectively serving communities and reducing the ability of small shareholders to exist.

Hruschka, Kaufmann and Vogl [5], relying on historical scholarship of participatory rural development strategies (i.e., [29,30]), suggest that too little research has considered the factors that shape participation in PGS initiatives and propose that additional empirical study of "the dimensions 'who' 'what kind' and 'how'" is an essential building block to a better understanding of the topic. In a related paper, Kaufmann, Hruschka, and Vogl [6] suggest that an improved understanding of the nature of actor participation is crucial, as is the application of this information to a broader theoretical framework. Rover, De Gennaro and Roselli [14], in their assessment of Ecovida, a consumer/producer collective in Brazil, also suggest that PGS initiatives are a response to a global food system that both increases the global availability of food while also increasing awareness of the negative implications of industrial practices for consumers and the planet; we gain more food, but also increase the potential for harm. Conversely, scholars have also considered PGS projects in Asia, particularly China, and suggest that producer incentives are shaped by simpler consumer messaging, notably an interest in healthful food driven by a series of food scares related to pesticides [24].

Lastly, Nelson, et al. [17] explores the degree to which PG systems might serve as an innovative governance mechanism specifically grounded in specific principles of food sovereignty, food justice and, frequently, agroecology. As is explored in the next section, the philosophical and practical impacts of agroecology principles have shaped the design and influence of participatory guarantee systems.

3.3. Agroecological Principles

Embedded in the PGS projects surveyed across multiple studies is a commitment to produce food in the best way possible. To that end, PGS projects embrace organic growing principles at the very least, but also tend to embrace the so-called "beyond organic" principles of agroecology. Agroecology and other forms of agroecological intensification continue to be widely debated. Still, many agree that conventional agriculture has some fairly substantial disconnects that can only be addressed through amendment of the current system, among which are the steep costs of chemical, genetic and energy inputs of the current system, the inadequacy of supply chains to meet the needs of all consumers, and the fact that current diet trends are not aligned with the sustainable use of resources. Tittonell [31] and many others suggest that the fact that food is not being produced where it is consumed (aka localization) is key to substantive change, and that agroecology, as a system of production that aligns with key ecological principles, balances food production needs with regeneration of the landscape.

By embracing agroecological principles, many actors within PGS initiatives are focused on remaking what they consider to be a failed food system. Nelson et al. [20] effectively initiated this discussion, suggesting that AG projects are weighted towards local food system success and are intent on reweaving the economic impacts of food with community-based social relationships. Conversely, Andres and Bhullar [18] argue convincingly that there is room for both conventional organic production and agroecological strategies in a transition to a more resilient food system. They suggest that there are ample similarities and that the differences are complementary: while agroecology tends to address internal system self-regulation and innovative social institutions, conventional (and often TPC) organic agriculture has focused on market access and regulatory frameworks.

Still, many, if not most, actors within PGS initiatives are committed to a collection of agroecological principles. López Cifuentes, Vogl and Cuéllar Padilla [12], for example in their study of PGSs in Spain, utilized structured and semi-structured interviews across three PGS projects, reference a strong motivation to pursue agroecology, and suggest that PGS projects are reflective of a larger global movement among consumers, producers and other stakeholders to bring about a healthier food system for consumers and for the planet. Furthermore, there is awareness of the possible detrimental impacts of contemporary TPC

practices, notably that an unfortunate unintended consequence of the TPC of organic farms is larger and larger monocultures, as they are far easier to certify than the diverse farming practices embraced by agroecological farming systems [8].

As mentioned earlier, Hirata [9] found that farmers primarily choose to become part of PGS initiatives because it allows access to markets. However, in order to gain access to PGS membership, producers are compelled to adopt agroecological principles. By adopting those principles, not only are they required to amend production practices, but they are also encouraged to engage in relationship-building activities, strengthening trust between farmers and with their customers while also guaranteeing fair prices. Significantly, while trust and trust-building activities are also addressed at length by scholars focused on PGS initiatives in Asia, they emphasize a different component: encouragement of organic agriculture often means returning to the long-standing and sound principles of peasant agriculture. Vicziany and Plahe [23] cite an example of the cultivation of basmati rice in Uttarakhand's Dun valley and describe not only a growing incentive to market native rice broadly but also a commitment to traditional forms of production, which are mainly organic farming methods.

Indigenous knowledge is a recurring theme, although it is rarely covered in depth. Marchetti et al. [7] conclude, for example, that perspectives other than those of continued high-intensity food production are imperative, yet the issue is framed most often in a way that focuses on the growth of the human population, diet requirements, and our current and projected ability to feed the world. This framing necessarily suggests an emphasis on industrial high-intensity agriculture, with the danger of forgetting the ecological (and often deeply local) basis of agriculture. Innovation, according to available scholarship, is also a necessary component of agroecology. Marchetti et al. [7] (p. 2) suggest that innovation spurred on by an emphasis on agroecological principles is key to connecting PGS activities to local development, stating that "In this way, local communities' capability to experiment, evaluate and expand their innovation power is emphasized, thanks to farmer-to-farmer research." Rover, De Gennaro and Roselli [14], similarly, find that social innovation, particularly in the form of networked and inclusive governance, plays a key role in the development and evolution of participatory guarantee systems in Brazil.

3.4. Cooperation and Collective Branding

Whereas much scholarship has focused on the question of operationalizing agroecological principles or in mechanisms of farmer governance of local food systems, other reasons for the birth of PGS pilots have been far more aligned with the marketplace, such as the need for additional markets. Still, Lemeilleur [8] (p. 467) argues that "PGS are more than just a certification process. They provide a framework to facilitate individual or collective marketing activities and contribute to a continuous learning process." Furthermore,

> "In the global institutional context, developing a PGS can be interpreted as a return to the principle of the collective management of common resources because a PGS simultaneously aims to define a standard collectively, generate knowledge and ensure the credibility of a label." [8] (p. 468)

In other cases, PGS producers secure more market share and garner better prices by engaging in collective branding under a PGS label [14,15,23,24]. Zanasi, Cosimo, Setti and Venturi [22] (p. 56) conclude that "a successful participatory certification can be influenced by strong local awareness of its advantages not only in altruistic but also egoistic terms; a strong social cohesion, the sense of belonging to a community, becomes another necessary condition to start a participatory process." In this way, collective branding is a feedback process: participation often begets additional participation, and broader and more enthusiastic participation tends to produce a stronger label, more trust among members and greater market share for producers.

Still Bellante [16], among others, suggests a need to balance idealism with a "reflexive localism," noting that alternative food systems are by no means conflict-free, and are evolving communities of practice. To that end, one recurring theme in the literature,

explored in detail in the next section, is the degree to which PGS projects are supported by external actors.

3.5. University and Public Sector Support: Utilizing Institutions for Transformation

The benefit of having administrative support and guidance from research universities and NGOs has been addressed by several scholars, although it is a place where further research is necessary. Hruschka, Kaufmann and Vogl [5] provide extensive commentary about the history of institutional and public support for PGS initiatives, much of which is applicable to our question of how to apply cooperatives and producer-devised certification schemes in the US. They suggest that facilitated support, either through private or institutional arrangements, has been essential for overcoming hurdles and sustaining initiatives.

Marchetti et al. [7] suggests that "more knowledge per hectare" will be crucial to pursue innovation, and recommend both continued technological transfer and continuous training, driven by a participatory, producer-centered approach. We need to straddle the importance of multidisciplinary and cross-field study by being broad and expansive while also emphasizing the particular conditions of each food system through local knowledge by diving deepLy. While such co-production initiatives were not obvious in a recent Chilean study, Rossing et al [25] concludes that a more diverse and effective knowledge production landscape may emerge as the research and practice gaps are filled.

Leung [21], in their empirical study considering the impact of certifications, refers at length to the work of the Partnership of Community Development (PCD), a Hong Kong-based organization that has acted as an incubator for the CSA movement in Mainland China over two decades and has been instrumental in developing a supportive infrastructure for both producers and consumers:

> "two main convivial techniques are brokering the consumer producer relation and the rural-urban relation: one technique allows caring for agricultural commons to be more visible, sensitive, and accountable by calling the producers 'carers' [of the land]; the other, in parallel, renders visible the negotiation of responsibility, producing consumers as companions." [21] (p. 9)

3.6. Key Challenges

Lastly, the literature is rife with examples of what scholars suggest are the challenges faced by PGS groups and their communities. As might be expected, the most notable challenges are the rigors of continuous implementation of the certification process, such as the time it takes to design, implement and sustain a peer-reviewed system, and the personal conflicts that arise [10]. Furthermore, there is a significant and persistent gap in what we know about PGS projects, which has limited the degree to which an effective policy evaluation can be performed [6].

The scholarship also points to broader philosophical concerns as barriers for continued growth in the number of PGS projects:

> "A significant ideological barrier has been generated by societal distrust of self-management and the imagined rupture with certification conventions that are assumed to be technically superior. In most cases, society is reluctant to accept a system based on autonomy and jointly established standards over a system based on technical expertise, as the latter is considered to be more objective." [11] (p. 9)

Cuéllar-Padilla and Ganuza-Fernandez [11] point out that this challenge persists, despite the unending food-related crises that should compel some reconsideration of the sustainability of the current agro-industrial food model. They also suggest that a second internal challenge has to do with established power dynamics. Often, when PGS projects are proposed, they face fierce resistance by conventional certifying bodies and by third party certifiers, who often wield significant governmental power and frequently aim to discredit groups in a way that prevents them from gaining official recognition or gaining public trust. This perspective is shared by Bellante [16], who suggests, in the context of

Mexican PGS projects, that while the strength of a diverse set of actors committed broadly to building a "community economy" is a complementary mechanism that sustains these projects, it is unlikely to succeed in bringing about change in the broader agro-industrial model. Still, even here there is a diversity of opinion: Li and Loconto [27] suggest that despite their lack of state-sanctioned political power, Chinese consumers exert influence by altering conventional food imaginaries as well as the logic of the market.

The root causes of the challenging aspects of PGS projects are also where scholarship finds novelty and hope. Rover, De Gennaro and Roselli [14] characterize PGS projects as instances of intentional social innovation that are qualitatively different from the kinds of cooperatives that might result from an accumulation of social capital or the desire to build a social network:

> "Their practical implementation is connected to a vision of superiority as a solution to existing methods, with its main focus on the construction of social skills and assets, and not on the fulfilment of social needs." [14] (p. 3)

The authors conclude that with regard to PGS initiatives, the end results—greater access to markets, for example, or ongoing peer-learning workshops—are material results that are laudable, but beside the point, in the sense that participatory guarantee systems are collaborative social constructs that aim to wholly reinterpret the local food system in a way that profoundly changes the local food system [14]. Like Bellante [16] suggests, the challenge is one of both scale and sustainability, and yet there is a sense throughout the scholarship that PGS projects are a tangible outcome of a belief that the conventional system is not working for reasons that are much more sweeping than simply gaining access to markets. Koensler [28] (p. 146), in an ethnographic assessment of the Italian Terra Libera network, suggests that actors have successfully formed "a new system of microeconomic exchanges based on principles of solidarity and cooperation rather than competition and market-driven elements (solidarity and material help in cases of difficulty, as well as constant knowledge exchange)".

In summary, PGS projects are broadly characterized in the extant literature as attempts to accomplish a range of food systems goals, including enhanced market access, greater farmer profitability and deeper engagement with their consumer base, frequently with the assistance of external partners. However, they are also representative of a zeitgeist that aims to reconstruct governance structures within local food systems and to reimagine the degree to which production systems can be shaped by an embrace of agroecological principles. The reconstruction of local food systems governance and the re-envisioning of production systems also tend to be iterative feedback structures, suggesting that once they are begun, they are potentially self-reinforcing. The following section considers what we know of the successes and challenges of participatory guarantee systems, and discusses the possibility that they might represent novel governance mechanisms equally applicable to regions without the preconditions of cooperation and substantial small producer populations, such as the United States.

4. Discussion: Will PGS Initiatives Disperse?

Our assessment of the current state of the Participatory Guarantee Systems literature suggests that PGS projects have, particularly over the last decade, emerged as a novel form of local food system governance. The research has been guided by inquiries that define who is involved in PGS projects and where they are located; how they are designed and, frequently, how they have come to embrace agroecological principles; how they are defined as a form of collective marketing; and what external support has assisted their creation and sustainability. For the purposes of this inquiry, the key challenges identified by the prior scholarship shapes the following discussion. In this section, we examine the degree to which participatory guarantee systems are representative of transformative change in the discourse around food, food systems and food as a commons.

Our inquiry here is predicated on a need to provide better guidance for farmers, consumers and policymakers. The United States is widely viewed as having a perfectly

well-functioning food system, one that is efficient at providing an abundant supply, albeit one that is frequently accused of creating foodstuffs of dubious nutritional value, and not doing so equitably and affordably to everyone [32]. However, considering the elephant in the room of the fact that industrial agricultural production is a leading cause of climate change and contributes to a biodiversity crisis, amendments to that food system appear warranted. Moreover, it seems particularly important to note that for over 100 years, the United States has effectively exported a brand of agriculture that has dispersed throughout the world; has the time come to begin importing practices that focus less on production and profit, and more on conservation, regeneration, and well-being?

Therefore, this discussion is guided by several broad questions: why have novel social innovations like PGS projects not happened here? What can we learn about the preconditions, incentive structures and unique challenges of PGS projects that might bolster food system transformation in places like the United States? Under what conditions might we expect PGS projects or something similar to find support in the United States? Below, we outline the conditions that we consider important, based on our review of the literature.

4.1. Participatory Guarantee Systems Will Disperse Widely in the United States, but Only if They Are Economically Viable

In the United States, much of the power of the USDA has historically been aimed at enhancing production capacity: so-called windrow to windrow farming, encapsulated in former Secretary of Agriculture Earl Butz's now-infamous suggestion to American farmers to "get big or get out." Even as the United States has moved towards support of organic production techniques, efforts have primarily been aimed at managing larger and larger enterprises while controlling inputs. Notable exceptions to this rule include efforts to encourage food hubs and food policy councils, though even those mechanisms have frequently failed to sustain interest and support [33–35]. Funding streams have also attempted to address gaps in bottom-up social innovation, specifically through programs, such as the Community Food Projects (CPP) competitive grant program, administered through the National Institute of Food and Agriculture (NIFA) and through the Farmers Market Promotion program, and the Local Food Promotion program (FMLFPP), administered through the Agricultural Marketing Service (AMS). Each effort attempts to support local food system initiatives. Moreover, basic research capacity has grown over time, some of which has attempted to address questions of interest to small and medium farmers, and rural economic development. Still, the success of these programs is unclear. Rural communities continue to struggle, small and medium sized farmers occupy a smaller and smaller share of the national agricultural footprint, and there is little evidence that producer communities are banking social capital and building the kinds of trust networks that make up PGS projects.

Furthermore, as producer-driven mechanisms, is there evidence that PGS initiatives will provide profitability to struggling communities and farmers? While there is evidence that some of the historical incentive for producers is financial stability, the outcomes of PGS projects are often represented as a bundle of benefits, such as access to markets [9,13], but also a vague aim to bolster the well-being of producer and consumer communities [14,15,21,23]. In a culture that is driven primarily by market motives, it seems unlikely that PGS projects would easily gain traction.

4.2. PGS Projects Will Disperse to the United States, but Only if There Are Incentives and Regulations That Support Innovation

As indicated in our review of previous research, one way of addressing this economic challenge is to demand more institutional incentives. USDA incentive programs like the Environmental Quality Improvement Program (EQIP), the Conservation Stewardship Program (CSP) and the Conservation Reserve Program (CRP), lean on an economic history of capitalism and competition and attempt to compel a transition to more beneficial production methods through financial leverage. We propose that further enhancement of those

mechanisms might be indispensable, if we aim to achieve any degree of social innovation in agriculture.

Furthermore, regulations have played some role in the degree to which PGS projects have dispersed throughout the globe. In some cases, participatory guarantee systems are a reaction and response to a global system of industrial agriculture (and, consequently, certification schemes) that tends to leave out small producers [16]. In the United States, we have failed for decades to enact stronger antitrust legislation to regulate the upward consolidation of agricultural firms, from seed to equipment to producers, cooperatives, distributors, wholesalers and retailers, although there is some evidence that this might be changing, driven in part by fears of inflation and widening economic impacts of the COVID-19 pandemic [36].

Similarly, much of the impetus behind PGS is based in an overt rejection of the current system of globalized food production, including impacts to ecosystem health and biodiversity [14]. In the United States, it is instructive to point out that environmental regulations are frequently lax, and the agency chiefly responsible for monitoring the effects of environmental pollution, the Environmental Protection Agency (EPA), is often prevented from addressing food production; crop agriculture is barely regulated, addressing only point-source pollution, presumably for fear that increased regulation would dramatically increase the financial viability of the current system.

Furthernore, the impact of supportive partners is frequently addressed in the participatory guarantee system literature, and it is a potentially impactful leverage point for food system change in the developed world. In making the case for university and public sector partners, we also note that there is frequently a mismatch in purpose and priorities. In the first case, the missions of universities, even the land grant universities, are not aligned with the goals of most producers creating PGS projects. While land grant universities were initially created to foster trust in our food supply, a purpose they fulfilled very successfully, and while they frequently and effectively aim to support local agriculture, they also tend to do so with a particular set of tools, such as through traditional incubator support, conventional cooperative development, and with organic farming support and training [37]. However, their aim is not to assist in the creation of mechanisms like participatory guarantee systems, which are very different from conventional cooperatives. Where PGS projects form endogenously to bring about positive change in a community food system, US land grants aim to scale-up successful agricultural initiatives, innovating for the purpose of higher efficiency and higher production, rather than community-based resilience.

Lastly, Hirata [9] suggests that market access represents an incentive to join PGS projects, and in this way, it is leveraged to induce more uptake of agroecological production practices. In the United States, and elsewhere, where there are often more pedestrian markets than there are available consumers, market access represents far less of a barrier to overcome, and is, therefore, less of an incentive. Similarly, innovation is considered to be a beneficial product of agroecology [7]. In the United States (and throughout the European Union) small farm innovation tends to be shaped by the tepid availability of innovation funding, either from nonprofit or third sector organizations or from government [38].

4.3. PGS Projects Will Disperse to the United States, but Only if Consumers Demand It

As indicated above, the preponderance of effort in the United States, on the part of government, academia and the private sector has been aimed at productivity. Consumers are increasingly perceived as malleable, particularly in local food systems, and their demand is shaped by marketing and advertising. The food systems literature has been silent on the question of whether consumers have adequate information to judge rational food policy. Much print space has been devoted to food insecurity; far less has considered what an effective local food system might look like, to avoid circumstances of food insecurity.

There is also scant research examining the nexus of consumer diet changes and changing food systems. Has education in developed world settings substantively altered consumer choice? While there is some research that has focused on the re-localization of food

systems, it hinges on a normative assumption that localization is a positive outcome. Here, we suggest only that we do not know the impact of increased food production on regions, nor how it would be perceived by consumers within local food systems.

Still, we find that PGS scholarship originating in Asia, particularly that from China, offers novel guidance on how to proceed. Leung [21] in particular suggests that use of PGS as a novel governance mechanism provides not just a useful pathway towards safer and more beneficially produced food, it offers a way forward to a more productive consumer-producer relationship. Leung's model of "convivial agriculture" aims "to render visible the agricultural commons" in a way that transforms PGS projects from models of trust to models of active collaboration between consumers and producers [21] (p. 6).

4.4. PGS Projects Will Disperse to the United States, but Only if Farmers Want It to Happen

One of the guiding preconditions to advancing PGS projects is a desire to solve various problems: the dilemma of markets, the need to boost farmer profitability (especially those who are small and poor) and the need to provide the infrastructure for the certification of production practices. These are undoubtedly requirements within many developing countries. They are often not pressing problems, however, for farmers in the wealthier global North, where, for example, government agencies (such as the USDA) assist in the development of farmer's markets, food hubs and other forms of regional aggregation for local markets. The private sector, in reaction to growing consumer demand for locally produced products, has also designed mechanisms for local producers to market to larger grocery chains. One excellent recent example of this is Walmart's new local delivery program, GoLocal, which offers their in-house advanced logistics support to local merchant businesses, presumably including farms.

Related to this, Bellante [16] suggests, that while the proliferation of global third-party certification schemes has been a boon for some producers and some products (coffee and chocolate for international niche markets, for example), participatory guarantee systems provide a useful mechanism for small producers of perishable crops who do not (and do not aspire to) supply a global market. The population in the wealthier global North represents a complicated mix of producers, but when surveyed, those small producers attending farmers markets in the United States, for example, might align well with developing world producers who aim to supply local markets, suggesting that the proliferation of alternative governance mechanisms for local food systems might only successfully disperse if they originate with our own local farmers. Even if farmers were to demand participatory guarantee systems, the question of how to do so in regions nested within a globalized and industrialized agricultural system remains elusive, and so far, little substantive scholarly work has been devoted to understanding the factors and preconditions necessary to prompt such a transformation.

As indicated above, however, we are not without some signposts: Andres and Bhullar [22] suggest that there is a kind of learning curve that we could embrace. We could, first, lean on those counties that have already explored alternative governance schemes to identify different ways of integrating them into contemporary and established food system governance structures, and, second, we could embrace flexibility, allowing for decisions about PGS design and support to be context-dependent and malleable.

Similarly, Nelson [17], and Leung [21], in the context of the model of "convivial agriculture," point to Ostrom's (Ref. [39] and many others) commons work as a useful theoretical framework, as it highlights the importance of participatory decision-making to designing regulations and enforcing their implementation, the need to adapt to local conditions, and recognition of grassroots-based governance systems (such as those designed by farmers) by higher level authorities.

Similarly, Cuéllar-Padilla and Ganuza-Fernandez [11] indicate that PGS initiatives are often considered a way of applying "radical democracy" to the food system and highlight the possible shift to a commons-based rather than a commodity=based view of food production. Lemeilleur [8] suggests that, while the boundaries of PGS initiatives often

remain fuzzy, there is increasing evidence that governance is converging around principles of common interest, shared vision and, importantly, rules to govern a food commons.

4.5. What if Replication Isn't the Answer?

One of the lessons drawn from a review of successful PGS projects is perhaps not to adopt them as replicable models but instead to embrace their aims, which are to design food systems that are often market-based, but also deeply egalitarian; profoundly committed to conservation and ecological agriculture; and widely perceived as both emblematic of learning communities and committed to subsidiarity in practice. In the United States, it may also be possible to embrace those ideals to produce outcomes that look different from what has been born in Chile, Brazil, China and throughout Europe.

Furthermore, it is also relevant to mention that there is still no scholarly consensus on a framework [6] on which we can hang elements of PGS scholarship in order to better understand the degree to which they are replicable, likely to disperse into regions without a strong history of small producer cooperatives, or representative of novel governance mechanisms that can be applied to a broad range of local food systems. Currently, the literature focused on participatory guarantee systems and, more broadly, on local food systems irrespective of region, fails to identify a firm theoretical foothold on which to understand where we are going. We conclude by suggesting that that a theoretical framework might offer a clear pathway to understanding, at minimum, research directions, and, beyond them, also an understanding of how we might effectively and efficiently transition to cultures that are food-secure, environmentally sound and economically just.

5. Conclusions

One key overarching criticism of food systems work is undoubtedly the very siloed nature of scholarly investigations [40–43]. Indeed, as we push past the second year of the COVID-19 pandemic, scholars have attempted to better understand how the dynamics of disease have impacted food systems, offering an opportunity to broaden the scope of investigations and identify pathways for transformation [44,45]. The attempts to better understand what makes a participatory guarantee system work necessarily reflect this challenge; they also highlight one way in which we might better pursue transformative change in food systems.

There has been significant scholarship describing the characteristics of PGS initiatives. Authors attempt primarily to understand what makes them operate, how they are formed, what happens to them over time, and whether they are likely to thrive or collapse. These are interesting questions about such a novel approach to sustainable agriculture, participatory economics and collaborative governance. Still, virtually all of these articles are found in journals with a specific focus on sustainability and agriculture. Additional research is important; research published in the types of journals that are likely to compel informed policy change is also critical.

Many of the preconditions for the birth of PGS systems are not met in the global North, where the problems of market access, training and certification are solved in other ways. This includes the instigating factor behind the growth of PGS systems: support of agroecology, with its focus on intensification of regenerative production methods and robust relationship building, aims for transformation of the governance of local food systems. In this way, PGS projects, if they were only another market mechanism supporting small farmer connections to markets, education, and customer relations, would seem to be unlikely to disperse widely; indeed, many of these suggestions were made eight years ago, when FAO designated 2014 the International Year of the Family Farming [46]. However, as a solution to a growing problem of the unsustainability of conventional agriculture, challenged by the need to negotiate the needs of small producers and their diverse communities, all while undertaking the remaking of food systems, PGS projects, as representative solutions in developed nations, become more likely.

Finally, the novel aspects of this particular governance mechanism provide fertile ground for policy investigations. Here we have asked how PGS might disperse to the United States, noting the particular factors that shape PGS initiatives in other parts of the world. As with scholarly investigations, we find that there are ample pathways for policy improvement, and methods that are likely to produce multiple benefits. Should the United States decide to shift the mission of institutions, adjusting regulatory and incentive structures to better serve small producers and their bottom lines, it is possible that PGS projects might find support in the US. Should it also decide to encourage the involvement of academics in participatory projects, as has helped in developing nations, it is possible that PGS might find some additional support. It is yet unclear how a robust response from consumers might challenge the status quo in the US, but should consumers become more actively involved in their own food systems, participatory guarantee systems offer a novel social mechanism to bolster support for regenerative agricultural practices and stronger consumer-producer relationships. Nevertheless, farmers remain the most potent force behind efforts to re-localize and regain control of local food systems. In the United States, a systematic effort to regrow the population of small farmers, performed with as much vigor as the effort that was made to decimate them, may hold the key to restoring vibrant, cooperative and resilient food systems.

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