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To cite this article: Julia Reynolds, Michael M Bell, Jacob Grace, Claudio Gratton, Randall D. Jackson, Keefe O. Keeley & Diane Mayerfeld (2021): An agroecological vision of perennial agriculture, Agroecology and Sustainable Food Systems, DOI: 10.1080/21683565.2021.1918313

To link to this article: https://doi.org/10.1080/21683565.2021.1918313

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Published online: 21 Apr 2021.

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An agroecological vision of perennial agriculture

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ABSTRACT

Not all agriculture based on perennial plants is ecologically sound or socially just. But an agroecological concept of perennial agriculture must be. We suggest three key elements of an agroecological vision for perennial agriculture. First, perennial agriculture must be managed with regard for the future as much as the present. Second, perennial agriculture must be situated in an ecological and social context, meeting the material, social, and ecological needs of the individuals and communities that engage in producing agricultural goods – making it what we term an “agroecological endeavor.” Third, perennial agriculture must include a diversity of plants, including – but not limited to – perennial plants. Thus, we propose envisioning perennial agriculture as the perennial management of an agroecological endeavor that includes perennial plants.

KEYWORDS

Perennial agriculture; agroecology; sustainability; social justice

Introduction

On Green Fire Farm in south-central Wisconsin, Farmer Jacob appreciates a perennial struggle: how to balance ecological restoration with the production needs of his agricultural operation. As a sixth-generation farmer on this land, Jacob is attempting to restore the condition of fields degraded by years of annual crops. For inspiration, he looks to mimic oak savanna, the historical landscape of the region. Though he recognizes the agroecological benefits of building perennial grasslands, Jacob also needs fodder for his livestock to graze – but livestock will damage young grasses and saplings. In a pilot study to better determine this process, Jacob planted one silvopasture on a ten-acre plot.

“I’m looking at what types of fencing systems I can use for different livestock classes,” he says, “and how that affects the success of our tree planting” (J. Marty, personal communication, April 16, 2019).

Jacob will use these results to improve these farm management techniques over the next few years. The process is slow, perhaps, but deliberate.
Eventually, he plans to plant most of his several hundred hectare farm to silvopasture that provides shade and fodder for his cattle, pigs, and chickens; contributes to nutrient cycling, soil stability, resilience to extreme weather, aesthetic quality, and biodiversity on his farm and in his neighborhood; and provides nutritious food to a regional food system for many years to come. Though he has yet to use these words, Jacob’s broader vision is for perennial agriculture.

He is not alone. In the past decade, farmers and agricultural scientists alike have increasingly endorsed the agronomic potential of perennial crops for mitigating the environmental impacts of intensive agriculture (Bell, Wade, and Ewing 2010; Glover, Cox, and Reganold 2007; Gomiero, Pimentel, and Paoletti 2011; Picasso et al. 2011; Vukicevich et al. 2016). Though inquiry into perenniality in agriculture is not new (Jackson 1980; Wagoner 1990), scholarship on the subject has intensified with the search for more sustainable agriculture technologies (Pimentel et al. 2012; Smaje 2015). Perennial crops have the capacity to improve erosion control, soil health, pest management, and biodiversity (Glover and Reganold 2010), while potentially increasing food security (Ertl et al. 2015; Glover, Reganold, and Cox 2012; Karlsson et al. 2018) and sovereignty (Holt-Giménez and Altieri 2013).

Definitions of “perennial agriculture” vary substantially. Recent literature includes these broad interpretations: the integration of perennial plants into annual cropping systems (Smaje 2015; Vukicevich et al. 2016); “evergreen agriculture,” or planting trees alongside row crops (Glover, Reganold, and Cox 2012); cropping systems relying on perennial plant cultivation (Eliades 2012); and “perennializing” or breeding cereal grains into perennial plants (Glover and Reganold 2010; Glover et al. 2010; Jackson 2011). Though related, each of these definitions could lead to implementing entirely different agricultural systems, with potentially conflicting goals and processes.

Further, none of these definitions include the social dimensions of agriculture, instead focusing on specific agronomic practices or desired ecological outcomes. Inclusion of the social in agriculture is certainly not new (e.g. Altieri 2002, but as of yet there is little discussion of the social in distinctly perennial systems. We aim to change that. Because we cannot separate agriculture from its embeddedness in social contexts (Bell 2018), and because many problems with agriculture stem from social practices (Smaje 2015), we suggest that a clear vision of perennial agriculture must encompass the social dimensions, as well as the agronomic. All agriculture is a human activity, done by humans for humans, and thus is necessarily always social in its conduct and implications.

To move forward conversations about perennial agriculture, to encourage its implementation, and to invite more voices to the conversation, we offer this vision: the perennial management of an agroecological endeavor that includes perennial plants. Not all agriculture based on perennial plants is necessarily
ecologically sound or socially just. But an agroecological conception of perennial agriculture must be.

Here, we move beyond definitions that limit perennial agriculture to pathway or a practice. Perennial agriculture, as we envision it, is both a means and an end in pursuit of a lasting agriculture. For example, breeding perennial grain crops is indeed a practice of perennial agriculture. But it is not sufficient. Single-crop systems focus on resource extraction and landscape reduction rather than integration. So even if it is comprised of a perennial plant, a monoculture is not ecologically viable in the long-term. Similarly, unjust systems are unstable in the long-term because they create conflict. Perennial agriculture is not just plants that last, but about farming systems as a whole that endure. Thus, farming perennial plants will only adhere to our agroecological vision of perenniality if, at the same time, the agronomic system also supports perennial ecosystems and perennial, or lasting, justice.

Perennial practices need to be socially, ecologically, or economically sound to stay successful. Our vision includes the notion of “perennial management,” or the long-term, consistent, iterative, and intentional management of an agriculture that spans many years or perhaps generations. This explicit reference to management integrates the social with the ecological: someone must be there to manage the land. But perennial management is not quite enough. An agriculture that prioritizes the use of perennial plants may still evade issues of social justice, and will not necessarily provide ecological benefits. So we position this management within an agroecological system in which questions of social justice are inseparable from food production and ecological health. We propose a vision for perennial agriculture in which politics and power must be considered just as explicitly and carefully as the agronomic, economic, or ecological aspects of the agricultural endeavor.

**What it is not**

We view perennial agriculture as distinct from, though cooperative with, other agricultural movements and strategies under the wide umbrella of sustainability. It is worth highlighting a few of these distinctions.

**Perennial agriculture is not just a practice**

Perennial agriculture does not provide a formula for landscape management. There are diverse pathways and practices that may lead to perennial agriculture. However, by representing a concrete goal – one that includes perennial plants but is not defined by them – our vision of perennial agriculture suggests that the practice is only half of the story. The goals matter too. To put it another way, just because an agriculture practice uses perennial plants, it is not necessarily good for people or the land. A landscape
of pure switchgrass oriented only toward biofuels production or even a perennial variety of corn (should a viable one ever be developed) reduce the landscape to economic output. As such, these systems miss the integrative goals that we believe should be our vision for a perennial agroecological endeavor.

On the other hand, certain alternative agriculture movements, like sustainable or regenerative agriculture, share these integrative goals but do not necessarily entail the use of perennial plants. We believe there are sound integrative reasons for including perennial plants in a regenerative system, and that any truly regenerative agriculture is likely to closely resemble our vision for perennial management of an agroecological endeavor that includes perennial plants. This is why we wish to make the case for that inclusion explicit: to ensure the ecological, economic, and social regenerative capacity of agriculture, through perennial practices and goals.

**Perennial agriculture is not a brand**

Because of the many potential perennial practices engendering a multiplicity of perennial agricultures, this concept must not be branded. Perennial agriculture is place-based and context-specific, emerging from grassroots value systems and organization. Other movements, including permaculture (Mollison et al., 1991) and organic agriculture, advertise many of these core tenets. Yet, we are troubled by the ease with which manifestations of these movements, or even the perennialization of grain crops, have embraced top-down management or industrial-scale agriculture (Van Tassel, DeHaan, and Cox 2010) leading to exclusionary, fixed, or destructive systems. Truly sustainable agriculture does not demand ownership over lifeforms or practices. Perennial agriculture fails to meet its end goal if it culminates in the exclusiveness of a branded perennialized landscape, just as it fails if it is socially or ecologically extractive.

**Perennial agriculture is not static**

The concept of perenniality should not be confused with permanence. Perennial agriculture is iterative, dynamic, and adaptive. Though perennial plants stay rooted, they are but one part of an ecological and social system of continuous change. When F.H. King lauded permanent agriculture in 1911, he referred not to permanence of practice, but to the permanent fertility of the agriculture he observed in southeast Asia (King). For King, permanence was the promise from those systems to nurture current and future populations. We are similarly inspired by the promise of perennial agriculture to ensure sustainable food and landscapes.
What it is

We imagine perennial agriculture as socially-just, ecologically enduring farming made possible through perennial plants. Though our purpose is to articulate a vision, we recognize that perennial agriculture is certainly not new. Communities around the world have implemented myriad versions of perennial agriculture for thousands of years. In naming this endeavor, we do not aim to co-opt or control the term, or disregard the peoples who have managed their agroecological landscapes with perennial care. The core tenets of perennial agriculture are foundational to agricultural societies around the world. Rather, we aim to deepen discussions around the term, and in doing so support those individuals who already “do” perennial agriculture. Ultimately we wish to see greater inclusivity in current discussions around the term. Diminishing perennial agriculture to a purely agronomic or technocratic recipe renders invisible certain social and economic exclusions (Lyon et al. 2011). By making explicit these sociopolitical implications inherent to perennial agriculture, we can more clearly articulate and address these challenges.

There are three core elements within our vision for perennial agriculture: The perennial management of an agroecological endeavor that includes perennial plants.

Perennial management

Perennial agriculture manages with regard for the future as much as the present. Without specifying this long timeframe, we risk accepting temporary or annually-oriented practices. Like the concept of sustainability, perennial agriculture is oriented toward the future as well as the present, which is why it must be imagined as both a means and an end. The practice of incorporating perennial plants will only get us so far. We also need practices of perennial justice to reach the goal of a lasting agriculture.

Focusing on the role of intentional, long-term management also highlights the social aspects of agriculture. It leads us to consider what person or group of people will manage the operation now and in the future. Integrating this social context into perennial agriculture creates opportunity for social, political, and economic scrutiny. If perennial agriculture requires long-term management, then individuals or communities without land access, without immediate cash flow, or without the power to make land-use decisions can become marginalized. Those with inter-generational access to land, investment capital, or supportive social or political networks are much more likely to financially succeed. Farmer Jacob reminded us that the distant returns from perennial systems are simultaneously an ecological boon and a socio-economic barrier. As agronomic research reveals the ecological logistics of perennial agriculture, we
need further investigation into these socio-political obstacles and possibilities for transformative action to overcome them (e.g. Rotz, Fraser, and Martin 2019).

**Agroecological endeavor**

Perennial agriculture is situated in an ecological and social context. Agroecology provides a framework to integrate the science, the practice, and the movement (Altieri 1989; Wezel et al. 2009). This framework makes considerations of social justice explicit to perennial agricultural practitioners. If perennial management does not attend to ecological and social justice issues, then it falls short of our perennial agriculture vision. Too often, underlying the definitions of agro-ecological practices are unstated assumptions that agricultural systems are or should be based on individual ownership of land and equipment. Perennial agriculture can be the goal of a single farm operator or a community, with inter-generational or collective ownership, at the garden, farm, or landscape level (Keeley et al. 2019). It can be implemented successfully within various scales, climates, and socioeconomic systems. We opened with a depiction of perennial agriculture on a family-owned farm in the upper-Midwest, and indeed temperate grasslands are the focus of many conversations about perennial agriculture (Smaje 2015). However, perennial endeavors are apparent throughout the world, particularly in peasant agroecosystems (Altieri, Anderson, and Merrick 1987), such as the pastoral agriculture of southern Africa.

Perennial agriculture must meet the material, social, and ecological needs of the individuals and communities that engage in producing agricultural goods. An “agroecological endeavor” provides for society’s material needs, including food and other ecosystem services, as well as livelihoods for those who produce that food. We use the word “endeavor,” however, and not an agroecological “enterprise” to emphasize a broader vision of the goals of perennial agriculture than the merely economic, and to widen our vision of those who are involved and have a “stake” in perenniality. An agroecological endeavor encompasses those who tend the plants and animals that become food, and also the broader social systems that support the long-term capacity of that food production, processing, and distribution. As well, an agroecological endeavor attends to the flourishing of everyone involved, from production to conduction to consumption: farm operators, farm workers, food workers, food distributors, and food eaters (Legun and Bell. 2016). Plus, farms produce goods and services which are not necessarily part of markets – for example, pollination, wildlife habitat, climate change mitigation, and community vitality – but no less valuable for the difficulty and inappropriateness of turning them into something traded. We intend the word endeavor to remind us of the broader values of agriculture beyond the market.
So, our vision for perennial agriculture should not exclude the cultivation of annual plants. Many annuals produce valuable food and fodder and yield diverse economic, social, and ecological benefits. By advocating for perennial agriculture, we do not vilify annual plants or place a moral “good” on perennial species. Still, we recognize that farming landscapes overwhelmingly dominated by two or three annual plants typically result in ecological degradation and economic risk. When annual plants are grown within a greater perennial context, as a component of the agroecosystem rather than as its foundation, they can diversify risk portfolios, increase farm production, and contribute to vibrant landscapes.

**Perennial plants**

Perennial agriculture is an unequivocal call for perennial plants on the landscape. Bringing more perennial plants into our agriculture can help build healthy soils, restore clean surface and groundwater, and enhance the resilience of our food system. The promise of perennial agriculture materializes when diverse perennial plants take root (Crews and Rumsey 2017). Hence, we view both diversity and perenniality as essential components of these systems. In such an approach, monocultures of a single perennial species fall short of our perennial agriculture vision. For example, orchard monocultures are still high-input systems of low diversity, and many criticisms of annual agricultural systems would apply to these orchards as well. We are interested in agriculture that is ecologically resilient and economically sustainable.

Here a noteworthy detail presents itself: perennial agriculture diverges from many notions of sustainability because it necessarily includes perennial plants. Yet, cultivation of perennial plants is by itself not sufficient for our vision of perennial agriculture, because the latter has to be sustainable. Not all sustainable agriculture is perennial, but all perennial agriculture is intended to be sustainable.

Current economic and political systems are oriented toward monocultural production. If our perennial agriculture were implemented today, the farmer would clearly face challenges within the dominant agro-economic structure. For this kind of perennial agriculture to succeed, there must be new, corresponding visions of socio-political and economic systems to support a diverse, integrated, and socially-just world.

**Conclusions**

Because of the nature of perennial management, implementing perennial agriculture as we envision it requires community- and society-level decision-making. Though we celebrate those individuals who are already committed to action, isolated implementation of perennial agriculture is significantly limited
in its ability to produce change. We hope that increasing the visibility of perennial agriculture will add momentum, insight, and critical evaluation to the agricultural and food justice movements that are already seeking these perennial transformations.

Like Farmer Jacob, the authors of this essay share the goal of implementing perennial agriculture on the landscape. We are not interested in prescribing specific practices. Indeed, we have seen many successful pathways toward achieving perennial success in agroecological endeavors. We welcome discussion on various pathways for, and contexts in which, perennial agriculture might be realized. We seek more examples of where and how it already exists. Perhaps more important, we urge conversation and insight on what structures or inequalities restrict implementation. In anticipation of these future discussions of perennial agriculture, we recognize, respectfully, that the final definition will not come from academic scholarship but will emerge from the people who work the land and from the land itself.

Acknowledgments

No potential conflict of interest was reported by the authors.

Partial support (RDJ) for this work came from USDA NIFA Sustainable Agriculture Systems CAP grant (2019-68012-29852).

Funding

This work was supported by the Wisconsin Alumni Research Foundation [UW2020].

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