

REVIEW

Human and social values in agroecology: A review

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Addressing human and social values is a core element of agroecology, including questions of equity and social justice in food systems, supporting autonomy and well-being of food producers, fostering meaningful, dignified forms of food systems work, and reshaping ways of interacting with nonhuman species and ecosystems. In this article, we review peer-reviewed literature related to human and social values in agroecology. We identified a growing social science literature on agroecology and related social theory. We organized and summarized our review around the following themes: social well-being, livelihoods, meaningful work, and gender and social equity. There is considerable evidence that agroecology can improve social well-being, in part through increased food security and improved dietary diversity, which often contributes to culturally meaningful foodways. There is less literature demonstrating how agroecological approaches can increase people's livelihoods through increased income, reduced dependence on inputs, greater financial autonomy, and increased self-provisioning. In some cases, more embedded local markets build connections between producers and consumers and increase employment. Some case studies of agroecological territories point to the salience of understanding how to shift discourses and support social innovations. While there is evidence that agroecology offers an alternative path away from industrial approaches to agriculture, there is minimal research on the meaningful and dignified nature of that work itself. There is also limited research on gendered implications of agroecology, such as impacts on care work, although emerging literature points to transformative methods that address structural inequities for women and other marginalized groups in agroecological initiatives. There is a small but growing literature on racial inequities and agroecology, primarily in the Americas. Major research gaps include racial inequity and agroecology in different cultural contexts, the health impacts of agroecology, such as through the reduced use of pesticides, and the meaningfulness of work derived from a shift to agroecology.

Keywords: Agroecology, Gender equity, Labor, Well-being, Livelihoods

Introduction

Agroecology differs from the synthetic input-intensification of the dominant agricultural paradigm through a holistic approach that emphasizes the linkages between *techno-scientific*, *sociopolitical*, and *ontological*¹/*experiential* dimensions of agricultural systems. Broadly, agroecology can be defined as “the integrative study of the ecology of the entire food system, encompassing ecological, economic and social dimensions” (Francis et al., 2003, p. 100). Agroecology has been highlighted as a potential strategy

to transform the food system (Gliessman, 2016; Anderson et al., 2019) since it can improve soil health and enhance biodiversity while supporting people's livelihoods and food security (Saj et al., 2017; Debray et al., 2019; High Level Panel of Experts [HLPE], 2019; Mbow et al., 2019; Mdee et al., 2019; Bezner Kerr et al., 2021). Understood as “a science, a movement and a practice” (Wezel et al., 2009), agroecology can be viewed as operating in 3 inter-related fields (Sanderson Bellamy and Ioris, 2017; Rosset et al., 2019). The agronomic and ecological fields that receive the greatest attention from researchers comprise the *techno-scientific dimension*, which focuses on ecological approaches to agriculture at the plot or farm scale; the aim within this component of agroecology is typically to minimize the environmental damage from agriculture and leverage biological interactions for food production and the long-term resilience of the food system. Common agroecological practices include mulching, crop-livestock integration, agroforestry, composting, and intercropping (Wezel and Silva, 2017). A primary focus on the technical and scientific dimensions of agroecology, however, has led some scholars to caution against the danger of co-opting agroecology as simply another

1. Ontological is related to or based upon being or existence.

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set of techniques that do not challenge the current inequities of the food system (Levidow et al., 2014; Sanderson Bellamy and Ioris, 2017).

The second broad category, the *sociopolitical dimension*, emphasizes the political and socioeconomic dynamics shaping agricultural production systems (Wezel et al., 2009; Méndez et al., 2013; Meek, 2014; Anderson et al., 2019). In this sense, agroecology addresses questions of equity and social justice in food systems, supporting greater autonomy and well-being for food producers, fostering meaningful, dignified forms of food systems work, and reshaping ways of interacting with nonhuman species and natural spaces (Dumont et al., 2016; Rossett et al., 2019; Barrios et al., 2020; Wezel et al., 2020). Sociopolitical dimensions of agroecology include land tenure, community seed banks, access to credit, local markets, and knowledge sharing (Dumont et al., 2016; Sanderson Bellamy and Ioris, 2017). Agroecological approaches work to build autonomous spaces that value local knowledge and transform food production into more ecologically sound and socially just production systems (Martínez-Torres and Rosset, 2014; Meek, 2014; Méndez et al., 2017; Anderson et al., 2019). In these ways, agroecology is counterhegemonic to the neoliberal, industrial mode of food production, thereby nurturing opportunities for greater food sovereignty (Meek, 2014; International Panel of Experts on Sustainable Food systems [IPES-Food], 2016).

The third broad category includes agroecological ways of being, knowing, living, and producing food differently, namely the *ontological, epistemic, and experiential dimension* of agroecology that produces different subjectivities and understandings of people's sense of living in the natural world (Rosset et al., 2019). Agroecological approaches promote a type of work that requires skills and ongoing learning and is considered by some as providing greater meaning or fulfilment to farmers (Timmerman and Félix, 2015). Farmers have to pay close attention to the processes occurring within agroecosystems, work with a diverse range of crops and animals, and constantly observe and learn new skills due to the knowledge-intensive nature of agroecology. The challenge that this kind of work presents can make it stimulating and enjoyable; agroecological work can help build autonomy by requiring farmers to use their creativity and ingenuity to increase their capacity to apply ecological principles on their farms while developing viable market strategies. Farmers may feel that they are making an important contribution to their communities and supporting long-term ecosystem and human health. Agroecological methods, because of the link to building a circular economy and local markets, might also emphasize more social skills, the need to build trust within their communities, network, and learn from others, and undertake collective action at the landscape scale (Timmerman and Félix, 2015). The lower use of toxic, synthetic inputs, combined with more physical labor to carry out a wide range of on-farm tasks, can contribute to improvements in farmers' and farm workers' bodily health. These working conditions can shift perceptions of, or deepen relationships with, diverse biota within and surrounding farmlands—insects, birds, weeds,

and so on (Timmerman and Félix, 2015; Langwick, 2018). Addressing human and social values is thus embedded in both the sociopolitical and experiential dimensions of agroecology.

Methods

A review of key publications on agroecology identified a consolidated list of 13 principles that underpin an agroecological approach (Wezel et al., 2020) and include those in the *techno-scientific realm* (recycling; input reduction; soil health; animal health; biodiversity; synergy); *sociopolitical realm* (economic diversification; fairness, connectivity, land and natural resource governance; participation), and *ontological or experiential realm* (cocreation of knowledge; social values and diets). In this article, we carry out a focused review of the social science literature related to human and social values in agroecology, including identified agroecology principles, namely *fairness, connectivity, social values, and diets* (Wezel et al., 2020). It was not a systematic search but instead used a “rapid review” methodology since not all criteria of a systematic review were met (Grant and Booth, 2009), such as using 2 reviewers to assess all papers. The review methods combined expert knowledge of the authors, “snowballing” from previous reviews of agroecology (Sevilla Guzmán and Woodgate, 2013; Dumont et al., 2016; Sanderson Bellamy and Ioris, 2017; Anderson et al., 2019), and a search in databases for additional papers. Inclusion criteria included peer-reviewed literature explicitly discussing agroecology in relation to human and social values, English, and published after 2000 and before 2021. (Any papers published after 2020 were included based on expert knowledge). Exclusion criteria included nonpeer-reviewed publications, papers on organic agriculture that did not specifically consider agroecology, and papers published before 2000.

The initial scoping assessment of previous reviews and expert knowledge generated a list of 104 papers, and the reference lists of these papers were also examined for relevant papers using a “snowballing” technique. Scopus database was then searched for additional relevant papers. The authors initially used the keywords of social OR human OR food sovereignty OR unequal* OR equit* OR knowledge OR just* OR gender OR livelihoods AND agroecolog* OR agro-ecolog*. After an initial assessment of the identified papers, a list of key themes was developed, and a further search was done for more specific topics related to human and social values, namely well-being OR well-being OR just* OR meaning OR digni* ($n = 434$), labour OR labor OR work or employment OR livelihood ($n = 763$) OR gender OR feminis* OR women OR woman OR equit* OR youth ($n = 298$) OR racial OR race OR ethnic* AND agroecolog* OR agro-ecolog* ($n = 141$), see **Table 1**. A total of an estimated 240 papers were reviewed by one or more of the authors (see **Table 1**) and a list of key themes and findings were collated. The thematic results were discussed by all authors over a series of virtual meetings over 2 years.

The review has several limitations: First of all, it is likely that some papers were not identified because this is not a systematic review. Secondly, the review is only of

Table 1. Summary of database search procedures and number of abstracts/papers reviewed. DOI: <https://doi.org/10.1525/elementa.2021.00090.t1>

Search Method	Search Terms	Number of Abstracts Screened	Number of Papers Reviewed
Previous reviews and expert knowledge	NA, examined titles	NA	104
Scopus	well-being OR wellbeing OR just* OR meaning OR digni* AND agroecolog* OR agro-ecolog*	273	31
Scopus	labour OR labor OR work OR employment OR livelihood AND agroecolog* OR agro-ecolog*	763	55
Scopus	gender OR feminis* OR women OR woman OR equit* OR youth AND agroecolog* OR agro-ecolog*	298	25
Scopus	health OR pesticid* AND agroecolog* OR agro-ecolog*	670	15
Scopus	racial OR race OR ethnic* AND agroecolog* OR agro-ecolog*	141	10
Total		2145	240

peer-reviewed literature; the exclusion of gray literature limits the extent of the findings, which is particularly relevant for agroecology given the association with social movement and practice-oriented literature. Thirdly, the review primarily included English documents, thereby excluding other relevant studies, including an extensive literature written in Spanish. As the authors' research is focused on Africa and North America, these regions may be over-represented in the rapid review, although the authors' previous experience conducting a high-level policy document (HLPE, 2019) and systematic review (Bezner Kerr et al., 2021) has exposed them to studies in other regions, and considerable effort was made to include literature from other regions.

We identified a growing scholarship from a wide range of disciplines (Sevilla Guzmán and Woodgate, 2013; Dumont et al., 2016) that connect agroecology and social theory to human and social values in diverse ways. We discuss some major themes, critical questions, and remaining research gaps that emerged from our overview of the literature. We divided the results into the following 4 overarching themes based on the Food and Agriculture Organization elements of human and social values (Wezel et al., 2020): social well-being, rural livelihoods and empowerment, meaningful work, and gender and social equity.

Results

Social well-being

A core principle of agroecology is to create thriving food systems that attend to the physical, psychosocial, and spiritual needs of people. Agroecology does this by repositioning agriculture and food systems to be culturally appropriate and responsive to changing societal needs in a sustainable manner. Ensuring that the food system supports social well-being is one way in which agroecology is a holistic approach (Barrios et al., 2020). Improved social well-being relates to multiple agroecological principles (Wezel et al., 2020), including social values and diets (food

systems that are built on the culture, identity, tradition, social, and gender equity of local communities), fairness (supporting dignified and robust livelihoods for all actors in food systems), and connectivity (building linkages and trust between producers and consumers in the food system).

To better situate the role of agroecology in advancing social well-being, it is important to understand the meaning of (social) well-being; even though the term is used in a variety of policy discussions (Gasper, 2007), the definition is fuzzy. The ambiguity surrounding well-being stems from how it can be defined, measured, and applied (Coulthard, 2012). McGregor (2008) describes well-being as a state of being with others that arise from met human needs, and when people can act meaningfully to pursue their goals and enjoy a satisfactory quality of life. Drawing on this definition, White (2009) set out a 3-dimensional approach to the assessment of human well-being outcomes: the *relational* dimension, which considers the extent to which social relationships enable the person to act meaningfully in pursuit of what they regard as well-being; the *material* dimension, which emphasizes the resources people have and the extent to which the needs of the person are met; and the *cognitive* dimension, which takes into account the level of satisfaction people have with the quality of life they achieve (McGregor, 2007; 2009). All the stated dimensions of social well-being—material human needs, relational, and cognitive—are related to the socioeconomic principles and elements of agroecology (Barrios et al., 2020; Wezel et al., 2020). In this section, we emphasize the relational and cognitive dimensions of social well-being; the material dimension is discussed under livelihood impacts.

The relational dimension of social well-being enables a person or group to act meaningfully in pursuit of what they regard as well-being. This dimension transcends the individual to her or his interaction with others in society and how they are satisfied with their living situation (McGregor, 2009). Well-being thus ties in with the concept

of “eudaimonia,” the notion that suggests that beyond physical needs there are social and psychological needs that must be fulfilled for a human being to have achieved total well-being (Ryan and Deci, 2001). These social and psychological needs are constructed together with others in society.

As such, the relational dimension of well-being links with the social movement form of agroecology whereby groups—such as resource-poor smallholder farmers—in self-organized processes can dramatically increase the rate, spread, and use of agroecological innovations and help improve the well-being of their members (McCune et al., 2014; Rosset and Martínez-Torres, 2014). Van der Ploeg (2011) argues that to transform the agricultural system and enable farmers to achieve higher levels of satisfaction, agroecology needs a “social carrier.” Essentially, a social carrier can be described as a group whose own emancipation, as the struggle for its interests and prospects in pursuit of greater social well-being, strongly coincides with the defense and further development of agroecological practices. Van der Ploeg (2011) states that the peasantry is the only possible social carrier of agroecology on a historical scale.

In this way, social well-being is seen as the social fabric of a community and includes, *inter alia*, a sense of belongingness, trust, mutuality, identity, and place (Anwar-McHenry, 2009). This is closely related to the agroecology principle of *connectivity*. The relational dimension of well-being aligns with several socioeconomic principles of agroecology. Self-organizing to promote the welfare of group members can support social equity (or the *fairness* principle), lead to experimentation and joint implementation of the various principles in the actual practice of agroecology (connected to the *cocreation of knowledge*), as well as power rural development and the preservation of the rural fabric (related to the principle of fairness; Dumont et al., 2016). As such, the premise is that the social capital from connections with other farmers influences well-being and serves as the glue that binds communities together.

The cognitive dimension of social well-being deals with the level of satisfaction people have with the quality of life they have achieved (White, 2009). This cognitive dimension describes the total condition of human beings and their quality of life and pays attention to the values and beliefs that people have toward each other and the environment. More broadly, it encompasses the social and cultural context in which farmers live. Several agroecological principles that have been espoused from both theory and practice are linked with this cognitive dimension. Having culturally appropriate diets coincides with the theme of rural development and preservation of the rural fabric as highlighted by Dumont et al. (2016), and the agroecology principle of fairness by supporting robust and dignified livelihoods (Wezel et al., 2020). Consuming culturally appropriate diets requires cultivating crops that are relevant to the cultural fabric of the farming community. Traditional farming systems are increasingly becoming biologically simplified partly due to the rise of monocropping in smallholder farming contexts that were previously

more diversified (Altieri et al., 2015). Aside from the nutritional implications, the reduction in crop diversity has had adverse effects on the longstanding cultural values smallholder farming communities have built around traditional crops. The reduced production of culturally significant foods also implies a loss of Indigenous knowledge systems around such foods (Deaconu et al., 2019). On this point, Gliessman (2007) maintains that there should be a connection between producers in the local food system and consumers to maintain community, enhance social cohesion, and improve social well-being. Consuming culturally appropriate diets further calls for partnerships between producers and consumers of local food, which forms *connectivity* (Dumont et al., 2016).

Peasant economies, as theorized by Chayonov (1966) and elaborated by van der Ploeg (2008; 2011), combine family labor and ecological processes with a range of market and nonmonetary priorities, including greater autonomy. By self-organizing and generating the relationships needed to foster their well-being internally through agroecology, farmers also attain self-determination and financial autonomy from input suppliers and government extension programs that tie them to unsustainable and less efficient farming methods (Rosset et al., 2011). This is closely related to the material dimension of well-being. These material benefits further strengthen the social fabric for stronger collective organizing; more importantly, they serve as the basis for the attainment of livelihood outcomes such as greater financial stability and the preproduction of economically self-sufficient farming communities.

Empirical evidence of social well-being in agroecology
Several studies have linked the increased use of agroecological methods to social well-being and farmer autonomy. In studies of farming communities in Europe and China, van der Ploeg (2008; 2011) makes the case that these households are operating on a different “peasant logic” in which control over the means of subsistence is prioritized over profit. In Malawi and Tanzania, several studies have found that farmers’ use of agroecological practices increased their financial autonomy through reduced synthetic fertilizer use; the financial savings were often reinvested in crop diversification, which in turn increased their household self-provisioning, enhancing food security and dietary quality (Kassie et al., 2013; Bezner Kerr et al., 2019c; Madsen et al., 2021a; Madsen et al., 2021b). Reduced reliance on unreliable and exploitative markets was an expressed benefit for farmers in Malawi, a form of building self-reliance (Bezner Kerr et al., 2019a; Madsen, 2022). Another study in Malawi (Kansanga et al., 2019b) revealed that farmer-to-farmer knowledge cocreation and sharing in a 5-year participatory agroecology project significantly improved social networks and social capital for farmers. Studies in Ecuador and Uruguay also found that farmers valued self-provisioning as a means to reduce reliance on markets, exchange farm products within their communities, and build social ties (Blixen et al., 2006; Deaconu et al., 2019).



Figure 1. Two farmers, along with a local agroecological researcher, inspect a pecan tree in their organic agroforestry system in Santa Catarina, Brazil. Prior to transitioning to agroecology more than 35 years ago, the farmers heavily relied on synthetic pesticides, which led to family health issues. Now the farmers say that “agroecology is everything—from spirituality, health, food, well-being, and living in harmony . . . Because, you are what you eat, in your health.” Photo credit: Dana James. DOI: <https://doi.org/10.1525/elementa.2021.00090.f1>

The links between sociocultural dimensions, political identities, and agroecological practices are a common theme in several studies. Coolsaet (2016) details the role of agroecological processes in rebuilding collective identities and reclaiming the autonomy of farmers in France. Agroecological wine makers in Italy established sociopolitical roles and networks through alternative production practices that celebrate deep connections to the soil and cultural traditions, not as an elite type of *terroir* but as a political stance in opposition to mainstream capitalism and conventional agriculture (Ascione et al., 2020). Another study in Italy and Argentina found that ethnic communities in mountainous landscapes drew on their Indigenous cultural values related to caring for the earth to sustain agroecological practices, despite pressures from tourism and outmigration (Steinhaüser, 2020). In contrast, a comparison of 2 distinct livestock-producing regions in France found that key cultural dimensions of livestock production systems, including gastronomy heritage, cultural landscapes, and contribution to social bonds, could act as either a lever or a barrier to agroecological transitions (Beudou et al., 2017).

In relation to another aspect of well-being, several studies have linked the application of agroecological methods to improved human health (Azevedo and Pelicioni, 2012; Nyantakyi-Frimpong et al., 2017; O'Rourke et al. 2017; Suárez-Torres et al., 2017; Frison and Clément, 2020; Deaconu et al., 2021). Connections to health include increased dietary diversity, the intangible benefits of growing and consuming culturally significant foods, reduced exposure to toxic pesticides, and mental health (Figure 1; Bezner Kerr et al., 2019b; Barrios et al., 2020; Frison and Clément, 2020). A primary goal (and principle) that agroecology

seeks to achieve is enhanced (agro)*biodiversity* through the maintenance of traditional crop species and varieties in smallholder agriculture (Bisht et al., 2018). Numerous studies have found positive relationships between agroecological approaches (especially agrobiodiversity) and increased household and individual-level dietary diversity for smallholder farmers in a diverse array of contexts, including Kenya, Tanzania, Malawi, India, Bolivia, and Guatemala (Darrouzet-Nardi et al., 2016; Ayenew et al., 2018; Bisht et al., 2018; Jones et al., 2018; Bezner Kerr et al., 2019c; Boedecker et al., 2019; Kansanga et al., 2020; Deaconu et al., 2021; Madsen et al., 2021a; Madsen et al., 2021b; Santoso et al., 2021).

An important link between agroecology and health may be the emphasis on cultural values, including Indigenous cosmologies that emphasize one's relationship with nature (Botelho et al., 2016; Suárez-Torres et al., 2017; Gallegos-Riofrío et al., 2021). One study in Guatemala with Indigenous communities found that agroecological systems, which build on the traditional *milpa* system (an ancient traditional farming system founded around the combination of maize, beans, and squash), drew on and supported important cultural values (González-Esquivel et al., 2020). Another study of Indigenous communities in Guatemala conducted in-depth research with organizations that applied agroecological practices combined with Indigenous concepts of well-being, rooted in reciprocity, commitment to Mother Earth, sustainable production and consumption, and contentment with work and family (Einbender and Morales, 2020). The authors found that these Indigenous cultural values combined with agroecological practices inspired and facilitated a pathway to development that improved the local quality of life, while supporting cultural recovery following many decades of violence and armed conflict in the region. Similarly, a case study in Zimbabwe found collective agroecological practices in land restoration increased trust, social networks and cultural recovery from conflict (McAllister and Wright, 2019). These studies underline the significance of cultural values, ancestral heritage in food systems, and cosmologies that support agroecology (Suárez-Torres et al., 2017; Gallegos-Riofrío et al., 2021).

In an analysis of the impact of agroecology on the nutrition of farming communities in Ecuador's Imbabura province, Deaconu et al. (2021) found that compared to their non-agroecology-practicing neighbors, agroecological farmers produced and consumed more traditional foods, particularly food from neglected traditional crops. In this context, Deaconu et al. (2019) explored the pathways through which agroecology improves nutrition in a culturally sensitive manner. They found that agroecology builds social capital through the nurturing of social spaces—such as local markets and community events—which facilitate traditional food exchange practices (related to the principle of *connectivity*). These spaces were observed to also promote nutritional literacy through informal knowledge exchange practices in local communities, which yielded downstream impacts on non-agroecological neighbors. Agroecological markets provided spaces for food bartering, which provided the

opportunity for farmers to access diverse food from other ecological zones that they could not cultivate themselves (Deaconu et al., 2019).

There are limited studies on urban consumers of agroecological food products. One mixed methods study in Ecuador found that urban consumers of agroecological food products from local markets in 3 different sites were more likely to consume adequate fruits and vegetables, and less likely to consume processed foods high in salt (April-Lalonde et al., 2020). These agroecological consumers shared that preparing and eating food from agroecological farms gave them pleasure, joy, and love, suggesting that broader social well-being aspects were important in their eating habits (April-Lalonde et al., 2020). In contrast, a study on urban community gardens in Johannesburg, South Africa, found dietary norms, such as low fruit and vegetable consumption and limited knowledge of and interest in diverse and Indigenous fruits and vegetables, mitigated against local, agroecological urban food production and consumption. Research on ways to encourage changes to food preparation and dietary change in urban contexts is needed (Kesselman et al., 2021).

Fewer studies have examined other dimensions of social well-being related to health, such as pesticide exposure, though broader research on these topics has been conducted (Frison and Clément, 2020). Organically produced foods are higher in substances linked to positive health impacts, such as polyphenols and fatty acids, but more research is needed (Frison and Clément, 2020). In a study in Malaysia, How et al. (2020) found that conventional farmers had higher heat stress levels due to pesticide exposure and the need to wear protective clothing during pesticide applications. The authors also found that agroecological farmers had lower blood pressure and blood glucose than conventional farmers, attributed in part to differences in age (agroecological farmers were younger) and pesticide exposure, which can increase the risk of blood pressure (How et al., 2020). One study of a state-level program that supported traditional agrosilvopastoral systems in Brazil found that farmers emphasized the significance of foods grown without pesticides for their health and well-being (Fedyna da Silveira Furtado and Bezerra, 2014). Another study in Brazil of coffee producers found that agroecological coffee farmers had eliminated pesticide applications in contrast to conventional farmers, but direct impacts on health were not assessed (Pronti and Coccia, 2020).

The emphasis on participation, connectivity, cocreation of knowledge and fairness in agroecological principles suggest that people's mental health may also benefit from agroecological systems. Our review identified one study in Tanzania by Cetrone et al. (2020) which identified links between agroecology and mental health (depression in particular). The study found that agroecology played an important role in improving mental health through improved food security, gender equity, peer mentoring, and farmer experimentation, with the odds of depression 32% lower in women in a participatory agroecology intervention compared to the control group (Cetrone et al.,

2020). In another connection to well-being through health, agroecological systems integrate Indigenously cultivated and foraged plants, many of which serve a dual purpose as medicine and nutrition for local communities (Barrios et al., 2020). Nyantakyi-Frimpong et al. (2016) found that HIV-affected households practicing agroecology reported relatively higher yields and dietary diversity, as well as improved health. In this context, the application of agroecology also helped HIV-affected households navigate other challenges related to labor, social support, and access to seeds. Another study in Malawi found that households using agroecological practices self-reported higher levels of health compared to non-agroecology-practicing households (Nyantakyi-Frimpong et al., 2017).

Overall, there is some research on agroecology and social well-being impacts, but there is limited empirical evidence, including overall social well-being compared to non-agroecological systems, as well as on specific health impacts, particularly related to lower pesticide use, mental health outcomes.

Livelihoods

Theorizing livelihoods in the context of agroecology

The concept of livelihood, although one of the most widely used terms in contemporary development discourse, is contested. A common definition is that of the processes and outcomes associated with how groups in particular places negotiate interaction with their environment and leverage the ecological, social, and cultural resources in such environments to promote material well-being (Scoones, 2009; Carr, 2015). This normative framing of livelihood has, however, been critiqued on several fronts: (1) for ignoring the broader socioeconomic and political processes that affect how people live locally and (2) for focusing narrowly on economic or material outcomes. The former critique is grounded in the realization that local livelihoods such as farming, no matter how locally situated they are in terms of the resources that constitute or drive their reproduction, are tangled in and shaped by broader environmental, political, and socioeconomic processes and structures (Bebbington, 1999, 2000; Carr, 2015). This theoretical lens to livelihoods is particularly central to agroecology as it seeks to renegotiate local agricultural livelihoods within a broader global capitalist food system. The latter critique expresses concern about the "economism" of livelihoods and challenges the dominant thinking that the assets on which people's livelihoods in particular places are grounded are not entirely natural or local. For instance, material resources are typically leveraged into livelihoods outcomes in close connection to knowledge systems can both be locally and externally driven (Bebbington and Batterbury, 2001; Scoones, 2009; Carr, 2013). This framing is also a key feature of agroecology, which thrives on the combined power of local and scientific knowledge systems. Thus, as argued by Carr (2015, p. 333), livelihoods are better conceived of "as systems of local resources and networks intermittently connected to social, economic, political, and environmental relations that cross scales."

How farmers in particular geographies mobilize and combine environmental, cultural, and socioeconomic resources to achieve material well-being within a broader system of global relations has long been at the core of agroecology. Recognizing that local agrarian livelihood outcomes are linked to macro processes and structures in the contemporary capitalist food system, agroecology provides the frame for such mobilizing by first creating opportunities for the renegotiation of access to the means of production and farmer autonomy through collective organizing. By creating agroecosystems that mimic the functioning and resource-conserving principles of natural systems, agroecology provides opportunities for repositioning agriculture in ways that enable farmers to minimize cost and achieve material stability in crucial areas such as food security and income generation.

Agroecology also seeks to connect producers and consumers through shorter food chains as a core principle of agroecological transitions, which can lead to the creation of fairer and more equitable markets for both agroecological food eaters and producers (Loconto et al., 2018). Thus, aside from its emphasis on ecological sustainability, agroecology is also a powerful tool for socioeconomic transformation (Snipstal, 2015; Dumont et al., 2016). As highlighted previously, the agenda for social change and well-being through agroecology transcends the goal of eliminating the sociopolitical constraints enacted by the contemporary capitalist food system to include farmer livelihood improvement. In fact, improving the livelihoods of smallholder farmers and farmworkers—a core aspect of the fairness principle in agroecology—is reinforcing and constitutes the foundation from which to build a grass-roots capacity for broader food system transformation.

Livelihood vulnerability is a growing policy concern in smallholder farming contexts globally, with agroecological farming systems increasingly connected to complex input-intensive agricultural value chains and the associated social and ecological challenges thereof (Dumont and Baret, 2017). Today, most smallholder farming systems rely on synthetic inputs and the transnational corporations that supply these inputs (Moseley, 2016). This socioeconomic integration of smallholder agriculture into capitalist driven agriculture is even expressed in the proliferation of novel financial instruments, such as risk financing and contract farming schemes. The broader livelihood implications of these developments for smallholder farmers include increasing indebtedness and dwindling returns to agriculture (HLPE, 2013). The risk of indebtedness from these programs has found to be a key disincentive for youth engagement in agriculture (Isakson, 2015; Clapp and Isakson, 2018).

The increasing integration of smallholder farmers into global agricultural value chains also means that farmers are increasingly moving away from previous ecologically based nutrient recycling practices, such as crop residue incorporation and composting, which are not only relatively cost-effective ways of replenishing soil fertility but also beneficial for climate change mitigation (Snapp et al., 2021). A related livelihood vulnerability concern is the paradox that smallholder farmers and farmworkers,

together who constitute the majority of the world's food producing population, are food insecure (HLPE, 2013; Minkoff-Zern, 2014).

Given these constraints, the economic viability of smallholder agriculture has, therefore, been a longstanding concern for agroecology. Agroecology provides opportunities for food system transformation that supports autonomous and profitable livelihoods by creating the social organizing necessary for reducing farmer dependence and indebtedness while reorienting farming to take advantage of the resource-conservation synergies of natural ecosystems. This next subsection turns to a review of the contribution agroecology makes to livelihoods.

Empirical evidence of agroecological linkages with livelihoods

A review of agroecological projects in Europe by van der Ploeg et al. (2019) indicated that agroecology has the potential to expand productive agricultural employment and increase the total income generated from the agricultural sector, at multiple scales. In some contexts, such as Andalusia, Spain, agroecological social movements have arisen explicitly to provide viable rural livelihoods for agricultural workers, and have resulted in initiatives such as organic cooperatives that seek to provide decent livelihoods and rebuild rural economies linked to organic consumers (González de Molina and Guzmán, 2017). In Cuba, a long-term country-wide participatory plant breeding initiative, established to increase availability of locally adapted varieties as part of state support for agroecology, led to thousands of viable jobs being created (Benítez et al., 2020). These studies and others suggest that agroecological approaches may increase viable rural employment opportunities through producing value-added local products, improving circular economies, addressing fairness and equity, and building relationships between producers and consumers (HLPE, 2019).

Despite evidence of increased employment opportunities and reduced costs, the limited empirical number of studies in Europe and North America suggest that agroecological producer livelihoods are often precarious, with a low viability of income and social benefits and ongoing work insecurity (Dumont and Baret, 2017). Operating within broader socioeconomic and political capitalistic systems that do not support agroecological farming makes it very challenging to establish viable and decent livelihoods. In an assessment of farming in Puerto Rico, small-scale conventional farmers, in general, struggled to stay afloat, with many relying increasingly on outmigration, particularly after a severe hurricane in 2017 (McCune et al., 2019). In contrast, small-scale agroecological farmers, who were connected to social movements, organized collective labor to rebuild their farms, maintained viable local markets, and used a range of agroecological practices, thereby demonstrating greater resilience posthurricane in maintaining agrarian communities. Farmers and other network members who came to work on the farms articulated a shared history of oppression and efforts to advance decolonization as one of the underlying reasons for their collective labor, and as a means to maintain

dignity in their livelihoods (McCune et al., 2019). Gilbert (2020) observed similar collective efforts by former plantation workers in Sumatra, which led to the establishment of collective agroecological farms and several cooperatives that together provide decent, meaningful livelihoods, in sharp contrast to the precarious, heavy, and difficult work of plantations. In France, farm machinery cooperatives are observed as a key strategy for agroecological farms, pointing to the potential of increased local sharing of seeds, land, knowledge, and other forms of intrafarm cooperation to foster agroecological transitions (Lucas et al., 2019).

The literature documents some livelihood improvements across other regions in the Global South. In an analysis of several agroecological interventions in the Western Highlands of Guatemala, which is made up primarily of small-scale Indigenous farmers, González-Esquivel et al. (2020) used the Framework for the Evaluation of Management Systems to evaluate 4 agroecological interventions implemented to improve farmers' livelihoods and rescue the *milpa* system. The authors found that these interventions delivered "the satisfaction of multiple family objectives, such as food production, income generation, conservation of natural resources and cultural values." This success is notable given that agroecology is currently a key tool used by nongovernmental organizations to drive rural development in this particularly poor region of Guatemala. In a recent study in the Dry Corridor of Nicaragua, Simon et al. (2020) also provide evidence of positive livelihood impacts of agroecology. In this context, the authors found that bio-intensive methods—a labor-intensive agroecological food production approach that requires little land—improved food security and strengthened the capacities of local communities in dealing with other related livelihood challenges arising from poverty and a changing climate. Studies in Brazil (das Chagas Oliveira et al., 2012; Pronti and Coccia, 2020) and Malawi (Kpienbaareh et al., 2022) also found evidence of more diversified and stable livelihoods for small-scale agroecological producers, in part due to reduced input costs and greater diversity in farm products. One emerging model for agroecological markets is that of Participatory Guarantee Systems (PGS), which relies on less costly but structured networks of trust between producers and consumers (Loconto et al., 2018). PGS have been established in several regions of the world, and there is some evidence of their efficacy in supporting more stable livelihoods for agroecological producers as well as increased access to agroecologically produced food for consumers (Loconto et al., 2018; Chaparro-Africano and Naranjo, 2020). The long-term viability of PGS and its potential more broadly is an emerging area of research, with some papers published after the 2020 inclusion criteria of this rapid review.

There are several studies on the livelihood impacts of agroecology in the African context. Kangmennaang et al. (2017) show that households in rural Malawi that applied agroecological farming methods significantly increased household wealth and food security compared to those who did not after just 2 years of applying agroecological

approaches. Another study in rural Malawi found that farmers using agroecological practices not only increased their income, food security, and dietary diversity in a few years compared to those who maintained conventional (non-agroecological) methods, they also increased seed sharing and expanded their social networks, with broader positive impacts on their community's food security (Madsen et al., 2021a). A study of agroecological practices in Tunisia, Morocco, and Algeria found that many farmers used them for explicit economic reasons, noting that the increased use of organic materials to replace purchased fertilizer helped farmers improve their livelihoods (Ameur et al., 2020).

The impact on livelihoods from agroecology as explained in the studies reviewed here is connected to increases in farmer autonomy and food sovereignty. The few studies that examined the impact of agroecological practices on income noted reduced dependence on costly external synthetic inputs, which in turn reduced the vulnerability of local farmers to input price volatility. More research is needed, however, to fully assess the impacts of agroecology on rural incomes, employment, and livelihoods across different social, cultural, political, and geographic contexts.

Beyond the ruralscape, agroecology has also served important livelihood functions in urban areas across the Global North and South (Altieri and Nicholls, 2018; Tornaghi and Dehaene, 2020), including peri-urban farms that serve urban populations and community farms that serve multifunctional roles in the urban context (Horst et al., 2017; Nagib and Nakamura, 2020). In São Paulo, Brazil, for example, urban and peri-urban agriculture using agroecological methods was promoted in the city Master Plan, and agroecological producers have special farmers' market spaces reserved within the city. Farmers who switch from conventional to organic or agroecological production are permitted to label their products "in transition" to gain increased price benefits (Nagib and Nakamura, 2020). Urban agriculture can also serve as a form of community activism, advocating for people's right to the city and the right to land (Nagib and Nakamura, 2020; Siegner et al., 2020). Community groups in low-income areas supported urban agriculture as spaces that provide social interaction and healthy food (Nagib and Nakamura, 2020). In the case of São Paulo, urban agroecological women's groups also raised awareness about and action regarding gender inequity and gender-based violence (Carvalho and Bógus, 2020). While urban agriculture alone cannot provide adequate food to urban populations, there is evidence that urban agriculture significantly contributes to livelihoods and food and nutrition security for some regions and low-income groups, as well as spaces for social interaction and improving mental health (Eigenbrod and Gruda, 2015; Algert et al., 2016; Horst et al., 2017; Siegner et al., 2020).

In an analysis of the impact of urban agroecology in 7 African countries under the Slow Food Movement, Peano et al. (2020) document how urban agroecology is a vehicle for social resilience in urban areas through the development of collective activities, knowledge sharing, and the opportunity for farmers to add value to their products and

develop food-based enterprises to generate income. In an analysis of urban farming in the San Francisco Bay Area of the United States, Siegner et al. (2020) document how urban agroecological farms contribute to ecological resilience while also creating vital spaces for exploring food, community, health, and culture for urban dwellers. In this context, urban agroecology provided the space for farmers to distribute food to community organizations, including food pantries, community health groups, and native land trusts seeking to feed and repossess land for Indigenous communities. Consistent with Siegner et al. (2020), Simon-Rojo (2019) also documents the use of agroecology to address urban food poverty in the marginalized or under-resourced neighborhoods of Madrid, Spain. Tornaighi and Dehaene (2020) articulate urban agroecology initiatives in London, Brussels, Rosario (Argentina), and Riga (Latvia) where social movements organize around affordable land, community hubs to share food, production knowledge and resources, and innovations in nutrient recovery from municipal waste.

Agriculture provides an important source of livelihood for rural youth, who spend an estimated half of their working time on farming globally (International Fund for Agricultural Development, 2019). Hence, it is vital to pay special attention to agroecology's contribution to youth livelihoods. Understanding the impacts on youth livelihoods not only constitutes an opportunity to assess the performance of agroecology as an alternative approach to agriculture, but also its long-term sustainability. In an in-depth analysis of the practices of the youth in the Zona da Mata Mineira region of Brazil, Goris et al. (2019) document the active role of young agroecologists in valorizing traditional knowledge on agroecological practices, such as intercropping, and the subsequent deployment of these practices in producing diverse products to attain financial autonomy. Using research conducted in Senegal, Barrios et al. (2019) also provide evidence of the contribution of agroecology to youth livelihoods. This study demonstrates how agroecology was deployed to regenerate marginal land and create incentives for youth to engage in farming amid persistent youth outmigration due to widespread soil infertility. As the primary intervention, an agroecological farm school was established to train young farmers on soil restoration practices. While in training, young farmers were provided with resources, including land, seeds, and livestock, to equip them for independent agricultural production upon completion of the program. Aside from improving on-farm ecological sustainability, this agroecological project also promoted youth employment. In India, Khadse et al. (2018) argues that the Zero Budget Natural Farming (ZBNF) initiative combined education on agroecological practices with strong community mobilization through discourse, self-organized pedagogical activities, and volunteerism among participants to develop and scale an alternative farming system that addressed farmer indebtedness and suicides among Indian farmers. In a contrasting perspective, Münster (2018) argues that the cultural discourse and practice of the ZBNF is an ambivalent combination—that of joyful experimentation, recognition of soil microbiomes as fellow



Figure 2. Rural livelihoods are maintained with traditional hay harvesting in species-rich alpine meadows in Carinthia, Austria. Such traditional practices can only be maintained through special government payments to the farmers for biodiversity conservation. Photo credit: Alexander Wezel. DOI: <https://doi.org/10.1525/elementa.2021.00090.f2>

living beings, reclamation of decent agrarian livelihoods, and far right Hindu nationalism. This research points to the need to understand the ways in which agroecological systems and related livelihoods are embedded in a broader regional sociocultural, political and economic context.

There is a growing body of work on agroecology “territories” in which agroecological transitions at a regional scale involve farmer-to-farmer exchanges, integration of extension using agroecology, development of local and regional businesses that sell value-added agroecological products, and incentives to initiate change, including public procurement and legislation (Wezel et al., 2016; Pérez-Marin et al., 2017; Anderson et al., 2019). Territory-level agroecological transitions in the semi-arid region of Brazil included social movements that organized forums with governments to develop social innovations and shift the management of local resources (Petersen and Silveira, 2017). A new notion of “coexistence with semi aridity” emphasized conservation and sustainable resource use, generating innovations such as community seed banks, collective labor, cooperatives, and public procurement in school meals and farmers’ markets (Pérez-Marin et al., 2017; Petersen and Silveira, 2017). Other agroecological territorial transitions have been studied in Guatemala, India, Mexico, Brazil, Wales, France, Spain, Italy, and Argentina (Mier y Terán Giménez Cacho et al., 2018; Einbinder and Morales, 2020; Márquez-Barrenechea et al., 2020; Owen et al., 2020; Steinhäuser, 2020). These studies have emphasized several key drivers, including the recognition of a crisis in the food system; a shift in social organization; pedagogical shifts to horizontal, participatory approaches; external allies; favorable policies and markets; and efforts to mobilize discourse (**Figure 2**). Human and social values figure prominently in many of these key drivers; in Guatemala, for example, incorporating important Indigenous values, such as reciprocity, well-

being, and care for the earth, into the spread of practices within the Mayan territory were key (Einbinder and Morales, 2020). In remote mountainous ethnic communities in Argentina and Italy, Indigenous discourse and values related to caring for the earth were identified as important in fostering a shared community vision to sustain agroecological territories (Steinhauser, 2020). More empirical research, including an examination of how to mobilize discourses around a “true-cost accounting” to understand the connectivity between rural livelihoods generated through agroecology, empowering youth, and others in agroecological markets and supporting regional markets at a territorial scale, would help transition agroecology beyond a “niche” approach to food production in many contexts (HLPE, 2019).

Another important principle of agroecology is *autonomy*. In a review of 17 studies that assessed agroecological performance, D’Annolfo et al. (2017) found evidence that agroecology contributes positively to the financial capital of farmers but noted that there was limited research on other social dimensions of agroecology. Several studies of ZBNF, a social movement and set of agroecological practices in India, suggest that an agroecological approach reduced input costs, decreased debt loads, and increased income for farmers (Khadse et al., 2018; Koner and Laha, 2020). Overall, research findings on livelihoods relate to the concept of meaningful and decent work.

Meaningful work

Theoretical perspectives on meaningful work and agroecology

Meaningful work is a contested designation (Roessler, 2012). As discussed among political philosophers and social theorists, there is an inherent contradiction between the necessity of work in society (to earn a living or as reciprocal social duty) and autonomy (Roessler, 2012). Broadly, we might think of work as “meaningful” if it involves the pursuit of purpose, builds, and maintains social relationships; exercises skills and encourages self-development; improves self-esteem and recognition; and fosters autonomy (Smids et al., 2020). For Roessler (2012), work that is autonomous and unalienated, when taken together, largely comprises meaningful work. Supported by principles in Rawls’ “A Theory of Justice,” the notion of self-realization through the “skillful and devoted” exercise of work as a social duty is one example of how work might be understood as meaningful. Importantly, the theory of recognition emphasizes that the way in which we experience work as meaningful (or meaningless) is not independent of the values of a given society (Roessler, 2012, p. 90). For example, it can be personally meaningful to grow crops that sustain and nourish people, but this work rarely receives the social recognition it deserves, especially outside of more explicit community-supported agricultural schemes that directly connect producers and consumers. There are increasing calls for “contributive justice” in society, through work which allows people to participate, develop skills, be productive in ways that reflect one’s ability, and has a more even distribution of meaningful and tedious tasks (Timmerman, 2018).

Within a particular social context, individuals will also ascribe value to work in different ways. Regardless of how a society might generally valorize some work, individuals might determine work to be more or less meaningful. With so many structural and individual factors influencing what type of work is and is not deemed meaningful, clearly evaluating the meaningfulness of work can be challenging and elusive, including within agroecology.

At its core, agroecology represents a critique and contestation of the capitalist (il)logic of industrial, input-intensive agriculture (IPES-Food, 2016). On large-scale industrialized farms, maximum productivity is pursued with mechanization, standardization, and specialization in a limited number of crops. Through the consolidation of land, replacement of human workers with mechanical or synthetic inputs, and both policies and market forces that favor large farms with economies of scale, the rural workforce has been “deskilled” (Carlisle et al., 2019). Small-scale farmers and farmworkers are also subject to and embedded with this capitalist logic, producing and selling farm goods within a marketplace where standardized, monotonous, exploitative, work, purchased fossil-fuel based inputs, biological simplification, and mechanization help to produce vast amounts of standardized food products for low prices, thereby undermining the value of human labor and diverse local ecologies (Weis, 2010). In contrast to the dominant model, agroecology recenters farm management on farmers and farm workers, relying on knowledge-intensive, skilled labor instead of biological simplification and synthetic inputs. On farms that are agroecologically managed, both farmers and farm workers must demonstrate an understanding of how ecological processes and relationships function within a complex agroecosystem. Implementing agroecological practices, such as intercropping or border plantings (e.g., hedges), is not only knowledge-intensive, but it often also requires more labor than conventional, input-intensive management. In addition, the complexity of transitioning to agroecology can be particularly challenging for farmers, although there is limited research on this process.

Empirical studies of agroecology and meaningful work

Researchers have found that some farmers address the higher labor demands of agroecological management through a variety of tenuous, underpaid, or unpaid labor arrangements, such as volunteer programs or student internships (Levkoe, 2018; Ekers, 2019), or with poorly paid migrant labor, family labor, self-exploitation, and off-farm income (Getz et al., 2008; Carlisle et al., 2019; Meyfroidt et al., 2019). Interns working on ecological farms in Canada expressed satisfaction at a mutually beneficial exchange where they learned complex skills and contributed toward changing the food system, but some expressed frustration at unjust labor practices or exploitation (Levkoe, 2018). In a case study in Spain, Medland (2016) notes that while the conversion from conventional to organic production—often the first step toward agroecological practice-use—might signify a significant shift in values toward greater ecological and social sustainability, the same conversion might mean little for farm workers.

Ultimately, labor standards are often the same whether one works on a conventional, organic, or agroecological farm. Without explicitly codified labor standards for a given management approach, differences in the meaningfulness or quality of work on farms will vary significantly (McLaughlin and Weiler, 2017).

Chizallet et al. (2018) carried out action research with 2 grain farmers in France transitioning to agroecology over a year and identified the complexity and organization of work, and a lack of technical support for agroecological practices as 2 key challenges. A study of farmers who transitioned to agroecological horticulture production in Argentina also found that they had to learn new skills and reorganize their work to incorporate new processing and marketing skills with direct markets and short food chains (Parodi, 2018). Farmers managing cacao agroforestry systems in Brazil reported that they were not always able to incorporate additional agroecological practices because of the increased workload involved, and their inability to afford or find hired labor (Fernandes Nogueira et al., 2019).

McCune et al. (2019) in Puerto Rico describe the ways in which agroecological farmers manage their work as a form of Chayonovian “peasant balances,” which they define as “a capacity to aggregate daily farm management decisions into coherent, multifunctional economic strategies that allow for dynamic responses to changing environmental, social and market conditions” (p. 810). Dense social networks, careful market engagement, and use of agroecological practices allowed small-scale farmers to mitigate in response to a hurricane and other shocks, in contrast to other small-scale farmers increasingly reliant on migration and wage labor in a deeply unequal rural context (McCune et al., 2019).

In terms of work quality, empirical evidence for the ways in which agroecology improves the meaningfulness of work for farmers or farm workers is scarce. Though meaningfulness is not explicitly assessed, Dumont and Baret (2017) compared the working conditions of producers across agroecological, organic, and conventional vegetable systems. Through a multidisciplinary literature review, the authors identified 9 dimensions that govern working conditions on farms: leeway and control level, income and social benefits, work (in)security, occupational health, political experience at work, time at work, competence, intrinsic benefits of work, and work-related discomfort (Dumont and Baret, 2017). The comparative analysis indicated that agroecological vegetable systems, as a broad category, did not provide a better work experience for producers than systems under organic or conventional management. Instead, the authors found that farmers who managed medium-sized agroecological farms (2–10 ha) derived greater work satisfaction, worked fewer hours, and valued the social equity of their workers more than farmers who managed conventional or small-sized agroecological farms (<2.5 ha). These outcomes appeared to be a result of numerous psychosocial factors contextualized by structural elements and the trade-offs one must make between the social, ecological, and economic dimensions of food production. As a discrete factor or proxy for other



Figure 3. Farm workers transplant leeks on a sunny winter day in California, United States. Asked about farm worker task diversity, the farmer (not pictured above) responded “Right in front of you, what were the guys doing? They were doing the ditch and putting in the irrigation. They jump over to plant some leeks. They could go out and harvest strawberries. Today there’s no strawberry harvest. Tomorrow they will harvest strawberries.” Whether or not the farm workers would consider this variety to translate into meaningful or higher quality work is unclear and highlights the need for more research that directly engages with farmers and farm workers, rather than just farmers. Photo credit: Jeffrey Liebert. DOI: <https://doi.org/10.1525/elementa.2021.00090.f3>

characteristics, scale was an important variable in this study (Dumont and Baret, 2017).

Investigating the effect of farm size rather than management approach on the quality of farm work in the United States, Harrison and Getz (2015) found that larger farms performed equally, and in some cases better, than their smaller-scale counterparts across a variety of job quality metrics. The benefits of working on larger farms, however, tended to accrue to White, U.S.-born workers, rather than immigrants. Some of the large-farm advantages were associated with economies of scale (e.g., financial capacity to provide fringe benefits) and industrialization (e.g., more ergonomic working conditions on highly modernized dairy farms), but the effect of these large-farm characteristics were often counterbalanced by drawbacks, such as less task diversity on more homogenous, highly specialized operations. One benefit ascribed to agroecological management is the provision of a wide variety of tasks on a single farm (Figure 3) due to the biologically diverse cropping system and ecological practices required for production, as well as an extended growing season and greater duration of seasonal employment (Harrison and Getz, 2015). While task diversity can reduce the likelihood of injuries related to repetitive movements, more physically demanding farm work can simply be less viable for farmers and farm workers of advanced age or with physical disabilities.

A study of diversified organic vegetable producers in southern France also found that while farmers worked

long hours, they derived greater satisfaction and meaning from their work, in part because of a wide range of different and challenging tasks, and increased farmer autonomy and decision-making (Dupré et al., 2017). The complexity and diversity of tasks and ongoing learning that was required, as well as the positive feedback directly from consumers, gave these producers a sense of accomplishment and fulfillment in their work, which helped to compensate for the long hours (Dupré et al., 2017).

Researchers in Senegal have examined the political dimensions and labor dynamics for farmers using agroecological practices (Boillat and Bottazzi 2020; Bottazzi et al., 2020). Despite an emphasis on increasing farmers' well-being in agroecological initiatives, dominant agribusinesses, different hierarchical forms of control by nongovernmental organizations over farmer labor, and increasingly neoliberalized markets restrict farmers' autonomy and often make them more technical demonstrators rather than agents of agroecological transformation. Here, the broader political economy of development in a neocolonial context is shaping the experience of agroecological production. Overall, there is limited empirical research on the meaningfulness and experiences of those using agroecological practices. Notably, this research gap is closely related to concerns about equity in agroecology.

Gender and other forms of social (in)equity

Addressing power inequities within agroecology

A core component of human and social values in agroecology is addressing power differences, with gender inequity as one important theme. One reason for the specific focus on gender relations is due to the key role that gender dynamics play in fostering nutrition (Smith and Haddad, 2015; Bezner Kerr et al., 2019c), although the links between gender and other social inequities are also tightly linked to social justice questions. Attention to power dynamics is one of the fundamental ways to differentiate agroecology from other sustainable agriculture approaches (HLPE, 2019). Although there is limited research on power dynamics within households and communities that use agroecological approaches, it is an emerging field of scholarship (e.g., see Schwendler and Thompson, 2017; Zuluaga Sánchez et al., 2018; Bezner Kerr et al., 2019c; Trevilla Espinal et al., 2021). Furthermore, concerns about the labor intensity of agroecology have ethical dimensions: if agroecology is leading to increased workloads for women at the expense of their health and well-being or in ways that exacerbate gender inequities, then it is not supporting a just food system. As noted by Zuluaga Sánchez et al. (2018), feminism and agroecology have shared goals to transform social relations, improve people's quality of life, and support nature. Feminist scholars note that addressing inequity goes beyond gender to consider multiple and often layered differences in the food system (Sachs and Patel-Campillo, 2014). Intersectionality refers to these overlapping and interactive ways that race, sexuality, class, gender, and other categories of difference act as multiple sources of power and forms of oppression at the

individual, social, and institutional levels (Crenshaw, 1991). *Feminist agroecology* considers these power dynamics in many ways—asking about the benefits, drawbacks, and costs of different practices, and how the food system needs to be reshaped to ensure that everyone benefits (Zuluaga Sánchez et al., 2018). These questions can be asked at multiple scales: field, household, community, and beyond. How do specific practices affect different people's time, work, and leisure? Who is involved in decision-making about farm practices? How are benefits from agroecological practices being shared among families and communities? At a broader level, what are the political implications of a shift in agroecological practice—such as farmer cooperatives, extension programs, research activities, or government subsidies—and how are social inequities addressed at this scale?

Gendered experiences with agroecological practices at the field level

While limited, there is increasing scholarship on gender and agroecology. Feminist movements within agroecological social movements have raised issues of gender inequity in multiple contexts, including global, national, and regional scales (Schwendler and Thompson, 2017; Carvalho and Bógus, 2020; Feitosa and Yamaoka, 2020). Land is a critical resource that, with rising numbers of landless people in the context of a global increase of land grabs (Edelman et al., 2013), can make agroecology inaccessible for women and other marginalized groups, such as Indigenous producers (Nyantakyi-Frimpong, 2017; Jacobi and Llanque, 2018; Sylvester and Little, 2020). A study of HIV-affected households in Malawi found that land availability was a particular constraint for widows and other female-led families to use agroecological methods (Nyantakyi-Frimpong et al., 2016). This study also found gender inequities in agricultural decision-making, with tobacco often prioritized by men over food crops; nonetheless, over half of the households interviewed reported improved dietary diversity, income, and food security from the use of agroecological methods (Nyantakyi-Frimpong et al., 2016). In northern Ghana, gender, marital status, age, and gender dynamics influenced whether agricultural diversification led to benefits for different household members (Nyantakyi-Frimpong, 2017). A few studies found that increased agrobiodiversity alongside livelihood diversification can be empowering for addressing gender inequities by increasing women's access to resources (Oliver, 2016; Bezner Kerr et al., 2019a). An in-depth qualitative study in Costa Rica with 9 female farmers using agroecological methods (Sylvester and Little, 2020) found that agroecology offered economic opportunities for women, a finding echoed by another study in Brazil (García Rocas et al., 2014). Access to credit varied for women in Costa Rica, with some credit programs available for small-scale agroecological and organic farmers (Sylvester and Little, 2020).

The disproportionate work that women provide in the “care economy” (including childcare, household work, and elder care) has been a notable barrier that prevents women from carrying out and benefiting from



Figure 4. A man smiles while grinding grain into flour at a community event called a “Recipe Day” in the Ekwendeni region of northern Malawi. As part of the locally based Soils, Food, and Healthy Communities project, Recipe Days were developed to address the inadequacy of one-on-one interventions to improve child malnutrition, food insecurity, and gender inequality, particularly as these challenges relate to the division of household labor and decision-making. Recipe days created an opportunity for men to take part in traditionally ascribed cultural roles of women, including cooking, as shown in this picture. Photo credit: Rachel Bezner Kerr. DOI: <https://doi.org/10.1525/elementa.2021.00090.f4>

agroecology (Lyon et al., 2017; Calderón et al., 2018; Chiappe, 2018; Sylvester and Little, 2020). In the study of HIV-affected farmers in Malawi, women reported reduced labor from agroecological practices such as intercropping, but some indicated that due to having HIV-positive people in the family, their reduced labor and increased workloads from caregiving prevented them from implementing some practices (Nyantakyi-Frimpong et al., 2016). A few studies found some, but limited, evidence that agroecological approaches were changing the household division of labor (Bezner Kerr et al., 2016; Calderon et al., 2018; Bezner Kerr et al., 2019a), while some studies reported that agroecological methods can reduce leisure and time for other important household tasks, such as income generation or childcare (Bezner Kerr et al., 2019a; Sylvester and Little, 2020). At the same time, an agroecological approach may foster greater cooperation within communities, which can reduce unequal workloads at the community scale (Sylvester and Little, 2020). The emphasis on colearning and participatory methodologies as part of an agroecological approach means that there is often increased equity in knowledge sharing and empowerment for marginalized groups, including women, those living with HIV, and Indigenous peoples (Figure 4; Nyantakyi-Frimpong et al., 2016; Oliver, 2016; Bezner Kerr et al., 2019c; Sylvester and Little, 2020).

Another arena where social equity is addressed is through increased participation and leadership in

agricultural organizations (Benítez et al., 2020; Feitosa and Yamaoka, 2020; Sylvester and Little, 2020). An agroecological herbal cooperative in Uruguay, for example, encouraged women’s leadership and organizing to address social inequalities, in some cases influencing policy (Oliver, 2016). Two agroecological initiatives connected to social movements in Brazil actively involved women’s networks and supported women to play more of a leadership role, with positive effects for women in terms of solidarity, knowledge sharing, and economic benefits (Swendler and Thompson, 2017; Feitosa and Yamaoka, 2020). Similar results were reported from a participatory plant breeding initiative in Cuba which included a focus on gender equity (Benítez et al., 2020). Urban agroecological women’s groups in São Paulo provided opportunities for raising awareness about gender inequities (Carvalho and Bógus, 2020). Efforts to engage in participatory research with women in Chile actively led to the establishment of agroforestry systems, with the recognition of many constraints on women’s productive time allowing for their successful use (Peredo Parada et al., 2020). In other instances, however, dominant patterns of patriarchal and political power are not challenged in agroecological organizations; one study in Bolivia reported that men tend to hold sway in meetings and positions (Jacobi and Llanque, 2018). Underrepresentation of women in coordination and leadership roles in other agroecological social movements has also been observed (Arias Guevara, 2014; Morales et al., 2018; Sylvester and Little, 2020; Trevilla Espinal et al., 2021). These gender inequities found in agroecology—gendered workloads, leadership roles, and access to resources—reflect broader inequities in society; consequently, agroecology can only contribute to the transformation of food systems if it addresses these underlying social inequities (Nyantakyi-Frimpong, 2017; Sylvester and Little, 2020). Addressing these inequities means establishing focused initiatives to challenge heteronormative, gendered household models and dominant patriarchal cultural norms about men and women (Sachs and Patel-Campillo, 2014; Benítez et al., 2020; Sylvester and Little, 2020; Trevilla Espinal et al., 2021).

Furthermore, considering intersectionality is crucial for understanding potential impacts such as gender, marital status, health status, Indigeneity, small-scale and landless groups, and the overlapping, context-specific realities that limit the potential of transformational agroecology (Nyantakyi-Frimpong, 2017; 2021; Sylvester and Little, 2020). There is limited literature on intersectionality related to racial or ethnic inequities and agroecology, but with some common ground and exchange between food justice and agroecology scholarship and activism (Fernandez et al., 2013; Glennie and Alkon, 2018). Earlier scholarship in Indonesia (Gauthier, 2000), Laos, and Thailand (Choocharoen et al., 2014) examined how ethnic groups had different agroecological farm management strategies and perceptions, due to differences in land tenure, political systems, knowledge, and cultural practices.

Research in Nicaragua found that the Indigenous and Afro-descendent farmers sustained higher levels of agrobiodiversity than the “*mestizo*” (Spanish-speaking people

of mixed European and Amerindian descent) farmers (Williams, 2016). The authors of the study traced this to a political history of autonomy and rights for Afro-descendent and Indigenous farmers. Another study was carried out in Brazil with the *quilombola*, descendents of African, Indigenous, and European people who formed independent communities, separate from the plantation system (Montero, 2020). The *quilombos* (communities of quilombola) are recognized in the 1988 Brazilian Constitution for both their collective land rights and cultural practices and are considered sites of Black cultural heritage, resistance, and social memory (Montero, 2020). In Campinho, Brazil, community members have long used agroecological practices, and women leaders have promoted community-based tourism centered around “ethno-ecological” approaches that focus on cultural, environmental, and economic needs related to the sovereignty of their quilombo community (Montero, 2020). Women quilombo leaders act as guides, restaurant owners, and managers of the agroecological tree nursery, and the profits from tourist activities go to the Association and are shared within the community. This community-based tourism emphasizes women’s local agroecological knowledge and Black cultural heritage and resistance, with women’s leadership in matrilineal families at the forefront. Rather than challenging gender and racial categories, gender and Black ethnicity are essentialized to some extent as a form of “otherness” by the women quilombolas, and gender inequality remains a challenge for women participating in tourism and agroecology practices in Caminho (Montero, 2020). Nonetheless, the combination of agroecology with community-based tourism promotes an ethos and awareness of links between ecological sensibilities, gender, ethnicity, cultural heritage, and rights, which has liberatory potential as a form of social action in this context.

Another area of recent scholarship related to racial inequity and agroecology focused on the growing racial diversity, tensions, and contradictions of farmers and eaters in alternative and sustainable agriculture in the United States (Slocum, 2006; Alkon and Vang, 2016; Aptekar, 2019; Minkoff-Zern et al., 2020). Alternative farmers’ markets and the narratives associated with healthy, sustainable food production are often coded as higher income “white spaces” that exclude lower income and other racial categories (Slocum, 2006; Aptekar, 2019). One south Asian market in California, for example, moved beyond the dominant narratives and spaces of white farmers and eaters in alternative food markets (Alkon and Deng, 2016). Another study examined national statistics as well as qualitative interviews to argue that many Latino/a farmers used ecological farming practices, including increased agrobiodiversity and limited use of synthetic inputs, but they were often not recognized for these agroecological methods due to persistent and often racialized barriers, and spaces of exclusion (Minkoff-Zern et al., 2020).

Discussion

In this article, we reviewed the literature on human and social values in agroecology, identifying 4 thematic areas:

social well-being, livelihoods, meaningful work, and gender and other forms of social (in)equity. We identified a small but growing literature in these areas, as noted by a previous review of agroecology research (Sanderson Bellamy and Ioris, 2017). We linked these findings to agroecology principles, namely *fairness, autonomy, connectivity, social values, and diets*.

The review shows some empirical evidence of social well-being improvement for households that transition to agroecology. Well-being was connected to increased financial autonomy and increased social ties through agroecological methods, which often involved knowledge sharing and exchange. In addition, there was considerable evidence of improved human health, primarily through increased dietary diversity, but also through consumption of culturally significant foods, often with strong linkages to Indigenous cultural values. Agroecological households tended to practice diversified food production, which translated into enhanced dietary diversity that can be beneficial for child nutrition. Although scholars have described the potential linkages between the lower use of toxic inputs and health (Timmerman and Félix, 2015), there were few studies specifically examining human health impacts due to reduced pesticide exposure in agroecological systems.

A limited number of studies have also made claims of improved mental health due to the practice of agroecology (Cetrone et al., 2020; Siegner et al., 2020). While findings on the therapeutic benefits of agroecology are promising, they have been criticized as being inferential rather than being based on a psychological examination of the mental state of the farmers and farm workers. One study (Cetrone et al., 2020) reported improved mental health (using a standardized measure) for women farmers using agroecological approaches, which was attributed to both improved food security and increased social networks. Well-being is supported, in part, by the theoretical pluralism embedded within agroecology (Norder et al., 2016), including active engagement of farmers in experimentation and exchange, and valuing local and Indigenous knowledge systems (Timmerman and Félix, 2015). Social processes that foster organization and communication can produce conditions for farmers to innovate, experiment, and cocreate knowledge through participatory research (Pérez-Marin et al., 2017). Dialogues of knowledge between diverse groups, such as different scientific disciplines, farmers, and policymakers, enhance a plurality of viewpoints and collective learning (Rosset and Martínez-Torres, 2014). These interactions and respect for diverse knowledge can, in turn, have impacts on well-being, including mental health, but the linkages are understudied.

Improved rural livelihoods, through increased income, reduced dependence on purchased inputs, and increased self-provisioning, was another important theme, with variable evidence in the literature across a range of contexts. Agroecology preserves ecological processes that deliver ecosystem services, such as improved soil fertility or a reduction in soil erosion, that are critical to agriculture while also addressing human well-being (Dumont and

Bernuès, 2014; Holt et al., 2016; De Leijster et al., 2019; Kpienbaareh et al., 2020; Sethuraman et al., 2021). Particularly in resource-poor contexts, agroecology proves useful as it reduces the need to purchase synthetic inputs. Although agroecology can enhance ecological integrity and increase productivity, its livelihood gains may be limited due to the dominant role that input-intensive agriculture and a concentrated number of large agri-business companies play in the economy (IPES-Food, 2016). This review, however, provides evidence from several studies that, despite this dominance, agroecology can offer a viable approach for improving income and fulfilling livelihoods. Rebuilding or establishing local markets that fostered greater interaction between producers and consumers was also documented, with the concept of agroecological territories emphasized in some studies (Wezel et al., 2016). Agroecological transitions at a territorial level included shifts in the management of local resources, social innovations in governance, and re-embedding markets in sociocultural relations (Norder et al., 2016; Pérez-Marin et al., 2017; Anderson et al., 2019). In some urban contexts, explicit involvement and leadership of marginalized racial and ethnic groups and employment opportunities for youth were important components of agroecological projects.

Evidence in many parts of the world depicts a gradual but persistent shift toward the adoption of input-intensive and mechanized agriculture, in part due to the new green revolution being promoted and supported in many countries (Takeshima et al., 2013; Kansanga et al., 2019a; Luna, 2020). The shift to input-intensive agriculture has redefined the very nature of agriculture by establishing dependent relations where farming must continuously rely on external inputs and the dictates of those supplying these inputs. The opportunity to source inputs locally and to determine the flow of these inputs is a dignifying trait of agroecology that also enhances the freedom of farmers. Agroecology, although often more labor intensive, creates a dignifying space for farmers to have control over the means of production. The shift to input-intensive agriculture is also linked to the breakdown of traditional farming practices, such as labor sharing, which have been demonstrated to have a meaningful role in smallholder farming communities. As argued by Nyantakyi-Frimpong and Bezner Kerr (2014), input-intensive agriculture undermines small farmers' agency in solving day-to-day farming challenges as well. The opportunity for farmers to improve production with locally sourced resources and knowledge systems enhances the practice of smallholder agriculture as work that is deeply ingrained in the way of life of rural communities.

In light of these changes, there is considerable evidence that agroecology can enhance livelihoods, and it is promoted as a pro-poor alternative to input-intensive agriculture (Altieri, 2009; Bezner Kerr et al., 2019a; McCune et al., 2019; Mdee et al., 2019). At the same time, there is also evidence in some contexts that agroecological production involves unpaid, tenuous, self-exploitative, and at times highly labor-intensive work. What constitutes “meaningful work” emerges in contemporary discussions about the

actual practice and application of agroecology, particularly due to longstanding arguments about the “drudgery” of farm work in general. The degree to which agroecological practices are compatible with various forms of mechanization is also not well-understood, but there is potential for the development of both mechanical and digital tools to support agroecological management (Wittman et al., 2020). Some scholars point to the epistemological shift in viewing humans as embedded within socioecological relations, rather than outside of and controlling nature in an industrial food production system, as a way in which agroecology can help provide a form of contributive justice (Timmerman and Félix, 2015), but the empirical literature on meaningful or dignified work as it pertains to agroecology is limited.

While social well-being improvements may be the result of implementing agroecological farming methods, the trade-offs made to attain such social well-being may be skewed in a negative or inequitable way. Agroecological activities such as compost preparation and application, manure collection and transport, and agroforestry are labor- and time-intensive. Where such tasks are regarded as “women’s work” amid the broader gendered division of labor that prevails in some farming societies (Kansanga et al., 2020; Magadla, 2021; Pattnaik and Lahiri-Dutt, 2021), the burden of these laborious tasks may fall disproportionately on women, which may negatively impact the material, relational, and cognitive dimensions of social well-being for such women. A study in northwestern Ghana (Nyantakyi-Frimpong, 2021) showed that climate change and unequal divisions of labor puts pressure on women’s productive time in agriculture, leading to poor child feeding practices, undernutrition, and acute mental stress for women. The labor-intensive and time-consuming nature of agroecology may also infringe on time for leisure and negatively impact the health of farmers practicing agroecology. A key barrier for agroecology to benefit women, therefore, is to shift the “care economy” so that it is more equitably carried out by men and women. Due to long historical patriarchal dominance in agricultural leadership and farmer organizations, there is a potential for agroecological initiatives to reinforce existing gender inequalities if spaces for addressing these injustices are not created (Lyon et al., 2017; Calderon et al., 2018; Chiappe, 2018; Sylvester and Little, 2020). In addition, women and other marginalized groups who lack access to resources such as land, seeds, or knowledge may be excluded from agroecology without explicit efforts to address these inequities. Empirical studies show that the integration of deliberative opportunities in knowledge sharing and attention to gender dynamics can help to ensure that the work associated with agroecological management is equitably shared (Nyantakyi-Frimpong et al., 2016; Oliver, 2016; Bezner Kerr et al., 2019a; Sylvester and Little, 2020).

While limited in scope, a small but nascent literature on racial inequities and agroecology largely comes from the Americas and builds on earlier scholarship related to food justice, racial inequity in food systems, and the focus on fairness in agroecological approaches.

Many research gaps have emerged from this study. Do people experience significant health and well-being gains from the use of agroecological practices, including the reduced exposure to toxic inputs? What are the mental health implications of an agroecological approach, and do these translate into “meaningful work?” Livelihood benefits, while documented in some contexts, need further study with more economic data, including a “true-cost accounting” to take into account the savings from health, social, and environmental benefits and the challenges at work from capitalist agriculture. The ontological and experiential dimensions of agroecology—how people interact with the natural world and their experiences and perceptions of agroecology—is another important gap. Finally, the implications of agroecological approaches for power structures and the relationship between gender dynamics, the care economy, racial inequities, and agroecology remain underexplored.

Conclusion

Although there are numerous papers attributing a wide range of social benefits to the implementation of agroecology, they tend to be descriptive or theoretical rather than empirical in approach (e.g., see Timmermann and Félix, 2015). Collectively, this research provides a richly detailed theoretical framework from which empirical studies can draw from and build upon. As agroecology continues to garner attention from an increasingly diverse array of practitioners and stakeholders, scrutiny of the claims associated with it will likely intensify. As such, proponents of agroecology should urgently seek to address knowledge gaps, such as the general lack of research on the well-being, meaningfulness, or quality of work—especially for farm workers—on agroecological farms. Autonomy, given its importance as a cornerstone of both food sovereignty and agroecology, should receive greater attention in this regard as well. Livelihood impacts in urban agroecology initiatives, the role of youth, and the connections with urban consumers is another gap. As emergent topics related to the more recent development of feminist agroecology, the impacts of agroecological approaches on the care economy and gender power dynamics will be critical to assess in order to realize a more just and equitable food system. Decolonial agroecology that considers racial inequities is yet another intersectional area of scholarship in need of further research. New or expanded research on these topics might reveal various ways in which certain agroecological systems fall short of their potential. Only in reconciling the difference between expectations and the lived experiences of farmers and farm workers—both adults and youth in urban and rural spaces—will agroecology, and in particular, the movement thereof, flourish.

Competing interests

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author contributions

Contributed to the conception and design of the study: RBK, JL.

Contributed to manuscript revision, read, and approved the submitted version: All authors.

References

- Algert, SJ, Baameur, A, Ortiz, D, Gray, L, Diekmann, LO.** 2016. Vegetable output, cost savings, and nutritional value of low-income families' home gardens in San Jose, CA. *Journal of Hunger & Environmental Nutrition* **11**(3): 328–336.
- Alkon, AH, Vang, D.** 2016. The Stockton farmers' market. *Food, Culture & Society* **19**(2): 389–411. Available at <https://www.tandfonline.com/doi/full/10.1080/15528014.2016.1178552>.
- Altieri, MA.** 2009. Agroecology, small farms, and food sovereignty. *Monthly Review* **61**(3): 102.
- Altieri, MA, Nicholls, CI.** 2018. Agroecología urbana: diseño de granjas urbanas ricas en biodiversidad, productivas y resilientes. *Agro Sur* **46**(2): 49–60.
- Altieri, MA, Nicholls, CI, Henao, A, Lana, MA.** 2015. Agroecology and the design of climate change-resilient farming systems. *Agronomy for Sustainable Development* **35**(3): 869–890.
- Ameur, F, Amichi H, Leauthaud, C.** 2020. Agroecology in North African irrigated plains? Mapping promising practices and characterizing farmers' underlying logics. *Regional Environmental Change* **20**(4): 133.
- Anderson, CR, Bruil, J, Chappell, MJ, Kiss, C, Pimbert, MP.** 2019. From transition to domains of transformation: Getting to sustainable and just food systems through agroecology. *Sustainability* **11**(19): 5272.
- Anwar McHenry, J.** 2009. A place for the arts in rural revitalisation and the social well-being of Australian rural communities. *Rural Society* **19**(1): 60–70.
- April-Lalonde, G, Latorre, S, Paredes, M, Hurtado, F, Muñoz, A, Deaconu, D, Cole, C, Batal, M.** 2020. Characteristics and motivations of consumers of direct purchasing channels and the perceived barriers to alternative food purchase: A cross-sectional study in the Ecuadorian Andes. *Sustainability* **12**(17): 6923.
- Aptekar, S.** 2019. The unbearable lightness of the cosmopolitan canopy: Accomplishment of diversity at an urban farmers market. *City & Community* **18**(1): 71–87.
- Arias Guevara, M.** 2014. Género y agroecología en Cuba, entre saberes tradicionales y nuevas tecnologías. *Agroecología* **9**(1&2): 23–30.
- Ascione, E, Belsky, J, Nelsen, M, Barbato, M.** 2020. Cultivating activism through terroir: An anthropology of sustainable winemakers in Umbria, Italy. *Food, Culture & Society* **23**(3): 277–295.
- Aynew, HY, Biadgilign, S, Schickkramm, L, Abate-Kassa, G, Sauer, J.** 2018. Production diversification, dietary diversity and consumption seasonality: Panel data evidence from Nigeria. *BMC Public Health* **18**(1): 988. DOI: <https://dx.doi.org/10.1186/s12889-018-5887-6>.

- Azevedo, E, Pelicioni, MC.** 2012. Agroecology and health promotion in Brazil. *Revista Panamericana de Salud Publica / Pan American Journal of Public Health* 31(4): 290–295.
- Barrios, E, Gemmill-Herren, B, Bicksler, A, Siliprandi, E, Brathwaite, R, Moller, S, Batello, C, Tittonell, P.** 2020. The 10 elements of agroecology: Enabling transitions towards sustainable agriculture and food systems through visual narratives. *Ecosystems and People* 16(1): 230–247.
- Barrios, ED, Ndiaye, G, Loconto, AM, Cluset, R.** 2019. Agroecology: Fostering improved access to land and natural resources. In *4. World congress on agroforestry*. Montpellier, France: Food and Agriculture Organization (FAO). Available at <https://hal.inrae.fr/hal-02736456>.
- Bebbington, A.** 1999. Capitals and capabilities: A framework for analyzing peasant viability, rural livelihoods and poverty. *World Development* 27(12): 2021–2044.
- Bebbington, A.** 2000. Reencountering development: Livelihood transitions and place transformations in the Andes. *Annals of the Association of American Geographers* 90(3): 495–520. DOI: <https://dx.doi.org/10.1111/0004-5608.00206>.
- Bebbington, AJ, Batterbury, SPJ.** 2001. Transnational livelihoods and landscapes: Political ecologies of globalization. *Ecumene* 8(4): 369–380. DOI: <https://dx.doi.org/10.1177/096746080100800401>.
- Benítez B, Nelson E, Romero, SMI, Ortíz Pérez, R, Crespo, Morales A, Casanova, Rodríguez, C, Campos Gómez, M, Méndez, Bordón, A, Martínez Massip, A, Hernández Beltrán, Y, Daniels, J.** 2020. Empowering women and building sustainable food systems: A case study of Cuba's local agricultural innovation project. *Frontiers in Sustainable Food Systems* 4: 554414. DOI: <https://dx.doi.org/10.3389/fsufs.2020.554414>.
- Beudou, JG, Martin, J, Ryschawy.** 2017. Cultural and territorial vitality services play a key role in livestock agroecological transition in France. *Agronomy for Sustainable Development* 37(4): 36. DOI: <https://dx.doi.org/10.1007/s13593-017-0436-8>.
- Bezner Kerr, R, Chilanga, E, Nyantakyi-Frimpong, H, Luginaah, I, Lupafya, E.** 2016. Integrated agriculture programs to address malnutrition in northern Malawi. *BMC Public Health* 16(1): 1197.
- Bezner Kerr, R, Hickey, C, Lupafya, E, Dakishoni, L.** 2019a. Repairing rifts or reproducing inequalities? Agroecology, food sovereignty, and gender justice in Malawi. *Journal of Peasant Studies* 46(7): 1499–1518.
- Bezner Kerr, R, Madsen, S, Stüber, M, Liebert, J, Enloe, S, Borghino, N, Parros, P, Mutyambai, DM, Prudhon, M, Wezel, A.** 2021. Can agroecology improve food security and nutrition? A review. *Global Food Security* 29: 100540.
- Bezner Kerr, R, Owoputi, I, Rahmanian, M, Batello, C, Burlingame, B, Dernini, S.** 2019b. Agroecology and nutrition: Transformative possibilities and challenges, in Burlingame, BA, Dernini, S eds., *Sustainable diets*. Wallingford, UK: CABI: 53–63.
- Bezner Kerr, RJ, Kangmennaang, L, Dakishoni, H, Nyantakyi-Frimpong, E, Lupafya, L, Shumba, R, Msachi, GO, Boateng, SS, Snapp, A, Chitaya, E, Maona, T, Gondwe, P, Nkhonjera, Luginaah, I.** 2019c. Participatory agroecological research on climate change adaptation improves smallholder farmer household food security and dietary diversity in Malawi. *Agriculture, Ecosystems and Environment* 279: 109–121.
- Bisht, IS, Mehta, PS, Negi, KS, Verma, SK, Tyagi, RK, Garkoti, SC.** 2018. Farmers' rights, local food systems, and sustainable household dietary diversification: A case of Uttarakhand Himalaya in north-western India. *Agroecology and Sustainable Food Systems* 42(1): 77–113.
- Blixen, C, Colnago, P, Gonzalez, N.** 2006. Propuesta de evaluación de sustentabilidad en agricultura urbana para huertas vinculadas al programa de producción de alimentos y organización comunitaria - UdeLAR. [Thesis report]. *Universidad de la República, Facultad de Agronomía, Montevideo, Uruguay*.
- Boedecker, JF, Odhiambo Odour, C, Lachat, P, Van Damme, G, Kennedy, Termote, C.** 2019. Participatory farm diversification and nutrition education increase dietary diversity in Western Kenya. *Maternal & Child Nutrition* 15(3): DOI: <https://dx.doi.org/10.1111/mcn.12803>.
- Boillat, S, Bottazzi, P.** 2020. Agroecology as a pathway to resilience justice: Peasant movements and collective action in the Niayes coastal region of Senegal. *International Journal of Sustainable Development & World Ecology* 27(7): 662–677. DOI: <https://dx.doi.org/10.1080/13504509.2020.1758972>.
- Botelho, MIV, Cardoso, IM, Otsuki, K.** 2016. "I made a pact with God, with nature, and with myself": Exploring deep agroecology. *Agroecology and Sustainable Food Systems* 40: 116–131.
- Bottazzi, P, Boillat, S, Marfurt, F, Seck, SM.** 2020. Channels of labour control in organic farming: Toward a just agroecological transition for sub-Saharan Africa. *Land* 9(6): 205.
- Calderón, CI, Jerónimo, C, Praun, A, Reyna, J, Santos Castillo, ID, León, R, Hogan, R, Prado Córdova, JP.** 2018. Agroecology-based farming provides grounds for more resilient livelihoods among smallholders in western Guatemala. *Agroecology and Sustainable Food Systems* 42(10): 1128–1169. DOI: <https://dx.doi.org/10.1080/21683565.2018.1489933>.
- Carlisle, L, Montenegro de Wit, M, DeLonge, MS, Iles, A, Calo, A, Getz, C, Ory, J, Munden-Dixon, K, Galt, R, Melone, B, Knox, R, Press, D.** 2019. Transitioning to sustainable agriculture requires growing and sustaining an ecologically skilled workforce. *Frontiers in Sustainable Food Systems* 3: 96.
- Carr, ER.** 2013. Livelihoods as intimate government: Reframing the logic of livelihoods for development.

- Third World Quarterly* **34**(1): 77–108. DOI: <http://dx.doi.org/10.1080/01436597.2012.755012>.
- Carr, ER.** 2015. Political ecology and livelihoods, in Perreault, T, Bridge, G, McCarthy, J eds., *The Routledge handbook of political ecology*. Oxfordshire, UK: Routledge: 332–342.
- Cetrone, H, Santoso, M, Petito, L, Bezner Kerr, R, Blacker, L, Kassim, N, Mtinda, E, Martin, H, Young, S.** 2020. A participatory agroecological intervention reduces women's risk of probable depression through improvements in food security in Singida, Tanzania. *Current Developments in Nutrition* **4**(Supplement 2): 819.
- Chaparro-Africano, AM, Naranjo, SE.** 2020. Participatory system of guarantees – PSG of the red de mercados agroecológicos de bogotá región RMABR. A contribution to the sustainability of agroecological producers and markets. *International Journal of Agricultural Sustainability* **18**(6): 456–472.
- Chayanov, AV.** 1986 [1966]. *The theory of peasant economy*. Madison, WI: University of Wisconsin Press.
- Chiappe, M.** 2018. Contribuciones y desafíos al empoderamiento de las mujeres en la agroecología en Uruguay, in Zuluaga Sánchez, GP, Catacora-Vargas, G, Siliprandi, E eds., *Agroecología En Femenino*. La Paz, Bolivia: SOCLA: 75–90.
- Chizallet, M, Barcellini, F, Probst, L.** 2018. Supporting farmers' management of change towards agroecological practices by focusing on their work: A contribution of ergonomics. *Cahiers Agricultures* **27**(3): 35005. DOI: <https://dx.doi.org/10.1051/cagri/2018023>.
- Choocharoen, C, Neef, A, Preechapanya, P, Hoffmann, V.** 2014. Agrosilvopastoral systems in northern Thailand and northern Laos: Minority peoples' knowledge versus government policy. *Land* **3**(2): 414–436.
- Clapp, J, Isakson, SR.** 2018. Risky returns: The implications of financialization in the food system. *Development and Change* **49**(2): 437–460.
- Coolsaet, B.** 2016. Towards an agroecology of knowledges: Recognition, cognitive justice and farmers' autonomy in France. *Journal of Rural Studies* **47**: 165–171.
- Coulthard, S.** 2012. What does the debate around social well-being have to offer sustainable fisheries? *Current Opinion in Environmental Sustainability* **4**(3): 358–363.
- Crenshaw, K.** 1991. Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Review* **43**(6): 1241–1299.
- D'Annolfo, R, Gemmill-Herren, B, Graeub, B, Garibaldi, LA.** 2017. A review of social and economic performance of agroecology. *International Journal of Agricultural Sustainability* **15**(6): 632–644.
- Darrouzet-Nardi, AF, Miller, LC, Joshi, N, Mahato, S, Lohani, M, Rogers, BL.** 2016. Child dietary quality in rural Nepal: Effectiveness of a community-level development intervention. *Food Policy* **61**: 185–197.
- das Chagas Oliveira, F, Calle Collado, A, Carvalho Leite, LF.** 2012. Peasant innovations and the search for sustainability: The case of Carnaubais Territory in Piauí State, Brazil. *Journal of Sustainable Agriculture* **36**(5): 523–544. DOI: <https://dx.doi.org/10.1080/10440046.2012.656342>.
- de Carvalho, LM, Bógus, CM.** 2020. Gender and social justice in urban agriculture: The network of agroecological and peripheral female urban farmers from São Paulo. *Social Sciences* **9**(8): 127.
- De Leijster, V, Santos, MJ, Wassen, MJ, Ramos-Font, ME, Robles, AB, Díaz, M, Staal, M, Verweij, PA.** 2019. Agroecological management improves ecosystem services in almond orchards within one year. *Ecosystem Services* **38**: 100948.
- Deaconu, A, Berti, PR, Cole, DC, Mercille, G, Batal, M.** 2021. Agroecology and nutritional health: A comparison of agroecological farmers and their neighbors in the Ecuadorian highlands. *Food Policy* **101**: 102034.
- Deaconu, A, Mercille, G, Batal, M.** 2019. The agroecological farmer's pathways from agriculture to nutrition: A practice-based case from Ecuador's highlands. *Ecology of Food and Nutrition* **58**(2): 142–165.
- Debray, V, Wezel, A, Lambert-Derkimba, A, Roesch, K, Lieblein, G, Francis, CA.** 2019. Agroecological practices for climate change adaptation in semiarid and subhumid Africa. *Agroecology and Sustainable Food Systems* **43**: 429–456.
- Dumont, AM, Baret, PV.** 2017. Why working conditions are a key issue of sustainability in agriculture? A comparison between agroecological, organic and conventional vegetable systems. *Journal of Rural Studies* **56**: 53–64.
- Dumont, AM, Vanloqueren, G, Stassart, PM, Baret, PV.** 2016. Clarifying the socioeconomic dimensions of agroecology: Between principles and practices. *Agroecology and Sustainable Food Systems* **40**(1): 24–47.
- Dumont, B, Bernuès, A.** 2014. Agroecology for producing goods and services in sustainable animal farming systems. *Animal* **8**(8): 1201–1203.
- Dupré, L, Lamine, C, Navarrete, M.** 2017. Short food supply chains, long working days: Active work and the construction of professional satisfaction in French diversified organic market gardening. *Sociologia Ruralis* **57**(3): 396–414.
- Edelman, M, Oya, C, Borrás, SM, Jr.** 2013. Global land grabs: Historical processes, theoretical and methodological implications and current trajectories. *Third World Quarterly* **34**(9): 1517–1531.
- Eigenbrod, C, Gruda, N.** 2015. Urban vegetables for food security in cities. A review. *Agronomy for Sustainable Development* **35**: 483–498.
- Einbinder, N, Morales, H.** 2020. Development from within: Agroecology and the quest for Utziil K'asleem in the Maya-Achí Territory of Guatemala. *Journal of Latin American Geography* **19**(3): 133–158.
- Ekers, M.** 2019. The curious case of ecological farm interns: On the populism and political economy of agro-ecological farm work. *The Journal of Peasant*

- Studies* **46**(1): 21–43. DOI: <https://dx.doi.org/10.1080/03066150.2018.1512487>.
- Fedyna da Silveira Furtado, ACG, Bezerra, I.** 2014. Semeando a agroecologia e colhendo práticas alimentares saudáveis: um olhar sobre os faxinalenses. *Demetra Aliment. Nutr. Saúde* **9**. DOI: <https://dx.doi.org/10.12957/demetra.2014.6647>.
- Feitosa, C, Yamaoka, M.** 2020. Strengthening climate resilience and women's networks: Brazilian inspiration from agroecology. *Gender & Development* **28**(3): 459–478.
- Fernandes Nogueira, R, Roitman, I, Alvim Carvalho, F, Taboada Soldati, G, Baiocchi Jacobson, TK.** 2019. Challenges for agroecological and organic management of Cabruca cocoa agroecosystems in three rural settlements in south Bahia, Brazil: perceptions from local actors. *Agroforestry Systems* **93**(5): 1961–1972. DOI: <https://dx.doi.org/10.1007/s10457-018-0303-x>.
- Fernandez, M, Goodall K, Olson, M, Mendez E.** 2013. Agroecology and alternative agri-food movements in the United States: Towards a sustainable agri-food system. *Agroecology and Sustainable Food Systems* **37**: 115–126.
- Francis, C, Lieblein, G, Gliessman, S, Breland, TA, Creamer, N, Harwood, R, Salomonsson, L, Helenius, J, Rickerl, D, Salvador, R, Wiedenhoft, M, Simmons, S, Allen, P, Altieri, M, Flora, C, Poincelot, R.** 2003. Agroecology: The ecology of food systems. *Journal of Sustainable Agriculture* **22**: 99–118.
- Frison, E, Clément, C.** 2020. The potential of diversified agroecological systems to deliver healthy outcomes: Making the link between agriculture, food systems & health. *Food Policy* **96**: 101851.
- Gallegos-Riofrío, CA, Waters, WF, Carrasco, A, Riofrío, LA, Pintag, M, Caranqui, M, Caranqui, J, Black-Deer AA, Iannotti, LL.** 2021. Caliata: An indigenous community in Ecuador offers lessons on food sovereignty and sustainable diets. *Current Developments in Nutrition* **5**: 61–73.
- García Rocas, I, Soler Moneil, M, Canto, ASI.** 2014. Perspectiva ecofeminista de la soberanía alimentaria: La Red de Agroecología en la comunidad Moreno Mai en la Amazonia brasileña. *Relaciones Internacionales* **27**: 75–96.
- Gaspar, D.** 2007. Human well-being: Concepts and conceptualizations, in McGillivray, M ed., *Human well-being*. London, UK: Palgrave Macmillan: 23–64.
- Gauthier, R.** 2000. Agro-ecological strategies in north Lampung, Indonesia: Social constraints to biological management of soil fertility. *NJAS: Wageningen Journal of Life Sciences* **48**(1): 91–104. DOI: <https://dx.doi.org/10.1016/S1573-5214%2800%2980007-X>.
- Getz, C, Brown, S, Shreck, A.** 2008. Class politics and agricultural exceptionalism in California's organic agriculture movement. *Politics & Society* **36**: 478–507.
- Gilbert, DE.** 2020. Laborers becoming 'peasants': Agroecological politics in a Sumatran plantation zone. *The Journal of Peasant Studies* **47**(5): 1030–1051. DOI: <https://dx.doi.org/10.1080/03066150.2019.1602521>.
- Glennie, C, Alkon, AH.** 2018. Food justice: Cultivating the field. *Environmental Research Letters* **13**(7): 073003.
- Gliessman, SR.** 2007. *Agroecology: The ecology of sustainable food systems*, 2nd Edition. Boca Raton, FL: CRC Press.
- Gliessman, SR.** 2016. Transforming food systems with agroecology. *Agroecology and Sustainable Food Systems* **40**: 187–189.
- González de Molina, M, Guzmán, GI.** 2017. On the Andalusian origins of agroecology in Spain and its contribution to shaping agroecological thought. *Agroecology and Sustainable Food Systems* **41**(3–4): 256–275. DOI: <https://dx.doi.org/10.1080/21683565.2017.1280111>.
- González-Esquivel, CE, Camacho-Moreno, E, Larondo-Posadas, L, Sum-Rojas, C, de León-Cifuentes, WE, Vital-Peralta, E, Astier, M, López-Ridaura, S.** 2020. Sustainability of agroecological interventions in small scale farming systems in the Western Highlands of Guatemala. *International Journal of Agricultural Sustainability* **18**(4): 285–299.
- Goris, M, van den Berg, L, Lopes, I da S, Behagel, J, Verschoor, G, Turnhout, E.** 2019. Resignification practices of youth in Zona da Mata, Brazil in the transition toward agroecology. *Sustainability* **11**(1): 197.
- Grant, MJ, Booth, A.** 2009. A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information and Libraries Journal* **26**: 91–108. DOI: <https://dx.doi.org/10.1111/j.1471-1842.2009.00848.x>.
- Harrison, JL, Getz, C.** 2015. Farm size and job quality: Mixed-methods studies of hired farm work in California and Wisconsin. *Agriculture and Human Values* **32**: 617–634.
- HLPE.** 2013. Investing in smallholder agriculture for food security. Rome. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. Available at <http://www.fao.org/3/i2953e/i2953e.pdf>. Accessed 20 April 2022.
- HLPE.** 2019. Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition. Rome. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. Available at <https://www.fao.org/3/ca5602en/ca5602en.pdf>.
- Holt, AR, Alix, A, Thompson, A, Maltby, L.** 2016. Food production, ecosystem services and biodiversity: We can't have it all everywhere. *Science of the Total Environment* **573**: 1422–1429.
- Horst, M, McClintock, N, Hoey, L.** 2017. The intersection of planning, urban agriculture, and food justice: A review of the literature. *Journal of the American Planning Association* **83**(3): 277–295.

- How, V, Baharudin, NAM, Singh, S, Guo, H-R, Dang, QT, Chokeli, R, Yuswir, NS.** 2020. The different effects of climate extremes on physiological health among agroecology and conventional smallholder rice farmers. *Environmental Justice* **13**(2): 47–54.
- International Fund for Agricultural Development.** 2019. *Rural Development Report*. Available at <https://www.ifad.org/en/web/knowledge/publications>. Accessed 10 December 2021.
- IPES-Food.** 2016. *From uniformity to diversity: A paradigm shift from industrial agriculture to diversified agroecological systems*. International Panel of Experts on Sustainable Food systems. Available at <https://ipes-food.org/reports/>. Accessed 7 January 2022.
- Isakson, SR.** 2015. Derivatives for development? Small-farmer vulnerability and the financialization of climate risk management. *Journal of Agrarian Change* **15**(4): 569–580.
- Jacobi, J, Llanque, A.** 2018. “When we stand up, they have to negotiate with us”: Power relations in and between an agroindustrial and an indigenous food system in Bolivia. *Sustainability* **10**(11): 4001.
- Jones, AD, Creed-Kanashiro, H, Zimmerer, KS, de Haan, S, Carrasco, M, Meza, K, Cruz-Garcia, GS, Tello, M, Plasencia Amaya, F, Marin, RM, Ganoza, L.** 2018. Farm-level agricultural biodiversity in the Peruvian Andes is associated with greater odds of women achieving a minimally diverse and micronutrient adequate diet. *The Journal of Nutrition* **148**(10): 1625–1637. DOI: <https://dx.doi.org/10.1093/jn/nxy166>.
- Kangmennaang, J, Bezner Kerr, R, Lupafya, E, Dakishoni, L, Katundu, M, Luginaah, I.** 2017. Impact of a participatory agroecological development project on household wealth and food security in Malawi. *Food Security* **9**: 561–576.
- Kansanga, M, Andersen, P, Kpienbaareh, D, Mason-Renton, S, Atuoye, K, Sano, Y, Antabe, R, Luginaah, I.** 2019a. Traditional agriculture in transition: Examining the impacts of agricultural modernization on smallholder farming in Ghana under the new Green Revolution. *International Journal of Sustainable Development and World Ecology* **26**(1): 11–24.
- Kansanga, MM, Luginaah, I, Bezner Kerr, R, Lupafya, E, Dakishoni, L.** 2019b. Beyond ecological synergies: Examining the impact of participatory agroecology on social capital in smallholder farming communities. *International Journal of Sustainable Development & World Ecology* **27**(1): 1–14. DOI: [10.1080/13504509.2019.1655811](https://doi.org/10.1080/13504509.2019.1655811).
- Kansanga, MM, Mkandawire, P, Kuuire, V, Luginaah, I.** 2020. Agricultural mechanization, environmental degradation, and gendered livelihood implications in northern Ghana. *Land Degradation & Development* **31**: 1422–1440.
- Kassie, M, Jaleta, M, Shiferaw, B, Mmbando, F, Mekuria, M.** 2013. Adoption of interrelated sustainable agricultural practices in smallholder systems: Evidence from rural Tanzania. *Technological Forecasting and Social Change* **80**(3): 525–540.
- Kesselman, B, Ngcoya, M, Casale, D.** 2021. The challenge posed by urban dietary norms to the practice of urban agroecology. *Agroecology and Sustainable Food Systems* **45**(4): 480–498.
- Khadse, A, Rosset, PM, Morales, H, Ferguson, BG.** 2018. Taking agroecology to scale: The Zero Budget Natural Farming peasant movement in Karnataka, India. *Journal of Peasant Studies* **45**(1): 192–219.
- Koner, N, Laha, A.** 2020. Economics of zero budget natural farming in Purulia District of West Bengal: Is it economically viable? *Studies in Agricultural Economics* **122**(1): 22–28.
- Kpienbaareh, D, Bezner Kerr, R, Luginaah, I, Wang, J, Lupafya, E, Dakishoni, L, Shumba, L.** 2020. Spatial and ecological farmer knowledge and decision-making about ecosystem services and biodiversity. *Land* **9**(10): 356.
- Kpienbaareh, D, Luginaah, I, Bezner Kerr, R, Wang, J, Poveda, K, Steffan-Dewenter, I, Lupafya, E, Dakishoni, L.** 2022. Assessing local perceptions of deforestation, forest restoration, and the role of agroecology for agroecosystem restoration in northern Malawi. *Land Degradation & Development* **33**(7): 1088–1100.
- Langwick, S.** 2018. Cultivating vitality. *Anthropology News*. DOI: <https://dx.doi.org/10.1111/AN.748>.
- Levidow, L, Pimbert, M, Vanloqueren, G.** 2014. Agroecological research: Conforming—or transforming the dominant agro-food regime? *Agroecology and Sustainable Food Systems* **38**: 1127–1155.
- Levkoe, CZ.** 2018. Engaging the tensions of ecological internships: Considerations for agroecology and sustainable food systems movements. *Agroecology and Sustainable Food Systems* **42**(3): 242–263. DOI: <https://dx.doi.org/10.1080/21683565.2017.1347120>.
- Loconto, A, Jimenez, A, Vandecandelaere, E.** 2018. *Constructing markets for agroecology – An analysis of diverse options for marketing products from agroecology*. Rome, Italy: FAO/INRA: 214. Available at <https://www.fao.org/publications/card/en/c/I8605EN/>. Accessed 28 March 2022.
- Lucas, V, Gasselin, P, van der Ploeg, JD.** 2019. Local inter-farm cooperation: A hidden potential for the agroecological transition in northern agricultures. *Agroecology and Sustainable Food Systems* **43**(2): 145–179. DOI: <https://dx.doi.org/10.1080/21683565.2018.1509168>.
- Luna, JK.** 2020. ‘Pesticides are our children now’: Cultural change and the technological treadmill in the Burkina Faso cotton sector. *Agriculture and Human Values* **37**(2): 449–462.
- Lyon, S, Mutersbaugh, T, Worthen, H.** 2017. The triple burden: The impact of time poverty on women’s participation in coffee producer organizational governance in Mexico. *Agriculture and Human Values* **34**(2): 317–331. DOI: <https://dx.doi.org/10.1007/s10460-016-9716-1>.

- Madsen, S.** 2022. Farm-level pathways to food security: Beyond missing markets and irrational peasants. *Agriculture and Human Values* **39**: 135–150.
- Madsen, S, Bezner Kerr, R, LaDue, N, Luginaah, I, Dzanja, C, Dakishoni, L, Lupafya, E, Shumba, L.** 2021a. Explaining the impact of agroecology on farm-level transitions to food security in Malawi. *Food Security* **13**(4): 933–954.
- Madsen, S, Bezner Kerr, R, Shumba, L, Dakishoni, L.** 2021b. Agroecological practices of legume residue management and crop diversification for improved smallholder food security, dietary diversity and sustainable land use in Malawi. *Agroecology and Sustainable Food Systems* **45**: 197–224.
- Magadla, S.** 2021. Bridging through “women’s work”: African women and men chasing the rise of China. *International Feminist Journal of Politics* **23**(2): 243–262.
- Márquez-Barrenechea, A, García-Llorente, M, López-Medellín, X, Llobera, F, Redondo, M.** 2020. How do policy-influential stakeholders from the Madrid region (Spain) understand and perceive the relevance of agroecology and the challenges for its regional implementation? *Landbauforsch/Journal of Sustainable and Organic Agricultural Systems* **70**(2): 145–156.
- Mbow, C, Rosenzweig, C, Barioni, LG, Benton, TG, Herero, M, Krishnapillai, M, Liwenga, E, Pradhan, P, Rivera-Ferre, MG, Sapkota, T, Tubiello, FN, Xu, Y.** 2019. Food security, in Shukla, PR, Skea, J, Calvo Buendia, E, Masson-Delmotte, V, Pörtner, H-O, Roberts, DC, Zhai, P, Slade, R, Connors, S, van Dieën, R, Ferrat, M, Haughey, E, Luz, S, Neogi, S, Pathak, M, Petzold, J, Portugal Pereira, J, Vyas, P, Huntley, E, Kissick, K, Belkacemi, M, Malley, J eds., Climate change and land: An IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems.
- McAllister, G, Wright, J.** 2019. Agroecology as a practice-based tool for peacebuilding in fragile environments? Three stories from Rural Zimbabwe. *Sustainability* **11**: 790. DOI: <https://dx.doi.org/10.3390/su11030790>.
- McCune, N, Perfecto, I, Avilés-Vázquez, K, Vázquez-Negrón, J, Vandermeer, J.** 2019. Peasant balances and agroecological scaling in Puerto Rican coffee farming. *Agroecology and Sustainable Food Systems* **43**(7–8): 810–826.
- McCune, N, Reardon, J, Rosset, P.** 2014. Agroecological formación in rural social movements. *Radical Teacher* **98**: 31–37.
- McGregor, JA.** 2007. Researching wellbeing: From concepts to methodology, in Gough, I, McGregor, JA eds., *Wellbeing in developing countries*. Cambridge, UK: Cambridge University Press: 47–70.
- McGregor, JA.** 2008. Well-being, poverty and conflict. WeD Policy Briefing 01/08. Available at <https://www.welldev.org.uk/research/working.htm>. Accessed 17 March 2022.
- McGregor, JA.** 2009. Building sustainable governance. Human wellbeing in fishing communities. ESPA Workshop 1, Institute for Ocean Management, Chennai, India, 1–8. Available at <http://www.wellcoast.org/resources/>. Accessed 23 June 2020.
- McLaughlin, J, Weiler, AM.** 2017. Migrant agricultural workers in local and global contexts: Toward a better life? *Journal of Agrarian Change* **17**(3): 630–638. DOI: <https://dx.doi.org/10.1111/joac.12199>.
- Mdee, A, Wostry, A, Coulson, A, Maro, J.** 2019. A pathway to inclusive sustainable intensification in agriculture? Assessing evidence on the application of agroecology in Tanzania. *Agroecology and Sustainable Food Systems* **43**(2): 201–227.
- Medland, L.** 2016. Working for social sustainability: Insights from a Spanish organic production enclave. *Agroecology and Sustainable Food Systems* **40**: 1133–1156.
- Meek, D.** 2014. Agroecology and radical grassroots movements’ evolving moral economies. *Environmental Sociology* **5**: 47–65. DOI: <https://dx.doi.org/10.3167/ares.2014.050104>.
- Méndez, V, Caswell, M, Gliessman, S, Cohen, R.** 2017. Integrating agroecology and participatory action research (PAR): Lessons from Central America. *Sustainability* **9**: 705.
- Méndez, VE, Bacon, CM, Cohen, R.** 2013. Agroecology as a transdisciplinary, participatory, and action-oriented approach. *Agroecology and Sustainable Food Systems* **37**: 3–18.
- Meyfroidt, P, Abeygunawardane, D, Ramankutty, N, Thomson, A, Zeleke, G.** 2019. Interactions between land systems and food systems. *Current Opinions in Environmental Sustainability* **38**: 60–67.
- Mier y Terán Giménez Cacho, M, Giraldo, OF, Aldasoro, M, Morales, H, Ferguson, BG, Rosset, P, Khadse, A, Campos, C.** 2018. Bringing agroecology to scale: Key drivers and emblematic cases. *Agroecology and Sustainable Food Systems* **42**: 637–665.
- Minkoff-Zern, LA, Welsh, R, Ludden, MT.** 2020. Immigrant farmers, sustainable practices: Growing ecological and racial diversity in alternative agrifood spaces. *Agroecology and Sustainable Food Systems* **44**(7): 947–972.
- Minkoff-Zern, L-A.** 2014. Knowing “Good Food”: Immigrant knowledge and the racial politics of farmworker food insecurity. *Antipode* **46**(5): 1190–1204. DOI: <https://dx.doi.org/10.1111/anti.1016>.
- Montero, CG.** 2020. Women sustaining community: The politics of agro-ecology in quilombo tourism in Southern Brazil. *Bulletin of Latin American Research* **39**(2): 191–207. DOI: <https://dx.doi.org/10.1111/blar.12884>.
- Morales, H, Zuluaga Sánchez, GP, Gonzalez-Santiago, MV, Perfecto, I, Papuccio de Vidal, S.** 2018. Alianza de Mujeres en Agroecología (AMA-AWA): Fortaleciendo vínculos entre académicas para el escalamiento de la agroecología, in Zuluaga Sánchez, GP, Catacora-Vargas, G, Siliprandi, E eds.,

- Agroecología En Femenino*. La Paz, Bolivia: SOCLA: 15–33.
- Moseley, WG.** 2016. The new green revolution for Africa: A political ecology critique. *Brown Journal of World Affairs* **23**: 177.
- Münster, D.** 2018. Performing alternative agriculture: Critique and recuperation in Zero Budget Natural Farming, South India. *Journal of Political Ecology* **25**: 748–764.
- Nagib, G, Nakamura, AC.** 2020. Urban agriculture in the city of São Paulo: New spatial transformations and ongoing challenges to guarantee the production and consumption of healthy food. *Global Food Security* **26**: 100378.
- Norder, LA, Lamine, C, Bellon, S, Brandenburg, A.** 2016. Agroecology: Polysemy, pluralism and controversies. *Ambiente & Sociedade* **19**(3): 1–20.
- Nyantakyi-Frimpong, H.** 2017. Agricultural diversification and dietary diversity: A feminist political ecology of the everyday experiences of landless and smallholder households in northern Ghana. *Geoforum* **86**: 63–75.
- Nyantakyi-Frimpong, H.** 2021. Climate change, women's workload in smallholder agriculture, and embodied political ecologies of undernutrition in northern Ghana. *Health & Place* **68**: 102536.
- Nyantakyi-Frimpong, H, Bezner Kerr, R.** 2014. A political ecology of high-input agriculture in northern Ghana. *African Geographical Review* **34**(1): 13–35.
- Nyantakyi-Frimpong, H, Kangmennaang, J, Bezner Kerr, R, Luginaah, I, Dakishoni, L, Lupafya, E, Shumba, L, Katundu, M.** 2017. Agroecology and healthy food systems in semi-humid tropical Africa: Participatory research with vulnerable farming households in Malawi. *Acta Tropica* **175**: 42–49. DOI: <https://dx.doi.org/10.1016/j.actatropica.2016.10.022>.
- Nyantakyi-Frimpong, H, Mambulu, FN, Bezner Kerr, R, Luginaah, I, Lupafya, E.** 2016. Agroecology and sustainable food systems: Participatory research to improve food security among HIV-affected households in northern Malawi. *Social Science & Medicine* **164**: 89–99.
- O'Rourke, ME, DeLonge, MS, Salvador, R.** 2017. Insights from agroecology and a critical next step: Integrating human health. *Agroecology and Sustainable Food Systems* **41**(7): 880–884.
- Oliver, B.** 2016. "The earth gives us so much": Agroecology and rural women's leadership in Uruguay. *Culture Agriculture Food and Environment* **38**(1): 38–47. DOI: <https://dx.doi.org/10.1111/cuag.12064>.
- Owen, L, Udall, D, Franklin, A, Kneafsey, M.** 2020. Place-based pathways to sustainability: Exploring alignment between geographical indications and the concept of agroecology territories in Wales. *Sustainability* **12**(12):4890.
- Parodi, G.** 2018. Agroecological transition and reconfiguration of horticultural work among family farmers in Buenos Aires, Argentina. *Cahiers Agricultures* **27**(3): 35003. DOI: <https://dx.doi.org/10.1051/cagri/2018020>.
- Pattanaik, I, Lahiri-Dutt, K.** 2021. Do women like to farm? Evidence of growing burdens of farming on women in rural India. *Journal of Peasant Studies* **49**(3): 629–651. DOI: <https://dx.doi.org/10.1080/03066150.2020.1867540>.
- Peano, C, Massaglia, S, Ghisalberti, C, Sottile, F.** 2020. Pathways for the amplification of agroecology in African sustainable urban agriculture. *Sustainability* **12**(7): 2718.
- Peredo Parada, S, Barrera, C, Burbi, S, Rocha, D.** 2020. Agroforestry in the Andean Araucanía: An experience of agroecological transition with women from Cherquén in Southern Chile. *Sustainability* **12**(24): 10401.
- Pérez-Marin, AM, Rogé, P, Altieri, MA, Forer, LFU, Silveira, L, Oliveira, VM, Domingues-Leiva, BE.** 2017. Agroecological and social transformations for coexistence with semi-aridity in Brazil. *Sustainability* **9**(6): 990.
- Petersen, PF, Silveira, LM.** 2017. Agroecology, public policies and labor-driven intensification: Alternative development trajectories in the Brazilian semi-arid region. *Sustainability* **9**(4): 535.
- Pronti, A, Coccia, M.** 2020. Agroecological and conventional agricultural systems: Comparative analysis of coffee farms in Brazil for sustainable development. *International Journal of Sustainable Development* **23**(3/4): 223–248.
- Roessler, B.** 2012. Meaningful work: Arguments from autonomy. *Journal of Political Philosophy* **20**: 71–93.
- Rosset, P, Val, V, Barbosa, LP, McCune, N.** 2019. Agroecology and La Via Campesina II. Peasant agroecology schools and the formation of a sociohistorical and political subject. *Agroecology and Sustainable Food Systems* **43**: 895–914.
- Rosset, PM, Machín Sosa, B, Roque Jaime, AM, Ávila Lozano, DR.** 2011. The Campesino-to-Campesino agroecology movement of ANAP in Cuba: Social process methodology in the construction of sustainable peasant agriculture and food sovereignty. *Journal of Peasant Studies* **38**(1): 161–191.
- Rosset, PM, Martínez-Torres, ME.** 2014. Food sovereignty and agroecology in the convergence of rural social movements, in Constance, DH, Renard, M-C, Rivera-Ferre, MG eds., *Alternative agrifood movements: Patterns of convergence and divergence*. Bingley, UK: Emerald Group Publishing Limited: 137–157. DOI: <https://dx.doi.org/10.1108/S1057-1922201421>.
- Ryan, RM, Deci, EL.** 2001. To be happy or to be self-fulfilled: A review of research on Hedonic and Eudaimonic well-being. *Annual Review of Psychology* **52**(16): 141–166.
- Sachs, C, Patel-Campillo, A.** 2014. Feminist food justice: Crafting a new vision. *Feminist Studies* **40**(2): 396–410.
- Saj, S, Torquebiau, E, Hainzelin, E, Pages, J, Maraun, F.** 2017. The way forward: An agroecological

- perspective for Climate-Smart Agriculture. *Agriculture, Ecosystems & Environment* **250**: 20–24.
- Sanderson Bellamy, A, Ioris, A.** 2017. Addressing the knowledge gaps in agroecology and identifying guiding principles for transforming conventional agri-food systems. *Sustainability* **9**: 330.
- Santoso, MV, Bezner Kerr, R, Kassim, N, Martin, H, Mtinda, E, Njau, P, Mtei, K, Hodidinott, J, Young, SL.** 2021. A nutrition-sensitive agroecology intervention in rural Tanzania increases children's dietary diversity and household food security but does not change child anthropometry: Results from a cluster-randomized trial. *Journal of Nutrition* **151**(7): 2010–2021. DOI: <https://dx.doi.org/10.1093/jn/nxab052>.
- Schwendler, SF, Thompson, LA.** 2017. An education in gender and agroecology in Brazil's Landless Rural Workers' Movement. *Gender and Education* **29**(1): 100–114. DOI: <https://dx.doi.org/10.1080/09540253.2016.1221596>.
- Scoones, I.** 2009. Livelihoods perspectives and rural development. *Journal of Peasant Studies* **36**: 171–196.
- Sethuraman, G, Mohd Zain, NA, Yusoff, S, Ng, YM, Baisakh, N, Cheng, A.** 2021. Revamping ecosystem services through agroecology—The case of cereals. *Agriculture* **11**(3): 204.
- Sevilla Guzmán, E, Woodgate, G.** 2013. Agroecology: Foundations in agrarian social thought and sociological theory. *Agroecology and Sustainable Food Systems* **37**: 32–44.
- Siegner, AB, Acey, C, Sowerwine, J.** 2020. Producing urban agroecology in the East Bay: From soil health to community empowerment. *Agroecology and Sustainable Food Systems* **44**(5): 566–593.
- Simon, X, Montero, M, Romero, Ó.** 2020. Advancing food security through agroecological technologies: The implementation of the biointensive method in the dry corridor of Nicaragua. *Sustainability* **12**(3): 844.
- Simon-Rojo, M.** 2019. Agroecology to fight food poverty in Madrid's deprived neighbourhoods. *Urban Design International* **24**(2): 94–107.
- Slocum, R.** 2006. Anti-racist practice and the work of community food organizations. *Antipode* **38**(2): 327–349. DOI: <https://dx.doi.org/10.1111/j.1467-8330.2006.00582.x>.
- Smids, J, Nyholm, S, Berkers, H.** 2020. Robots in the workplace: A threat to—or opportunity for—meaningful work? *Philosophy & Technology* **33**: 503–522.
- Smith, LC, Haddad, L.** 2015. Reducing child undernutrition: Past drivers and priorities for the Post-MDG Era. *World Development* **68**: 180–204.
- Snapp, SS, Kebede Y, Wollenberg E, Dittmer KM, Brickman S, Egler C, Shelton S.** 2021. *Agroecology and climate change rapid evidence review: Performance of agroecological approaches in low- and middle income countries*. Wageningen, The Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), CGIAR: 63. Available at <https://hdl.handle.net/10568/113487>. Accessed 6 June 2022.
- Snipstal, B.** 2015. Repeasantization, agroecology and the tactics of food sovereignty. *Canadian Food Studies / La Revue Canadienne Des Études Sur l'alimentation* **2**(2): 164–173.
- Steinhäuser, C.** 2020. Mountain farmers' intangible values foster agroecological landscapes: Case studies from Sierra Santa Victoria in northwest Argentina and the Ladin Dolomites, northern Italy. *Agroecology and Sustainable Food Systems* **44**(3): 352–377.
- Suárez-Torres, J, Suárez-López, JR, López-Paredes, D, Morocho, H, Cachiguango-Cachiguango, LE, Del-lai, W.** 2017. Agroecology and health: Lessons from indigenous populations. *Current Environmental Health Reports* **4**(2): 244–251.
- Sylvester, O, Little, M.** 2020. “I came all this way to receive training, am I really going to be taught by a woman?” Factors that support and hinder women's participation in agroecology in Costa Rica. *Agroecology and Sustainable Food Systems* **45**(7): 957–980. DOI: <https://dx.doi.org/10.1080/21683565.2020.1811830>.
- Takeshima, H, Nin-Pratt, A, Diao, X.** 2013. Mechanization and agricultural technology evolution, agricultural intensification in sub-Saharan Africa: Typology of agricultural mechanization in Nigeria. *American Journal of Agricultural Economics* **95**(5): 1230–1236.
- Timmermann, C.** 2018. Contributive justice: An exploration of a wider provision of meaningful work. *Social Justice Research* **31**(1): 85–111.
- Timmermann, C, Félix, GF.** 2015. Agroecology as a vehicle for contributive justice. *Agriculture and Human Values* **32**(3): 523–538.
- Tornaghi, C, Dehaene, M.** 2020. The prefigurative power of urban political agroecology: Rethinking the urbanisms of agroecological transitions for food system transformation. *Agroecology and Sustainable Food Systems* **44**(5): 594–610. DOI: <https://dx.doi.org/10.1080/21683565.2019.1680593>.
- Trevilla Espinal, DL, Soto Pinto, ML, Morales, H, Estrada-Lugo, EIJ.** 2021. Feminist agroecology: Analyzing power relationships in food systems. *Agroecology and Sustainable Food Systems* **45**(7): 1029–1049.
- van der Ploeg, J.** 2008. *The new peasantries, struggles for autonomy and sustainability in an era of empire and globalization*. London, UK: Earthscan.
- van der Ploeg, JD.** 2011. The drivers of change: The role of peasants in the creation of an agro-ecological agriculture. *Agroecología* **6**: 47–54.
- van der Ploeg, JD, Barjolle, D, Bruil, J, Brunori, G, Madureira, LMC, Dessein, J, Drag, Z, Fink-Kessler, A, Gasselin, P, de Molina, MG, Gorchach, K, Jürgens, K, Kinsella, J, Kirwan, J, Knickel, K, Lucas, V, Marsden, T, Maye, D, Wezel, A.** 2019. The economic potential of agroecology: Empirical evidence from Europe. *Journal of Rural Studies* **71**: 46–61.

- Weis, T.** 2010. The accelerating biophysical contradictions of industrial capitalist agriculture. *Journal of Agrarian Change* **10**(3): 315–341. DOI: <https://dx.doi.org/10.1111/j.1471-0366.2010.00273.x>.
- Wezel, A, Bellon, S, Doré, T, Francis, C, Vallod, D, David, C.** 2009. Agroecology as a science, a movement and a practice. A review. *Agronomy for Sustainable Development* **29**: 503–515.
- Wezel, A, Brives, H, Casagrande, M, Clément, C, Dufour, A, Vandenbroucke, P.** 2016. Agroecology territories: Places for sustainable agricultural and food systems and biodiversity conservation. *Agroecology and Sustainable Food Systems* **40**: 132–144.
- Wezel, A, Herren, BG, Bezner Kerr, R, Barrios, E, Gonçalves, ALR, Sinclair, F.** 2020. Agroecological principles and elements and their implications for transitioning to sustainable food systems. A review. *Agronomy for Sustainable Development* **40**: 40.
- Wezel, A, Silva, E.** 2017. Agroecology and agroecological cropping practices, in Wezel, A ed., *Agroecological practices for sustainable agriculture: Principles, applications, and making the transition*. London, UK: World Scientific Publishing Europe: 19–51.
- White, SC.** 2009. *Bringing wellbeing into development practice*. WeD Working Paper 09/50. Wellbeing in Developing Countries ESRC Research Group. Available at <https://researchportal.bath.ac.uk/en/publications/bringing-wellbeing-into-development-practice>. Accessed 3 April 2022.
- Williams, N.** 2016. The political ecology of “ethnic” agricultural biodiversity maintenance in Atlantic Nicaragua. *Journal of Political Ecology* **23**(1): 223–245.
- Wittman, H, James, D, Mehrabi, Z.** 2020. Advancing food sovereignty through farmer-driven digital agroecology. *International Journal of Agriculture and Natural Resources* **47**(3): 235–248. DOI: <https://dx.doi.org/10.7764/ijanr.v47i3.2299>.
- Zuluaga Sánchez, GP, Catacora-Vargas, G, Siliprandi, E.** 2018. *Agroecología en Femenino. Reflexiones a partir de nuestras experiencias*. La Paz, Bolivia: SOCLA.

How to cite this article: Bezner Kerr, R, Liebert, J, Kansanga, M, Kpienbaareh, D. 2022. Human and social values in agroecology: A review. *Elementa: Science of the Anthropocene* 10(1). DOI: <https://doi.org/10.1525/elementa.2021.00090>

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Knowledge Domain: Sustainability Transitions

Part of an Elementa Special Feature: Principles-based Approaches in Agroecology

Published: June 14, 2022 **Accepted:** May 10, 2022 **Submitted:** October 1, 2021

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