

Article

Feminist Agroecology: Towards Gender-Equal and Sustainable Food Systems in Sub-Saharan Africa

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Abstract: Agriculture is pivotal in the global economy but is challenged by unsustainable practices that harm the environment and aggravate social inequalities, particularly in sub-Saharan Africa (SSA). Women, making up half the agricultural workforce, often do not benefit equitably from their labour due to systemic gender inequalities. Applying a Feminist Political Ecology (FPE) lens reveals the unequal gendered power dynamics that influence access to resources, decision-making, and the distribution of benefits within agricultural value chains. In a narrative literature review, I integrate FPE principles with agroecological approaches to address gaps in understanding gender dynamics within food systems and highlight positive outcomes from integrating FPE, such as improved crop diversity, food security, and economic stability, while acknowledging challenges like entrenched gender norms, intersecting inequalities, and resistance to change. I explore how gender-sensitive agroecology can promote sustainable and equitable food systems and examine how patriarchal systems marginalize women in agriculture, restricting their access to resources and decision-making. The analysis asserts ongoing debates around the scalability of gender-sensitive agroecological approaches and the challenges of implementing FPE insights within existing policy frameworks. Identified gaps include the need for more longitudinal studies on the impacts of FPE-informed interventions and greater attention to women's diverse experiences across different agroecological zones. Overall, this review contributes to academic discourse and policy discussions, seeking to advance a critical understanding of gender equality and sustainable agriculture in smallholder farming.

Keywords: agroecology; feminist political ecology; gender equity and equality; sustainable food systems; sub-Saharan Africa; smallholder farmers

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1. Introduction

Agriculture sustains millions of farmers globally, yet it is plagued by practices that undermine both the environment and social equality, not the least among smallholders in sub-Saharan Africa (SSA) (Food and Agriculture Organization of the United Nations [FAO], 2023). Sustainable food systems, which aim to balance food production with environmental protection and social equity, are especially critical in SSA, where agriculture supports a significant portion of the population. These systems integrate ecological principles, such as crop diversity and soil health, with social dimensions like equitable access to resources and gender equality (Amede et al., 2023). In SSA, the agricultural sector is integral to the global economy, accounting for approximately 15-20% of the GDP and supporting 70–80% of employment, primarily among smallholder farmers (Solomon et al., 2024). The typical food systems are characterized by their diversity and reliance on smallholder farmers, who produce the majority of the region's food. However, these systems often depend on rain-fed agriculture, making them vulnerable to climate variability. Despite the inherent diversity of SSA's food systems, smallholder farmers face numerous challenges that hinder their productivity and market access (Solomon et al., 2024). These barriers are exacerbated by gender inequalities, as women, who play crucial roles in food production, often lack access to resources and decision-making opportunities (Wezel et al., 2020). Addressing these challenges is essential for fostering sustainable and inclusive agricultural practices that can mitigate both environmental and social inequities in the region (Zaremba et al., 2021).

However, the dominant model of industrial agriculture, characterized by extensive monocultures, agrochemical-intensive practices, and large-scale operations, contributes to environmental degradation and biodiversity loss (Tschamtko et al., 2021). This model disproportionately benefits large, resource-rich farmers, marginalizing smallholders—particularly women—who face

restricted access to land, credit, and other resources (Manji, 2020). This exacerbates existing gender inequalities, pushing women, who play a crucial role in SSA's agricultural systems, further to the economic margins (Wezel et al., 2020). Despite the recognized need for sustainable and inclusive agricultural practices, much of the existing research focuses broadly on agroecological benefits without adequately addressing the gender dynamics within these systems. Additionally, while there are review studies on sustainable agriculture, many are outdated and do not reflect recent developments in both FPE and agroecology, particularly in the context of SSA (Zaremba et al. 2021). These studies often overlook gender dynamics and the evolving focus on social equity and environmental sustainability in the region. This represents a significant research gap, especially regarding how systemic gender inequalities shape women's access to, use of, and control over agricultural resources and decision-making power.

Recent debates on agricultural development continue to focus on balancing productivity with sustainability and social equity. For example, Ajibade et al. (2023) advocate for the commercial intensification of agriculture to promote food security, while Foley et al. (2011) emphasize the importance of agroecological practices that support smallholder farmers. However, these discussions often overlook how gender-sensitive approaches could play a transformative role in achieving both sustainability and equity. In particular, the intersection of gender and agroecology remains underexplored, especially in terms of how gender dynamics shape access to resources and decision-making within agricultural systems, leaving a critical gap in understanding the potential of feminist political ecology (FPE) to address these issues. Women in SSA's farming communities, who make up a substantial portion of the agricultural workforce and play key roles in production and biodiversity management, continue to face systemic barriers that limit their access to resources and decision-making agencies (Manji, 2020; Solomon et al., 2024). Addressing these gender imbalances is essential not only for women's empowerment but also for the broader sustainability and equity of food systems.

In this study, I aim to integrate FPE with agroecology to critically examine and address these gender inequalities within agricultural systems. Unlike previous studies that either overlook gender or focus on isolated issues, this review explores how gender and FPE intersect with agroecological practices. By effectively addressing the systemic gender imbalances and economic injustices prevalent in current food production systems (Elmhirst, 2017), this approach provides a promising avenue for transforming agricultural systems to be both equitable and sustainable. Embedding gender considerations into the fabric of agroecological strategies can challenge and reshape unequal socio-economic structures and gender dynamics constraining equitable and sustainable food systems while advancing gender equality (Zaremba et al., 2021). This article argues that this integration enhances the sustainability of agricultural systems and promotes gender equity by addressing the power dynamics and intersectional issues that affect women farmers. This approach can potentially transform food systems to be both environmentally sustainable and socially just by leveraging women's local ecological knowledge and advocating for policy support. Following that, this research seeks to provide actionable insights and policy recommendations for promoting gender-responsive and sustainable agricultural practices in SSA.

The study is designed as a narrative literature review, where I lay out the theoretical foundations of FPE and show how it is practiced in agroecological contexts. In doing so, I explore various dimensions of FPE, including its critique of traditional ecological and agricultural approaches that often marginalize gender considerations. I will also discuss how FPE can provide a lens for understanding the intersectionality of gender with other forms of social and economic power, such as class and race/ethnicity, and their cumulative impact on agricultural productivity and ecological sustainability. I go beyond merely highlighting problems, focusing on proposing solutions through case studies and empirical evidence demonstrating the viability and benefits of incorporating FPE into agroecology. I will conclude with policy recommendations aimed at scholars interested in agroecology to pay attention to the gendered nature of agricultural development.

2. The Feminist Political Ecology Framework

Political Ecology (PE) is a multidisciplinary domain/field that explores how unequal power dynamics and associated narratives influence the construction, expression, experience, and generation of human-environment interactions (Sultana, 2021). Originating in the 1970s as a response to a politically neutral ecology that treats nature as a static entity, PE offers insights into how politics and power influence environmental changes and resource management over time and space (Forsyth, 2004; Sultana, 2021). It examines how different groups access and control resources, negotiate their use or resist unfavorable policies and relations of power (Zimmerer, 2006). Moreover, PE explores the role of activism and social movements in challenging injustices, promoting alternative development, and influencing environmental outcomes (Rocheleau, 2008).

Building on the principles of PE, FPE emerged in the 1990s and draws inspiration from academic disciplines such as anthropology, critical development studies, and political economy, which

examine power dynamics within socio-ecological relationships and research practices (Harcourt et al., 2023). It is influenced by feminist theories like ecofeminism, feminist environmentalism, feminist science studies, post-colonial feminist critiques of development, and post-structural critiques of political ecology (Mohanty, 2003; Rocheleau et al., 1996; Sultana, 2021). FPE adopts the feminist concept of intersectionality to move beyond a singular focus on women and/or gender binaries (Cho et al., 2013). In doing so, it draws attention to the complexities of multiple intersecting inequalities such as race, gender, class, ethnicity, religion, sexuality, age, and geographical location within specific landscapes (Mollett, 2017; Sultana, 2021).

FPE provides a nuanced understanding of resource access and control, resource governance, gendered knowledge, and local ecological gender conflicts within broader political and economic contexts (Lau, 2020; Susial-Martin, 2017). It emphasizes the consideration of multiple dimensions of power and social structures that influence environmental interactions, advocating for more inclusive and equitable environmental policies and practices. FPE has been employed in various fields, including environmental studies, development studies, and political ecology, to address the intersection of gender, environment, and socio-economic issues (Elmhirst, 2011). It provides a critical lens to examine how gendered power relations influence environmental management, resource access, and social justice outcomes (Sultana, 2021). This approach has been particularly influential in understanding the dynamics of environmental degradation, capitalist accumulation, and control over resources, especially in the Global South. Having set out briefly how FPE builds upon the PE and its core concepts of gendered power relations (gender, power, subjectivity) across scales and intersectionality, I move on to outline three key traits of FPE that make it particularly suited to address gender disparities in agriculture.

2.1. Gendered Power Relations and Intersectionality

As a theoretical framework, FPE explores how gendered power relations are historically constructed and organizes resource governance and social justice outcomes, and how these intersect with other forms of domination including race and class. It is used to examine the gendered nature of environmental knowledge, rights, and practices, as well as the existence of gendered environmental movements and collectives (Rocheleau & Nirmal, 2015). It addresses how gender inequalities intersect with environmental issues and how individual experiences are linked to broader socio-political and economic structures, impacting resource access, decision-making processes, and environmental outcomes (Rocheleau et al., 2016).

Initially, FPE aimed to critique mainstream PE scholarship for ignoring gendered power dynamics in environmental struggles (Sultana, 2021). This is evident in the work of the La Via Campesina and Zimbabwe Smallholder Organic Farmers Forum (ZIMSOFF), which advocates for the rights of smallholder farmers and promotes food sovereignty while facilitating grassroots networking among women leaders in environmental initiatives. The organizations challenge existing power dynamics within global agriculture and empower women to lead community-based solutions, thereby reshaping resource governance through a gender-sensitive lens (Wiebe, 2023). This empowers local communities, particularly women, to take control of their agricultural practices and land. These initiatives not only address immediate ecological challenges but also foster long-term social justice by enhancing the leadership capacities and rights of women within their communities.

FPE's framework is comprehensive, enabling a deeper analysis of patriarchy and other power structures to examine power and oppression dynamics. However, gender remains a fundamental aspect of differentiation in societies and within FPE scholarship (Sultana, 2021). Thus, feminisms address more than just "women's issues," focusing broadly on social justice and decolonizing gender and other social relations. One of the strengths of approaches informed by FPE is that they encourage a focus on how gender and other power dynamics, both between men and women and among women themselves, intersect to shape access to and control over resources or property in specific locations (Sato & Alarcón, 2019). These approaches highlight the gendered nature of intersecting power relations that connect humans and natural environments across multiple scales.

In this context, FPE emphasizes the importance of an intersectional approach, which acknowledges how gender and other forms of power interact (Tavener et al., 2022), and how identities (such as gender, class, ethnicity, and race) and social ranks intersect to shape individuals' experiences and position in agricultural settings. This is crucial for addressing diverse community needs and tailoring inclusive and effective interventions. In SSA, women often face numerous disadvantages due to their intersectional identities, influenced by gender, class, race, ethnicity, and colonial legacies. These factors shape their access to resources, roles in agriculture, and vulnerability to environmental changes (Santpoort et al., 2021). Understanding these layered inequalities is essential for developing effective environmental policies and interventions sensitive to the nuanced needs of different community groups. FPE acknowledges the complex connections between various forms of oppression and privilege, leading to an in-depth analysis of how these intersecting factors influence human-environment relationships.

Recognizing the multifaceted nature of these power dynamics, the FPE also embraces collective action as a tool for advancing gender equality within agroecology, highlighting the significant benefits such approaches offer, including enhanced knowledge sharing and learning. In so doing, FPE has renewed interest in commons and commoning, focusing on collective action and transformative politics (Clement et al., 2019). A practical example of this is the Green Belt Movement in Kenya, initiated by Wangari Maathai. This movement involved women in tree planting to combat deforestation and promote sustainable livelihoods, effectively illustrating how collective action can lead to significant environmental and social transformations (Hunt, 2014). Through these activities, women restored ecological health by planting millions of trees and empowered themselves politically and economically, embodying the transformative politics central to FPE. However, FPE approaches often leave the concepts of common and commoning undefined. Additionally, while FPE acknowledges the commons as a contested resource, it seldom recognizes the central role of commons in community formation or considers common resources and property beyond their biophysical aspects (Sato & Alarcón, 2019).

2.2. Commitment to Equity and Justice

Central to FPE are its commitments to equity and justice, critically exploring how power dynamics are rooted in the intertwined histories of colonialism, patriarchy, capitalism, development, and the interconnected oppressions and injustices arising from these systems (Sundberg, 2017). FPE critiques traditional ecological and agricultural approaches that often marginalize gender considerations and emphasizes the importance of addressing social justice issues to enhance agricultural sustainability.

FPE critiques traditional agroecological approaches for often ignoring gender dynamics and power imbalances. These traditional practices, which include knowledge, practices, and beliefs passed down through generations, are deeply rooted in community-agroecosystem relationships and form the basis for resilient farming systems, especially against climate change (Altieri et al., 2015). FPE addresses social justice issues and aims to enhance agricultural sustainability by integrating feminist theories. This framework exposes the gendered dimensions of environmental risks, rights, and responsibilities, showing how gender inequalities intersect with environmental issues (Lawhon et al., 2013). Moreover, it links individual experiences to broader socio-political and economic structures, exploring how gendered power relations impact resource access, decision-making processes, and environmental outcomes (Nightingale, 2006). FPE highlights often-overlooked aspects, which promote a nuanced understanding of environmental dynamics, emphasizing gendered impacts and methods of survival, management, and resistance against environmental challenges. This critique is essential for promoting gender equity in agriculture by ensuring that women's roles and knowledge are recognized and valued in sustainable farming practices.

Building upon this critique, FPE shifts the focus to the embodied everyday experiences of nature-human interactions and how they manifest in various spatial contexts (Elmhirst, 2015; Rocheleau & Nirmal, 2015). It acknowledges women as active contributors, often overlooked in historical analyses (Kansanga et al., 2019), and examines how gender influences access to knowledge, space, and resources. FPE values the local ecological knowledge held mainly by women, who are often primary caretakers of biodiversity and have deep insights into resource management and sustainable practices (Rocheleau & Nirmal, 2015; Shiva, 1992). This local knowledge includes techniques for soil fertility, seed preservation, and water management, crucial for sustainable agriculture. Women's traditional ecological knowledge significantly contributes to the resilience and adaptability of food systems amid environmental change (FAO, 2011). Elias et al. (2021) highlight how an FPE approach can foster a deeper understanding of the "politics of knowledge" by meaningfully acknowledging and validating diverse forms of knowledge, including the knowledge and lived experiences of resource users, particularly women, who have been historically marginalized and silenced. Incorporating local knowledge into mainstream agroecological practices challenges the dominant scientific paradigms that overlook or undervalue indigenous wisdom. This integration enriches ecological research and fosters more sustainable and culturally appropriate farming techniques.

2.3. Equitable Resource Governance and Distribution

Gender disparities and the promotion of sustainable livelihoods are critical issues that need addressing by examining the gendered political economy and its impact on resource management. Advocating for a fairer distribution of rights and responsibilities, scholars in FPE explore how gender dynamics influence agricultural practices, including community-supported agriculture, to empower women in sustainable food systems. This scholarship and the practices it informs advocate for equitable access to land and other agricultural inputs for women, which are essential for sustainable development (Bryan et al., 2024). Differential access to resources like land, water, seeds, and credit is often structured by patriarchal norms, marginalizing women's roles, and contributions

(Santpoort et al., 2021). Policies that recognize and address these inequalities are crucial. For example, reforms in land ownership laws to ensure women's rights to land, better financial services for women, and support for women's agricultural collectives are essential steps toward gender equity in agriculture.

Moreover, the application of an intersectional approach is crucial in addressing disparities in resource governance. This approach reveals how historical discrimination and multiple power structures combine to perpetuate social disadvantage and unequal distribution of resources in ways that differ for specific women according to their social locations (Jost et al., 2015). Understanding these compounded disadvantages can lead to the development of more inclusive agricultural policies that meet the specific needs of diverse community groups.

As we consider the implications of FPE in addressing gender disparities and promoting sustainable livelihoods in agriculture, it becomes clear that a fundamental shift in our approach to farming is necessary. This brings us to the concept of agroecology as an alternative to the current industrial agricultural model. How can the transition to agroecology, which aligns closely with the principles of the FPE, be leveraged to create a more holistic, sustainable, and socially just approach to food production in the future? Exploring this question could provide valuable insights into transforming our food systems to better address gender disparities and achieve sustainable livelihoods.

3. Methodology

In this literature review, I employ a narrative synthesis approach to explore how FPE perspectives have been integrated into agroecology in SSA, specifically examining how the FPE lens addresses social justice and gender dynamics within agroecology. Narrative synthesis is a form of knowledge synthesis that summarises and interprets a wide range of studies on a given topic, offering an overview alongside critical analysis and interpretation (Sukhera, 2022). This method relies on a detailed search and analysis strategy, utilizing both academic and practitioner-oriented literature. This dual focus allows me to identify theoretical gaps and propose practical solutions, ensuring that my contributions are both academically significant and practically relevant. I searched for academic sources through databases like JSTOR, Web of Science, and Google Scholar, which are recognized for their extensive collections of scholarly resources (Gusenbauer & Haddaway, 2020). JSTOR contains archives of foundational studies, Web of Science offers citation indexing to ensure high-quality and relevant articles, and Google Scholar provides access to a wider range of multidisciplinary sources. These databases house the most current and pertinent journals on feminist political ecology, agroecology, and gender dynamics in agriculture, all of which are essential for this study.

The search terms – “agroecology,” “feminist political ecology,” “gender dynamics in agriculture,” and “sustainable food systems in Sub-Saharan Africa” - were selected to capture the critical intersections of gender and sustainability in agricultural practices. These keywords aim to identify research that explores gendered power relations in agriculture, which is pivotal to understanding the role of women in agroecological systems. They also ensure the inclusion of studies that address sustainability and equity within SSA's unique socio-economic and environmental contexts. The focus is on peer-reviewed articles and book chapters published between 2000 and July 2024, capturing the latest trends in the field. Agroecology emerged as a transdisciplinary, participatory, and action-oriented approach in the early 2000s, gaining significant traction. A pivotal moment came with the first International Forum on Agroecology in Nyéléni, Mali, in 2007 (“Declaration of the International Forum for Agroecology, Nyéléni, Mali: 27 February 2015,” 2015). This event marked a critical juncture in the acceptance of agroecology as a viable alternative to industrial agriculture, particularly following the endorsement by the FAO in 2014, which recognized it as a sustainable approach to food systems (FAO, 2014). The temporal scope of this study ensures that it encompasses the most current theoretical advancements and empirical findings pertinent to contemporary discussions on policy and practice, while also reflecting the significant evolution of feminist and agroecological thought over the past two decades. Conference papers have been excluded from this analysis, as peer-reviewed journal articles typically undergo a more rigorous quality control process. While it is recognized that innovative ideas often emerge first in conference proceedings, journal articles offer more comprehensive and validated analyses following the peer review and revision process (Kelly et al., 2014).

I also reviewed practitioner-based reports to capture practical insights and real-world applications not fully represented in academic literature. Non-peer-reviewed sources, such as websites, reports, and brochures, were examined for their practical relevance. Organisations' websites, such as the FAO, UN Data, and the World Bank, were reviewed to ensure the inclusion of authoritative and influential sources that contribute to global and regional agricultural policies and practices. In the analysis, I merged FPE insights with agroecological practices to examine power dynamics, resource distribution, women's roles and representation in agriculture, and the impact of agroecology on social equity and ecological sustainability. By synthesizing the literature, I provide an overview

of current knowledge at the intersection of FPE and agroecology. The key themes identified include gendered access to resources, women's contributions to biodiversity, and the effects of equitable practices on food security. These themes will be discussed in subsequent sections.

Research Process

The research process followed four key sub-steps to ensure a rigorous and transparent approach:

1. *Search*: A comprehensive search of the selected databases using the identified keywords and filters (post-2000 publications, peer-reviewed sources) which ensures that the research covers a wide spectrum of existing knowledge and does not overlook relevant sources. The outcome of this step is a curated compilation of research articles and studies that serve as the primary materials for the subsequent stages of the research. A successful search phase yields a dataset of relevant and contemporary literature for critical review.
2. *Filtering*: To refine the list of collected studies, I applied inclusion/exclusion criteria, prioritizing articles that examined the intersections of gender, agroecology, and social justice. Studies irrelevant to the geographic or thematic scope (e.g., those not addressing gender or not relevant to Sub-Saharan Africa) were excluded from consideration. This selective approach facilitates the establishment of a more concentrated and manageable body of literature, thereby ensuring that the subsequent analysis is firmly grounded in the relevant contexts and aligned with the objectives of the study.
3. *Preparation*: I categorized and organized the filtered studies according to relevant themes including gendered resource access, the role of women in agroecological practices, and sustainable food systems. This thematic organization facilitates a systematic comparison and contrast of insights drawn from various studies enabling the researcher to more readily identify patterns, trends, and gaps within literature. This structured methodology enhances the analytical process, thereby simplifying the extraction of meaningful insights and the identification of interconnections across the studies.
4. *Analysis*: I employed a narrative synthesis approach to identify key themes and debates pertinent to the integration of FPE and agroecology, the implications for social equity, and the influence of gender in the transformation of food systems. By concentrating on these themes, the analysis not only reviews existing knowledge but also provides critical evaluations and recommendations. This methodology facilitates a comprehensive synthesis of current literature, highlights gaps in existing research, and suggests avenues for future inquiry and policy interventions. The outcome is intended to yield actionable insights that advance the fields of gender studies, agroecology, and social justice, particularly in relation to their intersections within the context of Sub-Saharan Africa.

This research process is illustrated in Table 1 below which shows all the steps followed:

Table 1. Research process.

Step	Objective	Databases used	Search terms	Exclusion criteria	Outcome
<i>Search</i>	To gather a comprehensive collection of relevant literature on the chosen themes.	JSTOR, Web of Science, Google Scholar	Agroecology; Feminist Political Ecology; Gender Dynamics in Agriculture; Sustainable Food Systems in SSA.	Studies before 2000, non-peer-reviewed journal articles, irrelevant geographical focus.	A broad collection of academic articles, reports, and grey literature relevant to the study's focus.
<i>Filtering</i>	To ensure the selection of high-quality, relevant studies that align with the research questions.	JSTOR, Web of Science, Google Scholar	Agroecology, Feminist Political Ecology, Gender Dynamics in Agriculture, Sustainable Food Systems in SSA	Articles not directly addressing gender, agroecology, or Sub-Saharan African context.	A refined selection of high-quality, relevant literature for detailed review.
<i>Preparation</i>	To categorize and organize the articles based on common themes and relevance to the study.	Organised by key themes and relevance	Keywords related to gender and sustainability in agriculture	Articles that do not align with identified key themes or are overly generalized.	An organized repository of categorized articles to facilitate narrative synthesis.
<i>Analysis</i>	To critically synthesize the literature and extract key insights for the study's objectives.	Thematic synthesis of selected articles	N/A	N/A	The extraction of key themes and insights for integration into the study's findings and recommendations.

As a central argument, I emphasize the need to integrate gender perspectives into agricultural policies and practices to achieve sustainable and equitable food systems. Through an in-depth analysis of documented case studies (to access concrete, real-world empirical evidence), I demonstrate the diverse socio-ecological contexts and practical challenges of implementing agroecological practices in SSA. This approach bridges a critical gap in literature by providing empirical evidence of the benefits of integrating FPE with agroecology. It offers actionable insights for policy and practice, grounded in robust theoretical insights, for enhancing equity and sustainability in agricultural systems in SSA.

4. Transition to Agroecology as an Alternative to Industrial Agriculture

Having established the critical role of FPE in addressing gender disparities and promoting equity in agricultural practices, I now turn to agroecology as an alternative to industrial agriculture. Nikiema defines agroecology transitions as:

The set of linked technical and organizational processes by which new production modes based on agroecological principles gradually and sustainably replace systems resulting from conventional intensification that have led to the massive use of synthetic inputs or allow very low productivity farmers to intensify their production without reproducing this conventional intensification scheme (Nikiema et al., 2023, p.2).

Agroecology emphasizes ecological sustainability, social justice, and food sovereignty, offering a transformative approach to food systems that align with the FPE principles. In this section, I introduce agroecology's principles of prioritizing natural processes and community relationships, highlighting its potential to address environmental degradation, socio-economic inequalities, and gender disparities. The narrative explores agroecology's benefits for environmental sustainability, biodiversity conservation, empowering smallholder farmers, and promoting gender equality and women's empowerment in agriculture. While acknowledging critiques and challenges, I emphasize

the urgent need for robust policy support and public funding to facilitate the transformative transition to agroecological practices, ultimately fostering a more just and resilient food system.

4.1 *Sowing the Seeds of Harmony: The Agroecological Symphony*

The fundamental principles of agroecology prioritize natural processes and community relationships over industrial inputs. Gliessman defines agroecology as:

The integration of research, education, action, and change that brings sustainability to all parts of the food system: ecological, economic, and social. It's transdisciplinary in that it values all forms of knowledge and experience in food system change. It's participating in that it requires the involvement of all stakeholders from the farm to the table and everyone in between. It is action-oriented because it confronts the economic and political power structures of the current industrial food system with alternative social structures and policy action. The approach is grounded in ecological thinking where a holistic, systems-level understanding of food system sustainability is required (Gliessman, 2018, p.599)

Moreover, agroecology approaches are based on the fact that food systems comprise science, practice, and social movement to achieve holistic integration and sustainability. It is a movement advocating for a transformative approach to food production (Rosset & Martínez-Torres, 2012). Recognized as a scientific field, agroecology explores ways to transform the existing food system, further develop agriculture toward social and ecological ends, and adapt to the changing environment (Gliessman, 2018). These multiple benefits make agroecology an essential strategy for ensuring food security.

Agroecology aims to improve land productivity by maximizing production per hectare through ecosystem synergies (Bernard & Lux, 2017). The intensification of agroecology can contribute to environmental preservation and sustainable agricultural transformation, particularly in SSA. It is not merely a collection of farming practices but a holistic approach that views the entire food system through ecological, cultural, political, social, and economic lenses. This approach promotes biodiversity, resource recycling, water conservation, and balanced energy usage while considering gender dimensions (Gliessman, 2016, 2018). Agroecology highlights the importance of local knowledge, participatory processes, and the agency of community-focused food producers over profit-motivated corporations. It embraces the rich cultural knowledge of indigenous and traditional farming communities, enabling them to control their agricultural practices and resources (Altieri et al., 2015; Pimbert, 2016).

Furthermore, agroecology emphasizes the importance of biodiversity, and ecological synergies, which are critical for the sustainability of small-scale farms (Wezel et al., 2015). It helps protect, restore, and improve agricultural systems in the face of climate shocks and stressors by promoting crop diversification, agroforestry, and organic farming. This approach not only enhances soil fertility and mitigates erosion but also supports greater carbon sequestration and increases the resilience of livelihoods, providing effective solutions for climate change mitigation and adaptation (Sachet et al., 2021). It emphasizes farmer autonomy and the use of locally sourced, renewable inputs (Gliessman, 2016), to offer a sustainable alternative to the industrial agriculture model, creating more equitable food systems that support socio-economic equity and empower marginalized communities' economic viability and environmental sustainability (Anderson et al., 2021).

4.2 *Cultivating Equality: Empowering Women Through Agroecology*

The discourse surrounding the impact of prioritizing gender equality in agricultural productivity is multifaceted. According to many scholars, agroecology not only transforms farming systems but also restructures social hierarchies by empowering smallholder farmers and, when women have access to resources and their knowledge and contributions are valued, by promoting gender equity in agricultural practices in SSA (Adu Boahen et al., 2024). Despite their crucial roles in food production and resource management, women in many parts of Africa face significant barriers that limit their economic opportunities and rights. Agroecological approaches are uniquely positioned to address these disparities because they emphasize inclusivity and community participation.

When guided by social justice values, agroecology aims to tackle power imbalances and inequalities by using traditional knowledge and inclusive processes that empower producers. Agroecology is found to pose a challenge to patriarchal and oppressive systems (Zaremba et al., 2021), to acknowledge and incorporate cultural aspects of farming, and preserve diverse traditions, thereby valuing women's role in agriculture and strengthening community resilience (Altieri & Nicholls, 2020). Indigenous communities, especially women within them, have preserved agroecological practices, which enhance their food sovereignty and protect their cultural heritage (Anderson et al., 2019; Shiva, 2016). Gender dynamics are at work here as agroecology promotes the use of indigenous knowledge and political economies, which often value women's role in agriculture and align with women's priorities within the sphere of social reproduction. In Malawi, women have been leaders in seed preservation and biodiversity through community seed banks, which support

agroecological farming by preserving local seed varieties that are more resilient to climate change (Bizikova et al., 2022; Puskur et al., 2021). This involvement boosts agricultural biodiversity and positions women as key stakeholders in combating climate change, enhancing crop diversity supported by passed-down indigenous and traditional knowledge (Phiri et al., 2022).

Although women hold a pivotal position in food production, they frequently encounter discriminatory treatment, as well as restricted access to resources and mechanisms for decision-making (Wezel et al., 2020). Agroecology creates the social conditions for those involved in food production, and rural community members, to recognize the important role of women. It is being used by women to strengthen their capacity, seek independent financial resources, and protect their rights. By involving women and promoting gender equality, practicing AE can help women feel empowered and part of society (Serpossian et al., 2022). Hence, acknowledging the contributions of women and marginalized communities can improve social justice within food systems. Feminist perspectives in agroecology stress the need to tackle social inequalities, especially those affecting women due to patriarchal norms (Zaremba et al., 2021).

While critics argue that gender-centric policies could complicate agricultural programs and detract from their efficiency and output, a review of the literature suggests otherwise. As indicated by Kilic et al. (2015), incorporating gender equality in agriculture leads to better productivity, sustainability, and fairness. Addressing these disparities can significantly improve overall agricultural outcomes by ensuring that women, who constitute a substantial part of the agricultural workforce, have equal access to resources, inputs, and training (Perelli et al., 2024). Insights from the Nigerian agricultural promotion policy emphasize the importance of gender and age-sensitive policies in creating an enabling environment for entrepreneurship within the agricultural sector (Ifeoma, 2019). This indicates how gender-centric policies can foster a more inclusive and dynamic agricultural sector, potentially leading to innovation and growth.

Many studies, including those by Slavchevska et al. (2016); Quisumbing et al. (2019), and Haug et al. (2021), highlight that the feminization of agriculture does not always lead to women's empowerment but can instead be associated with poverty and rural distress. This challenges the assumption that increased female participation in agriculture automatically translates to improved gender equality and economic empowerment. However, Mukasa and Salami (2016) have a different view. Their research shows that gender equality not only stands as a fundamental goal but also enhances agricultural productivity, sustainability, and broader developmental objectives. For instance, closing gender gaps in agriculture in Nigeria, Tanzania, and Uganda could increase production by 2.8%, 8.1%, and 10.3%, respectively. Similarly, a 2023 report by the FAO on the Status of Women in Agrifood Systems highlights a powerful opportunity: if women farmers had equal access to resources compared to men, their agricultural output could rise by 30%, potentially reducing the number of hungry people worldwide by 12 to 17% (Solomon et al., 2024). Recognizing this potential and addressing the existing gender gap in agriculture are key aspects of agroecology, which aims to promote gender equity and women's empowerment.

Thus, agroecology serves as a tool for gender equality and empowerment by integrating feminist principles into agricultural practices (Altieri & Nicholls, 2020; Serpossian et al., 2022). It recognizes the critical role of women in food production and seeks to address gender disparities by promoting equitable access to resources, decision-making power, and economic opportunities (Shiva, 1992; Zaremba et al., 2021). To further this empowerment, development agencies, and governments should establish programs that focus on valuing women's contribution to agroecology and supporting women's participation and training in community-based agroecological initiatives. Moreover, by addressing gender disparities in agriculture and developing platforms for women to share their agroecological experiences and achievements, there is a potential to unlock the capabilities of a significant portion of the agricultural workforce. This agroecology approach orients itself towards the goals of the FPE, which advocates for policies that promote and enable gender equality in agriculture and food systems. In the next section, I will now examine how a feminist perspective in agroecology can challenge patriarchal norms, promote social justice, and restructure inequalities within food systems.

5. Empowering Change: Feminist Political Ecology in Agroecology

FPE in agroecology examines the complex relationships between gender, ecology, and agriculture, addressing the historical gender-blindness of traditional agricultural approaches. This framework explores the social, economic, and political factors that shape women's experiences in agricultural systems (Oteros-Rozas et al., 2019). Drawing on the work of scholars like Naves and Fontoura (2021) and Oteros-Rozas et al. (2019), FPE investigates key aspects of agroecological systems through a gendered lens. These aspects include equitable resource distribution, the impact of patriarchal norms on agricultural practices and decision-making, the recognition and valuation of women's agencies and local knowledge, and the role of collective action in promoting gender equality within agroecology. By integrating feminist theory, political ecology, and agroecology, I

aim to show how agroecological practices have the potential to transform dominant social relations into more inclusive and resilient ones. This framework emphasizes the importance of diverse perspectives, intersectionality, local practices, food sovereignty, and environmental justice to create equitable and sustainable food systems (Teixeira et al., 2018; Zaremba et al., 2021).

A critical aspect of FPE is its focus on equitable resource distribution, which strongly influences gender power dynamics in food systems (Anderson et al., 2019). Naves and Fontoura (2021) highlight how patriarchal norms perpetuate gender inequalities in access to land, inputs, finances, and markets, limiting women's control over agricultural resources. Similarly, Anderson et al. (2019) emphasize that agroecological practices often require a labor-intensive approach, leading to changes in gender roles and responsibilities, with women taking on greater responsibilities through their work both on farms and in households. FPE demands a nuanced understanding of how agroecological practices can be reformed to become more inclusive and supportive of more equitable gender relations by focusing on the gendered allocation of resources.

The FPE approach challenges existing patriarchal structures that often sideline or ignore women's long-standing contributions to agriculture and food security. Assan et al. (2018) urges that women's agency and local knowledge of sustainability need to be acknowledged in agricultural policies. Historically, women's knowledge and labor have been pivotal in the success of sustainable farms. Women's specific knowledge and skills acquired through their work in social reproduction, gardening, and tradition are crucial to agriculture and natural resource management, yet their contributions have frequently been overlooked and marginalized (Clement et al., 2019; Mollett et al., 2020). FPE champions an agroecological approach that upholds human rights, including those of women, youth, and Indigenous peoples, and respects local cultures, social participation, and traditional food practices (Teixeira et al., 2018). This not only supports women's empowerment but also the sustainability and resilience of agricultural systems. Implementing gender-responsive agricultural policies can amplify women's roles in sustainable farming, creating more equitable and inclusive agroecological systems.

Furthermore, the FPE promotes collective action as a tool for enhancing gender equality within agroecology. The FPE framework recognizes the benefits of gender equality, including enhanced cross-gender knowledge sharing and learning (Zaremba et al., 2021). Scholars such as Clement et al. (2019), Elmhirst (2015), and Lau (2020) have examined various forms of collective action rooted in social justice, revealing how different identities impact participation and decision-making in resource management. Women's ecological knowledge and agricultural expertise can significantly contribute to collective decision-making, thereby enriching agroecological practices and enhancing social equity and cohesion. The insistence on collectivizing resources is important as it advances the efforts by women to gain equitable access to resources and support networks that were previously out of reach on an individual basis. This can create economic opportunities, including better market access, and stronger social capital (Isgren & Ness, 2017).

It is essential to recognize that while collective action within agroecology offers potential benefits, it also presents significant challenges. Eminent scholars such as Anderson et al. (2018) and Bottazzi and Boillat (2021) note that women's participation may be impeded by power dynamics and gender inequalities within communities. Patriarchal norms and structures often restrict women's access to resources, their decision-making power, and their opportunities to assume leadership roles in agroecological initiatives. These restrictions manifest through mechanisms such as gender-based violence, cultural norms that prioritize male authority, and systemic biases that limit women's educational and economic opportunities (Ramirez-Santos et al., 2023). Therefore, it is vital to include and amplify women's voices in decision-making processes and address their specific needs (de Carvalho & Bógus, 2020). Additionally, involving men in these efforts through education and relationship-building is crucial. The women's movements have advocated such practices to foster gender equity for decades (Pichat, 2022). Intersectional factors such as race, class, and ethnicity can distinctly influence the experiences and opportunities available to women in agroecology communities (Bottazzi & Boillat, 2021; Isgren & Ness, 2017).

This disparity is highlighted in various studies exploring the dynamics of women's participation in collective action and decision-making processes across different contexts. Drawing upon the framework of FPE, I emphasize the intersectionality of social identities, women's empowerment, the importance of including diverse voices, and challenging patriarchal power structures (Zaremba et al., 2021). Evidence from Zimbabwe shows that initiatives promoting women's leadership in agroecology groups have enhanced their ability to make decisions and have their voices heard, leading to increased crop diversity and farm income (Mpofu, 2016). This benefits entire communities by bolstering food security and economic resilience. This approach enriches our understanding of collective action in agroecology by highlighting critical assumptions about shared interests and equitable outcomes. Challenges related to intersecting forms of oppression are also relevant within various governance and policymaking systems, underscoring the complexities of forming agricultural collectives.

Despite its insightful contributions, FPE faces several critiques and limitations. Sundberg (2017) argues that its perceived overemphasis on gender issues can overshadow other critical factors such as economic viability, technological advancements, and environmental challenges. However, the framework's focus on gender dynamics is vital for addressing deeply ingrained inequalities that impact agricultural productivity and sustainability. And, with intersectionality, FPE recognizes the relation between gender and other categories of social oppression. It integrates intersectional gender considerations into ecological and economic analyses, enriching our understanding of how broad social power dynamics influence access to resources like land, seeds, and credit. Lau (2020) suggests that while FPE is theoretical, it can lead to practical changes with proper policy support and community relationships, as demonstrated by initiatives promoting women's leadership in agroecology, which have enhanced crop diversity and farm income in countries like Zimbabwe (Mpofu, 2016).

Ultimately, I argue, FPE revolutionizes agroecology by integrating gender perspectives into agricultural practices. Drawing on intersectionality to embrace other critical factors alongside gender, the ongoing integration of FPE into agroecological studies enhances our understanding of gender relations in agriculture and provides actionable strategies to mitigate these challenges. While challenges exist, such as community power dynamics and patriarchal structures, case studies show that collective action and inclusive decision-making significantly benefit women and their communities. The inclusion of feminist perspectives is essential for addressing social inequalities and power disparities within agroecology. Discussions on the importance of feminist theory and activism in promoting gender equality and social justice in farming practices are crucial. Such discourses emphasize the central importance of considering gender and other social dimensions in creating fair and resilient food systems, and of acknowledging the significant contributions and experiences of women in agriculture and food systems.

Navigating Challenges and Critiques of Feminist Political Ecology in Agroecology

Agroecology, while a promising alternative to industrial agriculture, faces several critiques. A major concern is its perceived inability to produce enough food for a growing population, with some arguing that only industrial agriculture can meet global food demands (Fortuna, 2022). However, evidence suggests that the industrial system is unsustainable. With almost a century of trial and error, it has led to soil degradation, biodiversity loss, and increased greenhouse gas emissions (Capra & Lappé, 2018). Agroecology, by contrast, offers a robust alternative by utilizing diversified planting and organic methods that restore ecosystem health while still producing sufficient yields (Wezel et al., 2020).

There is also concern that "agroecology" is being co-opted by various actors to align with the dominant industrial food system, potentially depoliticizing and reshaping its discourse (Anderson et al., 2018; Anderson et al., 2021; Pimbert, 2015). Proponents worry that without maintaining its core principles, agroecology might lose its transformative potential. Therefore, transitioning to agroecological practices is urgent but complex, requiring significant upfront investment in education and infrastructure. Despite high initial costs, the long-term benefits of reduced input costs, improved soil health, and greater climate resilience provide a compelling return on investment (Fosse & Grémillet, 2020). Continued funding from governments and international bodies could facilitate the replacement of outdated and destructive farming methods.

Supportive policies are crucial for encouraging sustainable practices and providing financial incentives for small-holder farmers. For example, community-based seed systems in Tanzania preserve indigenous crop varieties and promote agro-biodiversity, helping farmers access seeds better adapted to local conditions (Ayenan et al., 2021). Such programs have increased agricultural diversity, reduced costs, and fostered greater community resilience and food security through collaborative networks among researchers, farmers, and government agencies (Kansiime et al., 2021; Sacht et al., 2021). Also, adopting agroecology within capitalist structures presents challenges and opportunities. While some argue that integrating agroecological principles into capitalist systems may not lead to desired transformations, agroecology's adaptability is crucial (Wach, 2021; Wezel et al., 2020). Effective scaling can be achieved through modern innovations and community-led agricultural planning, addressing scalability and efficiency challenges associated with traditional practices. (Ewert et al., 2023).

Gender equality in agriculture is another significant challenge. Advocating for gender equality might face cultural opposition (Zaremba et al., 2021), particularly in African cultures where traditional roles often marginalize women, making it difficult for them to fully participate in and benefit from agricultural activities (Mukasa & Salami, 2016). These cultural and societal norms can hinder the implementation of gender equality initiatives, perpetuating gender disparities and limiting women's potential (Hernandez et al., 2023). Addressing these disparities is essential for enhancing agricultural productivity and achieving broader developmental goals (Chekene & Kashim, 2018).

Similarly, critics of FPE argue that it sometimes overemphasizes gender issues at the expense of economic viability, technological advancements, and environmental challenges (Sundberg, 2017). Moreover, integrating intersectionality into practical applications is complex and resource-intensive (Harcourt, 2020). FPE emphasizes the importance of considering gender alongside class, race, and other dimensions of political-ecological life, adding complexity to research and practical applications (Elmhirst, 2011; Rocheleau et al., 1996; Sundberg, 2017). This is highlighted by the need to integrate feminist methodologies and principles into research designs, recognize diverse epistemologies, and incorporate reflexivity, responsibility, and co-production in research. However, these participatory and inclusive research methods, while valuable, can be time-consuming and resource-intensive.

Translating FPE principles into actionable policies and practices is challenging, especially in contexts with entrenched patriarchal norms. FPE critiques dominant power structures and emphasizes the need to challenge inequality and differentiated resource access (Elias et al., 2021). The localized and context-specific nature of many FPE studies can limit the scalability, necessitating further research on applying these insights across different contexts and scales (Mollett & Faria, 2013). Addressing these critiques and challenges is crucial for the continued development and relevance of FPE, ensuring it remains a robust and influential framework for understanding and addressing complex socio-ecological issues (Rocheleau & Nirmal, 2015; Sultana, 2021). Ultimately, both agroecology and FPE revolutionize agricultural practices by integrating ecological and gender perspectives, respectively, into agricultural practices. Despite the challenges, such as community power dynamics and patriarchal structures, case studies show that collective action and inclusive decision-making significantly benefit women and their communities. Therefore, the inclusion of feminist perspectives is essential for addressing social inequalities and power disparities within agroecology.

6. Conclusion

In conclusion, this article contributes to the literature on feminism and agroecology by integrating FPE with agroecology to propose a transformative approach to addressing the intertwined challenges of sustainable and gender-equitable food systems in SSA. This proposed approach is both theoretical and practical. The theoretical framework is grounded in feminist and ecological principles, emphasizing the importance of gendered power relations, intersectionality, and equitable resource governance and distribution. On the practical side, it provides actionable recommendations, advocating for gender-responsive policies, women-led capacity building, and the integration of local ecological knowledge, including women's knowledge. This dual contribution of theoretical insights and practical steps highlights the importance of a holistic approach to achieving sustainable and gender-equitable food systems.

Through empirical evidence from case studies, I explore the real-world benefits of this integrated approach thus offering a robust framework for future research and policy development. For instance, the Green Belt Movement in Kenya, led by Wangari Maathai, involved women in tree planting to combat deforestation, promote sustainable livelihoods, and empower women politically and economically. Similarly, in Malawi, women's leadership in seed preservation through community seed banks has supported agroecological farming by preserving local seed varieties resilient to climate change. These initiatives demonstrate that embedding gender considerations into agroecological practices enhances agricultural productivity and sustainability while advancing gender equality and social justice, ultimately contributing to more resilient and equitable food systems.

FPE offers crucial insights for addressing potential risks and problems that may arise when implementing agroecology without a feminist approach. It challenges existing patriarchal structures, promotes collective action, and emphasizes the importance of women's voices in decision-making processes to ensure that agroecological practices do not inadvertently perpetuate or exacerbate gender inequalities. Furthermore, FPE's recognition of intersectionality and its focus on equitable resource distribution contributes to a more nuanced understanding of the complex social dynamics within agroecological communities.

Building on these foundational insights, emerging directions and future research agendas in FPE emphasize greater intersectional approaches that examine how gender intersects with other axes of difference such as race, class, and sexuality across multiple scales. Future research should aim to develop more integrated methodologies that balance gender analysis with other critical factors, explore ways to scale up and generalize FPE insights for broader policy application, and strengthen connections between FPE theory and practical implementation. Amplifying diverse voices within FPE, particularly from the Global South, and critically examining the intersection of gender, environment, and emerging technologies are also crucial. FPE scholars increasingly focus on the gendered implications of digital technologies and climate justice, advocating for more equitable and sustainable futures. By engaging in these debates and limitations, the FPE can continue evolving as a robust and influential framework for understanding and addressing complex socio-

ecological issues. Pursuing these emerging directions will ensure that FPE continues to offer critical insights into the gendered dimensions of environmental change, enhancing the sustainability and equity of food systems globally.

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