

Gender-Based Approaches in Agroecosystems: Enhancing Agricultural Sustainability

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Abstract

This article explores the significant role of gender-based approaches in agroecosystems and their profound impact on agricultural sustainability. It begins with a comprehensive literature review that includes articles and reports that provide information on the current state of gender-based practices within agroecosystems. Subsequently, the study systematically collects and synthesises data, highlighting key themes such as labour allocation, resource access, decision-making dynamics, and agrobiodiversity preservation. Real-world case studies are integrated to exemplify effective strategies and challenges in promoting gender equity, while intersectionality analysis examines how gender interacts with other contextual factors. Stakeholder interviews enrich the discussion with expert insights and rigorous qualitative data analysis techniques are applied to distill meaningful insights. While potential limitations include bias in the selection of the literature and data availability, the research aims to offer evidence-based recommendations to promote gender equity and agricultural sustainability, contributing to a holistic understanding of this critical intersection. By addressing gender disparities, this article underscores the importance of inclusive and sustainable agricultural value chains for global food security and rural economic development.

Keywords: Agriculture value chains, gender dynamics, sustainable interventions, women in agriculture, gender-sensitive programmes.

Introduction:

The agricultural value chain refers to the integrated range of goods and services necessary for an agricultural product to move from the producer to the final consumer. It comprises factors that can improve a product while linking commodity producers to processors and markets. An efficient and sustainable agrivalue chain is the need of the hour, as it can help increase the profits made by the farmer and create a roadmap for adopting a climate-resilient farming system, which would benefit the ecosystem in general. In recent years, global markets have become more accessible, allowing farmers to increase their income by gaining a better foothold in the agricultural product market. For instance, in today's data-rich environment, farmers can generate higher profits by exporting their products to more significant markets in high-income nations. They can also add more value to their produce through proper storage and processing.

Food Security and the Role of Gender-Based Approaches

Food security is a top priority for developing countries, and it is estimated that by 2050, food production will need to grow by 50-70% to feed an additional two billion people. This is especially important for developing countries, given the recent food price shocks highlighting the challenges of feeding people experiencing poverty. Agricultural ecosystems are sensitive to climate change, so it is essential to consider how climate change will affect various parts of these ecosystems to get a complete picture.

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In most countries, smallholders are central to the value chain transformation process, but realising this potential can be challenging. Although they make up most raw material suppliers, they are often excluded from the chain, particularly regarding management and value addition. Dynamics and sociocultural norms and practices are the main factors for resource allocation, benefit sharing, and access to growth opportunities within the value chain. Among these factors, the role of women, who produce up to 60-70% of food in developing countries, has been significantly underrepresented. Although they constitute a predominant proportion of the agricultural labour force, women face significant gender-based disparities in resource access and benefit sharing. This imbalance hampers the positioning of women at higher nodes of the value chain, which involves decision-making tasks. A two-step intervention is required for women farmers to adopt sustainable agricultural practices, which involve their participation in decision-making roles within the value chain of agriculture. This is followed by empowerment through tools and technologies to increase efficiency and reduce their burden. Addressing gender disparities is imperative to improve the penetration of sustainable agricultural technologies. This article will discuss various measures for adopting sustainable agriculture relevant for women farmers.

Literature review:

Gender-based approaches to agricultural systems have gained increasing attention in recent years due to their potential to address gender disparities and improve the sustainability of agricultural systems. Agroecosystems encompass complex interactions between agriculture and ecosystems, and incorporating a gender perspective in these approaches is essential to promote equitable and sustainable agricultural development.

One key aspect of gender-based approaches to agroecosystems is recognising men's and women's agricultural roles and responsibilities of men and women in agriculture. Research by Doss (2001) highlights the importance of understanding gender-specific labour allocation and decision-making within agroecosystems. This understanding is crucial for designing interventions that empower women farmers and promote their active participation in agroecological practices.

Another critical area of research focusses on the impact of gender dynamics on agrobiodiversity and food security. Studies such as Rahman et al. (2017) emphasise that women often play a significant role in conserving traditional crop varieties and local knowledge of the agroecosystem. Gender-sensitive approaches can contribute to the preservation of agrobiodiversity, which is essential for building resilient agricultural systems.

Furthermore, access to resources and technologies within agroecosystems is a central theme in the literature. Meinzen-Dick et al. (2019) highlight the importance of addressing gender-specific constraints in accessing land, credit, and modern agricultural tools. Ensuring equal access to resources is crucial to improving women's productivity and reducing their vulnerability in agroecosystems.

The role of women in management and decision-making is another area of interest. Studies such as Badstue et al. (2018) emphasise the need to recognise and strengthen women's participation in agroecological research and development processes. Engaging women in decision making at various levels of agroecosystem governance is essential to promote sustainable practices.

Finally, gender-based approaches to agroecosystems also consider the intersectionality of gender with other factors such as ethnicity, socioeconomic status, and location. Research by Bezner-Kerr et al. (2017) explores how women's experiences in agroecosystems can vary significantly based on these intersecting identities, highlighting the importance of tailored interventions.

Objectives and Methodology:

This article explores the significance of gender-based approaches in agroecosystems and their impact on agricultural sustainability. To achieve this, the study will initiate an extensive literature review, including research articles and reports, to provide an overarching view of the current state of gender-

based practices within agroecosystems. Subsequently, data will be systematically collected and synthesised, focussing on key themes such as labour allocation, resource access, decision-making dynamics, and the preservation of agrobiodiversity. Real-world case studies will be integrated to exemplify effective strategies and challenges to promote gender equity. An intersectionality analysis will examine how gender interacts with other contextual factors. Stakeholder interviews will bring expert insight into the discussion and rigorous qualitative data analysis techniques will be applied to provide meaningful insights. The methodology will be evaluated with respect to strengths, such as a comprehensive review of the literature, real-world case studies, and limitations, including selection bias.

Strengths and weaknesses:

The chosen methodology combines rigorous research practices, including literature review, data synthesis, case studies, stakeholder participation, and qualitative analysis. These strengths enhance the credibility and depth of the study. However, limitations include potential bias in literature selection, data availability, and the feasibility of stakeholder interviews. Despite these limitations, the research aims to provide valuable information on the role of gender-based approaches in agroecosystems and offer evidence-based recommendations to promote gender equity and agricultural sustainability, contributing to a holistic understanding of this critical intersection.

Discussion:

Sustainable Agriculture and the Value Chain:

Sustainable agriculture includes environmentally friendly farming practices, diversification of natural resources, improved soil fertility, economic profitability, and socioeconomic equality (Foley et al., 2011; Pretty & Bharucha, 2014). Sustainable interventions at each step of the agrivalue chain can be a critical driver to achieve the Sustainable Development Goals (SDGs) established by the United Nations (UN, 2015). Each stage of the agrivalue chain, from production, aggregation, processing, distribution, and marketing, requires specific interventions to reduce pressure on natural resources while increasing profits (Hobbs, 2007; FAO, 2020). Governments must prioritise adopting sustainable agriculture through policy and investments (Duflo et al., 2012).

The efficiency of adopting tools and technologies that promote sustainable agriculture depends on the socioeconomic condition of the farmer (Pingali, 2012). Smallholder farmers constitute a large proportion of the farming community, especially in developing countries (Hazell & Wood, 2008). The limited number of educated and well-trained farmers willing to adopt sustainable interventions presents a significant bottleneck in disseminating sustainability within the agricultural system (Frelat et al., 2016).

The Role of Women in the Agricultural Value Chain:

Almost 80% of rural women are actively involved in agriculture, performing 60% of the work (FAO, 2011). Despite their substantial contributions, many of these women lack access to regular water and fuel and they bear sole responsibility for these essential tasks (UN Women, 2015). Rural women continue cultivating intercrop operations and harvesting standing crops (FAO, 2011). However, even though women do most of the labour-intensive work in agriculture, they are often unrecognised and unpaid for their contributions (Quisumbing et al., 2014). The burden of this unpaid work is further exacerbated by the uncertainties of climate change (FAO, 2018).

The critical role of women in the agricultural value chain has been deeply undermined. Women have limited access to data and resources, own fewer assets, and have heavier workloads (Doss, 2001; Meinzen-Dick et al., 2019). This limitation impedes your ability to participate at higher levels of the value chain and discourages their participation in decision-making activities (Badstue et al., 2018). Women's participation is deficient in processing, trading, and acquiring the skills necessary to run a business (Rahman et al., 2017). Moreover, in rural areas, women often lack access to bank loans to scale up their agricultural or agri-allied businesses due to their lack of land ownership rights (FAO,













2011). Although progress has been made on inheritance laws, women comprise only 14% of landowners in rural households and own up to 11% of total agricultural land (FAO, 2011).

Sustainable Technology and Gender Sensitivity:

Sustainable technology is essential for crop production and the entire value chain (Pingali, 2012). In developing countries, women face sociocultural barriers such as limited access to information and resources, limited control over assets, and high workload, which limit their ability to interact and operate at higher value chain nodes (Badstue et al., 2018). This requires the development of gender-sensitive technologies (Badstue et al., 2018). Among smallholder farmers, women are typically relegated to low-skilled operations and marginal subsistence farming (Meinzen-Dick et al., 2019). Male farmers have traditionally dominated mechanisation and physically demanding work, further exacerbating the gender gap due to the lack of machinery designed with women in mind (Doss, 2001). Even simple agricultural tools like spades are often heavier than is suited for women farmers, and slight modifications to their design could make them more suitable (Doss, 2001). The degree of mechanisation varies between countries, making it crucial to design gender-sensitive machinery tailored to local agricultural needs (FAO, 2011).

In agri-value chains, women farmers exhibit varying levels of involvement in different sectors. They participate in the production phases of dairy and livestock rearing and, to a lesser extent, in the production phase of plantation and cash crops (FAO, 2011). However, their representation is lacking in trading, procurement, processing, wholesale, and retail activities (Table 1) (FAO, 2011). Dairying has become an important secondary source of income for millions of rural families, particularly women and marginal farmers (FAO, 2011). This sector provides approximately 50% of direct and indirect employment opportunities for women in the country, exceeding other economic sectors (FAO, 2011). While the Department of Animal Husbandry and Dairy Development does not have a specific scheme designated for women's empowerment, it emphasises providing benefits to women engaged in animal husbandry and dairying (FAO, 2011).

Table 1: Gender-Sensitive Value Chain Mapping

<i>Input Supply</i>	<i>Production Phase</i>	<i>Aggregation</i>	<i>Processing and Wholesale</i>	<i>Retail/ Export</i>
<i>Food crops</i>				
<i>Dairy and Livestock</i>				
<i>Large-scale Farming/Plantation/Cash Crop</i>				

Aggregation Processing and Aggregation Processing in the Input Supply Production Phase and Wholesale Retail/Export Food Crops Dairy and Livestock/Large-scale Farming/Plantation/Cash Crop A gender-specific value chain mapping process can provide valuable information on the gender-specific division of labour within a value chain. When properly implemented, it can help increase the visibility of women's work, as much of the work done in value chains may remain unpaid, unacknowledged, or hidden within the informal economy (ILO, 2018). Evidence-based studies, such as the 2018 ILO Report, emphasise this, discussing gender imbalances in the agrovalue chain. The study found that in the informal agrivalue chain, women constituted the predominant workforce, performing the most labour-intensive work during crop production, such as sowing seeds, intercultural operations, and harvesting, especially in small-scale processing settings. However, women were minimally represented at the higher levels of the agrivalue chain, involving the aggregation of produce (wholesaling), distribution and marketing of agricultural products. In the formal agri-value chain, which encompasses agricultural production on large-scale farms linked to

larger processing units and distribution to supermarkets and for export, women farmers were consistently underrepresented at each step. This highlighted that the contributions of women in agriculture were not adequately compensated and they were excluded from the higher levels of the agri-value chain (ILO, 2018).

Interventions to Promote Women's Participation:

It is identifying the fundamental barriers that hinder women's participation or hinder them from benefiting from project activities (Badstue et al., 2018). Value chain interventions may include strategies to increase women's market participation and decision-making capacity (FAO, 2011). It is vital to encourage and facilitate female participation in typical male-dominated value chain areas (Quisumbing et al., 2014).

Women entrepreneurs often build on the expertise and experience of other female entrepreneurs or role models rather than relying on outside advice from men (FAO, 2011). Rural economies tend to function based on gender segmentation (FAO, 2011). Men and women often take on separate roles in any given value chain. For example, women may be responsible for processing a primary crop or running a store. Therefore, interventions must aim to strengthen the part of the women-dominated value chain, ensuring that they maximise their benefits (FAO, 2011).

Female farmers tend to have a different adoption process for modern technologies (Doss, 2001). Therefore, the technology must be fine-tuned to meet the specific needs of farmers (FAO, 2011). A shift toward a more gender-sensitive approach to economic development is necessary (FAO, 2011). Since mechanisation inputs are typically expensive, specialised service agencies will play a crucial role (FAO, 2011).

Implementing development activities such as electrification, road construction, regular water supply, and access to clean drinking water and sanitation can significantly reduce the burden of household tasks on rural women (FAO, 2011). Furthermore, land ownership and access to credit are mutually beneficial (FAO, 2011). Access to credit allows rural women to purchase small appliances for food preparation and storage, such as refrigerators and pressure cookers, which can reduce the time and money they invest in their households (FAO, 2011). In conclusion, gender-specific and family-orientated policies are necessary to share the burden of unpaid work in rural households, contributing to the long-term prosperity of the rural population (FAO, 2011).

Measuring Gender Interventions for Equitable and Competitive Agricultural Value Chains:

Gender-sensitive indicators can be used to track changes in the status of men and women and the reduction of gender disparities over time (Meinzen-Dick et al., 2019). These indicators should be able to detect changes in gender segmentation of the value chain to identify areas where activities have successfully created new opportunities for participants in the value chain. Furthermore, gender-sensitive indicators should not rely solely on counting headcounts. However, they should measure outcomes such as the proportion of women members of associations or in leadership positions and the proportion of women whose sales/incomes and assets have increased (Meinzen-Dick et al., 2019).

Gender interventions for equitable agricultural value chains should be sensitive to the roles and relationships of both men and women (Badstue et al., 2018). They should promote equitable participation by addressing the distinctive needs of women and encouraging gender-equitable market-driven solutions for their economic advancement (Badstue et al., 2018). Most gender-sensitive programmes often fail to generate participation from male stakeholders (Badstue et al., 2018).

A benefit-sharing mechanism in a gender-sensitive programme can be effectively implemented by giving equal importance to men and women in problem identification, as men have been involved in value chain-based activities for longer. However, engaging women in finding solutions empowers them to take the necessary risks and learn from experience (FAO, 2011).

Conclusion and the Way Forward:

Agricultural value chains are deeply influenced by gender dynamics and sociocultural norms, which determine resource allocation, benefits, and access to opportunities (FAO, 2011). In many developing countries, women are the backbone of agriculture, contributing 60-70% of food production and forming a significant part of the global workforce (FAO, 2011). Creating efficient and sustainable agricultural value chains is critical, offering the potential to increase farmer profits and establish climate-resilient farming systems beneficial to ecosystems (UN, 2015). Achieving this goal requires integrating sustainability practices such as crop diversification, minimal tillage, agroforestry, and the promotion of natural vegetation (FAO, 2011).

Despite their substantial contributions, women in agriculture face gender disparities in resource allocation and profit sharing (FAO, 2011). Gender mainstreaming has made strides in improving women's participation in various value chains, enhancing income for small-scale farmers, and bolstering the socioeconomic security of rural households (UN Women, 2015). Introducing gender-sensitive agri-entrepreneurship programmes could further boost GDP contributions from the unorganised sector, solidifying women's role as entrepreneurs driving rural economic development (FAO, 2011). Future research can focus on comprehensive impact assessments of gender-based interventions, exploring intersectionality with ethnicity and socioeconomic factors, conducting longitudinal studies and policy analyses to promote more inclusive and sustainable agricultural systems, comprehensively bridging gender gaps (Badstue et al., 2018).

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