



# Gender and Climate-relevant Agri-Food Systems Governance: A Strategic Evidence Review

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# Overview

This working paper summarizes existing evidence on barriers women face in agri-food system (AFS) governance and known approaches that can be scaled up to improve women's voice and agency in climate-relevant AFS governance. By AFS governance, we mean any aspects of institutions and governance, formal or informal, that influence the AFS, including those corresponding to individuals living in rural areas. There are numerous benefits to reviewing the current evidence on the barriers to and potentials of women's empowerment in AFS governance in the Global South. First, preparing a document on this topic could serve as a resource material for stakeholders, including policymakers, community organizers, and scientists involved in this sub-field of study, and it provides valuable information that could serve as a foundation from which further studies could be undertaken. Second, analyzing the current literature helps to not only identify research gaps but also avoid redundancy in future research in this field in the context of limited agricultural research funding. Third, policymakers will find this work relevant in designing and augmenting interventions to increase women's voice and agency in AFS governance. Instituting policies that will safeguard and expand women's voice could result in higher productivity, especially as climate change threatens to destabilize food systems in low- and middle-income countries.

## Abstract

There is a need to address gender inequalities in agri-food systems (AFS) governance to close the gender gap and improve women's agency and participation in the agri-food sector. Women often face barriers that silence their voices and stifle their agency in AFS systems due to a lack of education and knowledge, which limits their ability to adopt and implement new farming techniques for improved yields. Moreover, women often are underrepresented in decision-making processes and leadership roles, which can lead to policies and solutions that do not adequately address their needs and interests. In addition, societal norms and cultural restrictions often limit women's mobility and interactions with men, hindering their participation in productive meetings and decision-making processes. Furthermore, gendered roles and tasks can disincentivize women's involvement in AFS, and traditional practices often favor men in terms of owning agricultural assets such as land. To overcome these barriers, practical approaches such as the diffusion of gender-sensitive technological innovations and the development of women's leadership skills through training can be effective in supporting women's agency in climate-related AFS governance.

**Keywords:** agri-food systems; governance; decision-making; leadership; gender; participation; smallholder agriculture

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# 1 Introduction

Persisting gender inequalities in the governance of agri-food systems (AFS) continue to undermine multi-level efforts to end hunger, improve nutrition, and achieve a sustainable and inclusive food system (Candel, 2014; Duncan & Claeys, 2018). In particular, community-level perspectives on resource management, distribution, and resilient innovation often exclude the voice and agency of women (Barnes & Burchard, 2013). In the absence of women's meaningful participation in leadership and in the decision-making process, current policy solutions aimed at reducing climate vulnerability seldom represent women's interests (Njuki et al., 2022). At the same time, amid the protracted gender inequalities within the food system and worsening climatic stressors, research on gender inequalities in AFS governance communities in LMIC is surprisingly lacking. As such, the conceptualization of food systems governance remains largely gender blind.

However, the climate crisis is not gender neutral, as women and girls experience the greatest impacts in ways that amplify existing inequalities and pose threats to their livelihoods, health, and safety (Amoak et al., 2022). First, women are often disproportionately affected by climatic stressors, such as drought and extreme weather events, and yet their perspectives and experiences are not adequately considered in policymaking (Lau et al., 2021; Njuki et al., 2022). This can result in policies and solutions that do not adequately address women's needs and interests. Second, legal structures, and their stipulations for land ownership, such as unfavorable property and land rights, may prevent women from participating in decision-making processes and from leading initiatives related to food systems governance (OECD, 2020). Third, the lack of female representation and participation in leadership and decision-making tend to perpetuate gender inequalities and prevent women from shaping policies and solutions that address their needs (FAO et al., 2021; UN Women, 2022). Lastly, social, cultural, and legal barriers may prevent women from engaging in collective action and exercising pressure on the political system. Such barriers include gender stereotypes, unequal access to education and resources, and restrictive laws and regulations. As the impacts of climate change worsen, it becomes increasingly urgent to address gender inequalities in AFS governance.

To reduce the gender gap in AFS governance, researchers have argued that efforts to improve agricultural productivity, food security, and climate-change resilience should consider not only technical and environmental factors but also social, economic, and political aspects (Candel, 2014; Pérez-Escamilla et al., 2017). This

includes reviewing community-level practices for promoting women's leadership and implementing more concrete measures at the grassroots level, whether through government, private sector, or public-private partnerships. Women's extremely limited oversight and representation in community-level leadership can result in lower levels of participation, which in turn can lead to decisions that do not adequately reflect their needs and interests. This lack of representation can have negative impacts on the effectiveness of decisions made and the overall development of the community. Hence, it is essential to address gender disparities within the food system, such as unequal representation and distribution of benefits, in order to effectively enhance productivity, adapt to climate change, manage climate risks, and reduce agricultural emissions (Huyer & Chanana, 2021).

Despite protracted gender inequalities that manifest within the food system amid worsening climatic stressors, research on ways to bridge the gender gaps in AFS governance in the Global South is just emerging. Such studies point to a complex interplay of structural factors operating at multiple scales that need to be addressed to achieve women's empowerment and equitable participation in AFS governance. The goal of this review is to document the barriers women face as well as opportunities, pathways, and solutions to increase their voice and agency in climate-relevant AFS governance.

## 1.1 Defining agri-food systems governance

Governance refers to the systems and processes that are used to make and implement decisions within a community or organization. It can involve a variety of decision-making bodies—such as governments, markets, or networks—and can be applied to a range of groups, including families, tribes, formal organizations, and informal groups. Governance can involve the use of laws, norms, power, or language to guide decision-making and ensure that it is carried out in a responsible and accountable manner. Unlike government, which often focuses on the state and its institutions, governance emphasizes the social practices and activities that shape the way decisions are made and implemented (Eldidi et al., 2021).

AFS is defined as “all the elements (environment, people, inputs, processes, infrastructure, institutions) and activities that relate to the production, processing, distribution, preparation, and consumption of food, as well as the resulting socio-economic and environmental outcomes” (High Level Panel of Experts [HLPE], 2017, p. 11). These systems encompass the full range of factors and actions involved in the production and consumption of food, from the natural and human resources used in production to the social and environmental impacts of these activities.

AFS governance refers to the mechanisms and actors that shape decision-making and actions related to the production, distribution, and consumption of food (van Bers et al., 2019). This concept encompasses all forms of institutions and governance, formal or informal, that affect the AFS, including various institutions and governance at different levels that impact people living in rural areas.

In this research, we assess women's participation and leadership in AFS governance based on two frameworks. First, we follow the framework for women's empowerment in AFS governance proposed by Ragasa et al. (2022) to examine the various dimensions of improving agency and empowerment for women in decision-making processes (design, implementation, evaluation, and learning). To be considered gender-sensitive, an intervention must meet three criteria; it must: consider the needs and perspectives of women, include women in the decision-making process, and allow women to exert influence on the outcome. Second, we apply key tenets of Quisumbing et al.'s (2019) Reach–Benefit–Empower framework to evaluate the extent to which community-driven interventions include women, benefit from the intervention outcomes, and empower women to apply the lessons learned to achieve their goals.

## 2 Methodology

This strategic evidence review synthesizes research on the barriers women face in exercising their voice and agency in AFS governance in the Global South. It equally considers emerging opportunities that strengthen women's voice and agency, with particular attention to studies on climate-relevant AFS governance and governance that influences how women adapt to climate change.

We employed a systematic rapid review methodology to synthesize the available evidence on the gender barriers and best practices for improving AFS governance. In addition to time efficiency, rapid reviews are designed to be completed quickly, typically within a few weeks or months, making them a useful tool for decision-makers who need to act on the latest evidence but do not have the time for a more comprehensive review (Khangura et al., 2012). Also, rapid reviews focus on the most recent and relevant evidence, making them a good resource for practitioners and policymakers who need to stay up-to-date with the latest research in their field. Finally, rapid reviews are best designed for new or emerging research topics, updates of previous reviews, and critical topics, to assess what is already known about a policy or practice. Furthermore, this project relied on expert knowledge, including working group members and database searches for

relevant literature. In addition to the rapid review method, we also utilized a snowball search methodology by reviewing the reference list of relevant studies for related articles.

We used a multi-track retrieval approach (Web of Science, Scopus, and Google Scholar), relying on both peer-reviewed and gray literature (materials or research produced outside traditional commercial or academic publishing and distribution channels), including qualitative and quantitative studies across multiple disciplines. Examples of gray literature analyzed in this study include practitioner literature, policy briefs, and websites. The search terms used to identify relevant studies for this review are listed in Table 1. These terms were chosen to ensure that we retrieved the most relevant studies for our research. The search string used in databases is provided in the Appendix. Inclusion criteria included peer-reviewed literature explicitly discussing barriers women face in the context of climate-relevant AFS governance and processes that amplify their voice and agency in AFS governance. Studies also had to be at least from 2010, focusing on the Global South and written in English to be included. For our purpose, we focused on local or community-level rather than national studies as well as three key focal countries, namely Malawi, India, and Nigeria.

**Table 1: Theme and key search terms**

Key Theme	Key Terms Search
Shocks and Stressors	Climate change resilience; resilience agriculture; climate change; vulnerability agriculture; sensitivity shocks; adaptation agriculture
Agri-food systems	Food security; safe nutrition; sustainable consumption agriculture; food consumption; calorie intake; nutrition; food value chain
Women's agency	Leadership food systems; leadership agriculture; decision-making agriculture
Governance	Decision-making; Leadership; participation; women's empowerment
Gendered norms and expectations	Social norms; gendered practices; patriarchy
Barriers to AFS governance	Structural inequality agriculture; cultural Barriers; safety and security agriculture; educational agriculture; literacy agriculture; psychological agriculture; technology agriculture
AFS Governance best practices	Social protection agriculture; participatory agriculture; gender responsive agriculture; financial inclusion agriculture; economic empowerment agriculture

This approach has several limitations. First, given that this is not a comprehensive review (in that articles and book chapters selected for review cannot be considered a complete survey of the extant literature), it may be possible that not all studies on barriers women face in AFS governance were identified. Additionally, the focus on English language sources excludes important research and perspectives from non-English speaking regions or researchers. This can potentially impact the comprehensiveness and accuracy of the study's findings and recommendations. Similarly, the exclusion of studies before 2010 and the focus on the Global South rules out relevant studies published before 2010 focusing on the Global North that may be relevant to our research.

Still, there are some limitations to our study, we have been able to identify a significant amount of literature on gender inequalities in agriculture and food systems governance. Additionally, to our knowledge this is the first systematic review of the topic specifically focused on gender inequalities and pathways for improving women's participation and influence in governance decisions related to agriculture and food systems. These studies enabled us to develop themes and critical questions and to identify the gaps that emerged from the literature review. The search criteria are provided in this document's Appendix.

### 3 Gender inequalities in climate-relevant agri-food systems governance

This section describes the barriers women face in AFS governance.

The studies we consulted identified obstacles that point to a range of structural factors, including sociocultural, political, and economic, as well as technology and infrastructure. There were also biophysical drivers, reinforced by gendered norms and practices that create inequalities in accessing and controlling productive resources, including information, education, finance, and technology.

#### 3.1 Educational constraints

Inequalities in educational attainments between men and women have been a long-standing obstacle to bridging the AFS governance gender gap, especially in rural regions. Globally, rural women make up the majority of illiterate people (Todes & Turok, 2018), most of them being smallholder farmers.

A recent report by UNESCO (2022) stated that in South and Central Asia and sub-Saharan Africa (SSA), there is a persistent gender gap in adult literacy, with 81 literate adult women for every 100 literate men in 2018. For women with low levels of educational attainment, this disparity could serve as a roadblock to effective agricultural production and participation in AFS governance. For instance, poor quality education can be a major obstacle to participating in governance. On the other hand, knowledge of rights, policies, laws, and other relevant information can empower women and enable them to use their voices in AFS.

A case in point is the adoption of inorganic fertilizer in Malawi, an incidence which was found to be higher among farmers who had tertiary education (70%) compared to 54% of farmers with low levels of formal education (Government of Malawi, 2017). Fapojuwo et al. (2018) observed a similar pattern in their study on

“Gender Gaps and Adoption of Climate-Smart Practices Among Cereal Farm Households in Nigeria” and established a significant positive association ( $P < 0.05$ ) between the years of formal education of plot managers and the likelihood of adopting green manure. This alludes to the notion that the adoption of new farming innovations may be relatively inaccessible for most smallholder women farmers since most of them have lower levels of education. Building resilience to climate change then will require adopting innovative farming practices. Without this measure, women with low educational backgrounds will struggle more than their male counterparts to adapt to these innovations.

Furthermore, opportunities for female education, a crucial factor for women’s empowerment, are hindered mainly by early marriage. For example, one in two girls marry before the age of 18 years in SSA and South Asia (Nguyen & Wodon, 2015), while in Afghanistan, it is well documented that women have been denied access to education outside of their homes due to cultural and religious reasons (Wilcox et al., 2015). This can have a significant impact on their ability to participate in policy processes and make their voices heard.

### 3.2 Information constraints

Agricultural information is crucial for increasing agricultural productivity, and farmers need to obtain information and constantly supplement their knowledge and skills (Ndimbwa et al., 2021; Oladele, 2015). Access to information and extension services builds farmers’ ability to adopt new farming practices and innovations (Asfaw, 2015; Phiri et al., 2019) and exposes them to leadership opportunities within the food system. However, evidence from global studies reveals that women do not meet their information needs and do not benefit fully from rural climate services (Gumucio et al., 2020). Specifically, there is evidence to suggest extension workers prefer men over women farmers when it comes to information diffusion (Witinok-Huber et al., 2021). This, in part, may relate to social norms and cultural restraints on non-relational male-to-female conversations (Beuchelt & Badstue, 2013). Given that most agricultural development agents are men, they may prefer to work with men farmers who are generally the household heads. This may translate into less information on new farming practices for women. A similar pattern was observed in Ethiopia, where the likelihood of receiving help or visits from development officers was five times higher for male-headed households compared to female-headed households (Ragasa et al., 2013). This, in part, may be due to male extension officers’ assumptions about women’s limited role in farming and decision-making (Cohen & Lemma, 2011), which often results in little information dissemination to women.

In line with these observations, it was found in Kenya and Uganda that men have significantly more access to drought information than women across the various climate-smart villages studied (Twyman et al., 2014). Likewise, in Ghana, men were more likely to be recruited to participate in climate-smart technology programs and provided access to climate information than their women counterparts (Alidu et al., 2021). Even in cases where husbands and wives were selected for an intervention, it was revealed that the husbands still had more access to early warning information on climate stressors such as floods and droughts, while weather forecasts were more readily available to women (Ngigi et al., 2017). A similar pattern was observed in India, where meetings were purposefully organized for men while often excluding women from the picture; women’s attempt to take part in these meetings by seeking permission from household heads, who are often men, and their requests are generally turned down (Elias et al., 2018).

Additionally, the focus of extension services tends to favor land owners with capital and technology to attain higher yields (Kwao & Amoak, 2022; Meinzen-Dick et al., 2011). Women’s land ownership globally revolves around 20% in Latin America, 15% in SSA, and 10% in South and South-East Asia (FAO, 2011). This suggests that few women may benefit from extension services on improved agricultural practices, due to barriers such as low land ownership, and use of marginal lands. In many rural areas in SSA, extension services are often provided through community meetings, community-based organizations (CBOs), producer associations, and cooperatives due to limited resources. However, women’s participation in these forums is often limited as they are constrained by time, mobility, and social norms (Bouchama et al., 2018; Ferrant et al., 2014). This is because participants are often selected based on land ownership status, being a representative of householders (usually male family members), age, and level of education—factors that may inadvertently exclude most female folks and resource-poor farmers. For instance, in Ethiopia, it was observed that some extension officers operate with the general assumption that women’s role in farming is limited (Cohen & Lemma, 2011) or that the household representatives (in this scenario men) will pass down the information to their female counterparts. However, evidence suggests that this supposed medium of information transfer to women does not always work (Lemma et al., 2020; Mudege et al., 2017; Peralta, 2021)

### 3.3 Legal constraints

In many agrarian regimes in the Global South, there are often few laws that protect women against discrimination. These could be laws that protect women’s equal access to land, property, media, and information, as well as laws that protect individuals from gender-based violence or harassment. In cases where these laws



exist, laws that protect women's rights and their ability to realize those rights are not always enforced. These gaps in legal protection can have significant negative impacts on the lives of women in these communities.

Legal constraints have equally hampered women's participation in food systems governance. These legal constraints range from laws that exclude them from accessing production and distribution aspects of the food system and have the potential of reproducing existing vulnerabilities. For instance, in addition to their poor access to environmental and economic resources, women are faced with legal constraints in accessing improved seeds in Northern India, a fundamental unit of agricultural production (Pionetti, 2011).

Additionally, when seeking redress (e.g., for land disputes), the legal frameworks are usually unfair and discriminatory against women, especially in the context of multiple legal frameworks. In Nigeria, it was highlighted that rulings on plot-level land-related disputes at community and traditional courts tend to favor men over women (Edeh et al., 2022). These constraints in seeking legal redress are specially compounded due to the age of farmers, poverty, and low-level formal education, which hinders poor and destitute women from seeking more formal channels (Edeh et al., 2022). Overall, these legal constraints can significantly hinder women's ability to participate in food system governance and assert their leadership and decision-making power.

### 3.4 Normative constraints

Normalized routines and social norms often (re)produce inequalities that translate into cultural inscriptions of what a girl child should or should not do. These social norms dictate societal expectations of how women and men should behave, spend their time, and interact with each other, often limiting women's ability to participate in activities outside of their traditional domestic roles (Mudege et al., 2017). These take the form of sex stereotyping, whereby parents assign domestic roles to children and are resistant to change (Yu et al., 2017). Such attitudes may be associated with certain agricultural activities and masculinity, limiting women's involvement in a perceived male occupation. Elias et al.'s (2018) study of youths in Malawi noted that they openly agreed that men are naturally better suited to perform strenuous agricultural tasks than women and are better farmers. This, in part, relates to certain essential discourses and norms that prohibit girls from partaking in building a shed, fertilizer sourcing and application, and land tilling in central Malawi. In Nigeria, men are considered household heads and given their physical strength, agricultural-related activities such as land preparation and other tedious farm jobs are regarded as men's business. This notion extends so far that the idea of giving

limited fertile land to women is considered a "foolish act" (Elias et al., 2018, p. 94). In South Africa, family lands are typically allocated to men in the household, while widows or daughters may have access to land, but not outright ownership (Nyahunda et al., 2021).

Moreover, evidence suggests that in Nepal, social norms forbid women from certain agricultural activities, such as the use of machinery and land preparation (Farnworth et al., 2019). Similarly, in Bangladesh, it is considered taboo for women to use mechanized rice and wheat reaper/harvesters (Theis et al., 2019). A comparable restriction is observed in Ethiopia, where women's ploughing is considered a cultural taboo (Gebru, 2011). In this context, the traditional association of manual ploughing to manhood has been extended to the modern-day ploughing machine, which requires less manual input but is still considered a "man's" machine. Also, a study conducted by Njuki et al. (2017) in East Africa showed that women were restricted in using treadle pumps because it may expose the outline of women's thighs (Quisumbing & Pandolfelli, 2010). These reasons suggest that certain patriarchal ideologies tend to limit women's agency in choosing certain types of machinery or agricultural technology.

Similarly, in Malawi and Zambia, married women's adoption of climate-smart agriculture rested on their spouse's decisions (Khoza et al., 2019). Also, gendered roles and tasks may generate different priorities in adopting AFS. For instance, men are oriented toward cash crops because of their role in ensuring the economic security of the home, while women are responsible for household food security. Thus, men may support farming innovations targeted towards increased yields of saleable crops, while women may think of nutritious crops for feeding their families (Beuchelt & Badstue, 2013). Given that men's opinions dominate such decisions, the former may be adopted against women's wishes. These normative practices may serve as significant obstacles to women's involvement in AFS as their opinions are often missing in the decision-making process (Bouchama et al., 2018; Glazebrook et al., 2020).

### 3.5 Mobility Constraints

Rural roads, as well as infrastructure generally, have long been recognized as essential for rural development. Among other reasons, rural road development facilitates accessibility to markets, economic opportunities, resources, technology, and social infrastructure and increases the growth and diversification of rural livelihoods (Berg et al., 2018; Sewell et al., 2019). Despite its importance, there is growing recognition that mobility constraints, including inequitable access to road transportation, have detrimental effects on rural development and AFS governance. For instance, in the world's poorest countries, about

40% of the rural population lacks access to good quality and reliable roads, with dire implication for women's mobility (Mikou et al., 2019).

Poor road networks and other transportation barriers may limit women's movement to training centers, access to information on innovation, or voice their opinion on its adoption (Sorgho et al., 2020). This lack of mobility outside the home often leads to a lack of awareness of available services, which decreases women's prospects of learning about animal health and disease prevention. With women's limited free time and long hours spent doing unpaid work at home, lengthy training sessions may dissuade them from participation, when one considers its effect on their household and familial duties (Cohen & Lemma 2011). In livestock farming, the gendered division of labor limits women's on-premise activities such as watering, cleaning, feeding, and milking (Kinati & Mulema, 2019). This often translates into wider gender disparity in livestock farming.

Additionally, certain restrictions are placed on women's mobility and spatial access during menstruation (MacLean et al., 2020). These affect women's movement to training centers during this period and hinders their prospects of acquiring knowledge about new technological innovations. Cultural restrictions on women's mobility or interactions with men restrict participation in productive meetings and associations, and impedes their advancement and interest in agriculture (Manfre et al., 2013).

### 3.6 Technology and asset-based barriers

Tools and inputs that reduce women's labor burden, particularly fertilizer, are essential for increasing the productivity and efficiency of women-managed plots (Mizik, 2021; Murray et al., 2017; Njuki et al., 2022). Yet, women face unique barriers to accessing improved technology that is relevant to climate-change resilience (Mizik, 2021). This is exacerbated by the fact that policies aimed to improve farmers' access to climate-related technology, such as improved seed varieties, fail to realize that men and women have different preferences in accessing agricultural technologies (Cherotich et al., 2012; Ngigi et al., 2017). For instance, most smallholder women farmers prefer to access seeds through informal seed channels and have different seed preferences from male farmers, yet these differences are rarely considered in agricultural policies (Marimo et al., 2021).

Furthermore, studies in low-income countries suggest that agricultural assets are not equally accessible to men and women with existing intra-gender dynamics. For instance, Kansanga (2017) found that in Northern Ghana, access to agricultural inputs such as tractors was mediated by gender. Poor women, landless women, and those in remote areas were not likely to access government and private-run tractor ploughing services. In

addition, women were primarily sidelined in managing community tractor services, did not operate these machines, and often did not have the financial means to own tractors. These reasons made it difficult to ensure that women's voices were represented in managing these agricultural assets. In some cases, men openly opposed the use of technology by their spouses for fear of insubordination when their wives became financially independent (Badstue et al., 2020).

Furthermore, it has been observed that women farmers have poor access to machinery, fertilizers, and high-yielding seed varieties that boost agricultural productivity (Nyasimi & Huyer, 2017). Lack of access to these farming inputs often results in a considerable productivity gap between genders regarding farm output. This was evident in the case of Malawi, where women farmers were found to be using less fertilizer in maize farming due to lack of accessibility and sometimes affordability (Burke et al., 2022). This, in part, may relate to male domination over household resources. As demonstrated in Nigeria too, men had control over household labor (junior men and children), and the use of herbicides on men's plots compared to their female counterparts led to gender productivity gaps (Oseni et al., 2015; O'Sullivan et al., 2014).

Additionally, socio-cultural practices favor men access to natural resources such as rangelands, forests, and water needed for maintaining rural livelihoods (HLPE, 2017; Quisumbing & Pandolfelli, 2010). Fapojuwo et al. (2018) note that male plot managers in Nigeria had access to more land, which afforded them the privilege of crop rotation on several plots while females had to utilize limited plots for cultivation of staple foods for household consumption. Amigun et al. (2011) similarly observed in their study "Biofuels and Sustainability in Africa" that marginal lands, often closer to homes, were allocated to women with the reverse favoring their male counterparts. These forms of asset allocation and relative ownership may limit women's agency in deciding the type of crops, inputs, and even the purpose of crops grown, as most of these crops are meant for family consumption. Also, given that women have limited access to fertile lands and inputs, crop yields from women's farms are often on the low side compared to their male counterparts. For instance, in Malawi, unequal access to quality land and fertilizers was a contributing factor to low crop yields amongst women and, by extension, the gender yield gap (Burke & Jayne, 2021). Meanwhile, In Southern Africa, Mango et al. (2018) reported that women's adoption of small-scale irrigation farms as part of broader climate-smart agriculture strategies was hampered by poor access to irrigational tools and technical know-how as well as their lack of involvement in the management of the irrigation scheme project.

### 3.7 Safety and security constraints

Women's concerns over their security and safety hinder their participation in AFS governance. Those who express autonomy in decision-making are at risk for domestic violence. In a study by Badstue et al. (2020), study participants expressed marriage security concerns in situations where wives may face divorce for complaining too much about their farm work or suggesting adopting labor-saving technology. The authors also noted that women were subjected to hostile treatment and physical abuse for being independent of their husbands and hiring tractors against their husbands' will (Badstue et al., 2020). Although the women in this situation dared to procure the services of tractors against their husbands' wishes, the fear of physical abuse threatened their safety. This may be a deterrent for more vulnerable women and can affect their agency in AFS governance.

Moreover, gender-based violence (GBV) can impact women's participation in AFS (agriculture, forestry, and fisheries) in several ways. Studies have shown that GBV can hinder women's ability to assert agency and can lead to negative outcomes (Henry & Adams, 2018; Meinzen-Dick et al., 2019). Additionally, women working in agriculture or processing can be at risk of GBV. This can have negative consequences within their households if it is perceived that they "invited" the harassment (Eissler et al., 2021). Members of women's households may also restrict their mobility to reduce the perceived or real risks of exposure to GBV (Hallman et al., 2015). Malapit et al. (2020) found that these perceived or real risks can diminish women's interest in pursuing agri-entrepreneurship opportunities.

Other security concerns women face are manifested after the departure of husbands. This often takes the form of harassment or threats by in-laws and family members. For example, Badstue et al. (2020) reported that in-laws pressured widowed women to give up the land after the death of their spouses. Knowing these circumstances surrounding land ownership, women may be reluctant to risk making decisions about land use and applying innovative farming inputs and practices on contested lands. Researchers have also suggested that the fear of "male capture" (a situation in which men take charge of women's income or farms when they increase in value) affects women's adoption of agricultural technology negatively (Orr et al., 2016).

### 3.8 Women's exclusion from plant-breeding programs

In the past 20 years, plant breeding has played a crucial role in closing yield gaps of the 10 most important food staples (maize, pearl millet, rice, pearl sorghum, common beans, cassava, cowpea, bananas, sweet potatoes, and yams) in SSA that have provided

high yields, early maturing, drought and pest-resistant varieties (Eriksson et al., 2018). An estimated 50% of the success of global food production is attributed to the gains made in plant breeding (Eriksson et al., 2018).

However, formal breeding programs in developing countries have acutely underrepresented women's voices in terms of their varieties and seed preferences. Most plant breeding programs (government and private) have focused mainly on seeds with commercialization potentials and high yield, typically cultivated by men. These include maize, wheat, soybeans, and groundnut, with little attention to food crops and vegetables (Kramer & Galiè, 2020). In Ethiopia, for example, seed-breeding training sessions usually exclude women farmers, thereby disempowering them (Teklewold et al., 2013). In Ghana, it was found that women participants' contributions during plant breeding programs are less likely to be considered in breeding programs involving men and women farmers (Nyantakyi-Frimpong & Kerr, 2015). Due to the alienation of women's voices, there has been an emphasis on breeding male-dominated crops to the neglect of landraces and crop varieties preferred by women (Bezner Kerr, Hickey, et al., 2019; Kansanga et al., 2021). This systematic exclusion of the voices of women in the breeding process has implications for women's empowerment, food security, and autonomy (Mudege et al., 2017).

In instances where women and men are represented, "elite capture" problem is a common challenge in participatory plant breeding and other types of community-based development projects. This can happen when certain individuals or groups, often those with more resources or influence, dominate decision-making processes and marginalize the voices of other members of the community. In Ghana, for instance, a study assessing the maladaptation of improved maize seed varieties asserted that the farmers often selected for participatory plant breeding programs are usually well-connected, educated, better off, and often male. This situation leads to poorer farmers' marginalization. Female farmers and poor farmers feel excluded unless there are specific attempts to reach out to them (Poku et al., 2018).

## 4 Approaches/ opportunities for enhancing gender equality in agri-food system governance

To address these barriers and promote gender equality in food systems governance, it is important to take a gender-inclusive approach that considers the needs, concerns, and perspectives of women. This can include implementing policies and initiatives that

support women's participation in decision-making processes, providing access to education and resources, and ensuring that women's voices are heard and valued in policymaking at the community level. This section reviews practical approaches that support the voices and agency of women in the context of climate-related AFS governance.

## 4.1 Social innovations

### 4.1.1 Equitable access to agricultural resources

- **Technology**

Access to technological innovations ensures that women can access knowledge and integrate it into micro- and macro-level AFS value chains. For women to take full advantage of technology, gender-informed programs and policies should be directed toward addressing women's specific challenges and needs. Policymakers must adopt a range of culturally and socially familiar technologies to women to achieve positive result. A particularly helpful way of bridging the gap is by centering women in technology, innovation, and product design. In Sierra Leone, for example, the AKIS (Agriculture Knowledge Information Systems) app pioneered by Trócaire, in partnership with six civil society organizations funded by the European Union, has enabled women have better access to up-to-date information on the latest weather and market prices to help them to take crucial agricultural decisions (Kamara et al., 2019). Making climate information accessible through text messages to farmers has also been particularly beneficial to women farmers who previously had to rely on the sporadic visits of extension service workers and their husbands (Nyantakyi-Frimpong, 2020; Sarku et al., 2021). This technology has enabled female farmers to access accurate information on average crop prices in their local market, weather updates, and contact details for suppliers and the government's agriculture advisory services. Also, they can manage their time better, leaving room to take up community organizing roles and other paid roles.

A similar innovation is the Uganda Network, which supports women farmers to enhance rice-green gram productivity. Through technological innovations, farmers are trained to profile their crop data details, map their gardens and fields, engage with technical agricultural experts, and search for markets. Digital technologies also support transportation and tracking crops to markets, marketing and sales, and direct payment regimes. These technologies build on women's strengths in Indigenous knowledge of local and organic produce. As digital technologies enable women farmers to have better access to premium markets, they are able to facilitate the certification processes and enable digital-based solutions suitable for managing delivery chain logistics (Dugbazah et al., 2021). Again, women in Burkina Faso have been

benefiting from training in homestead gardening, irrigation, and animal rearing (UN Women, 2015). After experimental evaluation of the program, it was found that women have gained higher control over agricultural assets and small animals and now have a greater chance of making the decision to use garden products as well as proceeds from these homesteads. With technological access, women in the AFS can adopt a wide range of new agricultural skills and techniques to use machinery to produce more crops, earn income, and develop capacity. According to Zossou et al. (2017), using less gender-bias extension information and communication tools such as videos, mobile phones, radios, televisions, and social networks in rural areas of SSA is one way to overcome the gender disparity in communication. Moreover, Shikuku (2019) discovered that involving women in dissemination results in a more significant impact on knowledge acquisition and adoption of improving farming technologies, regardless of whether the contact farmers are male or female. However, including women among disseminating farmers empowers more female farmers.

- **Seeds**

Research conducted in Eastern India and Bangladesh revealed that women who had access to improved seeds and were trained in seed production claimed that their social status had improved; they perceived themselves as farmers and not just homemakers. They also gained confidence in decision-making, enhanced their knowledge, had a marketable surplus, and experienced better status within households and the community (Dar et al., 2020).

Gender-sensitive seed systems focus on interventions that promote women's access to resources, enhance women's participation and voice in household and community decision-making, and develop gender-responsive policies. They also consider power irregularities, community norms and practices, as well as customary and formal laws that shape gender relations and roles.

Gender-responsive design principles for seed systems, according to Puskur (2021), include, among others: recognizing the differentiated users' needs and preferences of women and men and devising appropriate delivery channels for each; using targeted and accessible channels, such as video, mobile seed shops, or promotions in local markets to provide information, solicit women's preferences, and facilitate networking opportunities; making quality seed affordable and within reach of women, tackling any adverse outcomes and trade-offs from, for example, subsidy or voucher schemes; prioritizing interventions that enhance the knowledge and skills of women, while reinforcing access to supporting and complementary resources, inputs, and services; and involving women and men equally in decisions on seed systems and extending opportunities equally.

The review of the literature also indicated that using the traditional seed system rather than the formal seed system to diffuse seeds empowers women (McGuire & Sperling, 2013).

Strengthening the traditional seed system leverages long-standing community practices such as barter, borrowing, and gifting.

Studies have found that locally managed seed systems reach women more efficiently, as they circumvent barriers women face when buying seed in the formal sector (Kramer & Galiè, 2020). To reduce gender disparities in seed access, reducing the seed industry's market share and allowing women to obtain seeds through other means—including seed exchange, labor exchange, gifts, and credit—is essential to closing the gap in access (McGuire & Sperling, 2016).

#### 4.1.2 Gender-sensitive participatory crop and livestock programs

Gender-sensitive crop and animal breeding programs that involve producers, farmers and scientists have been demonstrated to be technically feasible, financially rewarding, and have become a leading government and community-based intervention in the livestock sector. Gender-sensitive breeding programs often focus on low-input systems and involve farmers within a specific geographic area who have a shared interest in improving the genetic resources of their livestock (Mueller et al., 2015). These programs aim to ensure that women are represented and play a central role in determining the breeds that best meet their needs.

- **Crops**

According to Nchanji et al. (2021), participatory crop breeding approach has the potential to reduce the gender gap and improve women's leadership and participation in food systems governance for several reasons. First, participatory plant breeding often involves training and capacity-building for farmers, which can help increase women's knowledge and skills in plant breeding and agriculture. This can enable women to take on more leadership roles in the breeding process and contribute to decision-making in food systems governance. More so, participatory plant breeding can help to improve access to and control over assets, such as seeds and breeding materials, for women farmers. This can empower women to take a more active role in breeding and production and give them greater influence over the food systems in their communities. Lastly, participatory plant breeding often involves the development of locally adapted varieties that are more resilient and better suited to local growing conditions. This can help to reduce women's workload and improve their productivity, freeing up time and resources for them to participate in other activities, such as decision-making in food systems governance (Kramer & Galiè, 2020).

Proponents in the agrarian development landscape such as the International Potato Center (CIP) on behalf of the CGIAR Research Program on Roots, Tubers and Bananas (RTB) and the CGIAR Gender and Breeding Initiative have developed a gender-responsive, social targeting approach used in public and private sector breeding termed Gender-responsive participatory plant breeding (GPPB). Gender-responsive breeding is a new approach to making sure modern breeding takes advantage of opportunities to improve gender equality in agriculture. Modern breeding has introduced varieties beneficial to farmers in high-potential environments and to those who can profitably use inputs to modify their environments (Ribaut & Ragot, 2019). However, it has been challenging for breeding programs to equitably reach low-income users, particularly poor men and women farmers, who may have different needs and priorities. The GRPPB, through which women and men farmers and scientists work together to assess and improve varieties suitable for local farms, including selecting locally preferred traits (Vernooy, 2022), have been introduced to address some of these shortcomings. Through GPPB, it is possible to create sub-varieties that can then be multiplied locally and, where appropriate, registered and released for distribution by the government.

In Syria for example, the participatory barley breeding (PBB) program had been running for a while, and the idea had been to move it from involving only men to encouraging women to participate, making it a gender-responsive program. Building on the empirical findings of a 6-year study (2006–2011) undertaken in the context of a PBB program in pre-war Syria, Galiè et al. (2017) explained that in most countries, particularly in the Middle East, it is much easier to reach men with a new program than it is to reach women. But women and men alike are involved in growing and using these crops, so it was essential to understand the needs, preferences, and opportunities of both women and men that handle these seeds. Farmers in plant breeding were involved in designing and developing barley varieties that best meet their needs. They developed those varieties together and the farmers tested them on the ground until they reached the best results. Exchange visits were organized so the women taking part in the program in Syria could meet participants in Jordan and exchange experiences. It became apparent that many women had not become involved in the program previously because their husbands made all the decisions about the farm, even in cases when the women owned the land. They discussed what empowerment meant to the women, and what would be meaningful changes that they would see as milestones indicating progress in their empowerment. There was a significant change over the five-year study.

In Northern Nigeria, for instance, Orr et al. (2018) found that by using a gender-sensitive plant-breeding approach, women who

were structurally marginalized and silenced due to religious and cultural reasons were able to partake in innovative farming practices, including plant-breeding and smart-farming practices. A study that assessed the impact of GPPB in northern Ghana revealed that women participants were more likely to use improved seed varieties, have better yields, and introduce the variety to other farmers (Ifie et al., 2022). Another study by Abera (2021) highlighted that in harsh environmental contexts, using participatory plant breeding programs through women farmer-breeder partnerships led households in the Tigray region of Ethiopia to adopt stress-resistant seeds. These programs involve actively considering the different roles and responsibilities of men and women in the breeding process and ensuring that both genders have equal opportunities to participate and influence the outcome of the program. By considering and addressing gender issues, such programs may be able to promote greater equality and empower women to play a more active role in plant breeding decisions.

- **Livestock**

The community-based breeding program (CBBP), run by the International Center for Agricultural Research in Dry Areas and the International Livestock Research Institute, has been demonstrated to enhance women's governance in agricultural and farming systems. The CBBP involves farmers in the decision-making process and takes their needs and views into account is likely to be successful. This type of program considers the farmers' breeding objectives and the available infrastructure, and ensures their active participation and ownership. By taking these factors into account, the program can be tailored to the specific needs and circumstances of the farmers, and they can be more invested in its success.

Haile et al. (2019) examined the biological and socio-economic impact of three gender-sensitive breeding programs in Ethiopia. They found that these programs improved food and job security, as well as the creation of cooperatives, which led to the empowerment of poorer households, including those headed by women. In a study conducted in Nigeria by Yakubu et al. (2020), the impact of participatory chicken breeding on farmer trait preferences was examined through a questionnaire survey in five states. The farmers were asked to share their experiences and subjectively assess the performance of the genotypes provided to them, indicating their preference for the genotype. The results showed that trait preferences varied based on gender and location. The authors found that gender-sensitive breeding can improve food security, empower women financially, and increase their decision-making power.

According to Evans (2021), a women's community-based breeding program (wCBBP) for sheep farmers in Ethiopia that utilized gender-targeted capacity development and transformative

action through community conversations resulted in improved involvement of women in community-level decision making, both in mixed-gender settings and within their own communities. The program also led to the formation of cooperatives by women, which improved their bargaining power and incomes. Many women involved in the project reported feeling more respected and viewed as businesswomen, and the economic contribution they made to their households through sales helped to balance gender disparities and challenge stereotypes at the household and community level.

These studies demonstrate that interventions to improve agri-food systems governance are more likely to succeed when plant and animal breeding training and other agricultural innovation diffusion are done through gender-sensitive lens. Women and men can benefit equally from co-developed varieties by adopting a gender-responsive approach that challenges gender norms that favour men over women. Bezner Kerr (2013), however, emphasized that a participatory and democratic approach to seed deployment must be followed with particular attention to kinship ties and existing community relations to enhance seed and food sovereignty and reduce social inequality. This presupposes that processes of plant breeding and other interventions must consider the local context.

**Table 2: Community-level best practices that improve women's participation in governance**

Intervention	AFS Gov Markers	Findings	Country
<b>Farmer-led agroecological innovations</b>	<ul style="list-style-type: none"> <li>– More than 50% of farmers in MAFFA program women Women-leadership role</li> <li>– Gender analysis in design, implementation, and evaluation</li> <li>– WEAI empowerment pathways</li> </ul>	<ul style="list-style-type: none"> <li>– Increased uptake of leadership roles in community</li> <li>– Increased engagement in community activities</li> <li>– Enhanced joint-decision making on agriculture</li> <li>– Improvement in decision-making, and independence.</li> <li>– Increase in increased women's decision-making authority</li> </ul>	<ul style="list-style-type: none"> <li>– Malawi (Bezner Kerr, Kangmennaang, et al., 2019; Kansanga et al., 2021)</li> <li>– Tanzania (Galiè &amp; Kantor, 2016)</li> </ul>
<b>Adult education, literacy, and inclusion</b>	<ul style="list-style-type: none"> <li>– Recruitment of female headed HH</li> <li>– Adult literacy campaigns for women</li> <li>– Use of 'safe space' gender courses offered to young women</li> <li>– passage of legislation enhancing women's rights and supporting women's participation in political structures</li> </ul>	<ul style="list-style-type: none"> <li>– Educated women were more likely to take up leadership roles in local association; local government; participate in meetings</li> <li>– Intervention empowered women to share their new knowledge and insights with others in their networks can lead to a change in social norms</li> <li>– Increased support for women's political leadership</li> </ul>	<ul style="list-style-type: none"> <li>– Ghana (Nkansah, 2022)</li> <li>– Nigeria (Cislaghi et al., 2019)</li> </ul>
<b>Gender inclusive plant breeding</b>	Use of the Segmenting-Targeting-Positioning (STP) framework for consumer marketing; gender and targeting.	<ul style="list-style-type: none"> <li>– Bridging gender gaps by ensuring that women's voices (trait preferences) are considered in decision-making related to local breeding programmes.</li> <li>– Effective participation in the cassava value chain measured using the Women's Empowerment in Agriculture Index (WEAI)</li> </ul>	<ul style="list-style-type: none"> <li>– Nigeria (Orr et al., 2018)</li> </ul>
<b>Gender inclusive livestock breeding</b>	<ul style="list-style-type: none"> <li>– Community-based breeding programme (CBBP)</li> <li>– African Chicken Genetic Gains (ACGG) project</li> <li>– Gender sensitive value chain analysis (division of labour, gender-based constraints and opportunities, benefits)</li> <li>– randomised control design</li> <li>– Preponderance of women in programme</li> </ul>	<ul style="list-style-type: none"> <li>– The creation of cooperatives</li> <li>– Leveraging the cooperatives to build capital</li> <li>– Improvement in food security</li> <li>– Empowerment of poorer households, including female headed</li> <li>– enhance women's participation in the value chain</li> <li>– women's equal access to value chain benefits and services,</li> <li>– promoting gender equality and women's economic empowerment.</li> </ul>	<ul style="list-style-type: none"> <li>– Ethiopia (Haile et al., 2019) (Mulema, 2018)</li> <li>– Burkina Faso (van den Bold et al., 2015)</li> <li>– Nigeria (Yakubu et al., 2020)</li> </ul>
<b>Self-help groups</b>	<ul style="list-style-type: none"> <li>– Program targeted women and female household heads facing economic deprivation.</li> <li>– Sex-aggregated data</li> </ul>	<ul style="list-style-type: none"> <li>– Women who participated in women's self-help groups are more politically active and take advantage of more public entitlement programs than non-members</li> </ul>	<ul style="list-style-type: none"> <li>– India (Malapit et al., 2020)</li> <li>– Ethiopia (Alemu et al., 2018)</li> </ul>
<b>Women farmer leads</b>	<ul style="list-style-type: none"> <li>– Interviews with women</li> <li>– Lead female farmer approach to extension service</li> </ul>	<ul style="list-style-type: none"> <li>– An exclusively female-led lead farmer approach led to better information access for women.</li> <li>– Women were empowered to take up leadership roles.</li> <li>– Women challenged household and community gender norms.</li> </ul>	<ul style="list-style-type: none"> <li>– Pakistan (Cardey et al., 2019)</li> </ul>

### 4.1.3 Gender-balanced climate information diffusion

Effective AFS governance requires that decision-makers have access to comprehensive information about current and future climate change risks and the tools to apply this information in the development of policies and programs. Studies show that access to climatic services, including climate information, may help local actors (such as women farmers) challenge the limiting roles of gender norms and practices (Gumucio et al., 2020; Rengalakshmi et al., 2018). For instance, the availability of weather forecasts in India has enabled women to make informed agricultural decisions, and their increased involvement has led to a shift in gender roles, in which women are now seen as more than farm laborers, and men are no longer the sole decision-makers (Rengalakshmi et al., 2018). With the ability to make critical decisions as a measure of women's empowerment, these findings are profound.

Across SSA, a collaboration between stakeholders, including national governments, research organizations, and farmers, has improved farmers' access to information. For instance, with the help of an ICT platform owned by a private organization in Ghana, farmers in the northern part of the country receive market price alerts, agro-advisories, weather forecasts, and voice messages about climate-smart agriculture. Over 835 farmers (of which 33% are women) have been trained on this platform to access and use downscaled seasonal forecasts and agro-advisories through their mobile phones (Etwire et al., 2017). This initiative is critical for enhancing climate-change adaptation given the high farmer-to-extension service worker ratio, underfunding of public extension services and limited technological know-how of some extension workers and fewer female extension staff (McNamara et al., 2014).

Cardey et al. (2019) conducted a study in Pakistan to evaluate the effectiveness of the agricultural extension services provided by the government's Rural Advisory Services. Specifically, the authors sought to understand the extent to which these services could be more responsive to the needs of women farmers. To gather data, the authors interviewed female extension workers and used female farmers as lead participants. The results of the study showed that women farmers were more likely to report having their information needs met when they were visited by a female extension worker. Additionally, the information they received helped them to challenge gender norms within their households and communities, and they were more inclined to take on leadership and decision-making roles.

By ensuring that both men and women have access to the same information, decision-making processes can be more inclusive and representative, and women can have a greater say in shaping the direction of AFS governance. In addition, gender-balanced climate

information diffusion can help to address power imbalances between men and women, as it can ensure that women have the same level of influence and agency as men in decision-making processes. This can help to promote gender equality and empower women to take on leadership roles within the food system.

### 4.1.4 Farmer/women-led agroecological interventions

The Food and Agriculture Organization (FAO) of the United Nations asserts that agroecology can help alleviate hunger and poverty, especially among women, and contribute to meeting other sustainable development goals (HLPE, 2019). Agroecological practices such as crop diversification, intercropping, agroforestry, mixed crop-livestock systems, soil management measures, and farmer-to-farmer networks have been reported to have positive food security and nutrition outcomes and improves women's autonomy in the household and community (Bezner Kerr et al., 2022; Bezner Kerr et al., 2021).

Particularly, adopting farmer-led strategies and interventions and participatory praxis in climate change governance has unique benefits for women farmers. In Malawi, studies reveal that when the power imbalances between "authorities" and the farmer are disrupted, farmers, especially women farmers, have a voice and agency in AFS governance. In the patriarchal context of Malawi, where access to resources is socially mediated, Bezner Kerr, Hickey, et al. (2019) asserted that participatory methods, such as horizontal farmer-to-farmer sharing, farmer experimentation, and observation contributed to the shift in socio-ecological metabolism in communities. For instance, the MAFFA agroecological intervention (see Box 1) promoted joint decision-making with spouses on agricultural production, encouraged women's leadership, led to farmers being more food secure, and empowered women within the household and communities. A study found that multi-year interventions using environmentally sustainable agriculture techniques, taking into account gender inequalities and other forms of social inequality, can improve food security and nutrition for food insecure farmers (Bezner Kerr, Kangmennaang, et al., 2019). These interventions also have the potential to increase women's autonomy in their communities and empower them to challenge gender norms.



**Box 1**

The MAFFA project was a participatory farmer-to-farmer agroecology intervention implemented in Malawi from 2012 to 2017. The project aimed to draw on local resources and use horizontal knowledge sharing among smallholder farmers to improve land management, food security, nutrition and social equity. Apart from teaching farmers cost-effective and environmentally sustainable farm-level agroecology practices, including composting, manure application, crop residue integration, agroforestry, legume intercropping, and crop rotation, the project also targeted improving the social relations and networks of production on which smallholder agriculture is grounded. The rationale is that improving the social context, especially addressing gender and other social inequalities and fostering networks among local farmers, will, in conjunction with the application of farm-level agroecological practices, help improve land management, food security, nutrition and social relations and decision making.

Adopted from Kansanga et al. (2020, p. 4)

Galiè and Kantor (2016) conducted a gender analysis of the CCAFS crop and goat project, an agroecological intervention, in order to understand the complexity of gender relations and labor organization within households and how they influence household strategies and power dynamics. They found that the intervention resulted in improvements in decision-making and independence for women, as well as an increase in women's decision-making authority in the community. Altogether, women-led interventions, including agroecological innovations often prioritize the inclusion and empowerment of marginalized groups, including women. This can help to address power imbalances and promote gender equality within the community. Likewise, agroecology emphasizes the importance of traditional knowledge and skills, which are often held by women. Agroecology can empower women and enhance their leadership and decision-making abilities by promoting and valorizing the use of traditional knowledge and skills that are often held by women. Additionally, the collaborative and participatory nature of agroecological practices can create a more inclusive decision-making process that allows women to have a greater influence on the direction of the community (Amoak et al., 2022; HLPE, 2019).

**4.1.5 Engaging men in the advancement of women**

Engaging men in the advancement of women can help to improve women's participation in food systems governance in several ways. First, by involving men in efforts to address gender inequality and promote women's participation in decision-making processes, it can help to challenge and change harmful gender norms and stereotypes that limit women's opportunities and rights. This can create a more enabling environment for women to participate in food systems governance and other public spheres. Second, involving men in these efforts can also help to build support and allies for women within households and communities. This can provide women with more opportunities and resources to participate in food systems governance, as well as create a more inclusive and equitable decision-making process. Third, engaging men in the advancement of women can also help to hold men accountable for their actions and attitudes towards women, and promote men's active involvement in promoting gender equality and women's empowerment. This can help to create a more gender-equal society, which in turn can support women's participation in food systems governance and other spheres of public life.

Men can also be engaged at the family level, whereby male family members can serve as "gatekeepers" for women's economic empowerment by providing them with access to capital, information, and networks that would otherwise be out of reach due to context-specific gender barriers. A study in Ethiopia by the Gender Innovation Lab revealed the critical role of fathers and husbands in the likelihood of women entering male-dominated sectors. It also demonstrated that these crossover firms outperformed others in traditionally female sectors in terms of profits and firm size as measured by employee count (Alibhai et al., 2015). Crossover firms were more likely to report having started their business due to an opportunity provided by their husband. In contrast, a father's occupation appeared to strongly influence a woman's likelihood of crossing over due to them providing start-up funds for a business to contacts in male-dominated industries.

Furthermore, CARE Rwanda implemented a Village Savings and Loans intervention in Rwanda in 2012 (Slegh et al., 2013) delivered a structured group discussion and training activities on business skills and health and well-being (including sessions focusing on negotiation and decision-making between women and men and a cycle of workshops in household activities). The intervention's qualitative evaluation revealed that patterns of sharing care work had changed; as one man said, "I learned that I can do women's work and my wife can do man's work" (Slegh et al., 2013, p. 23), and other participants reported increased sharing of domestic tasks. The author found that in the group where men

were involved, the women reported increased economic empowerment and reduced domestic violence. In contrast, the control group, which involved no men, did not report any significant improvements in their living conditions (Slegh et al., 2013).

#### 4.1.6 Education

Education is a crucial factor in improving women's participation in decision-making and leadership in AFS governance. Evidence from 70 different countries shows that there is a positive association between women's educational attainment and their influence in household decision-making on financial and non-financial matters, such as small and large household purchases and their own healthcare choices (Le & Nguyen, 2020). Education can provide individuals with the knowledge and skills necessary for effective governance, including literacy, public speaking, and an understanding of group dynamics. Education can also increase individuals' interest in governance and their sense of self-efficacy, leading to greater participation. For women specifically, knowledge about their rights, policies, laws, and programs related to AFS is essential for their empowerment and ability to advocate for themselves.

The NGO School for Life conducted a project in Northern Ghana aimed at empowering parents in marginalized communities by increasing their capacity to support and engage in their children's learning and strengthening communication and collaboration between parents and teachers. According to focus groups and in-depth interviews, the intervention was successful in increasing parental involvement and support in schooling, which in turn helped to reduce the rate of girls dropping out of school (School for Life, n.d.)

Girl child education can be an effective tool for improving women's participation in decision-making and leadership in AFS governance in several ways. Through education, women can gain the knowledge and skills they need to participate effectively in decision-making processes and take on leadership roles within AFS governance structures. This might include training in areas such as agricultural techniques, business management, and policy analysis, as well as leadership development and communication skills. Additionally, education can help to increase women's confidence and self-esteem, which are important factors in their ability to assert themselves and participate in decision-making. This might include training programs that focus on personal development, such as assertiveness training or mentorship programs.

Ultimately, educational programs play a role in promoting gender equality by challenging gender stereotypes and raising awareness about the importance of women's participation in

decision-making (UNESCO, 2022). This can be done through curricula that includes content on gender equality and women's empowerment, as well as through the use of gender-sensitive teaching methods and materials. Finally, educational programs can provide a platform for women to come together, share knowledge and experiences, and build networks and collaborations with one another. This can be particularly important for women who may be isolated or have limited access to resources and support in their communities.

#### 4.1.7 Women self-help groups and associations

Women's organizations and networks can provide a valuable platform for women to come together, share knowledge and experiences, and advocate for their rights and interests. Building partnerships and collaborations with these organizations can help to amplify women's voices and increase their agency in AFS governance. Self-help groups (SHGs) are groups of women who come together to support one another and pursue common goals, such as improving their economic, social, and political empowerment. SHGs can be an effective way to improve women's participation in decision-making and leadership in AFS governance by building networks and collaborations, enhancing skills and knowledge, promoting gender equality, and providing a supportive environment (Patil & Kokate, 2017).

According to a systematic review of self-help group programs in developing countries, women's economic SHGs have been shown to have positive effects on economic and political empowerment, women's mobility, and women's control over family planning (Brody et al., 2017). These SHGs can provide a platform for women to come together and share knowledge and experiences, as well as build networks and collaborations with one another. This can be particularly important for women who may be isolated or have limited access to resources and support in their communities. SHGs can also provide opportunities for women to learn new skills and knowledge, such as business management, financial literacy, and leadership development, which can help them to become more effective decision makers and leaders (D'Souza, 2010).

In Ethiopia, Alemu et al. (2018) evaluated the impact of self-help groups in apple production on women's empowerment. The study used a cross-sectional survey of SHG members and non-members, and employed propensity score matching to assess the impact of SHG participation on empowerment at the community level. In addition to examining changes in attitudes among SHG and non-SHG women, the study also looked at differences in male attitudes towards the status of women. The results showed positive and significant impacts of SHG participation on empowerment,

suggesting that SHGs can be an effective platform for women to share information and raise awareness about their rights.

Acharya et al. (2007) conducted a mixed methods study in Nepal that examined the impact of a community development strategy that aimed to empower rural women through educational and small-scale household economic activities, including SHG participation. The study used both qualitative and quantitative methods, including a correlation matrix, to show that the program reduced the gender gap in literacy and had a spillover effect on other cognitive skills by promoting the value of education to nonparticipant women. Overall, the study found positive impacts from SHG participation. Meanwhile, in the context of microfinance, researchers conducted a quasi-experimental study in Odisha, India to examine the impact of women's SHG membership on empowerment, specifically autonomy, and subjective well-being. The study found that SHG membership had a positive impact on women's autonomy, but this did not translate into higher subjective well-being among women in more conservative villages (De Hoop et al., 2014).

Thus, SHGs can play a role in promoting gender equality by challenging gender stereotypes and raising awareness about the importance of women's participation in decision-making. This can be done through group discussions and activities that focus on gender equality and women's empowerment. Finally, SHGs can create a supportive and empowering environment for women, where they can feel safe to speak out, share their ideas, and advocate for their rights and interests. This can be particularly important for women who may face barriers or challenges to participating in decision making and leadership in other settings.

## 4.2 Organizational strategies

Based on the evidence review, we identified some organizational strategies that can be effective in improving women's voice and agency in AFS governance at the community level.

### 4.2.1 Gender budgeting

Emerging economies face different challenges in gender equality than high-income economies with larger informal economic sectors that typically employ a larger proportion of women, and weaker political accountability (Nolte et al., 2021). Integrating gender-related concerns into national policy has become prominent in many parts of the world and one of the notable tools is gender budgeting (GB; also known as gender-responsive budgeting and gender-sensitive budgeting), a public financial management practice that has been adopted by many governments across the globe as a way of ensuring that their budgets respond to the needs of all people (Stotsky, 2016). Countries that have

implemented GB include Ghana, Ethiopia, and Tanzania (Akalbila et al., 2020; Taye et al., 2021).

Although GB requires looking at the differing experiences of various genders, it can and should include analyzing and responding to how the intersection of gender with other identities such as ethnicity and age determines citizens' needs (Stephenson, 2018). GB is about using public financial management practices to correct inequalities between and among various populations, with a particular focus on using public services, infrastructure, and social protection to achieve gender equality (Akalbila et al., 2020).

If agriculture is to lead inclusive development, gender and rural development policies need updating. In addition, achieving high-quality agricultural public spending will require a conducive policy environment and a budget process that promotes the participation and well-being of women and girls as well as men and boys (Taye et al., 2021). Gender budgeting can be directed towards a particular program level such as empowering women to take charge in or enjoy the same benefits as men towards climate-relevant AFS governance. Civil society groups have a role to play in the implementation of gender budgeting, and across the world, gender budgets have emerged out of feminist practical politics. In the quest to hold government accountable for its commitments to gender equality, civil society groups have sought to promote gender budgeting as one means of influencing macroeconomic policy from a gender perspective.

Chakraborty (2016) in an IMF working paper indicated that India stands out for its implementation of gender budgeting at the national and subnational levels of government. India has integrated gender budget within the expenditure budget and given instructions to integrate it into the outcome budget. India's GB has resulted in its successful institutionalization at both national and subnational levels. It also has led to gender mainstreaming in the budget with more and more gender-neutral sectors adopting GB and reporting to the ministry of finance on their efforts to address gender equality through fiscal policies. Similarly, the incorporation of gender-sensitive approaches in funding climate change adaptation and mitigation initiatives by the Green Climate Fund (GCF), under the UNFCCC's financial mechanism, has resulted in gender mainstreaming in climate-change policies and programs (Budlender, 2017).

### 4.2.2 Financial literacy and inclusion

Education and awareness are critical factors in the uptake of any financial service or product and in reducing risks. If women, who have less financial capability overall, are not comfortable using financial services, especially digital financial services, it will be difficult to close the gender gap.

Financial literacy affects people's choice of financial products in such a way that financially literate individuals are more likely to seek and use relevant information, and also make better use of information (Kim et al., 2018; Vivek, 2016). According to Calcagno and Monticone (2015), financially literate women are more likely to look for advice from financial advisers and are also more likely to get useful advice to take up financial products such as a bank account or a loan. In the context of Uganda, Bongomin et al. (2018) found that cognition combined with financial education helps poor families, including female-headed households to make economically sound decisions and choices about the consumption of financial services and products provided by formal financial institutions.

Financial literacy is a key strategy that can enable women farmers to improve their bargaining power. Such an effort increased awareness of money management and self-employment in India. Similarly, designing the right commercial banking product can have an incremental impact on women's economic empowerment. M-PESA, a mobile financial transaction platform launched in Kenya in 2007, gave rural women an opportunity to save and build up financial cushions and weather occasional shocks (Kim et al., 2018).

Women's reliance on family members, friends, and advisers for financial planning and limited interest in participating in investment planning can be addressed through education on financial literacy (Aziz et al., 2022). This dimension covers strength of financial decision-making that benefits the economic growth, financial access, credit, social cohesion, local participation, and interaction of formal financial transactions for betterment of their lives. In this regard, developing countries should give priority to financial literacy for more financial inclusion to improve the economic empowerment of their women. Women's financial knowledge should be encouraged in terms of financial literacy by educating more employment avenues and financial awareness, thereby creating economic freedom in women. Calcagno and Monticone (2015) also explained that the improvement of financial literacy would support making better financial decisions and proper utilization of financial services and products among women.

Furthermore, Kumari et al. (2020) conducted a study to investigate the relationship between financial literacy and economic empowerment among rural poor women in Sri Lanka. They used five indicators to measure women's empowerment: decision-making power, control over income and expenditure, leadership in the community, control over time allocation, and financial well-being. The results showed that financial literacy had a significant impact on women's economic empowerment in rural Sri Lanka, with more financially literate women being more likely

to participate in community food governance and having more autonomy in household financial decision-making.

Ultimately, financial inclusion of women is critical to women's personal growth and their families. Being financially included can be transformative for women within agriculture and food systems. Active participation of women in the financial system can enhance their access to inputs, labor, equipment, markets, technology, and sustaining their agri-businesses. Interventions that increase personal savings show positive impacts for women and household welfare. Women's access to individual private savings accounts not only fosters economic resilience but also enables women to invest in essential quality goods and influence their bargaining power in the household. In Nepal, easily accessible, no-fee savings accounts were offered to female heads of households living in slums and this resulted in 84% of the women opening an account, which boosted spending on health, education, and nutritious food and allowed them to better respond to emergencies (Mishra et al., 2018). The Kenya Constitution of 2010 incorporates the principle of gender equality (e.g., by granting women equal rights to inheritance before, after, and during marriage). Work conducted by the World Bank's Women, Business and the Law program led to the revision of family law (marital regimes) in the Democratic Republic of Congo (DRC). But, before this basic legislation was completed, specific legislation was put in place to prohibit discrimination against women in credit applications.

#### **4.2.3 Gender integration or gender mainstreaming within public administration**

At every stage of development, adoption, and diffusion of innovations must take gender equity into account. This may entail going past innovation procedures primarily geared toward males and include detailed analyses of women's demands, as well as involving women as innovators and decision-makers. Political mobilization is an essential channel for women's voices to affect the laws governing the food system. Women can influence the functioning of food systems through their right to vote, becoming policymakers themselves, expressing their support or opposition to essential policies, and participating in other civic activities. Evidence from India demonstrates that women who participate in women's SHGs are more politically active and take advantage of more public entitlement programs. Women have the chance to collaborate in membership groups like the Self-Employed Women's Association in India to solve the unique issues they encounter in various areas of the food system (Malapit et al., 2020). A report by Kormelinck et al. (2012) on *Opportunities for Women's Empowerment Through Value Addition in Agri-Food Chains* revealed that female empowerment in agricultural groups and cooperatives should be implemented gradually. Strong

leadership and careful oversight are needed to achieve gender mainstreaming in these organizations. This suggests that collective action in cooperatives can be a sound operating concept when members have ownership and have attained the necessary level of minimum capacity.

Women's empowerment and gender attitudes can change significantly as a result of participatory testing of postharvest technology and gender transformative initiatives. Compared to traditional gender mainstreaming strategies, transformative techniques support more gender-equal attitudes among males and more power over women's income, choice, and voice (Cole et al., 2018; McDougall et al., 2022). For the benefit of everyone in society, it is vital to make sure that women's contributions to food systems are acknowledged by their families, communities, policymakers, and society at large and that women have the freedom to decide how strategically to participate in food systems.

#### **4.2.4 Training empowering women on how to approach government/leaders and influence community decision-making**

Climate-related education through improvements in extension services and increasing women's exposure to mass media campaigns on food systems governance can bolster their participation in AFS governance. Gender-sensitive education may help women better appreciate the importance of participating fully in various stages of the agricultural systems and value-chain systems. In Pakistan, it was determined that access to education was statistically associated with climate-smart adaptation, pointing to the influence of human capital on participation, adaption, management, and governance of AFS (Shahzad & Abdulai, 2020).

Investing in women's leadership can yield far-reaching dividends, not only for women themselves but also for the institutions they represent, their communities, and society at large. Evidence has shown that having active women leaders can result in increased funding for the services women prioritize, more robust policies related to gender-based violence, and even eliminate the gender gap in education (Beaman et al., 2012). But for women to affect these kinds of positive change, they need to be directly involved in making policy decisions, which includes challenging the systemic barriers that often prevent them from participating in policymaking.

To get women directly involved in policy decision-making, women need to be empowered through training to foster confidence, self-awareness, strategic advocacy, and communication skills to galvanize change. Similar training is the Suchana Intervention, a large-scale development program in Bangladesh that actively provided social intervention on behavior change communication to empower women belonging to the

poorest social segment of women's decision-making power. Haque et al.'s (2022) study assessed the impact of Suchana on various indicators related to women's decision-making power. The study adopted a cluster randomized pre-post design with two cross-sectional surveys conducted among beneficiary women with at least one child aged less than 23 months from randomly selected poor or very poor beneficiary households in Sylhet division. The findings showed a substantial influence of Suchana's intervention on the latent variable of women's decision-making power. In Rwanda, the World Food Programme and partners (including fellow UN agencies FAO, IFAD and UN Women) have also implemented an initiative that seeks to empower rural women by reducing gender inequalities and poverty, improving food security, and enabling women to be leaders, decision-makers, and agents of change. The program has empowered women to be more confident and participatory in decision-making (Sesonga, 2021).

#### **4.2.5 Devolution/decentralization of service delivery**

Women can be more effectively included in decision-making processes if they are invited to participate in meetings, workshops, and other events where decisions are made. This can be done through targeted outreach and engagement efforts, such as organizing training sessions or workshops specifically for women or inviting women to participate in existing decision-making structures such as local farming or community organizations.

Decentralized state organs, such as local government, can play an essential role in promoting women autonomy and leadership in the agri-food sector. Because local government brings the government closer to the people, it can promote food security policies and strategies that are practical and relevant to people's needs, such as gender mainstreaming. Local government can support the state's larger agricultural development efforts by improving access to local information and mobilizing local social capital for policy reinforcement. More importantly, it can play an important role in promoting trade that improves food production inputs on the one hand and trade that improves distribution and access to food items on the other. However, this can only happen if good governance prevails (Nyawo & Mubangizi, 2021).

In a report on studying the Cassava Seed System in Nigeria, several regulators interviewed for the study were eager to suggest opportunities for growth in the seed quality assurance system (Wossen et al., 2020). These included diagnostics training, decentralization of the inspection process, securing facilities for molecular diagnostics, and using information and communications technologies to share data and information with stakeholders (Wossen et al., 2020). As a result, inspection processes in Nigeria have already been decentralized to the state level, though final certification approval remains with National Agricultural Seed

Council (NASC) at the federal level. More importantly, as a result of recent legislative developments such as the 2019 seed act, the NASC governing body will be able to change seed system regulations without parliamentary approval. This may allow the regulatory system to pursue new opportunities, revise its rules and guidelines, and develop a more gender-responsive approach to seed quality assurance.

These studies suggest that decentralization can also lead to more responsive and accountable governance, which can be beneficial for women and marginalized groups who may have previously been excluded from decision-making processes. However, it is important to note that decentralization alone is not sufficient to promote gender equality in AFS governance. It must be accompanied by other efforts, such as addressing cultural and social norms that may hinder women's participation and empowering women through education and training programs.

#### **4.2.6 Private sector and value chain governance (standards, corporate social responsibility, decent work, equal pay, equal employment opportunities)**

Private sector actors that prioritize gender equality and women's empowerment in their operations and supply chains can create opportunities for women to participate in decision-making and leadership roles within the AFS sector. This can be achieved through initiatives such as implementing policies and practices that promote equal pay and equal employment opportunities for women, and implementing corporate social responsibility programs that target women's empowerment. Additionally, private sector actors that are part of value chains can work to improve the governance of these chains by setting standards for gender equality and women's empowerment and promoting compliance with these standards.

The Sub-Saharan Africa Agribusiness Alliance (WASAA) is a SSA women's alliance that spans the entire agricultural value chain. The emphasis is on wealth creation and economic independence for women and youth through strong and dependable agricultural partnership networks. WASAA works with smallholder farmers to remove obstacles to their competitiveness. WASAA uses a technology-enabled market linkage model to provide registered women farmers access to profitable markets. Farmers must pay a fee to register through a mobile platform. The goal is to boost farm earnings and profitability. Smallholder farmers who register on the mobile platform also receive training and information on improving crop quality. Farmers gain access to more profitable markets due to their membership because WASAA purchases produce (that meets the desired crop quality) from farmers using Fair Trade policies. The

produce is then sold in profitable (domestic and international) markets by WASAA (Kirui & Kozicka, 2018).

A similar platform was observed in Ghana and Nigeria through the Leventis Foundation with the intention of training young farmers in modern agricultural methods as part of its corporate social responsibility (CSR). This goal is consistent with the government's emphasis on food self-sufficiency. To date, nine schools in Nigeria and Ghana have been established that specialize in innovative small-scale training of farmers to improve productivity, efficiency, and environmental sensitivity by leveraging the most recent national and international research (Kirui & Kozicka, 2018). This shows that the more robust the governance system at the outset, the more willing a company is to invest in voluntary CSR instruments that go beyond compliance with local regulations (Rodríguez et al., 2014). Thus, robust governance systems may lower a country's risk and help private sustainability instruments ensure gender compliance.

## **5 Discussion**

Achieving gender equality in political and public leadership and decision-making within the AFS is vital for the successful attainment of the Sustainable Development Goals by 2030. However, various challenges continue to undermine the realization of a food system that works for all, providing equal chances of living a healthy, happier life and building resiliency to the changing climate. In the current agrarian regime, women continue to be underrepresented in the decision-making process. To put low representation of women in perspective, women currently make up only 26% of national parliamentarians, a slight increase from the 11% representation seen in 1995 (UN Women, 2022). At the community level, evidence points to disparities in the voices that matter in decision-making across all stages of the food system (Eldidi et al., 2021; Huyer, 2016; Nyantakyi-Frimpong, 2019). Using insights from a strategic evidence review, we found a host of structural barriers that impede women's equitable participation in AFS governance, where they take leading roles and decide on crucial matters to advance their goals. These findings aim to stimulate research on the barriers facing women in leadership and decision-making roles within the food system and the interventions being developed to address them. By examining these issues and providing new analytic perspectives, we hope to identify policy lessons and opportunities for using governance to increase women's leadership and decision-making at the community level and beyond. Additionally, this research can help those focused on tool development to expand their options in key areas.

The gender inequalities in the governance of AFS present a paradox whereby despite being the majority, women farmers have a lesser voice and agency than their male counterparts. The food

system is saddled with many inequalities that work to disproportionately underrepresent women's voices and decision-making and meaningful participation in community-level food systems governance. Additionally, these barriers significantly constrain their production and entangle them in a low productivity trap (Glemarec 2017; UN Women, 2015). These barriers encompass societal norms, the gender division of labor (GDOL), resource constraints (access to and use of land, water, rangelands, forests, livestock, and fisheries), no or low use of inputs (e.g., drought-adapted seeds), and limited access to information and climate services, finances, and limited participation in decision-making at all levels. Although it is widely acknowledged that cultural preferences and social norms play a significant role in explaining the underrepresentation of women in AFS governance, previous research on the topic has not given sufficient attention to this explanation.

The evidence suggests that all aspects of climate-related AFS governance, ranging from decision-making to representation, have implications for women's empowerment and resilience to climatic stressors. These manifest through inequalities in decision-making regarding use, management and control of assets, labor allocation, inclusion and exclusion of voices, who gets to benefit, and in what way, among others. As such, climate-related AFS governance is not gender-neutral. An assessment of the literature on AFS governance shows that many governance structures have been formulated without women's inclusive focus and perspective, nor do these interventions use gender-transformative approaches (Njuki et al., 2022). As a result, many sectors of agricultural food systems seem to perpetuate the existing structural inequalities that inhibit women's participation in the food systems and given the ongoing and projected worsening of climate change, failure to address women's needs may be particularly harmful to their climate change adaptation and resilience (Huyer & Partey, 2020).

Gender norms and practices that subjugate women in the developing world are one of the reasons behind these persisting gender inequalities (Gumucio et al., 2020). Gendered inequalities in AFS governance are primarily driven by gendered norms and practices rooted in patriarchal institutions that dictate the social roles, positions, and power relations between men and women, as well as the differentiation of roles, responsibilities, and status (Marimo et al., 2021). For instance, in Northern Mali, communication about land tenure laws have been found to be poor, and many marginalized women are unaware that they have equal access to land under the law. Despite persistent water scarcity throughout the region, many women have not sought to move from their current dry land to irrigated land due to exclusion by male farmers (Djoudi et al., 2013). A similar pattern is observed in Tanzania where men practically make decisions about land

ownership, making it hard for women to expand or diversify their farming activities even though the land tenure system legally facilitates access to land by women (Kongela, 2020; Paavola, 2008). Thus, these gendered norms reduce adaptive possibilities while increasing vulnerability to environmental hazards.

These barriers have implications for climate-change adaptation food security and well-being. Recent studies have brought attention to the unique ways men and women experience climate-induced stressors across various aspects of the food system and the need to pay critical attention to these differences (Lottering et al., 2021; Nyasimi & Huyer, 2017). Variations in exposure and impacts experienced by men and women may be related to differences in vulnerability contexts, arising from power imbalances filtered through institutional environments and from actions to mitigate the adverse effects (Argent, 2019; Bryan et al., 2018). Women farmers are less likely to adopt climate-adaptation strategies due to financial and resource limitations and less control over land (Jost et al., 2016; Mishra & Pedde, 2017), while agricultural organizations tend to exclude female farmers from many of the benefits of extension, including access to information, tools, seed, fertilizers, and improved livestock. As a result, women are often excluded from the decision-making process for adaptation efforts, which means that their valuable insights and experiences as farmers are not taken into consideration, leading to a lack of representation of their needs in these decisions (Davidson, 2016).

To promote women's participation in leadership and decision-making in AFS governance, it is important to challenge and change gender norms that limit women's opportunities and agency. The identified studies shows that this can be done through education and awareness-raising campaigns, as well as by implementing policies and programs that promote gender equality and support women's access to and control over assets. It is also crucial to involve women in the design and implementation of these initiatives, to ensure that they reflect the needs and priorities of women and are effective in addressing the barriers they face. One point of convergence among these interventions is the need to target vulnerable community members so that they can also realize the benefits of these interventions (Horowitz, 2009).

As part of efforts to address these issues, it is crucial to prioritize marginalized and vulnerable women to improve their leadership and representation in the food system. This can involve implementing strategies such as the diffusion of gender-sensitive technological innovations, the development of women's leadership skills, and the creation of inclusive and participatory decision-making processes. By prioritizing the voices and perspectives of marginalized and vulnerable women, it is possible to create more equitable and sustainable food systems that can

better meet the needs of all members of society (Nyantakyi-Frimpong, 2014). Additionally, gender budgeting is a public financial management practice that aims to address inequalities and promote gender equality through the use of public services, infrastructure, and social protection. It involves analyzing and addressing how the intersection of gender with other identities affects citizens' needs. Financial literacy and inclusion are also important in closing the gender gap in financial services, as financially literate women are more likely to seek financial advice and take up financial products. Increasing access to financial services, especially digital financial services, can also help improve financial inclusion for women (Agwu, 2021).

The findings show that investment in programs that can empower women and increase their influence, such as through literacy and financial education, can lead to improved participation in decision-making and leadership roles within the governance of the food system. Community-based initiatives, implemented by women, have been shown to be effective in increasing women's voice and agency in food system governance, like the MAFFA in Malawi or the use of women extension service workers in Ghana. For women to effectively participate in food system governance, they must have access to resources and control over them, as well as resilience, voice, and agency. Ensuring the safety and security of women, like through "women-led civil society organizations" in Nigeria, can also encourage their participation in governance. Social protection systems that already exist, like the LEAP program in Ghana, can be utilized to enhance the climate resilience of rural women, decrease gender inequality, and improve women's participation in food system governance.

## 6 Conclusion

There is alarming gender inertia and inflexibility in the agricultural system, which tilts production, marketing, distribution, and decision-making in the direction of men. This review demonstrated robust evidence of existing gender barriers women face in exercising voice and agency in agricultural food systems. Furthermore, we found a number of approaches implemented at varying scales that can be scaled up to improve their voice and agency in climate-relevant AFS governance.

Women face several barriers to expressing their voices and exercising their agency in AFS due to a low level of education and knowledge, which limits their voice and agency in access and managing resources as well as in adopting and implementing new farming techniques for improved yields. This is primarily due to informal training and upbringing, which create inequalities between men and women in learning and trying out new farming methods in gendered environments and societal norms constraining women's interest in agriculture. Girls are often

limited to household chores from an early age, while boys help with the farms and restrict women's passion for farming, using tractors, plowing, and other forms of agriculture. Often, this limitation leads to women being disinterested in agricultural ventures, limited involvement in agriculture, and having little to no knowledge of improved farming practices.

Women's participation in productive meetings is hindered by normative/cultural restrictions that limit their mobility or interactions with men, associations which restrict their access to information and their ability to exercise agency in climate-relevant AFS governance.

Furthermore, early marriage practices for girls served as a barrier to female advancement. Women's involvement in AFS has often been discouraged by social norms and cultural inscriptions of what girl children should or should not do. Gendered roles and tasks contribute to different priorities for women and disincentivizes women's involvement in AFS. Furthermore, these socio-cultural practices tend to favor men in owning agricultural assets such as land. Traditionally, how women have responded to opportunities has been shaped by society's perceptions of what is acceptable for women and men, including the adoption of new technology in agriculture and obtaining new employment opportunities. There was a concern in the literature that some women would be categorized as lazy by society or their husbands if they used labor-saving machines. In addition, women were hindered by gender norms in making strategic decisions and exercising strong agency when selecting specific types of machinery or agricultural technology.

Making the AFS more equitable to women is one way to close the gender gap. To overcome these barriers, the literature identifies practical approaches to support women's agency in climate-related AFS governance. Some worthwhile strategies are outlined in the literature, including the diffusion of gender-sensitive technological innovations, self-help groups, agroecological interventions led by farmers, and the development of women's leadership skills through training in confidence, self-awareness, strategic advocacy, and communication skills. It has been found that gender-responsive seed systems can enhance women's interest in AFS by providing information, soliciting women's preferences, and facilitating networking opportunities through targeted and accessible channels, such as video, mobile seed shops, or local market promotions.

By working together, advocacy groups can influence legislation to address specific issues relevant to gender equality and women's empowerment, advocating for legislative reforms that will protect and promote women's rights and concerns. Several examples include the Institute for Young Women's Development (IYWD) in Zimbabwe, which collaborated with the



traditional court system to uphold young women's rights and promote peace and stability in their communities. Moreover, it has also been demonstrated that adding gender quotas to top management will increase female representation and lead to gender-transformative approaches. Adopting gender-transformative strategies is another critical approach to promoting women's interest in AFS, including behavior change communication that creates opportunities for individuals to challenge gender norms actively. Women's interest in AFS can be increased if we promote women's social and political influence in communities and address power inequalities between people of different genders. Women's voice and agency can also be enhanced by involving women in both macro and micro political assemblies, adopting governance systems that legally protect their inheritance rights, allowing women access to productive resources, introducing women's machines, creating gender action plans and national gender strategies, introducing gender budgeting, and educating women about financial literacy.

# Appendix

## Search Terms

1	“Governance” or “rules” or “procedures” or “voice” OR “influence” OR “influencing” OR “speaking” OR “decision-making” OR “government” OR “service delivery” OR “laws” OR “regulations” OR institutions
2	Women OR Gender OR Female OR girl*
3	Agriculture OR farming OR “food security” OR “food insecurity” OR “food systems” OR “agri-food” OR “food systems governance” OR Rural OR “Climate Change” OR drought OR rainfall OR temperature
4 (Barriers)	Challenges OR Barrier* OR inequality* OR “social inequality” OR “structural inequality*” OR “cultural Barriers” OR “safety and security” OR “unequal power dynamics” OR patriarch* OR “educational constraints” OR “literacy constraints” OR “psychological constraints” OR “rural technological constraints” OR “structural inequality*” OR “rural gendered differences” OR marginali*
5 (Opportunities)	“Opportunities” OR “Community level” OR “best practices” OR “gender transformative” OR “climate-smart” OR “climate resilient” OR “traditional knowledge” OR “gender transformation” OR “social innovation” OR “affirmative action” OR “social protection” OR “participatory agriculture” OR “gender responsive” OR education OR “self-help groups” OR “gender-inclusive” OR “gender equality” OR “gender-based” OR “women leadership” OR “Women empowerment”
6	“Nigeria” OR “India” OR “Malawi” OR “Ghana” OR “Sub-Saharan Africa” OR “Global South” OR “Third World” OR “Developing World” OR “South Asia” OR “SSA” OR “Latin America and Caribbean (LAC)” OR “Middle east and north Africa”
A	1 AND 2 AND 3 AND 4 AND 6
B	1 AND 2 AND 3 AND 5 AND 6
Year	2010-2022
Databases	Scopus A (1543), B (2559) Web of Science (2,221) CCAFS Google Scholar Gray literature

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