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To cite this article: Abhishek Das, Kavitha Kasala & Shalander Kumar (2023): Gender inclusive food systems for sustainable healthy diets in low and middle-income countries, *Agroecology and Sustainable Food Systems*, DOI: [10.1080/21683565.2023.2215192](https://doi.org/10.1080/21683565.2023.2215192)

To link to this article: <https://doi.org/10.1080/21683565.2023.2215192>



Published online: 26 May 2023.



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Gender inclusive food systems for sustainable healthy diets in low and middle-income countries

Abhishek Das, Kavitha Kasala, and Shalander Kumar

Enabling Systems Transformation Program, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, India

ABSTRACT

Around the world, women along with men are key actors in every aspect of food systems, as farmers, processors, wageworkers, traders, and consumers. Despite their significant role, the evidence shows that women are not only structurally disadvantaged in the food system, but also their contributions are often undervalued. Unraveling the gender dynamics in food systems is necessary to address gender inequalities and develop efficient, inclusive, and resilient food systems. Some positive actions toward inclusion are being integrated, however, more efforts are needed. To achieve sustainable food systems, gender equity, and women's empowerment are needed across different nodes of the food systems. Men and women have different experiences and different strategies throughout the food system. Therefore, understanding such gender differences could facilitate the development of gender-sensitive policies and programs that could help achieve sustainable, nutrition-sensitive, and inclusive food systems. We have used the most recent food systems framework developed by the High-Level Panel of Experts (HLPE) and examined the perspective on how gender dynamics shape men's and women's participation in food systems and to identify the entry points for improved gender equity and inclusion to attain sustainable food systems for healthy diets in low and middle-income countries.

KEYWORDS

Gender; food systems; sustainable healthy diets

Introduction

Food systems are central to the lives of people around the world. Both men and women participate in food systems, but the nature and extent of their participation varies depending on the structure of the agrarian economies, gender norms, and the roles and responsibilities as per their social construct in the communities (Malapit et al. 2020). During the last two decades, the food systems, especially in agriculture, has been feminized as the waning economic growth in farming across Low and Middle-Income Countries (LMICs) pushed men to migrate to cities in search of new livelihood options while shifting women at the forefront of the food systems. Therefore, the role of women has become more important for the sustainability of food systems to ensure the

CONTACT Shalander Kumar ✉ Shalander.Kumar@icrisat.org 📠 International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), India

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food security and nutrition of societies. Despite such a significant role, women continue to face several challenges in performing various activities across the food systems due to increased gender inequalities, skewed access to information, and low empowerment, which has implications for the sustainability of the food systems. Women's contributions to food systems are often not formally recognized or appropriately valued (Quisumbing et al. 2021). In addition, compared with men, women are more vulnerable to chronic food insecurity and nutrition as well as shock-induced food insecurity (Madzorera et al. 2020; Theis et al. 2019).

Therefore, strengthening women's role in food systems entails a deeper understanding of gender interactions and how they interplay in food systems because the role of women in agriculture and allied areas are heavily affected by gender norms (Quisumbing et al. 2014). Hence, the knowledge of how gender interacts and interplays in food systems is vital to developing policy and programs to make gender interactions favorable to women's participation and productivity in agriculture, and food systems. The present study shows how gender plays a significant role in making the food systems more inclusive and sustainable and thereby contributing to sustainable healthy diets in LMICs.

To understand gender dynamics in food systems, we have used the food systems framework developed by High-Level Panel of Experts (HLPE 2017), and their connected perspectives on how gender dynamics shape men's and women's participation in the food systems and opportunities to identify the entry points for improved gender equity and inclusion to attain sustainable food systems for healthy diets in LMICs.

Following this brief introduction, the subsequent section describes the conceptual framework for the food systems used for this study, followed by the gender dynamics and associated challenges in the food systems, with the next section on how the gender equity and inclusion contribute toward attaining sustainable food systems and finally, the conclusions are presented in the last section.

The conceptual framework

A food systems framework consists of all the elements (environment, people, inputs, processes, infrastructures, and institutions) and their activities that relate to the production, processing, distribution, preparation, and consumption of food, and the outputs of these activities, including socio-economic, nutrition, and environmental outcomes. Food systems are not standalone entities but are influenced by a multitude of factors, including drivers, actors, and elements, as well as their interactions with other systems such as health, energy, and transportation. These interlinked systems are in a state of constant adaptation, growth, and renewal. Several food systems frameworks have been proposed in the literature (Burchi, Fanzo, and Frison 2011; Gustafson et al.

2016; HLPE 2017; Pinstруп-Andersen and Watson 2011; Sobal, Khan, and Bisogni 1998) using multidimensional indicators to quantitatively analyze the performance of food systems for sustainable nutrition security. In this study, we have used the framework (Figure 1) developed by (HLPE 2017)¹. We have reviewed the literature in the context of gender inclusion at every node of the HLPE food systems framework. By using a gender lens in a food systems framework, policymakers, practitioners, and stakeholders can identify the specific gender inequalities and disparities that exist within food systems and opportunities to design interventions that address these challenges.

For example, in the adequacy and diversity dimension, a gender lens can help to identify the specific nutritional needs of women and girls, who often have different dietary requirements than men and boys. Women's limited access to land, credit, and other resources may also restrict their ability to produce or access diverse foods, which can have negative impacts on their health and well-being. In the sustainability dimension, gender lens can help to identify the gendered impacts of environmental degradation and climate change on women, who often bear the brunt of these impacts due to their roles in food production and caregiving. Women's knowledge and skills in sustainable farming practices can also be leveraged to promote sustainable food production. In the resilience dimension, a gender lens can help to identify the specific vulnerabilities of women and girls to shocks and stresses, such as natural disasters or economic crises. Women's participation in decision-making processes can also enhance the resilience of food systems by ensuring that the perspectives and needs of all stakeholders are taken into account. Finally, in the inclusiveness dimension, a gender lens can help to identify and address the gender inequalities that exist within food systems, such as unequal access to resources, discriminatory social norms and practices, and limited participation in decision-making processes. By promoting gender equality and

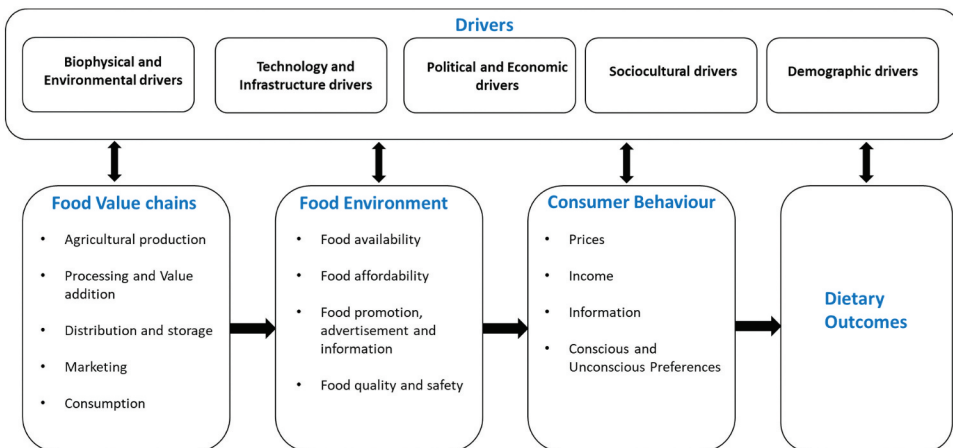


Figure 1. Food systems framework. Source: Adapted from (HLPE 2017)

empowering women and girls, food systems can become more inclusive and equitable for all stakeholders. Overall, using a gender lens with the HLPE food system framework can help to ensure that gender considerations are integrated into all dimensions of food system transformation, leading to more sustainable, equitable, and resilient food systems for all.

The proposed conceptual framework in [Figure 1](#) outlines five key categories of drivers of food system changes: biophysical and environmental, technology and infrastructure, political and economic, socio-cultural, and demographic drivers. Biophysical and environmental drivers include natural resources, ecosystem services, and climate change. Political and economic drivers encompass factors such as leadership, globalization, foreign investment and trade, food policies, land tenure, food prices, and volatility, as well as conflicts and humanitarian crises. Socio-cultural drivers include elements such as culture, religion, rituals, social traditions, and women's empowerment. Lastly, demographic drivers consist of population growth, changing age distribution, urbanization, migration, and forced displacement. The impact of each driver will depend on the specific type of food system, the actors involved, and the policies and actions implemented. Along with these drivers, the conceptual framework includes three core constituent elements of food systems: food value chains, food environments, and consumer behavior. Food value chains involve activities and actors that facilitate the food journey from production to consumption, including production, storage and distribution, processing and packaging, and retail and markets. The food environment comprises the physical, economic, political, and socio-cultural factors that shape dietary preferences, choices, and nutritional status. Finally, consumer behavior encompasses all the choices and decisions made by households or individuals regarding food acquisition, storage, preparation, cooking, and consumption, as well as the allocation of food within households, including gender distribution and feeding practices for children. These elements are interdependent and interact with the drivers of food system changes to shape the final outcomes. All of these three elements, which are influenced by the drivers, shape diets and determine the final nutrition, health, economic, and social outcomes of food systems.

Dynamics and the challenges faced by women in the food systems in LMICs

Our conceptualization of gender as a critical catalyst for progress in all aspects of food systems highlights the significant disparities that exist between men and women in their roles within these systems. These differences, determined by gender, have an impact on every facet of the food systems. Achieving sustainable food systems will require addressing gender inequality at all levels. We have reviewed the existing literature in the context of every node of the

HLPE framework examining its gender dimension. In this section, we discuss² the challenges faced by women at different nodes and levels of food systems based on the framework presented in [Figure 1](#).

Food value chains

Food Value Chains (FVC) provide a unique framework that encompasses all activities that move food from production to consumption responding to the demand, including production, storage, distribution, processing, packaging, retailing, and marketing. Around the world, women play a key role at different stages of the informal and formal food value chains, as producers, processors, traders, and consumers. However, women are structurally disadvantaged at the various stages of the food value chains (FAO 2017; McGuire, 2015). We have looked at the gender dynamics at the different stages of food value chains and their implications for the sustainability of food systems.

Production

Women in LMICs tend to face greater challenges than men in different aspects of food production (Botreau and Cohen 2019; Kangas et al. 2014). Worldwide, women often have lower access to inputs, information, training, capital, and credit. Women's ownership of land also typically lags far behind that of men (Food and Agricultural Organisation FAO 2011; Haddad et al. 2016 ; IPAR 2015; Quisumbing et al. 2014). As a result of these barriers and complex gender relations and intra-household bargaining, women farmers from LMICs are less likely than men to adopt improved crop varieties and management systems, and the crop yields on plots managed by women are typically lower than on plots managed by men. Furthermore, the division of labor for women and men is often inequitable. For example, farm mechanization has remained biased toward the activities such as plowing undertaken by men and lesser mechanization of activities undertaken by women (Abdelali-Martini 2011; Mehta, Gite, and Khadatkhar 2018). The gender division of labor also often results in disparate spheres of knowledge and practical needs for women and men. In case of women, productive and reproductive work is often unpaid and unrecognized which results in work burden and increased roles and responsibilities (Asian Development Bank ADB 2013).

Processing and value addition

The women are in a more disadvantaged position in the processing and value-added aspects of the FVC. Various constraints and challenges faced by women in post-harvest processing affect their decision-making processes. Women tend to be trapped in primary food production and have more challenges accessing value addition and transformation services and infrastructure for their produce (Doss et al. 2019; FAO 2017; Sumberg and Hunt 2019).

Expensive transformation technologies and machinery are also difficult for women to attain when access to credit is a major challenge. Women are also key players in food handling and transformation however, they are frequently excluded from training opportunities on food handling and food hygiene, exposing them and their families to several risks connected to unsafe processing and transformation of food for family consumption (Doss et al. 2019; GPAFSN 2016; Pinstруп-Andersen 2010). Women tend to be less involved in food transformation for commercial purposes, despite being important players in the transformation of food for subsistence purposes at the household level.

Distribution and storage

Social norms on gender are dynamic and context-specific and present in all domains of social life: in families, communities, the state, private companies, and modern development organizations (Badstue et al. 2020). Gender norms are a critical enabling (or disabling) factor affecting agricultural livelihoods and are determinants of the distribution of benefits and resources. Especially women in agriculture manage seed selection, processing, and storage for food crops but often not for cash crops (Amri and Kimaro 2010).

Marketing

In many parts of the world, women frequently have less access to markets and play a limited role in the commercialization of food, particularly for commercial purposes. Very often men are the main actors in marketing, especially in societies in which men have better access to education and are more numerate and literate than women, who also frequently lack marketing skills. Mobility is also often a major constraint for women (Fisher, Warner, and Masters 2000; McPeak and Doss 2006; Talle 1988) who are frequently constrained by societal stereotypes and rules, which prevent them from traveling alone and/or accessing public transportation to reach more lucrative urban and peri-urban markets to sell their raw or transformed produce.

Consumption

Women can be and often are decision-makers when it comes to food choices within the household, however, their frequent lack of power over a household's income may also often restrict their ability to freely select the food to purchase for household consumption. This strongly affects women's nutrition status and that of their families (Kurz and Johnson-Welch 2001; Narayanan et al. 2019).

Therefore, the gendered approach to food value chains helps us to consider a wide range of alternatives for women's engagement with the global food systems. A food value chain model with a gender lens offers a way to identify a diverse set of strategies that encourage women to benefit from expanding

economic opportunities (Achandi et al. 2018; Barrientos, Dolan, and Tallontire 2003; Ihalainen et al. 2021; Malapit et al. 2020).

Food environment

Food environment refers to the physical, economic, political, and socio-cultural surroundings, opportunities, and conditions that create everyday prompts, shaping people's dietary preferences and choices as well as nutritional status (GloPan Global Panel on Agriculture and Food Systems for Nutrition 2017; HLPE 2017). Here we discuss the challenges women face under different attributes of the food environment.

Food availability

The physical distance to markets impacts household food security outcomes for female-headed households more than for male-headed households (Aryal, Mottaleb, and Ali 2019). Also, women's lesser autonomy in mobility is found to be positively associated with wasting in children (Shroff et al. 2011).

Food affordability

Women are less likely than men to be able to afford a nutritious diet, as women often occupy lower-paying wage positions than men, earn and control smaller incomes than men, have less autonomy over household financial decisions, or have no income at all (Raghunathan, Headey, and Herforth 2021). Women's limited mobility (as explained earlier) can restrict their options for labor force participation and in turn, their purchasing power even the social grants and other social protection programs that are not designed in a gender-responsive way are a missed opportunity to improve women's ability to purchase food (Farrell et al. 2018; Hirvonen et al. 2020; Njuki et al. 2023; Raghunathan, Headey, and Herforth 2021).

Food promotion, advertisement, and information

Lack of information and awareness regarding nutrition more so in women often results in unhealthy food choices for the entire household. Regulation of the marketing of unhealthy foods and beverages, especially to children, is a growing concern in LMICs (Laar et al. 2020). Women belonging to LMICs lack education and thereby cannot make decisions based on the labeling information that is provided on food packages, display cases, or menus (Fanzo and Davis 2021).

Food quality and safety

Food safety during meal preparation has been important to keep their families safe and this is done by women mostly (Kendall et al. 2019;

Knight et al. 2003; Turner 2020; Wertheim-Heck, Vellema, and Spaargaren 2015, 2015). At the household level, awareness of food safety measures among the women is low which often results in a greater incidence of diarrhea and other diseases contributing to malnutrition among the children and household members (Nordhagen et al. 2022; Pradeilles, Baye, and Holdsworth 2019).

Consumer behavior

Consumer behavior reflects all the choices and decisions made by consumers, at the household or individual level, on what food to acquire, store, prepare, cook, and eat, and on the allocation of food within the household (including gender repartition and feeding of children). Following are the different aspects of consumer behavior observed with a gender lens.

Prices

Women are more exposed to price fluctuations that could lead to important drops in income, while poor levels of income lead to limited access to capital (Walther, Tenikue, and Trémolières 2019). In terms of food access, women are limited by both intra-household inequities regarding food purchases (Kristjanson et al. 2017) as well as market-led disproportionate price spikes because of a lack of stability (Arndt et al. 2016; Darnton-Hill and Cogill 2010; Hossain and Green 2011; Kumar and Quisumbing 2015).

Income

Women bear an unequal burden of unpaid care work within the household. This affects the time available for other kinds of work, including paid work, and thereby has an impact on incomes and the kind of food a household can afford (Asian Development Bank ADB 2013; HLPE 2017; Longhurst and Tomkins 1995; Mason and Gillespie 1990).

Information

Women in LMICs have limited access to communication services, especially in lower-income groups (that limits their access to information) especially when such information is in conflict with existing social norms and traditions such as certain social norms influence household behaviors related to intra-household food distribution (Masamha, Thebe, and Uzokwe 2018; Neogy 2010).

Conscious and unconscious preferences

The conscious and unconscious preferences for food purchases for household consumption vary by gender. Female-headed households spend more than male-headed households on food and they spend more on a variety of different foods (Kamath and Dattasharma 2017). While rural women

earn less income than men, they spend a greater proportion on food for their families (Ibnouf 2009). This results in limiting the possibilities for women farmers to acquire other assets such as livestock, land, and agricultural equipment (Gurung, Bhandari, and Paris 2016; Kasente 2012; Mudege et al. 2017). And thereby leads to lower performance in FVC leading to lower representation at important nodes of food systems. However, it was also found that women in certain cultures and communities value food more than acquiring livestock and agricultural equipment (Ferdous et al. 2016; Galhena, Freed, and Maredia 2013; Mdiya and Mdoda 2021).

Drivers of food systems

Structural gender inequalities and gendered shocks and vulnerabilities that affect men and women in different ways influence how men and women experience the changing drivers of food systems, which in turn shape the three main components of food systems: food value chains, the food environment, and consumer behavior. Here we discuss the five main drivers of food systems using gender dynamics.

Biophysical and environmental drivers

Food production is heavily dependent on natural resources and ecosystem services along with climate change and natural disasters. Women farmers are unequally and more negatively affected by climate change and natural disasters than their male counterparts and the knowledge gaps regarding climate change and adaptation strategies are also much higher for them (Maponya and Mpandeli 2013; Mitchell, Tanner, and Lussier 2007; Nkengla-Asi et al. 2017; Terry 2009). Women are more vulnerable than men, as the changes lead to a reduction in yields, which affects family well-being. Whereas most men tend to move away from the area in search of paid jobs in the cities, women remain in their own communities and work to diversify their livelihood activities (Bhadwal et al. 2019; Goh 2012).

Technology and infrastructure drivers

Infrastructure and technology are the critical components of the food systems, that influence production and transportation, of food from the place of production to the places, processing and value addition, distribution, and market access (Fanzo and Davis 2021). Poor access to technology and infrastructure support for women in LMICs hurts their nutrition, health, access to financial services and other technologies which leads to food insecurity and poverty (Maraka Joshua 2021).

Political and economic drivers

There is a lack of effective institutions and policies supporting gender equality and women's empowerment in food systems. The lack of policies and institutional capacities across a range of contexts and tension between formal legislation and practiced law such as where women's personal property rights differ from legal definitions increases the vulnerability of women within the food systems (Adebo and Sekumade 2013; Aleksandrova 2020; Njuki et al. 2023).

Sociocultural drivers

The sociocultural belief system and customs play a crucial role in shaping the dietary practices in the household, where most women are involved in the food preparation in the LMICs. Besides the changes in a socio-political context, cultural context, science, and technology, gender relationships and norms are among the most significant drivers of food systems and diets (Asian Development Bank ADB 2013; HLPE 2017; Rozin 2006). These cultural identities and social norms shape the food systems and result in exacerbating or reducing malnutrition, particularly among women and children (Das and Mishra 2021; Fanzo and Davis 2021; Narayanan et al. 2022; Smith and Haddad 2000; Smith et al. 2003).

Demographic drivers

Population change, urbanization, and migration influence the trajectory of food systems around the world. These demographic drivers affect food consumption and demand, which have ramifications for food production and the environment especially in LMICs (Fanzo and Davis 2021; HLPE 2017). Migration is transforming rural economies, landscapes, and potentially gender relations. In LMICs, migration due to shocks and vulnerabilities leads to the feminization of agriculture (Tamang, Paudel, and Shrestha 2014; Baada and Najjar 2020; Kawarazuka et al. 2022; Leder 2022; Pattnaik et al. 2018; World Bank 2015). This in turn affects the food supply chains wherein women struggle for access to services and products as they have no land rights and access to credit, networks for agricultural production thereby affecting household food security and nutrition. Not only are women affected directly, but members of their households and communities are also affected inter-and intra-generationally.

Dietary outcomes

Many food systems interventions have often not been designed based on gender evidence, an oversight that may result in poor outcomes or inefficient use of funds to improve food systems (Moore et al. 2021). Maternal malnutrition especially in LMICs has been linked to low birth weight, which in turn

results in high infant morbidity and mortality rates (Black et al. 2013; Victora et al. 2021)

Box 1: Recognizing women's agency and positionality in the food system

Recognizing women's agency and positionality in the food system is crucial for achieving food security, sustainability, and social justice (Portman 2018; WHO 2020). Women play a vital role in the food system, as they are often responsible for food production, processing, marketing, and preparation. Several studies across LMICs showed that improving women's agency can result in sustainable and healthy food systems. In India, women-led cooperatives (Mahila Kisan Sashaktikaran Pariyojana (MKSP) program) have been successful in improving the livelihoods of women farmers and promoting sustainable farming practices (Khadse and Srinivasan 2022); while in Egypt, the women in aquaculture program have been successful in promoting women's participation in the aquaculture sector (Kruijssen et al. 2018). In Kenya, the women in agroforestry program (Kiptot and Franzel 2012) have been successful in promoting women's participation in agroforestry, which involves integrating trees into farming systems. The program provides training and support to women farmers, enabling them to adopt more sustainable and diversified farming practices. Another study involving women in seed production programs in Mali has been successful in promoting women's participation in seed production. The program provides training and support to women farmers, enabling them to produce and market high-quality seeds (Ajeigbe et al. 2013). These case studies demonstrate the importance of recognizing women's agency and positionality in the food system. Through programs that empower women farmers, promote gender equality, and engage women in food production and processing, we can create more equitable and resilient food systems that benefit everyone.

Towards gender inclusive sustainable food systems in LMICs

The gender research has identified seven prominent issues, to elevate gender equality, women's empowerment as well as the engagement of women across all action pathways across food systems: Women's rights to land; economic empowerment of women in food systems; unpaid care and agricultural labor burden; women's leadership in food systems; access to technologies (including digital); changing norms and addressing institutional barriers; gender-responsive agricultural and food systems policies. The identified action pathways have to be applied using a gender lens to food systems, especially in LMICs. A systems thinking approach is needed to understand the complexity and inter/transdisciplinary nature of outcomes (Borghini 2021; Deller, Lamie, and Stickel 2017). Therefore, the systems thinking approach has to be applied through the lens of women empowerment/women's agency and the policy environment for bringing gender inclusive food systems for sustainable healthy diets.

Empowering women and agency by changing the sociocultural environment for gender equitable sustainable food systems

Gender dynamics and women's empowerment have been acknowledged to play an important role in achieving nutrition impact even though each country faces different challenges with gender equality and women's empowerment (de Brauw et al. 2019; Gebru et al. 2018; Panel et al. 2015; Posthumus et al. 2018) (Raneri et al. 2019). Efforts

to promote women's ability to equitably participate or increase women's agency in society might have substantial benefits for solving malnutrition, especially in LMICs (Brinda, Rajkumar, and Enemark 2015; Marphatia et al. 2016; Ringshaw, Wedderburn, and Donald 2021; Shekar et al. 2021; Victora et al. 2021). Women who were involved in direct communication and information services on nutrition were able to improve the nutritional outcomes of not only their own selves but also their children and household as a whole in the LMICs (Nichols 2021; Olney et al. 2015; Osei et al. 2017; Rahmawati et al. 2021).

Promoting women's empowerment and targeting women with nutrition information could be effective for food systems innovations addressing consumer behavior. Training on safe food handling and nutrition-sensitive value addition techniques can benefit every household member, and the safely transformed food, in some cases, contributes to healthy diets for all.

As nutrition becomes an important contributor to poverty reduction strategies and as countries start scaling up nutrition programs, new ways of delivering interventions, knowledge, and tools will be essential, especially for women (Fanzo et al. 2020; Frank 1999; Mulauzi and Zulu 2012; Wei et al. 2021). The innovative operations enabled by technologies can empower women to alleviate poverty, reduce hunger by improving health, increase access to clean water and sanitation, and increase access to education and decent work thereby resulting in sustainable healthy diets (Aleksandrova 2020; Nordhagen et al. 2021). Increasing control/ownership of assets helps create pathways out of poverty more than measures that aim to increase incomes or consumption alone.

Women's crop yields could increase by 20 to 30% if the gender gap in accessing agricultural inputs were closed, an increase that could raise agricultural output in LMICs by 2.5 to 4%, reducing the global number of food-insecure people by 12–17% (FAO, 2011; Nelson et al. 2010). Women's role in agriculture is even more crucial in LMICs, which suffer from the double burden of chronic malnutrition and obesity. It's critical to investigate the impact of male migration on agriculture, but also its implications for women's agency and agricultural productivity for bringing about equitable and sustainable food systems (Kawarazuka et al. 2022; Kelkar 2007; Slavchevska, Kaaria, and Taivalmaa 2019; Song and Vernooy 2010).

Evidence and debates are still needed to identify a balanced strategy for gender equity and women's empowerment for improving nutrition but reinforcing gender roles should not generate unintended negative consequences for women (Lecoutere, and Wuyts 2021; Beuchelt and Badstue 2013; Lemke and Bellows 2015).

Empowering women and agency by enabling policy environment for gender equitable sustainable food systems

When women and men have equitable opportunities to be productive food producers, food production increases, and the number of hungry people is lowered (UN Women, 2021; World Economic Forum, 2017). Enabling food policies in LMICs can play a critical role in influencing food choices by shaping food availability at national (Baker and Friel 2016; Baker et al. 2016; Thow and Hawkes 2009), local (Bridle-Fitzpatrick 2015); Davies et al., 2017 (Turner 2020), and institutional levels (Pehlke et al. 2016; Rathi, Riddell, and Worsley 2017). Synergistic public health nutrition policies are needed to build resilient food systems and support vulnerable population groups. Women's mobility is restricted by laws, customs, or violence, which limit their possibility to travel for work or food and frequent public spaces, including food markets, therefore effective policies on gender empowerment are needed for the freedom of mobility for women in the LMICs. It is important to facilitate women's access to markets by designing adequate and conducive policies, providing gender-sensitive services, and facilitating women's access to education.

Labor/workplace policies can make a difference, such as policies that aim at the creation of decent employment and social protection for women; workplace policies that promote work-life balance; provision of quality and affordable care services; and interventions promoting the equal sharing of domestic and care work, including food purchasing and preparation responsibilities, between women and men. Used in combination, such measures could improve both women's economic autonomy and household food security and nutrition (Bukachi et al. 2021 (Surendran et al. 2020)).

While policies aimed at gender equity are important, their effectiveness can be hampered by a range of social, economic, cultural, and political factors. In the context of the food system, policies aimed at promoting gender equity can face a range of challenges that may limit their effectiveness. One significant challenge is the limited resources and inadequate infrastructure available to implement these policies. In LMICs, in particular, resource constraints may make it difficult to provide adequate support for women farmers or to establish programs that promote gender equity in the food systems (Quisimbing et al. 2021). Insufficient infrastructure, such as inadequate transportation and storage facilities, can also create barriers to women's participation in the food systems (Masuku 2013).

In addition, cultural norms and values can present significant obstacles to advancing gender equity in the food systems. In many societies, women are expected to fulfill traditional roles within the household, which may limit their opportunities to participate in food production, marketing, and distribution. Changing these attitudes and behaviors can be a long and difficult process,

requiring sustained efforts to promote education and awareness (Allen 2010; Terry 2009).

Weak institutions and political instability can also hinder the implementation of policies designed to promote gender equity in the food systems. When institutions lack the capacity to coordinate and implement policies effectively, progress toward gender equity may be slow or nonexistent. Political instability and conflicts can further exacerbate these challenges, as they can disrupt food production and distribution networks, making it difficult to sustain gains in gender equity over the long term (Anderson et al., 2019).

In order to promote gender equity in the food systems, a more nuanced and context-specific approach is needed. This approach should take into account the unique challenges and opportunities presented by the specific social, economic, cultural, and political contexts of different regions and countries. Policymakers and practitioners must work to understand the complex web of factors that can influence gender equity in the food systems, and design policies and programs that are tailored to local needs and circumstances. By adopting such an approach, it may be possible to make meaningful progress toward gender equity in the food systems, even in the face of significant challenges (Caron et al. 2018).

Conclusions

Food systems are greatly influenced by gender dynamics. Addressing these dynamics improves the overall sustainability and productivity of food systems. Existing evidence shows how structural gender inequalities such as harmful norms, unequal responsibilities, restrictive masculinities (rigid and inflexible notions and expectations), and inequitable access to resources including technology make women vulnerable within the food systems to shocks and stressors such as climate change, conflict, state fragility and pandemics like COVID-19.

Women's increased involvement in food systems is associated with improved diets and nutrition outcomes for women themselves and other household members, although the pathways to impact are yet to be fully understood. Data are required to understand the local contexts and to identify points for intervention within food systems in LMICs, especially for diets and food environments. More gender-disaggregated evidence base to inform stakeholders of the appropriateness of applying a gender-sensitive lens and accompanying measures (for both men and women) in food systems interventions is needed. Such evidence data coupled with an understanding of the cultural, socio-economic, and political context allows for designing context-specific and innovative responses. Existing evidence is extremely localized and context-specific, limiting its application beyond the focus area of the study.

Moving forward, further research is required to produce stronger evidence on cross-contextual pathways to improve gender equity and women's empowerment in food systems. The key areas recommended for investment: improving women's agency and empowering women for decision-making in food systems, promoting equal and positive gender norms, improving access to resources, and building cross-contextual research evidence on gender and food systems. Continuous increase in awareness on importance of gender and social inclusion into the food systems globally and generation of robust evidence are likely to help create more inclusive and sustainable food systems.

Notes

1. The High-Level Panel of Experts (HLPE) is a group of experts appointed by the United Nations Committee on World Food Security (CFS) to provide evidence-based analysis and policy recommendations on food security and nutrition issues. The HLPE (2014 (HLPE 2017), developed a food systems framework to guide policymakers, practitioners, and stakeholders to assess food systems and design policies and interventions that can lead to sustainable and equitable food systems. The HLPE food systems framework is based on four dimensions: food systems' adequacy and diversity, food systems' sustainability, food systems' resilience, and food systems' inclusiveness. These dimensions reflect the multi-faceted nature of food systems and highlight the need for a holistic and integrated approach to food system transformation. The adequacy and diversity dimension focuses on ensuring that food systems provide sufficient and diverse food to meet the nutritional needs of all people. The sustainability dimension emphasizes the need to produce food in a way that is environmentally sustainable, while the resilience dimension highlights the importance of food systems to be able to withstand and recover from shocks and stresses. The inclusiveness dimension recognizes that food systems must be inclusive of all stakeholders and address social inequalities, including gender inequality.
2. It is important to acknowledge the limitations and potential problems associated with generalizing the experiences of women in low- and middle-income countries (LMICs) based on a narrow range of scientific literature. There is great diversity among women in LMICs, and their experiences are shaped by a range of factors including culture, socio-economic status, geography, and history. Therefore, drawing conclusions based on a limited body of literature may lead to oversimplifications and misrepresentations of the complex realities faced by women in these regions.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

The work was supported by the CGIAR Gender Platform [C-2022-194].

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