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Leveraging Social Protection to Strengthen Women's and Girls' Roles in Climate-Resilient Agrifood Systems

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Abstract

Women and girls (WGs) have important roles in making agrifood systems more climate-resilient. However, systematic inequalities in access to resources, technologies, information, services, and networks reduce their capacity to adapt to and mitigate climate change - with implications for the wellbeing of WGs and their households and the sustainability of agrifood systems. With growing recognition that social protection helps promote WGs' resilience in low- and middle-income countries (LMICs) at large scale, stakeholders are interested in developing social protection programs that are responsive to both climate change and gender inequality. However, little is known about effective approaches. We reflect on emerging evidence on how social assistance - the most prevalent type of social protection programming in many LMICs - affects WGs' coping, adaptive, and mitigative responses to climate hazards. Drawing on this evidence, we propose recommendations on program design features that may more effectively promote WGs' roles in climate-resilient agrifood systems. We additionally highlight important directions for future research to guide practice.

Keywords

Social protection, climate resilience, gender equality, agrifood systems, low- and middle-income countries

1. Introduction

The world is increasingly facing compounding crises, many of which are linked to rapid- or slow-onset climatic changes that destabilize agrifood systems and disproportionately afflict low- and middle-income countries (LMICs). If global temperatures overshoot the 1.5-degree target—an outcome that appears likely given current mitigation trajectories (IPCC 2022)—climate hazards are expected to intensify, making adaptation efforts less effective (and greater losses unavoidable). Large-scale measures are needed to support those most vulnerable to the negative impacts of climate change, including escalating food insecurity and disruptions to livelihoods. The most recent IPCC Synthesis Report (IPCC 2023a) and the Summary Report for Policymakers (IPCC 2023b) explicitly cite social protection as promising for supporting mitigation and adaptation to climate change. These reports also reflect a growing recognition in the literature that women and girls (WGs) in LMICs are at-risk groups and that social protection may be part of a scalable solution to increasing their climate resilience (Aleksandrova 2019; Huyer et al. 2020). Relatively little is known, however, about effective approaches to leverage social protection for climate adaptation and mitigation (Costella et al. 2023), and even less is understood about the gender implications (Nesbitt-Ahmed 2023). We reflect on emerging evidence in this space, highlighting its potential and limitations, promising program designs, and future important directions for research.

Social protection, defined as programs and policies designed to protect and prevent individuals from poverty and vulnerability, has expanded considerably in LMICs in recent decades (ILO 2021). While several types of social protection programs exist, the most prevalent in LMICs are non-contributory programs referred to as social assistance (SA). These include cash or in-kind transfers, often accompanied by complementary programming such as trainings. SA reaches large numbers of resource-poor people in LMICs, including many who face disproportionate climate risks, and often preferentially target women participants. A vast literature demonstrates SA's role in agrifood systems - supporting food consumption, nutrition, and production (Hidrobo et al. 2018; Daidone et al. 2019; Olney et al. 2022) - and its role specifically for WGs (Perera et al. 2022; Peterman et al. 2024) - but few studies bring these together with agrifood system challenges linked to climate change.

WGs have important roles in making agrifood systems more climate-resilient given that they represent almost 40 percent of the workforce (50 percent in sub-Saharan Africa) (Dhir 2017; FAO and ARC 2021; Sawas and Bose 2021; FAO 2023) and have gender-differentiated roles and knowledge. For example, women have specialized knowledge of seed diversity and conservation practices, contribute to diversification on and off farm, and have strong social networks that support resilience (De Pinto et al. 2020; Marimo et al. 2021; Otieno et al. 2021). However, women tend to be more vulnerable to the impacts of climate change, in part due to lower adaptive capacity driven by systemic inequalities in access to resources, technologies, information, services, and networks, as well as restrictive social norms within households, communities, and broader society (Theis et al. 2019; Bryan et al. 2024). These impacts have multiple malign consequences on the well-being of WGs (e.g., dietary outcomes, gender equality and women's empowerment, economic and livelihood outcomes) and their households and the sustainability of agrifood systems (FAO 2023).

Conceptually, SA has significant potential to change factors underlying WGs' disproportionate vulnerability to climate hazards and support their roles as agents of change - in particular, by addressing key constraints faced by WGs (Nesbitt-Ahmed 2023). The main function of SA is to provide resources to poor households, which can relax household-level financial constraints to both smooth consumption during negative shocks and invest in longer-term adaptation or mitigation behaviors (Costella et al. 2023). Depending on SA's program design (including whether it targets women, engages other household and community members to support women taking on new roles, links women to extension or other services, or provides additional bundled intervention components that enhance women's agency), SA can further increase women's own control over household resources, as well as bolster their knowledge, access to technology and services, and networks (Camilletti et al. 2022) - thereby strengthening their capacity to adapt to climate change. Moreover, depending on the type and design of SA (such as public works programs or programs that include components that shift inequitable gender norms), SA can build community-level support around WGs' climate adaptation needs, preferences, and opportunities - for example, by creating necessary physical infrastructure, promoting civic engagement and inclusion of WGs' voice, enhancing social cohesion, or promoting gender-equitable norms (Field et al. 2021; Camilletti et al. 2022; Gavrilovic et al. 2023).

While evidence shows that SA can indeed address several of these constraints (Jones et al. 2017), less research exists on whether this translates to changes in responses to climate hazards and resulting implications for the wellbeing of WGs and their households and environmental outcomes. We consider emerging evidence on this issue, to highlight three key messages on what is known about SA's potential to strengthen WGs' responses to climate hazards - in terms of ex-post coping, ex-ante adaptation, and contributions to mitigation - and reflect on promising ways forward for programming and research.

2. Key messages on how SA can strengthen women's and girls' (WGs') roles in climate-resilient agrifood systems

2.1 SA bolsters households' ex-post coping responses, reducing the need for actions that jeopardize WGs' well-being.

Households use a wide range of strategies to cope with climate hazards ex-post (or reactively). Poor households with limited access to risk management instruments (such as insurance, credit, savings, or SA) often reduce their consumption or use sub-optimal strategies to smooth their consumption in the face of climate hazards. These strategies can negatively impact WGs. For example, households' approaches to smoothing consumption can involve disproportionately depleting women's assets (Quisumbing et al. 2017), reducing WGs' caloric intake (Algur et al. 2021), removing girls from school (Sims 2021), choosing child marriage in settings with bride price (Corno et al. 2020), increasing risky sexual behavior (Treibich et al. 2022), forcefully extracting dowry payments (Sekhri and Storeygard 2014), or choosing sex-selective abortion (Chatterjee and Merfeld 2021). Increased economic insecurity as a result of climate hazards can also contribute to increased intimate partner violence (Díaz and Saldarriaga 2023). In addition to the intrinsic harm to WGs from these actions, they are linked to poorer food security and nutrition, lower agricultural productivity, and longer-term intergenerational threats to climate resilience (Feeny et al. 2021; Bryan et al. 2024; O'Mullan et al. 2024).

Several recent studies show SA can alleviate household-level welfare losses from climate hazards. For example, studies across Bangladesh, Ethiopia, India, Mexico, Nigeria, and Zambia show that cash transfers in the context of flood, drought, or rainfall variability protect household food consumption and food security (Hou 2010; Asfaw et al. 2017; Knippenberg and Hodinott 2017; Christian et al. 2019; Lawlor et al. 2019; Pople et al. 2021; Premand and Stoeffler 2022). Limited evidence also suggests that SA protects against loss in livelihoods; in Niger, cash transfers protected earnings in agriculture and off-farm businesses during droughts but had no impacts on asset accumulation (Premand and Stoeffler 2022). Two longer-term studies suggest that, while children born during rainfall shocks experienced lower cognitive, educational, and employment outcomes, receiving SA later in life partially offset these effects (Adhvaryu et al. 2024; Freund et al. 2024).

Some studies disaggregate impacts by gender. Christian et al. (2019) find that reductions in household expenditures due to a cyclone in India were largest for women. Program participation offset some of these reductions in household nonfood expenditure and expenditure on women's goods, although not on food expenditure. Freund et al. (2024) find that the mitigating effect of SA on longer-term cognitive outcomes for children born during rainfall shocks is driven by girls. A few studies also show protective impacts of SA on other gendered maladaptive actions. For example, studies show that adverse effects of climate hazards on (i) girls' schooling were diminished by conditional cash transfers in Mexico and by school feeding in Malawi (De Janvry et al. 2006; Staffieri et al. 2023); (ii) girls' engagement in paid labor were diminished by a cash transfer program in Brazil (Fitz and League 2021); (iii) sex-selected abortions were diminished by public works in India (Chatterjee and Merfeld 2021); (iv) women's nutritional status were mitigated by nutrition and livelihoods components added to public works (Hirvonen et al. 2023), and (v) women's experience of domestic violence were mitigated by public works in India (Sarma 2022) and by the addition of livelihood and nutrition interventions to public works in Ethiopia (Hirvonen et al. 2023). These findings generally show that SA can offset household-level reductions in consumption during climate hazards and prevent actions that compromise the well-being of WGs.

2.2 SA can promote livelihood diversification, disaster preparation, adoption of climate-smart practices, and community-level infrastructure - but more evidence is needed on whether these lead to longer-term adaptation to climate change for WGs.

A large body of evidence demonstrates that SA can support building livelihoods. Reviews show that, at the household-level, SA increases productive asset holdings (such as livestock, other agricultural assets, and nonfarm assets); increases the use of improved inputs and farm practices; and promotes shifting away from casual wage labor toward own-farm work or nonfarm business (Hidrobo et al. 2018; Correa et al. 2023). Although a more limited literature disaggregates by gender, SA is shown to increase women's productive work and labor force participation, as well as their investment in assets such as livestock and other agricultural assets (Perera et al. 2022; Peterman et al. 2024).

Income diversification as a result of SA, in turn, may reduce the losses from future climate hazards. Diversifying income may be particularly important for women, given more limited income-earning opportunities in general (FAO 2023). However, only a few studies explicitly make the link between income diversification and effects of future climate hazards, and even fewer focus on the impact on WGs. Evidence at the household-level includes a study in Ghana that showed a cash transfer led to a mix of off-farm and on-farm activities at the household level, which were associated with climate adaptation (Yiridomoh et al. 2021). A study in Nicaragua that focuses specifically on women found that, relative to providing only cash disbursements to women, complementing cash with vocational training or productive investment grants protected households from weather shocks two years later by facilitating income diversification, including by increasing women's non-agricultural self-employment or wage work (Macours et al. 2022).

In terms of income diversification through migration, SA evidence focuses on individual migration (more so than whole-household migration) and shows effects differing by gender. Cash transfers can affect long term migration under normal climate conditions, but conditionalities for receiving program benefits and gender norms around who migrates tend to increase men's migration more than women's (Hughes 2019; Mueller et al. 2020; Hidrobo et al. 2022; Gazeaud et al. 2023). Little evidence exists specifically on how women fare when SA induces men to migrate. While women's income may be diversified by remittances and taking on men's roles, workload may also increase, with ambiguous effects on their well-being (Mueller et al. 2015).

Recent household-level studies on "anticipatory" cash transfers explicitly linked to early warning of disaster risk also show promise to promote disaster preparation. A study in Nigeria found that, when early warning messages on flooding were provided to smallholder households, anticipatory lump sum cash transfers increased households' pre-emptive climate adaptation and increased investment in productive assets more than post-shock lump sum cash transfers (Balana et al. 2023). A similar anticipatory cash transfer program in Bangladesh increased evacuation in advance of flooding, reducing loss of productive assets and increasing reported earning potential (Pople et al. 2021).

There is limited research on whether SA supports WGs' uptake specifically of climate-smart agricultural practices that promote adaptation - in part because few SA studies frame impacts around climate adaptation, and even fewer disaggregate by gender. In-kind food aid and public works were found to encourage household-level adoption of soil and water conservation structures in Ethiopia and Malawi (Scognamillo and Sitko 2021; Sitko et al. 2021). However, one study suggests that liquidity might not be the only constraint to adopting climate-smart practices. Aker and Jack (2023) find that training promotes farmer adoption of demi-lunes (half-moon shaped embankments for harvesting rainwater), with female farmers more likely to increase adoption on account of the training. Access to an additional conditional or unconditional cash transfer does not increase the probability of adoption, though it increases the number of demi-lunes adopted. By including training for women on new technologies, or addressing other gender-specific barriers to adoption, SA could potentially strengthen its effects on women's uptake of climate-smart technologies and practices.

While many studies document that public works or food-for-work programs can improve community infrastructure, few show that improved community infrastructure leads to improved climate resilience for households. Fewer study gender-differentiated impacts. Scognamillo et al. (forthcoming) do not study gender but find that public works participants in Ethiopia are less adversely affected by droughts, with effects partially spilling over to non-participant community members. They argue spillover effects are due to the public works, including community-based watershed development. Qualitative studies indicate that assets created from India's public works program reduce households' and communities' climate vulnerability (Fischer 2020). Only one study discusses implications for women (Jordan et al. 2021), arguing that India's program serves as a safety net specifically during shocks and stresses, but does not offset women's ongoing climate risk, due in part to poor implementation, lack of training for women on less climate-sensitive activities, and insufficient inclusion of women's voices on types of assets to address their climate risks. Evidence also suggests there are difficulties in adequately scaling up these interventions and sustaining them over time (Jordan et al. 2021).

2.3 Large-scale SA has potential to contribute to climate mitigation, including through promoting cleaner fuels and forestation – but more evidence is needed, particularly on the roles of WGs.

Adaptation becomes less effective at higher levels of warming, which further endangers the livelihoods and food security of at-risk groups including WGs and the sustainability of agrifood systems. Thus, mitigation is essential. SA's effects on individual behavior at small scale will be negligible for mitigating climate change (nor arguably should this burden fall on poor rural people). However, large-scale SA programs that shift many people's behaviors towards low-emission practices could meaningfully contribute to climate mitigation over time. Given that several key areas of climate mitigation within agrifood systems show gender disparities in adoption – e.g., practices around livestock raising, rice cultivation, fertilizer use, solar irrigation, biogas, reducing post-harvest losses – if SA narrows these gender gaps at large scale, meaningful contributions to mitigation are also possible (Call and Sellers 2019; Bryan et al. 2024).

Few studies show the effects of SA on individual- or household-level mitigation behaviors, especially addressing gender differences in adoption. However, the evidence shows some initial promise. First, SA can play a role in shifting energy demand, which is strongly connected to income (Gertler et al. 2016). Yet, there have been mixed findings on the effect of SA on the adoption of cleaner fuels. Gelo et al. (2023) find that beneficiaries of old age pensions in South Africa increase their energy demand and reliance on cleaner fuels. Although the authors do not distinguish effects by the beneficiary's gender, they argue that women may be more incentivized to adopt clean technologies with increased income, because benefits are more apparent to women in terms of improved health outcomes and because women save time traveling to collect dirtier fuel sources. Chakrabarti et al. (2023) also show that cash transfers in Malawi and Zambia allow households to use improved fuels for lighting and, to a lesser extent, cooking. In contrast, Hanna and Oliva (2015) find that households who receive an asset transfer program increase their use of both dirty and cleaner fuels in India, and there is no overall shift in the use of stove technologies that use cleaner fuel. Additional constraints such as perceptions of benefits may need to be addressed to encourage adoption of cleaner fuels, particularly among women (Mobarak et al. 2012; Afridi et al. 2021). Supply constraints on clean energy technologies (Puzzolo et al. 2019) may also need to be addressed, for example through removing market barriers (through tax incentives) or government provision of complementary investments (e.g. liquefied petroleum gas connections).

Moreover, SA can promote forestation, though, again, evidence is mixed. In Indonesia, Ferraro and Simorangkir (2020) find that a conditional cash transfer program led to reduced deforestation, suggesting that cash reduced resource extraction for insurance or consumption purposes. They also acknowledge other possible mechanisms, such as cash facilitating out-migration and reducing deforestation through remittances or less local labor supply (Oldekop et al. 2018). However, in Mexico, Alix-Garcia et al. (2013) find that a conditional cash transfer program increased deforestation by increasing demand for resource-intensive goods. In contrast, in Colombia, Malerba (2020) shows that although a conditional cash transfer led to an increase in consumption of land- and energy-intensive goods, this did not have negative effects on the local environment or deforestation. Public work programs may also more directly promote reforestation. In Ethiopia, a public works program that promotes soil and water conservation and reforestation, led to an increase in the number of trees planted by participants (Andersson et al. 2011) and tree coverage (Hirvonen et al. 2022). Although research indicates WGs hold distinct roles in and are distinctly affected by forest management (Pouliot and Treue 2013), existing studies on SA and forestation do not distinguish by gender.

While other conceptual pathways exist for SA to contribute to mitigation, evidence is scarce. For example, there is a paucity of evidence that determines whether SA's effects at the community level around civic engagement, social cohesion, or norms translate into improved natural resource management, and whether such changes would better account for women's preferences in transitioning to a more sustainable agrifood system.

3. Design recommendations

Evidence above indicates that standard approaches to SA can address certain dimensions of WGs' greater vulnerability to climate change and support their adaptive responses – such as by improving households' coping responses to reduce maladaptation that disproportionately harms WGs, and by promoting some adaptive behaviors such as livelihood diversification. However, to promote more transformational adaptation or mitigation responses among WGs, SA design may need more intentional consideration of gender and climate. Little rigorous research exists on what SA design features are effective and feasible for these objectives, but existing evidence suggests promising approaches. We highlight several evidence-informed recommendations.

- ❖ **Targeting:** Implementers should prioritize expanding SA coverage to WGs, households, and communities at high risk of adverse effects from climate change, considering community-level risk of climate hazards (Costella et al. 2023) in addition to socioeconomic and demographic characteristics (e.g., female-headed households with children, pregnant women, adolescent girls). While women generally benefit from SA regardless of whether they are specifically targeted

as the main beneficiary (for example through reduced maladaptive practices that harm WGs), recent studies show that targeting women instead of men or depositing wages from public works programs in women's bank account instead of their spouses increases their empowerment (Haushofer and Shapiro 2016; Almås et al. 2018) and labor force participation (Field et al. 2021), which can strengthen their adaptive capacity.

- ❖ **Transfer size, frequency, and timing:** Transfer size must be of sufficient value to cover households' needs over the intended duration and be predictable in frequency, as insufficient or unpredictable transfers can increase maladaptive responses (Camilletti 2020). Conditional on total amount transferred, the optimal frequency may depend on objectives. Smaller and more frequent transfers may more likely be used toward consumption (Haushofer and Shapiro 2016) and better protect against maladaptation that affects WGs' diets, while larger less frequent transfers may more likely be used toward investment and promote livelihood diversification. Timing may also matter. A study in Niger found that an anticipatory cash transfer distributed before a weather shock was more likely to reduce maladaptive coping and improve long-term adaptation strategies compared to those distributed after a weather shock, although in the short-term there were no differences in consumption (Balana et al. 2023).
- ❖ **Modality:** There are many types of SA programs. Contextual features and objectives may determine what SA modality best supports WGs' climate resilience
 - **Cash versus in-kind transfers:** Under normal climate conditions and with sufficient market access – including in settings that are shock-prone but not immediately affected, or in transitions out of climate crises – cash transfers may more cost-effectively improve WGs' consumption and investments than equal-value in-kind transfers (Hidrobo et al. 2016; Schwab 2019). However, in the immediate aftermath of climate hazards, particularly if market access is limited or prices are fluctuating, in-kind transfers (such as food or inputs) may better help WGs and their households cope in the short-term without resorting to maladaptive coping.
 - **Public works or food assistance for assets:** Implementing SA through public works or food assistance for assets can be promising for building community infrastructure and promoting forestation, but the assets must be responsive to localized climate risks, and the infrastructure must have sufficient quality and maintenance (Lowe et al. 2019). Moreover, for WGs to benefit, WGs should be actively engaged in choosing the infrastructure project, and barriers to their participation should be alleviated – including normative constraints, as well as time, mobility, and childcare constraints (Chopra 2014; Jordan et al. 2021).
- ❖ **Bundling through complementary “plus” programs, graduation programs, and linking to services:** Many SA programs bundle resource transfers with complementary components or linkages. To strengthen WGs' responses, it is particularly promising to combine transfers (which primarily relax resource constraints) with components that address other factors underlying WGs' vulnerability to climate hazards. Below we focus on a few promising components.
 - **Trainings:** Many SA programs provide trainings alongside resource transfers. These trainings are typically focused on topics such as nutrition, health, livelihoods, savings, or financial literacy, and often target women (sometimes with other household members). Even if not explicitly focused on climate, these trainings may support adaptive responses; for example, training may inform WGs on how to protect their diets, health, livelihoods, and finances during climate hazards or it may promote income diversification. Group-based trainings can also strengthen women's agency and networks which may also support livelihood diversification (Ahmed et al. 2024). However, certain adjustments may better promote transformational adaptation or mitigation responses among WGs. For instance, complementary trainings could introduce a specific focus on adopting climate-resilient technologies and practices (Aker and Jack 2023), include vocational training for off-farm activities (Macours et al. 2022), or promote the benefits of clean energy. In women's group-based trainings, topics could include collective approaches to adaptation or natural resource management.
 - **Linkages to services:** Some SA programs link program participants to services – including for health, psychosocial, or financial needs. All these links may support WGs' coping during climate hazards. However, intentionally linking climate information services to resource transfers may be powerful. For example, anticipatory cash transfers linked to early warning systems can improve household-level coping and adaptive responses (Pople et al. 2021; Balana et al. 2023). Other promising approaches could include linking women to services that provide stress-tolerant seeds, liquefied petroleum gas connections, or other climate-smart inputs or technologies to which women often have less access. Although “payments for ecosystem services” schemes (Salzman et al. 2018) have traditionally fallen outside SA, as they generally do not target the poor, they suggest that linking innovative mitigation financing programs to SA could also be promising.

- **Multi-faceted programs:** SA implementers increasingly show interest in bundled multi-faceted “graduation” programs, aimed at addressing the multiple barriers constraining households’ exit from poverty. Even without an explicit climate focus, these designs may strengthen households’ and WGs’ adaptive capacity to respond to climate change by improving outcomes across multiple domains (Banerjee 2015). In Nicaragua, adding a complementary package of productive investment grants or vocational training to cash transfers better protected households from weather shocks than cash transfers alone, by diversifying economic activities (including among women) and facilitating income smoothing (Macours et al. 2022). In Ethiopia, bundling livelihood and nutrition interventions with the national public works program mitigated adverse effects of drought on households and women, in terms of food security, livestock holdings, and intimate partner violence (Hirvonen et al. 2023).
- ❖ **Accounting for WGs’ preferences:** All SA implementers should ensure that programming accounts for WGs’ preferences and needs, and accountability processes are accessible to women (Camilletti et al. 2022). Among SA implementers that have the resources, capacity, and knowledge of the local gender and climate context to implement effective “gender-transformative” interventions, context-specific programming to shift norms that restrict women’s livelihoods diversification may be particularly promising (Gavrilovic et al. 2023; Field et al. 2021).

4. Conclusion

SA shows significant potential as a large-scale approach to strengthen WGs’ responses to climate hazards and make agrifood systems more climate-resilient. However, designing SA with gender and climate in mind will likely lead to more transformational adaptation or mitigation responses among WGs. More research is needed to understand how to maximize that potential.

SA appears to be particularly effective in enhancing ex-post coping strategies after climate hazards occur. Studies across several countries show that standard SA approaches improve households’ ability to cope with climate hazards, reducing actions that disproportionately harm WGs’ wellbeing – such as reducing WGs’ consumption or removing girls from school.

Less is known about SA’s role in promoting longer-term, ex-ante adaptation for WGs. There is evidence that SA promotes behaviors that are likely to better prepare WGs and their households for future shocks. For example, studies have shown SA can promote livelihood diversification, disaster preparation, adoption of climate-smart practices, and community-level infrastructure. But very little SA research assesses whether these behaviors ultimately help WGs to better adapt to climate change over the longer term.

Even less is known about large-scale SA’s role in promoting contributions to climate mitigation and what the implications are for WGs. There is promising research, which suggests SA promotes cleaner fuels and forestation in some countries. But the evidence is both limited and mixed.

However, more intentional design can strengthen and broaden these effects. To bolster WGs’ longer-term adaptation, it is particularly promising to bundle SA transfers (which primarily relax resource constraints) with complementary “plus” programs or linkages to services (which address other constraints to WGs’ climate responses, such as lack of access to information, networks, inputs, etc.). Designing such bundles must include WGs’ voices on their perceptions and preferences around responding to localized climate hazards (Holmes 2019). Yet bundling should also be mindful of implementers’ core strengths and capacities, given that SA implementers are not well-placed to address all gendered constraints related to climate adaptation.

Many knowledge gaps remain, but we highlight two. First, while we have some knowledge of SA’s effects on WGs’ resilience against climate hazards such as droughts and rainfall shocks, we know even less about slow-onset climate hazards such as sea level rise and soil salinization. Optimal SA design to support the wellbeing of WGs’ and their households and promote the sustainability of agrifood systems will likely differ across different types of hazards. Second, we know little about tradeoffs across economic development, environmental sustainability, and gender equality, and what these imply for designing SA. To align poverty reduction (SA’s primary objective) with strengthening WGs’ climate resilience, it is important to understand whether short-term poverty-reducing behaviors facilitated by SA run counter to longer-term adaptation or mitigation. For example, SA could facilitate livelihood opportunities that increase WGs’ food security and income in the short-term but hinder longer-term climate resilience; SA could promote WGs staying in a climate-affected setting and attempting to cope over the short term while migrating would better serve them over the longer term; SA could lead to increased consumption of land- and energy-intensive goods, making agrifood systems more unsustainable. Recognizing that the agrifood system in its current form is unsustainable, thus needs to transform, we must carefully design SA to ensure it accelerates rather than slows this systems transformation.

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