

Rethinking climate-smart agriculture for gender equality and women's empowerment

Based on an evidence synthesis of gender and climate-smart agriculture

In a situation characterized by rapid climate change and widening inequalities, gender plays a central role in determining an individual's capacity to cope with climate shocks and adapt to changes. Faced with persistent gender gaps, which are a consequence of deeply embedded gender and social norms, women in agrarian societies continue to be challenged by lower agricultural productivity, and limited access to productive resources and services and assets. This in turn negatively affects their adaptive capacity and renders them disproportionately vulnerable.

Climate-smart agriculture (CSA) provides tools and technologies that can sustainably increase agricultural productivity and incomes, help people adapt, and build resilience to climate change while reducing or removing greenhouse gas emissions. However, women have not been able to widely benefit from CSA. Evidence on potential barriers, challenges and opportunities is thus critical to rethink how CSA can help women effectively tackle climate change and build their resilience.

INSIGHTS FROM THE EVIDENCE

- Most existing CSA programs do not consider the grass-roots-level gendered disparities during program design and implementation that consequently constrain them from reaching their full potential.
- While there is abundance of diagnostic research establishing women's disproportionate vulnerability to climate change, there is little research and evidence on the impacts of CSA and effectiveness of actions and solutions.
- Gender disparities in CSA adoption primarily stem from intrahousehold differences between women and men's preferences for agricultural practices, access to technology and information, social norms, and institutional constraints.
- A lack of gender-disaggregated data is a significant gap affecting CSA program design and implementation.
- Inadequacy of gender-responsive climate finance in agriculture limits the possibilities for CSA to reach women.
- The private sector plays a crucial role in proliferating CSA; however, it falls short on integrating gender systematically in its programs.
- The lack of gender-disaggregated data on impacts of CSA constrains how practitioners can tweak CSA interventions to be more gender responsive.
- While adaptation measures garner much attention, context-appropriate mitigation interventions also need to be prioritized.

INTRODUCTION

Climate change has profound implications for agriculture and food security, disproportionately affecting vulnerable populations, particularly women. Amidst the rising uncertainties, the concept of climate-smart agriculture (CSA) has emerged as a promising way to ensure adequate food supplies for the growing population and meet the challenge of climate change at the same time (Totin et al. 2018, 1). The CSA approach pursues the **triple objectives (three pillars)** of sustainably increasing productivity and incomes, adapting to climate change and reducing greenhouse gas emissions where possible.

Women farmers play a pivotal role in agriculture and are also more vulnerable. CSA has a great potential to contribute to strengthening their resilience; however, evidence suggests limited uptake of CSA practices by women. CSA could benefit from engaging women more, and women could benefit from CSA.

Research shows a complex relationship between gender and uptake of climate-smart interventions (Huyer et al. 2024). And it is not just gender, but other socioeconomic variables like age, social status, marital status, wealth, property ownership, and access to agricultural resources that intersect, making adoption of CSA complex.

For effective application of CSA at scale to make a difference, it becomes imperative to make it inclusive and work for women. Aligning CSA goals with gender equality aims would open opportunities not just for the transformation of food systems, but also the lives of women engaged in them. This requires reimagining CSA to also become gender-intentional—and this rethink needs to be based on evidence.

Purpose of this brief

To this end, the **Evidence module** of the CGIAR GENDER Impact Platform conducted a series of scoping and systematic reviews on priority themes related to CSA and gender that emerged from a **learning agenda** that highlighted knowledge and learning gaps.

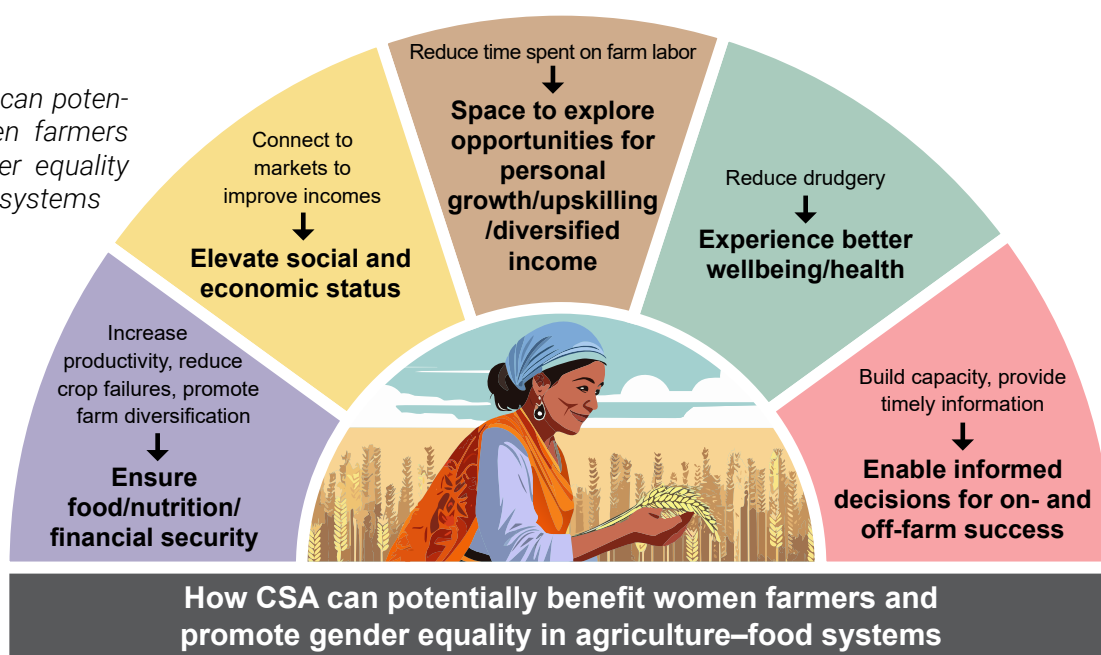
This brief compiles the highlights from those pieces of **evidence generated** on how gender interacts with different dimensions of CSA. It also provides **guidance** to researchers, practitioners and policy-makers on how the evidence can be leveraged to **design better evidence-based policies and programs** that avoid exacerbating gender inequalities in agriculture–food systems amidst climate change. It establishes **how integrating gender into the core of CSA is not just beneficial, but necessary** for more inclusive and sustainable agriculture–food systems.

EVIDENCE SHOWS CSA'S POTENTIAL FOR SOLVING AGRICULTURE–CLIMATE–GENDER CHALLENGES

Crucial but limited evidence highlights the potential of CSA interventions to achieve positive gender-related outcomes.

CSA interventions have been shown to boost women's entrepreneurship skills and capacity in studies from countries like Nepal and Tanzania, indicating a potential avenue for promoting gender inclusiveness and economic empowerment. In Zambia and Lesotho, women's collectives were identified as key promoters and advocates for CSA practices, emphasizing the role of collective action in advancing CSA objectives.

Figure 1. How CSA can potentially benefit women farmers and promote gender equality in agriculture–food systems



At the same time, in Malawi, gender inclusiveness has been mandated as a part of Malawi's national climate-smart agricultural framework (NCSAF 2018).

Stocktaking reports by the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) and systematic reviews by the CGIAR GENDER Impact Platform emphasize the crucial role of sociocultural and economic context in shaping the effectiveness of CSA.

EQUITABLE AND INCLUSIVE ADOPTION OF CSA REQUIRES GENDER-TRANSFORMATIVE APPROACHES

Evidence underlines that CSA adoption is highly contingent on existing gender roles and norms, power relations, as well as other social, economic and political factors. The unequal distribution and ownership of productive resources—especially land managed under customary laws in countries like Mali, Uganda, Nepal and Viet Nam—limit the participation of women and youth in decision-making. Key factors contributing to lower adoption or incorrect adoption of CSA practices among women include time poverty, limited resource access, information asymmetry, skill and literacy gaps, cultural inappropriateness, and restrictive gender roles and norms that prevent them from making independent decisions (Djoudi and Brockhaus 2011; Farnworth et al. 2016; Henriksson et al. 2020; Nhat Lam Duyen et al. 2020).

Studies from Nigeria, Malawi, Haiti, Kenya, India and Benin indicate that women often adopt certain CSA techniques more readily than men, although they may not sustain these practices in the longer term (Aryal et al. 2020; Bernier et al. 2015; Fisher and Kandiwa 2014; Onyeneke et al. 2018; Oyawole et al. 2020). For instance, women farmers in Nigeria adopted CSA practices related to their primary farming activities and that directly improved household welfare by increasing food crop yields. However, despite this higher initial uptake, they were not able to maintain CSA practices in the long term due to lack of legal land ownership and decision-making power. Similar evidence emerges from research in other African countries (Belcore et al. 2020; Call and Sellers 2019; Chidakwa et al. 2020; Sari et al. 2020).

Cross-country evidence suggests that even if gender equality is mentioned as a desired outcome of CSA programs, the programs often fail to explicitly address the root cause of disparities. Studies report that adoption of CSA practices like direct-seeded rice (zero tillage and low tillage using machines), green

manuring, and laser land-leveling offers women respite from laborious on-farm responsibilities (Gartaula et al. 2020; Khatri-Chhetri et al. 2020). However, the newfound relief does not always translate into fewer burdens or equity. Sociocultural expectations continue to steer women toward redirecting their efforts and newly acquired free time into household chores and increased caregiving duties (emanating from prevalent gender norms). At times, CSA technologies also inadvertently marginalize women's specialized knowledge related to critical activities like transplanting and harvesting, effectively erasing their socioeconomic contributions to the agricultural domain (Nhat Lam Duyen et al. 2021).

These negative consequences emerge when CSA programs are designed ignoring the structural inequalities ranging from land tenures, inheritance laws and technical literacy, to sociocultural norms influencing workloads and educational levels. In summary, the barriers for women farmers adopting CSA interventions are very similar to the factors that are responsible for their vulnerability in the first place. Hence, gender-transformative approaches—such as those that aim to alter or relax the rigid gender roles and promoting equitable relations between women and men—become necessary for enhanced uptake of CSA. Transformative methodologies like *Gender Action Learning Systems* are found to increase adoption of CSA among women farmers with a positive impact on their resilience (Reemer and Makanza 2015).

Current evidence shows the necessity of a paradigm shift where gender is integrated as a cross-cutting and transformative element of CSA efforts through continuous learning, planning, feedback and adjustment processes.

GENDER-RESPONSIVE CSA REQUIRES CONTEXT-SPECIFICITY, COLLECTIVE ACTION, ACCESS TO INFORMATION

Despite its inclusion in policy discussions, gender has not been fully integrated into current CSA initiatives. Efforts to effectively bring women into the fold of CSA remain lopsided across the countries in the global South.

Evidence reveals that successful CSA interventions account for the unique challenges and opportunities faced by women farmers in different regions and socioeconomic contexts. Targeted and tailored interventions based on vulnerability indices ensures that the interventions address priority concerns, places and people.

Community institutions, such as cooperatives and their federations, play a critical role in overcoming physical, financial and human capital constraints that further help in facilitating the adoption of CSA practices and building the resilience of women farmers (Roudier et al. 2014).

Overcoming the barriers in access to knowledge, skills and information is critical for women to become aware of and adopt CSA. Farmer-to-farmer interactions are immensely effective in this regard. Participatory peer learning through the *Farms of the Future* approach and *Farmer Field Schools* (Guo et al. 2015; Mancini 2006; Nyasimi et al. 2017; Osumba et al. 2021) have proven to be effective means of motivating adoption of sustainable and climate-smart techniques. Behavioral-change interventions that effectively bring about a change among the farmers' practices are also crucial in promoting the widespread adoption of CSA practices. Effective means for introducing such a change include video-mediated learning, radio dramas and street plays (Chowdhury et al. 2015; Dar et al. 2020; Sharma et al. 2019).

Climate information influences the gendered adoption of CSA

In numerous agricultural contexts, the adoption of CSA practices, particularly by women farmers, is significantly influenced by access to climate information through targeted dissemination. Information on anticipated climate risks and appropriate climate-smart farming practices to mitigate them helps women to make informed decisions. Using radio drama in northern Nigeria shows how interactive learning and community dialogue can promote local adaptation strategies and rapid responses to climate variability. The community radio enables farmers to give feedback via SMS messages or voice calls. The drama raises awareness of climate variability.

Co-producing climate information with the community and women's groups further enhances CSA uptake. Additionally, gender-responsive extension services and the combination of print media and smartphones, along with peer support groups, prove effective in stimulating real behavior change and empowering women in agriculture, ultimately contributing to resilient and sustainable farming communities.

GENDER-DISAGGREGATED DATA AND IMPACT ASSESSMENTS ARE ESSENTIAL FOR INCLUSIVE CSA DESIGNS

Gender-disaggregated data can offer essential insights required for planning effectively, implementing interventions, and evaluating their differential impacts on women and men in agriculture. However, not integrating gender goals explicitly and systematically into CSA design and implementation remains an important reason for the inadequate understanding of its variable effects on women and men. Many CSA interventions to date only utilize traditional participation metrics to account for gender equality and social inclusion. Merely counting the numbers of women and men adopting technologies—often misconstrued as gender analysis—remains the biggest challenge in achieving gender responsiveness in CSA interventions. Unfortunately, these approaches sidestep the profound power dynamics, social and political relations, and ingrained norms that lie at the root of gender inequalities within agriculture.

While there is research on the implementation and outcomes of CSA interventions, we lack comprehensive assessments of their impact on women farmers' resilience, livelihoods and the broader agricultural ecosystem. Studies often do not help identify the specific elements that contribute to their effectiveness, either. Additionally, the geographical distribution of evidence is skewed, with a predominant focus on sub-Saharan Africa, Southern Asia and South-Eastern Asia. There is a notable absence of research from Central Asia, Latin America and the Caribbean, Western Asia and Northern Africa—highlighting a critical gap in our understanding of CSA interventions in these regions.

Available modules and training material on *Gender in Climate-Smart Agriculture* (Nelson and Huyer 2016) provide essential guidance on indicators and metrics, but often fail to integrate participatory or gendered approaches to assessing vulnerability. Existing datasets used to build climate and agriculture risk profiles also continue to rely on broad national- and district-level public data that is deficient in household- or community-level gender information.

Although gender is increasingly being integrated in enabling policy frameworks, evidence suggests high variability in the levels of integration across CSA projects. One common trend identified is that many organizations tend to integrate gender considerations only in the monitoring and evaluation phases of their projects. A more comprehensive approach that accounts for gender differences throughout the project cycle—from initial design and planning

to implementation and continuous monitoring—has only been adopted by a limited number of organizations. One common practice is the conduct of baseline studies to map the gender dynamics and identify gender gaps in the agricultural value chain that could help in developing context-specific work plans for every country. For instance, the *She feeds the World Program* (run by CARE in partnership with PepsiCo) demonstrates how comprehensive data can be leveraged to multiply the impact of sustainable agriculture

Integrating gender in CSA indicators

Gender-based challenges and barriers within the context of CSA have been increasingly recognized in policy and practice papers. However, the commitment to specific actions and robust measurement systems that can effectively track progress remain elusive. A pivotal opportunity to address this deficit emerged with the development of CSA indicators in 2015 by the World Bank (World Bank 2015).

The indicators were structured into three indices—policy, technology and results—reflecting key dimensions of CSA implementation. While the indicators acknowledged the importance of social inclusion and women's roles in agriculture, and emphasized the need for gender-disaggregated data, the extent of gender integration within the framework is limited:

- The **policy index**, which outlines the institutional and policy environment for CSA, included references to social inclusion and women's roles in agriculture. However, it did not incorporate specific gender-related indicators or mechanisms to measure progress in advancing gender equality within policy frameworks.
- The **technology index**, which assesses CSA practices and innovations, has only one specific indicator related to gender. This single indicator addressed gender in the context of the resilience pathway, among 27 other indicators. Its wording was also rather general, stating that the technology “will contribute to reducing existing gender inequalities.”
- The **results index**, which focuses on the outcomes and impacts of CSA, did not include any gender-specific indicators. This omission further isolated gender from the evaluation of CSA outcomes and limited the ability to assess the differential impacts on women and men.

among women small-scale producers. This practice is a welcome step toward addressing gender-related issues within CSA projects, but requires regular follow-up and analysis to put the data to effective use.

A critical difference is observed in the intervals and frequency of data collection, usage of methods, and data-utilization practices among the organizations involved in these projects. This variability is often influenced by the project duration and the specific objectives of each initiative.

Qualitative tools like *Gender Marker* and *Gender Sensitive Climate Vulnerability & Capacity Assessment* (GCVCA) and quantitative tools like the *Abbreviated Women's Empowerment in Agriculture Index* (A-WEAI) have become integral for measuring and understanding the status of gender equality and women's empowerment in agriculture. Data generated from using these tools can allow organizations to tailor their interventions to be gender responsive. The *KOBO toolbox* and other phone-based applications designed to facilitate data collection can also streamline the process of gathering gender-disaggregated data in real time.

Despite these tools, challenges persist in collecting gender-disaggregated data. These include insufficient financial and human resources, difficulty in reaching program participants due to geographical constraints, time burdens involved in data collection, and deeply entrenched social and cultural norms prevalent in agrarian communities that restrict interactions with women. Additionally, preconceived notions and biases among data collectors who often consider “women to be shy” or “men to make better interviewees because they are the heads of households” hinder the process of data collection. Shorter project durations often also limit the quality and depth of data collected.

To overcome these challenges, it is crucial to invest in developing efficient and quality data systems that prioritize collecting gender-disaggregated data and employ triangulation approaches combining methodological and manual verification. This can help in understanding the gender dynamics of specific contexts. The full potential of gender-disaggregated data can only be realized when efforts are made to address the challenges in collecting, interpreting and using data.

Such evidence provides a compelling rationale to stop treating gender as an add-on variable in CSA interventions and to improve the monitoring and evaluation of gender indicators. There is also a need for regional diversification in research efforts, and a nuanced understanding of gender-responsive and context-specific approaches for advancing gender-inclusive CSA practices.

GLOBAL CLIMATE FINANCE AND PRIVATE SECTOR INVESTMENTS CAN BE LEVERAGED FOR GENDER-RESPONSIVE CSA

Women are uniquely positioned to advance climate mitigation and adaptation goals (Chiu et al. 2022). However, most CSA finance does not acknowledge gender-based adaptation needs or capacities. Evidence highlights a significant investment disparity that hinders women's functional roles at the intersection of climate change and agricultural development. While women make up 45 percent of agricultural workers, they receive only seven percent of total investment in the agriculture sector (Root Capital 2022). Moreover, climate finance for small-holder farmers and small-scale agribusinesses, where women are prominent, is significantly lacking compared to the estimated need. In general, most of the climate finance committed since 2015 has been assessed as *gender-neutral* with only a small portion (six percent) specifically tagged as *gender-responsive* (OECD 2022; USAID 2022).

In the private sector, the risk of “pinkwashing”—where the investments are presented as gender-responsive without commensurate impact—is on the rise (Turner 2022). The generic lack of gender integration within the life cycle of projects, and its treatment as an add-on rather than an imperative variable, obstructs the flow of appropriate and desirable investments. Additionally, inconsistent reporting of gender-tagged investments also complicates tracking financial flows. Disproportionate distribution of climate finance across geographical regions also remains unsettling: sub-Saharan Africa receives the most climate finance, while Latin America and the Caribbean receive a higher proportion of gender-tagged climate finance in agriculture (CPI 2022).

However, a lack of impact assessments makes it difficult to comment on the success of these investments. Moreover, women-led agribusinesses continue to find funds from private and development finance institutions to be inaccessible. For instance, a *ticketing value* is the minimum threshold amount of funding allocated to a single project or initiative. Women-led agribusinesses and enterprises tend to be smaller in size, so they often cannot meet the large ticketing value of these funds—typically exceeding a \$500,000 ticketing value limits women's access to capital, even if their businesses are impactful and aligned with the funding agency's goals (CPI 2020).

The private sector engages significantly in the processes of production, aggregation, processing and distribution in agriculture, and its role remains

Evidence presents a strong business case for private investment in gender-responsive CSA

Private-sector investment in gender-responsive CSA:

- is a value-add to an organization's goals and business strategy for accomplishing SDG 5
- can increase the reach of their innovation and technology both across and within value chains
- increases profits with deeper market penetration and enhanced uptake among women, yielding better returns on investments
- helps create a market in vulnerable places where the demand is induced by a crisis, creating a niche
- strengthens value chains by inducing labor efficiency
- contributes to branding, marketing and creating value by introducing ‘women-led entrepreneurial efforts’
- encourages better partnerships and collaborations that can result in greater social impact

crucial in driving gender-responsive climate finance. Investing in the nexus of agriculture–climate–gender can thus present a compelling business case for the private sector to align its socioenvironmental impact with economic growth (Value for Women 2018).

Evidence highlights that private-sector investment is integral for supporting women's entrepreneurship, promoting gender-inclusive employment practices within those private-sector organizations, and increasing the focus on designing goods and services that specifically benefit women in agriculture or at least do not create a disadvantage for them. To be able to reach more women on the ground, private investments in the form of grants need to:

- be issued through impact investors who act as intermediaries between large capital development finance institutions (DFIs) and local-level agri-businesses
- or
- adopt a blended finance approach, which merges concessional funds and private finance (World Bank 2015)

For instance, the [Women's Livelihood Bond 1](#) and 2 are two such funds (managed by Impact Investment

Exchange) that aim to empower and build the climate change resilience of low-income women in Southern Asia and Southeast Asia (OECD 2022). These bonds provide up-front capital for women to access affordable credit, climate-resilient products like disaster insurance and agricultural inputs, and clean energy solutions. This enables them to invest in income-generating assets and skills, transitioning from subsistence to sustainable livelihoods.

It is also important to allocate additional funds for the technical assistance required to integrate gender-transformative approaches that could help in overcoming the prevalent gender norms in rural agrarian communities. Such steps in tandem with the strong policies, like Sweden and Canada's feminist foreign policies, can lead a way forward to increased attention and financial support for the gender-agriculture-climate nexus (UN Women 2022).

2X criteria: an investment benchmark to make CSA investments gender-responsive

The **2X criteria** (established by 2X Challenge) is emerging as a benchmark for advancing gender equality through investments (2X Global 2023a). It provides critical guidance and tools that are extremely useful in supporting investors to integrate both gender and climate considerations into their existing investment processes. There are five categories of gender integration (entrepreneurship, leadership, employment, consumption, and investment through financial intermediaries)—each of which include quantitative benchmarks investors can use to assess commitments at a portfolio level or through dedicated use of proceeds.

Initially created for DFIs, private sector institutions are also increasingly qualifying their investments as *2X-compliant*. These criteria are a helpful blueprint presenting how gender can be integrated as an essential component within agriculture and climate finance. If widely adopted, the 2X criteria could also improve reporting and data-collection efforts required to efficiently regulate finance for the agriculture-climate-gender nexus.

HOW WE CAN MAKE CSA WORK FOR WOMEN: EVIDENCE-BASED RECOMMENDATIONS

Based on existing evidence, much work is needed to make organizations, governments and donors realize that neglecting gender in CSA interventions is not just holding women back from being resilient, but is holding back wide-scale adoption of CSA for agricultural communities and the sector becoming climate resilient. Research highlights that without a gender-responsive approach, the full potential of CSA cannot be harnessed.

In all current and future CSA initiatives, it is imperative to:

- Integrate gender meaningfully and intentionally across all three pillars of CSA for effectively tackling agricultural-, climate-, and gender equality-related challenges across the global South.
- Adopt systematic and innovative methodologies like climate-agriculture-gender inequality hotspot mapping to target efforts and investments to reach the most vulnerable, and not exacerbate inequalities.
- Invest in understanding context-specific gender dynamics to design more effective projects and interventions.
- Deploy gender-transformative methodologies in projects to address constraining social and gender norms, and use behavioral-change approaches to maximize uptake of and benefits from CSA to women and improve gender-transformative outcomes.
- Capitalize on informal institutions and farmer collectives to advance dual and complementary gender and climate goals.
- Invest in robust data systems to generate gender-disaggregated data for better planning, monitoring and evaluations.
- Clearly articulate the business case for private-sector investments at the intersection of CSA and gender.
- Leverage global climate finance to design and implement gender-responsive CSA strategies.

CONCLUSION

It is evident that most current CSA solutions and programs merely address the “tip of the iceberg” of gender inequality issues, while deep-rooted structural barriers persist. Inadequate research, data and evidence on the nexus of gender and CSA underlines the lack of effective actions and solutions.

As the effects of climate change continue to deepen and amplify, we must better manage agricultural resources by reimagining the modus operandi of CSA initiatives. Expanding the evidence base is critical to determine how gender goals can be integrated with the objectives of CSA. It is urgent to rethink how CSA initiatives, investments and programs are designed and implemented.

Therefore, the following actions become critical in moving toward just, equitable and climate-smart futures:

- Systematically integrate gender equality goals into CSA pillars, evaluation frameworks and metrics.
- Extend CSA to fisheries and livestock—rather than only focusing on cropping—where women also play important roles in the value chains.
- Elucidate the social, economic and environmental benefits and costs of CSA, and the associated trade-offs for women and men in different contexts.
- Establish the business case for private-sector investments in gender-responsive CSA.
- Develop more robust systems for pivoting climate finance to be gender transformative.
- Assess the impact of financial and institutional CSA interventions in promoting gender equality.
- Develop pathways for multisectoral and multi stakeholder coordination for gender-responsive CSA.
- Identify and plug finance and policy gaps to improve the efficacy of CSA for inclusive outcomes.

REFERENCES

- 2X Collaborative. (2023). The Gender-Smart Climate Finance Guide. <https://www.2xglobal.org/climate-toolkit-home>
- 2X Global. (2023a). 2X Challenge Criteria. <https://www.2xchallenge.org/2xcriteria>
- Aryal, J. P., Farnworth, C. R., Khurana, R., Ray, S., Sapkota, T. B., & Rahut, D. B. (2020). Does women's participation in agricultural technology adoption decisions affect the adoption of climate-smart agriculture? Insights from Indo-Gangetic Plains of India. *Review of Development Economics* 24(3), 973–990. <https://doi.org/10.1111/rode.12670>
- Belcore, E., Pezzoli, A., & Calvo, A. (2020). Analysis of gender vulnerability to climate-related hazards in a rural area of Ethiopia. *Geographical Journal* 186(2), 156–170. <https://doi.org/10.1111/geoj.12321>
- Bernier, Q., Meinzen-Dick, R., Kristjanson, P., Haglund, E., Kovarik, C., Bryan, E., Ringler, C., & Silvestri, S. (2015). Gender and institutional aspects of climate-smart agricultural practices: evidence from Kenya. CCAFS Working Paper, 79. <https://hdl.handle.net/10568/65680>
- Braimoh, A., Ijeoma, E., Maurice Andres, R., Christine, H., & Yuxuan, Z. (2016). Climate-smart agriculture indicators. World Bank. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/187151469504088937/Climate-smart-agriculture-indicators>
- Call, M., & Sellers, S. (2019). How does gender vulnerability shape the adoption and impact of sustainable livelihood interventions in an era of global climate change? *Environmental Research Letters* 14(8). <https://doi.org/10.1088/1748-9326/ab2f57>
- Chiu C, Smith J, Olosky L. (2022). Inclusive Adaptation: A Benefit Multiplier for Climate Action and Women, Peace and Security. Georgetown Institute for Women, Peace, and Security. <https://giwps.georgetown.edu/resource/inclusive-adaptation/>
- Chidakwa, P., Mabheba, C., Mucherera, B., Chikuni, J., & Mudavanhu, C. (2020). Women's vulnerability to climate change: gender-skewed implications on agro-based livelihoods in rural Zvishavane, Zimbabwe. *Indian Journal of Gender Studies* 27(2), 259–281. <https://doi.org/10.1177/0971521520910969>
- Chowdhury, A., Odame, H. H., Thompson, S., & Hauser, M. (2015). Enhancing farmers' capacity for botanical pesticide innovation through video-mediated learning in Bangladesh. *International Journal of Agricultural Sustainability* 13(4), 326–349. <https://doi.org/10.1080/14735903.2014.997461>
- Climate Policy Initiative (CPI) [Chiriack D, Naran B, Falconer, A]. 2020. Examining the Climate Finance Gap for Small-scale Agriculture. https://www.ifad.org/documents/38714170/42157470/climate-finance-gap_smallscale_agr.pdf/34b2e25b-7572-b31d-6d0c-d5ea5ea8f96f?t=1605021452000
- CPI [Chiriack D, Vishnumolakala H, Rosane P]. 2022a. Landscape of Climate Finance for Agriculture, Forestry, Other Land Uses, and Fisheries. <https://www.climatepolicyinitiative.org/publication/landscape-of-climate-finance-for-agriculture-forestry-other-land-uses-and-fisheries/>
- CSA Country Profiles. Research Program on Climate Change, Food Security and Food Security. <https://ccafs.cgiar.org/resources/publications/csa-country-profiles#:~:text=Quick%20and%20easy%20to%20read,to%20and%20mitigate%20climate%20change>
- Dar, M. H., Waza, S. A., Nayak, S., Chakravorty, R., Zaidi, N. W., & Hossain, M. (2020). Gender focused training and knowledge enhances the adoption of climate-resilient seeds. *Technology in Society* 63, 101388. <https://doi.org/10.1016/j.techsoc.2020.101388>
- Djoudi, H., & Brockhaus, M. (2011). Is adaptation to climate change gender neutral? Lessons from communities dependent on livestock and forests in northern Mali. *International Forestry Review* 13(2), 123–135. <https://doi.org/10.1505/146554811797406606>
- Farnworth, C. R., Baudron, F., Andersson, J. A., Misiko, M., Badstue, L., & Stirling, C. M. (2016). Gender and conservation agriculture in East and Southern Africa: toward a research agenda. *International Journal of Agricultural Sustainability* 14(2), 142–165. <https://doi.org/10.1080/14735903.2015.1065602>

Fisher, M., & Kandiwa, V. (2014). Can agricultural input subsidies reduce the gender gap in modern maize adoption? Evidence from Malawi. *Food Policy*, 45, 101–111. <https://doi.org/10.1016/j.foodpol.2014.01.007>

Gartaula, H., Sapkota, T., Khatri-Chhetri, A., Prasad, G., & Badstue, L. (2020). Gendered impacts of greenhouse gas mitigation options for rice cultivation in India. *Climatic Change*, 163(2), 1045–1063. <https://doi.org/10.1007/s10584-020-02941-w>

Guo, M., Jia, X., Huang, J., Kumar, K. B., & Burger, N. E. (2015). Farmer field school and farmer knowledge acquisition in rice production: Experimental evaluation in China. *Agriculture, Ecosystems & Environment*, 209, 100–107. <https://doi.org/10.1016/j.agee.2015.02.011>

Henriksson, R., Vincent, K., Archer, E., & Jewitt, G. (2021). Understanding gender differences in availability, accessibility and use of climate information among smallholder farmers in Malawi. *Climate and Development*, 13(6), 503–514. <https://doi.org/10.1080/17565529.2020.1806777>

Huyer, S., & Chanana, N. (2021). Gender-smart agriculture: an agenda for gender and socially inclusive climate-resilient agriculture. CCAFS Working Paper, 404, 52-pp. <https://ccafs.cgiar.org/resources/publications/gender-smart-agriculture-agenda-gender-and-socially-inclusive-climate>

Khatri-Chhetri, A., Regmi, P. P., Chanana, N., & Aggarwal, P. K. (2020). Potential of climate-smart agriculture in reducing women farmers' drudgery in high climatic risk areas. *Climatic Change*, 158(1), 29–42. <https://doi.org/10.1007/s10584-018-2350-8>

Mancini, F. (2006). Impact of integrated pest management farmer field schools on health, farming systems, the environment, and livelihoods of cotton growers in Southern India. <https://research.wur.nl/en/publications/impact-of-integrated-pest-management-farmer-field-schools-on-health>

Nhat Lam Duyen, T., Rañola, R. F., Sander, B. O., Wassmann, R., Tien, N. D., & Ngoc, N. N. K. (2021). A comparative analysis of gender and youth issues in rice production in North, Central, and South Vietnam. *Climate and Development*, 13(2), 115–127. <https://doi.org/10.1080/17565529.2020.1734771>

Nyasimi, M., Kimeli, P., Sayula, G., Radeny, M., Kinyangi, J., & Mungai, C. (2017). Adoption and Dissemination Pathways for Climate-Smart Agriculture Technologies and Practices for Climate-Resilient Livelihoods in Lushoto, Northeast Tanzania. *Climate*, 5(3), Article 3. <https://doi.org/10.3390/cli5030063>

OECD. (2022). Development Finance for Gender-Responsive Climate Action. <https://www.oecd.org/dac/development-finance-gender-climate-action.pdf>

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OECD (2022). Blended finance for gender equality and the empowerment of women and girls. OECD Development Co-operation Directorate, OECD Publishing, Paris. [https://one.oecd.org/document/DCD\(2022\)1/en/pdf](https://one.oecd.org/document/DCD(2022)1/en/pdf)

Onyeneke, R. U., Igberi, C. O., Uwadoka, C. O., & Aligbe, J. O. (2018). Status of climate-smart agriculture in southeast Nigeria. *GeoJournal*, 83(2), 333–346. <https://doi.org/10.1007/s10708-017-9773-z>

Oyawole, F. P., Dipeolu, A. O., Shittu, A. M., Obayelu, A. E., & Fabunmi, T. O. (2020). Adoption of agricultural practices with climate-smart agriculture potentials and food security among farm households in northern Nigeria. *Open Agriculture*, 5(1), 751–760. <https://doi.org/10.1515/opag-2020-0071>

Osumba, J. J. L., Recha, J. W., & Oroma, G. W. (2021). Transforming Agricultural Extension Service Delivery through Innovative Bottom-Up Climate-Resilient Agribusiness Farmer Field Schools. *Sustainability*, 13(7), Article 7. <https://doi.org/10.3390/su13073938>

Puskur, R. and Mishra, A. (2022). A learning agenda on gender-responsive climate-smart agriculture. Nairobi, Kenya: CGIAR GENDER Impact Platform. <https://hdl.handle.net/10568/128508>

Reemer, T. & Mkanza, M. (2015). Gender Action Learning System: Practical Guide For Transforming Gender And Unequal Power Relations In Value Chains. The Hague: Oxfam Novib. https://www.oxfamnovib.nl/Redactie/Downloads/English/publications/150115_Practical%20guide%20GALS%20summary%20Phase%201-2%20Ir.pdf

Root Capital [Naeve K, Moehler V]. 2022. Inclusion Pays. <https://rootcapital.org/publication/inclusion-pays-women-in-agriculture/>

Roudier, P., Muller, B., d'Aquino, P., Roncoli, C., Soumaré, M. A., Batté, L., & Sultan, B. (2014). The role of climate forecasts in smallholder agriculture: Lessons from participatory research in two communities in Senegal. *Climate Risk Management* 2, 42–55. <https://doi.org/10.1016/j.crm.2014.02.001>

Sari, R. R., Saputra, D. D., Hairiah, K., Rozendaal, D. M. A., Roshetko, J. M., & Noordwijk, M. Van. (2020). Gendered species preferences link tree diversity and carbon stocks in Cacao agroforest in Southeast Sulawesi, Indonesia. *Land* 9(4). <https://doi.org/10.3390/land9040108>

Sharma, P., Kaur, L., Mittal, R., Kaur, S., & Kaur, S. (2018). Social marketing approach to bring change in water use behaviour of rural people of Punjab, India. *Journal of Water and Climate Change* 10(4), 968–976. <https://doi.org/10.2166/wcc.2018.150>

Totin, E., Segnon, A. C., Schut, M., Affognon, H., Zougmore, R. B., Rosenstock, T., & Thornton, P. K. (2018). Institutional Perspectives of Climate-Smart Agriculture: A Systematic Literature Review. *Sustainability* 10(6), Article 6. <https://doi.org/10.3390/su10061990>

Turner, N. (2022). 'It's Easy to Pinkwash': Suzanne Biegel Says Look Beyond Boards. ESG Clarity.

UN Women. (2022). Feminist Foreign Policies: An Introduction. https://www.unwomen.org/sites/default/files/2022-09/Brief-Feminist-foreign-policies-en_0.pdf

USAID. (2022). Gender Equality and Climate Finance. https://pdf.usaid.gov/pdf_docs/PA00ZPSH.pdf

Value for Women (2018). Innovations in Gender-Inclusive Climate-Smart Agriculture. 1st August 2018. <https://www.v4w.org/resources/innovations-in-gender-inclusive-climate-smart-agriculture>

World Bank Group. (2015). Gender in Climate-Smart Agriculture: Module 18 for Gender in Agriculture Sourcebook. <https://openknowledge.worldbank.org/handle/10986/22983>