

**CLIMATE SMART ACTIONS (CSA) AQUACULTURE, AGROFORESTRY
AND RESOURCES MANAGEMENT**

GLOBAL ISSUES & LOCAL PERSPECTIVES

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RESOURCES MANAGEMENT-- ISBN 978-978-60709-1-6**

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Global Issues & Local Perspectives

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Preface

This book adopts an exegetical approach as well as a pedagogic model, making it attractive agriculture and environmental economics teachers, professional practitioners and scholars. It eschews pedantry and lays bare the issues in such clarity that conduces to learning. The book elaborates on contemporaneous **Climate smart actions (CSA) aquaculture, agroforestry and resources management** issues of global significance and at the same time, is mindful of local or national perspectives making it appealing both to international and national interests. The book explores the ways in which **Climate smart actions (CSA) aquaculture, agroforestry and resources management** issues are and should be presented to increase the public's stock of knowledge, increase awareness about burning issues and empower the scholars and public to engage in the participatory dialogue **Climate smart actions (CSA) aquaculture, agroforestry and resources management** necessary in policy making process that will stimulate increase in food production and environmental sustainability. **Climate smart actions (CSA) aquaculture, agroforestry and resources management : *Global Issues & Local Perspectives*** is organized in three parts. Part One deals with The Concept of **Climate smart actions (CSA)**, Part Two is concerned with The Concept of **aquaculture**, and Part Three deals with the Concept of **agroforestry and resources management**

Eteyen Nyong; March 2026

Chapter 5:

Gender-sensitive, Gender-responsive and Gender-transformative Climate Smart Actions

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1.0 Introduction

Environmental exigencies emanating from climate change is one of the most critical issues of our times; posing specific risks to livelihoods, health, safety and security. Men and women experience the impacts of

climate change differently and have different capacities to respond to them as a result of different social roles, access to resources and legal rights. In fact, women and girls bear the brunt of climate change impacts thus amplifying existing gender inequalities. Globally, climate and gender considerations reveal how the impacts of environmental change exacerbate risks for diverse groups.

Despite this recognition, a nuanced understanding of gender relations is often absent in the design and analysis of climate-smart actions, hindering the development of equitable and effective interventions. This oversight often results in policies and programs that fail to address the underlying power imbalances and structural inequalities that dictate access to resources, information, and decision-making platforms for diverse agrarian communities. It is crucial to recognize that gender is not a monolithic concept. The experiences of women and men in agriculture are further differentiated by intersecting social stratifiers such as age, ethnicity, and socio-economic status.

As the agricultural sector faces unprecedented challenges from a changing climate, articulating innovative approaches that integrate gender considerations becomes obligatory in order to ensure equitable and effective adaptation and mitigation strategies. Gender distinctions are particularly salient in the context of climate-smart agriculture, where technologies and practices aim to increase resilience. Gender equality is crucial for climate action because it addresses differential vulnerabilities and unlocks the potential of women as powerful agents of change. As climate policies and programmes are designed, women must be at the frontline because they are powerful agents in building resilient and sustainable practices. Nonetheless, women should not be assessed solely through the lens of vulnerability to avoid obscuring their significant contributions. Most importantly, integrating a gender perspective into climate action is fundamental requirement for building sustainable communities.

2.0 Climate Smart Action

Climate-Smart Action refers to any strategic intervention, practice, technology or policy particularly in agriculture, designed to address the dual challenges of food security and climate change. Climate-smart actions are purposeful strategies undertaken at local or global levels to address the climate change situation. An action is "smart" because it moves away from traditional, "climate-blind" methods. It recognizes that agriculture is both a victim and a cause of climate change. By integrating climate science with local knowledge, these actions aim to feed the world without further heating the planet. In the context of Climate-Smart Agriculture (CSA) and resource management, moving from gender-blind to gender-transformative actions is a journey of increasing impact. While traditional climate actions often ignore gender, "smart" actions recognize that resilience is impossible if half the population is left behind.

Climate-smart action is not just about helping women. It is a strategic approach that recognizes that men and women experience climate change differently and therefore require different solutions. In many developing contexts, including Nigeria, gender roles dictate who has access to land, who fetches water, who makes decisions about household assets. Climate actions that ignore these dynamics often fail because they unintentionally add to women's workload or exclude them from new technologies. Climate smart actions must address the three pillars of climate smart agriculture (productivity, adaptation, mitigation) from a gender perspective.

3.0 The Gender Integration Continuum

Gender-Sensitive, Gender-Responsive, and Gender-Transformative Approaches

Gender is not merely a biological distinction but a complex social construct that dictates roles, responsibilities, and access to resources, profoundly influencing how individuals experience and respond to climate change impacts. This social construction of gender, encompassing the roles, identities, and behaviors of men and women, profoundly shapes their actions, power dynamics, and access to essential resources. Consequently, understanding these varied gendered experiences is paramount for developing climate-smart agricultural strategies that are both effective and equitable.

Gender is central to climate smart actions for these primary reasons;

- a. **Vulnerability:** Globally, women are more dependent on natural resources that are threatened by climate change (water, forest products, subsistence crops)
- b. **Knowledge:** Women often possess unique traditional knowledge about local biodiversity, water management etc that is essential for adaptation
- c. **Productivity:** It is estimated that if female farmers had the same access to productive resources as men, they could increase yields by 20-30%, potentially reducing the number of hungry people in the world by up to 150million
- d. **Inclusive Finance:** Creating credit schemes that do not require land documents as collateral, as many women do not legally own the land they farm
- e. **Decision-making:** Ensuring women are not just present at meetings but are in leadership roles where they can influence climate policy

Gender-Sensitive, Gender-Responsive, and Gender-Transformative conceptualizations is crucial for designing interventions that move beyond merely acknowledging gender differences to actively challenging and reshaping unequal power dynamics within agricultural systems. Specifically, a gender-sensitive

approach identifies gender-differentiated impacts and needs, a gender-responsive approach tailors interventions to address these identified differences, while a gender-transformative approach actively seeks to dismantle the root causes of gender inequality and power imbalances.

3.1 Gender-Sensitive Climate Smart Actions

Gender-sensitive actions recognize that men and women have different roles, responsibilities, and vulnerabilities regarding climate change. These actions do not necessarily challenge the underlying power structures, but they ensure that climate programs are accessible to everyone by working within the existing cultural context. The fundamental aspect of gender-sensitive climate-smart actions involves collecting and analyzing gender-segregated data to identify the most vulnerable populations and understand their specific needs and capacities within agricultural landscapes. This analytical approach allows for the recognition of nuanced gender relations and intersectional vulnerabilities, which are often overlooked in conventional agricultural development paradigms. It also implies a critical examination of how gender norms and power structures influence access to climate-smart agricultural technologies, information, and financial resources, thereby impacting the adaptive capacity of different genders. In climate-smart agriculture and climate policy, gender-sensitive actions are the foundational step toward equity. In Nigeria, gender-sensitive climate-smart actions are critical because women make up nearly 80% of the small-scale farming workforce but often lack the same access to land and technology as men.

Core Components of Gender-Sensitive Actions

1. Awareness of "time poverty": Acknowledging that women often bear the "double burden" of agricultural labor and domestic chores. Actions are designed so they do not add more work to a woman's day.
2. Sex-Disaggregated Data: Collecting data that specifically shows how many women versus men are adopting a new technology or being hit by a specific climate shock.
3. Logistical Flexibility: Adjusting the where and when of interventions to fit the specific daily schedules and mobility constraints of women.

Practical Examples of Gender-Sensitive Actions in agriculture

- i. Sending weather alerts via both radio and SMS. In many regions, men may own the family phone, while women listen to the radio while working.
- ii. Scheduling Farmer Field Schools during mid-day hours. Avoids early morning or late evening when women are busy with cooking or childcare.
- iii. Promoting hand-held solar weeders or efficient stoves. Focuses on tools that reduce manual labor in tasks typically assigned to women.
- iv. Offering micro-insurance for "kitchen gardens" or small livestock. Men often manage cash crops; women often manage smaller-scale food security assets.

Case studies of Gender-Sensitive Actions in Nigeria

Building Nigeria's Response to Climate Change (BNRCC) project

BNRCC is a project that aims to increase Nigeria's capacity to adapt to the effects of climate change and reduce its negative impact on vulnerable geographic regions and households in those areas. BNRCC implemented pilot programs across various ecological zones. Its focus was making climate adaptation accessible by acknowledging the specific daily realities of Nigerian women in rural communities.

a. *Gender-Sensitive Action*: Introduction of closed-chamber, fuel-efficient wood stoves. In many rural Nigerian communities, women spend hours daily trekking long distances to fetch firewood, exposing them to physical strain and security risks. This was sensitive because it didn't try to change the social norm that women do the cooking; instead, it worked within that role to reduce their "time poverty" and respiratory health risks from smoke.

b. *Gender-Sensitive Action*: The establishment of community-managed fish farms in Coastal Regions. In the Niger Delta and coastal areas, rising sea levels and salinization have depleted traditional fishing stocks. The project ensured that management committees were composed of both men and women. It specifically tracked how proceeds were split, ensuring women weren't just laborers but also beneficiaries of the income.

c. *Gender-Sensitive Action*: Distribution of dual-purpose cowpea and provitamin A biofortified maize in Northern Nigeria. These crops were selected because women in these regions often manage small gardens and livestock. The cowpea provides grain for family food and fodder for the animals

The Impact

By taking these sensitive steps, Nigeria has seen:

- **Increased Yields**: Studies show that when women adopt CSA practices tailored to their primary crops, household food security improves significantly.
- **Reduced Vulnerability**: Women in the Southeast (e.g., Enugu/Anambra) using "minimum tillage" and "cover cropping" have reported better soil moisture retention, allowing them to survive longer dry spells.

3.2 Gender-Responsive Climate Smart Actions

Building upon gender-sensitive data collection, gender-responsive approaches then leverage this understanding to design interventions that are specifically tailored to meet the distinct needs and priorities of men and women, ensuring that both benefit without exacerbating existing burdens. This involves developing solutions that account for gendered power relations and existing inequalities, such as providing equitable access to improved agricultural seed, farm implements, and precision agriculture technologies. Such approaches recognize that effective climate change adaptation in agriculture necessitates inclusive

strategies that not only acknowledge but actively integrate indigenous knowledge and local practices, fostering participatory decision-making processes to enhance resilience and sustainability in agricultural systems.

In climate-smart agriculture (CSA) and climate policy, gender-responsive actions go beyond acknowledging gender differences (being sensitive). They involve proactive measures designed to narrow the gender gap by providing resources, services, and opportunities specifically tailored to the needs of marginalized genders (primarily women and youth). While a sensitive action might change the time of a meeting, a responsive action changes the content, delivery, and funding of the project to ensure women benefit as much as men.

Core Components of Gender-Responsive Climate Actions

1. Targeted Resource Allocation: Since women often have less access to land, credit, and tools, responsive actions "respond" by creating specific pathways for them to acquire these assets. Creating "Gender-Responsive Budgeting" where a specific percentage of climate adaptation funds is ring-fenced for women-led organizations or female farmers. Instead of general machinery, promoting labor-saving technologies that address the specific tasks women perform, such as solar-powered food processing or efficient irrigation for gardens. Implementing seed vouchers or micro-credit schemes that do not require land title as collateral (since women often lack legal land rights).
2. Specialized Capacity Building: Responsive actions recognize that women may have different literacy levels or social constraints, so they adapt the "how" of education. Using gender-responsive Farmer Field School where women are not just attendees but are trained as lead farmers and facilitators to encourage peer-to-peer learning.
3. Formalized Inclusion in Decision-Making: It is not enough for women to be "consulted"; responsive action mandates their participation in leadership. Implementing quotas or "reserved seats" for women on local climate-governance boards to ensure their traditional knowledge is used in policy as well as aligning national climate plans with existing gender equality laws to ensure climate action is legally bound to support women's rights.

Practical Examples of gender-responsive climate action

- i. Installing solar pumps in communal vegetable plots specifically managed by women's cooperatives. It increases women's income and reduces the physical burden of hauling water.
- ii. Subsidizing clean cookstoves and biogas units for rural households. It reduces time spent gathering firewood and improves health (less smoke inhalation).
- iii. Providing technical training to women on "Non-Timber Forest Products" (like shea or honey). It empowers women to protect forests while gaining economic independence.

- iv. Promoting "Stress-Tolerant Rice" varieties that grow in flooded or salty soil, specifically targeting female laborers. It secures food for the household in areas where women are responsible for subsistence farming.
- v. Engaging traditional and religious leaders (in states like Kano and Benue) to advocate for gender justice in climate adaptation

Case studies of Gender-responsive Actions in Nigeria

1. The UN Women "CSA Project" (2019–2021)

This project targeted the Shea Butter and Rice value chains in North-Central Nigeria to bridge the productivity gap.

Gender-responsive Action: Recognizing that women lacked the capital to buy high-yield seeds and processing machines, the project provided affordable technology (solar dryers and modern rice parboiling equipment) and ICT tools. It didn't just give tools; it provided entrepreneurial and financial training tailored to women's literacy levels. It used mobile networks to give women daily market prices, bypassing middlemen who often exploited them.

Result: Thousands of women in states like Niger and Kebbi saw increased incomes and reduced physical labor, strengthening their economic resilience to climate shocks.

2. The SCALE Project (2025)

The SCALE (Scaling Climate-Led Extension) project focuses on transforming how agricultural information is shared in Ebonyi and Enugu States.

Gender-responsive Action: Extension services in Nigeria have historically been dominated by men. SCALE implemented Gender-Inclusive Training for over 300 actors, ensuring 60% of participants were women. The project deployed low-cost, upcycled plastic bottle devices to protect crops (peppers and tomatoes) from pests exacerbated by rising temperatures. These tools were designed specifically to be accessible to smallholder female farmers who cannot afford expensive chemical pesticides.

Result: A 90% increase in participants' understanding of gender-inclusive adaptation, creating a pool of female "lead farmers" who train others in their communities.

3. G-SMART Monitor (Niger Delta & Nationwide)

Developed by Nigerian researchers (Dr. Chinwoke Ifeanyi-Obi), the Gender-Responsive Smart Monitor (G-SMART) is a tool designed to hold policy-makers accountable.

Gender-responsive Action: A digital framework that tracks gender inclusion in real-time across 12 thematic areas, including access to climate-resilient crop varieties and land ownership. It evaluates policy success

from the beneficiaries' perspective. Instead of just counting how many women attended a meeting, it measures if those women actually gained land rights or credit as a result.

The Impact

The Nigerian National Action Plan

Nigeria is one of the few African nations with a dedicated National Action Plan on Gender and Climate Change (2020). This plan mandates that all climate-smart agriculture projects must include gender-specific budgets and sex-disaggregated data collection to ensure women aren't left behind as the climate changes.

3.3 Gender-Transformative Climate Smart Actions

Gender-transformative climate-smart actions go further by actively addressing and challenging the underlying social norms, power imbalances, and structural inequalities that perpetuate gender-based vulnerabilities in the face of climate change. This involves a deliberate shift from merely accommodating gender differences to actively working towards systemic changes that empower marginalized genders and promote more equitable control over productive assets and decision-making processes in agricultural research and development. Such approaches often involve fostering women's leadership, advocating for policy reforms that secure land tenure for women, and promoting educational initiatives that challenge traditional gender roles within farming communities.

A Gender-Transformative Climate-Smart Action is the highest level of engagement on the gender spectrum. While sensitive actions acknowledge differences and responsive actions adapt to them, transformative actions aim to change the underlying systems that create inequality in the first place. In the context of climate change, this means tackling the social norms, laws, and power dynamics that make certain groups (usually women) more vulnerable to climate shocks.

Core Components of Gender-Transformative Climate-Smart Action

To be truly transformative, a climate action must address three interconnected areas, often referred to as the Agency-Structure-Relations framework:

1. Agency (Individual Level): Building the confidence, skills, and leadership of marginalized individuals. Example: Training women not just to use solar pumps, but to become the technicians who repair them and the entrepreneurs who sell them.
2. Structure (Systemic Level): Changing the "rules of the game," such as laws, policies, and institutional biases. Example: Working with local governments to reform land-tenure laws so women can legally own the land they are trying to protect from erosion.

3. Relations (Social Level): Shifting the power dynamics between people, particularly within households and communities. Example: Engaging men and community leaders in "household dialogues" to redistribute domestic chores, ensuring women have the time to participate in climate decision-making.

Practical Examples of Gender-Transformative Climate-Smart Action

- i. Giving women seeds to plant on their husband's land. Reforming customary laws to grant women equal land ownership, allowing them to make long-term investments like terracing or agroforestry.
- ii. Inviting women to sit in the audience of a water committee meeting. Mandating 50% female leadership in water boards and providing negotiation training so their voices actually influence policy.
- iii. Providing a more efficient cookstove to save a woman's time. Engaging the whole community to challenge the norm that "cooking is only for women," leading to shared domestic responsibilities.
- iv. Offering a small loan to a woman farmer. Working with banks to eliminate the requirement for a male co-signer or land collateral, dismantling institutional sexism in finance.
- v. Providing weather alerts via radio because women are often at home, while men receive them at the market.
- vi. Designing "women-only" training sessions for solar-powered irrigation because women felt intimidated in mixed groups.
- vii. Working with tribal leaders to grant women legal land titles, enabling them to access the credit needed for long-term agroforestry

Case studies of Gender-Transformative Climate-Smart Action

In the Nigerian context, represents a shift from merely supporting women to actively dismantling the barriers that keep them vulnerable. While Nigeria has a strong "National Action Plan on Gender and Climate Change (2020)," the most advanced projects are now moving toward transformative change by addressing land rights, male engagement, and institutional reform.

1. Land Tenure Reform & Customary Law

In many parts of Nigeria (especially the North and Southeast), customary laws often prevent women from owning land. This makes it impossible for them to invest in long-term climate-smart practices like agroforestry or permanent irrigation.

Gender-Transformative Action: Working with traditional rulers and community "Land Committees" to create Community Land Conventions. These initiatives don't just "lease" land to women; they formalize their ownership or long-term usage rights. For example, in Kano and Benue, the Side-by-Side Movement engages religious leaders to preach on "Gender Justice," framing women's land rights as a moral and religious necessity for community survival.

2. The "Green Women Platform"

Validated by the Federal Government of Nigeria in late 2025, this national initiative is a leap toward systemic transformation.

Gender-Transformative Action: It integrates women into the highest levels of environmental governance within the Great Green Wall project. Instead of women being the laborers who plant trees, the platform mandates their role as decision-makers in land-use planning. It seeks to change the institutional "structure" by ensuring that climate policies cannot be passed without the formal leadership of women's collectives.

The Impact

Male Engagement and Household Dialogues

Climate-smart agriculture often fails when a woman is trained on a new technique but her husband refuses to let her use the family's resources to implement it. Household Dialogue involve men and boys in discussions about the "double burden" of labor. This shifts social norms. When men begin to share domestic chores and recognize women as "co-managers" of the farm, it frees up women's time to engage in climate leadership and innovation. It changes the power dynamic inside the home.

4.0 Barriers to Achieving Gender Equality in Climate-Smart Actions

Achieving gender equality in climate-smart action is not just a social goal; it is a prerequisite for effective climate resilience. However, several deeply rooted barriers prevent women and other marginalized groups from participating in or benefiting from these actions.

1. Sociocultural Barriers

These are often the hardest to address because they involve deeply held beliefs and daily habits. Women disproportionately bear the "unpaid care burden" (cooking, cleaning, childcare, and fetching water/fuel). This lack of free time prevents them from attending climate-smart training or participating in community forest management. In many regions, including parts of Nigeria, norms may dictate that women cannot speak in public meetings or must seek a husband's permission before trying a new farming technique or joining a cooperative. Cultural or safety concerns may limit women's ability to travel to demonstration plots or distant markets where climate-smart seeds and tools are sold.

2. Economic and Asset Barriers

Climate-smart actions often require an upfront investment that many women cannot afford. Since women often do not legally own the land they farm, they lack the incentive and the legal right to make long-term climate investments like planting trees (agroforestry) or building terraces. Without land titles, women are

frequently excluded from formal banking systems. They cannot get the credit needed to buy "smart" technologies. Moreso, women start with fewer resources (less fertilizer, lower-quality tools), their yields are often lower, leaving them with less buffer capital to risk on new climate innovations.

3. Institutional and Policy Barriers

Even well-intentioned government programs can unintentionally exclude women. Agricultural extension officers are often men who, due to cultural bias, primarily talk to male heads of household. Consequently, climate-smart information never reaches the women who do the actual labor. Women are rarely in the "room where it happens." From local water boards to national climate delegations, the lack of female voices means policies often ignore the specific needs of female farmers. Many climate projects do not collect "sex-disaggregated data." Without knowing exactly how many women are participating, it is impossible to see if the project is failing them.

4. Technical and Information Barriers

There is a significant gender gap in mobile phone ownership and internet access. If weather alerts and market data are sent only via smartphone apps, rural women are often the first to be left behind. Historically, lower literacy rates for women in some rural areas make technical manuals or complex index-based insurance policies difficult to navigate without specialized, oral, or visual training.

5.0 Recommendations for Enhanced Gender Integration in Climate Smart Actions

1. Planning and Design: Conduct Intersectionality-Based Gender Analysis. Don't treat women as a monolith. Analyze how age, ethnicity, and disability status intersect with gender to create unique climate vulnerabilities. Instead of bringing a finished plan to the community, involve women's cooperatives in the design phase to ensure technologies actually meet their specific physical and logistical needs. Make gender equality a primary project goal rather than a cross-cutting secondary thought.

2. Implementation and Technology: Focus on technologies that reduce the time women spend on manual labor (e.g., solar-powered grain mills, efficient cookstoves, or mechanical weeders). This tackles the "time poverty" barrier. Hire and train more female extension officers. Deliver climate information through non-text-based channels (radio dramas, voice SMS, or visual posters) to reach those with lower literacy rates. Create collateral-free micro-loans or weather-indexed insurance products that accept group guarantees instead of land titles, which women often lack.

3. Institutional and Policy: Mandate that a specific percentage of climate funds is strictly allocated to activities that benefit women or are led by women's organizations. Work with traditional leaders and local governments to issue "Certificates of Occupancy" or joint land titles. Legal land security is the single biggest predictor of whether a farmer will invest in long-term climate-smart practices like tree planting.

Implement Household Dialogue programs where men are encouraged to share domestic responsibilities. When men are involved in the conversation, they are less likely to view women's empowerment as a threat to their own status.

Conclusion

Perceptions, adaptive capacities and strategies for coping with climate change can be influenced by gender. To foster more equitable and effective climate action, policymakers must move beyond gender-neutral or gender-blind approaches and proactively integrate gender considerations into all stages of climate policy and program development. The integration of gender-sensitive, gender-responsive, and gender-transformative approaches is crucial for achieving equitable and sustainable climate-smart actions, moving beyond merely acknowledging differences to actively challenging and transforming systemic inequalities. This nuanced continuum of approaches is essential for addressing the multifarious impacts of climate change, particularly as they intersect with gender.

References

- Anugwa, I.Q. and Ifeonu, C.F. (2024). Diversity and Gender in Extension: Skills and Competencies. In: Essential Competencies of Frontline Agricultural Extension Professionals. Suvedi, M., and Sasidhar, P.V.K. (Eds.) Chapter 8 pp. 221-276. East Lansing, Michigan, USA: Alliance for African Partnership, Michigan State University.
- Awoke, M. D., Löhr, K., Kimaro, A. A., Lana, M., Wenda, B. D. S., Buabeng, K., Hafner, J., and Sieber, S. (2025). Exploring gender dynamics in climate-smart agriculture adoption: a study in semi-arid Dodoma, Tanzania. *Frontiers in Sustainable Food Systems*, 8. <https://doi.org/10.3389/fsufs.2024.1507540>
- Begum, R., Sharmin, A., and Ethen, D. Z. (2025). Perception of and adaption to climate change: the case of groundnut production of costal island in Bangladesh. *Frontiers in Climate*, 7. <https://doi.org/10.3389/fclim.2025.1657507>
- Eneji, C.O., Onnoghen, N.U., Acha, J.O.and Diwa, J.B. (2021) Climate change awareness, environmental education and gender role burdens among rural farmers of Northern Cross River State, Nigeria. *International Journal of Climate Change Strategies and Management*,13, 4/5: 397-415 <https://doi.org/10.1108/IJCCSM-06-2020-0070>
- Hanesen, P. (2020). Building Nigeria's Response to Climate Change (BNRCC). Nigeria News Brief and Action Alert: Cimate Scorecard <https://www.climatescorecard.org/2020/11/building-nigerias-response-to-climate-change-bnrcc/>

- Ibukun T. (2025). Building Gender-Responsive Climate Security: Inside CGIAR's New Training Module. <https://www.cgiar.org/news-events/news/building-gender-responsive-climate-security-inside-cgiars-new-training-module>
- Khalil, Z. H., and Ghosh, A. (2025). Climate-Smart Agriculture and Just Transition: Addressing Gendered Impacts of Climate Change on Women Workers in Indian Agriculture. <https://doi.org/10.2139/ssrn.5218546>
- Rainard, M., Smith, C., and Pachauri, S. (2023). Gender equality and climate change mitigation: Are women a secret weapon? *Frontiers in Climate*, 5. <https://doi.org/10.3389/fclim.2023.946712>
- Rao, N., Sathe, R., and Grist, N. (2025). Gender, intersectionality and climate smart agriculture in South Asia: A review [Review of Gender, intersectionality and climate smart agriculture in South Asia: A review]. Public Library of Science (*PLOS*) *Climate*, 4(2). <https://doi.org/10.1371/journal.pclm.0000482>
- Roy, J., Prakash, A., Some, S., Singh, C., Kerr, R. B., Caretta, M. A., Conde, C., Rivera - Ferre, M. G., Schuster - Wallace, C. J., Tirado, C., Totin, E., Vij, S., Baker, E., Dean, G., Hillenbrand, E., Irvine, A., Islam, F., McGlade, K., Nyantakyi - Frimpong, H., ... Tandon, I. (2022). Synergies and trade-offs between climate change adaptation options and gender equality: a review of the global literature [Review of Synergies and trade-offs between climate change adaptation options and gender equality: a review of the global literature]. *Humanities and Social Sciences Communications*, 9(1). Palgrave Macmillan. <https://doi.org/10.1057/s41599-022-01266-6>
- Onyango, E., Banwell, N., Mose, T. M., and Ogallo, L. A. (2023). Editorial: Gendered impacts of climate change: women and transformative research, policy and practice. *Frontiers in Climate*, 5. <https://doi.org/10.3389/fclim.2023.1215661>
- UN Women (2025). Gender-responsive Synergies across the Rio conventions: Multi-stakeholder perspectives working paper. <https://www.unwomen.org/sites/default/files/2025-11/gender-responsive-synergies-across-the-rio-conventions-multi-stakeholder-perspectives-en.pdf>