

# Gendered Food Insecurity: Achieving SDG 2 for Climate-Affected Women in Rural Economies

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## Abstract

This article examines systemic and structural governance barriers to achieving Sustainable Development Goal 2 (SDG 2) for rural women in climate-affected regions of the Global South, using Ghana and Bangladesh as focal countries. While the centrality of women's roles in food systems is acknowledged in literature, intersecting gender inequalities, climate vulnerability, and institutional blind spots continue to marginalise rural women within food security and adaptation policies. The study employs an integrative literature review and interpretive qualitative content analysis, grounded in an intersectional and rights-based analytical framework, to synthesise how gender, land tenure, climate exposure, economic informality, and policy recognition are addressed within SDG 2–related scholarship and policy documents. The focal countries provide illustrative reference contexts that help the analysis identify recurring patterns and omissions that constrain gender-responsive food systems governance.

The review indicates that the absence of appropriate policy frameworks is not the major impediment to achieving SDG 2 goals. Still, rather fragmented institutional framing, including gender-blind adaptation strategies, insecure land governance, undervaluation of informal labour, and weak participatory accountability, are the greater impediments to success. The study concludes by outlining governance-oriented policy implications for aligning SDG 2 implementation with gender equity and climate resilience.

**Keywords** Gendered Food Insecurity · SDG 2 (Zero Hunger) · Climate-smart Agriculture · Global South Sustainability · Informal Food Systems · Intersectional Analysis · Climate Vulnerability · Sustainable Food Governance

## 1. Introduction

Global efforts to eradicate hunger under Sustainable Development Goal 2 (SDG 2), has been significantly constrained by entrenched systemic inequalities (United Nations [UN], 2015; UN, 2025). While there have been spheres of progress, recent evidence suggests that hunger and food insecurity driven by a composite of climate change, conflicts, economic instability, and the lingering impacts of the COVID-19 pandemic, remains endemic (UN Department of Economic and Social Affairs, 2025; World Food Programme [WFP], 2025). This claim of global hunger and food security crisis is validated by hunger indicators in 2024, revealing that approximately one-tenth of the global population is undernourished, and over two billion people experienced moderate to severe food insecurity. These worrying statistics call into question the achievability of SDG 2 targets by 2030 (UN, 2025). There is, however, significant regional variation in the severity of the crisis, with the problem concentrated in sub-Saharan Africa and parts of Asia (UN, 2025). While quantitative indicators provide an indispensable baseline, they are insufficient for analysing the systemic, social, and political factors that drive hunger and food privations.

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One of these notable variations is the gendered dimensions of food insecurity, a subject that has comparatively received less attention in governance and scholarship. Women are central to food production, processing, and distribution in many parts of the Global South. According to the Food and Agriculture Organisation (FAO), women comprise 43% of the agricultural labour force in developing countries and contribute significantly to household and community food security (FAO, 2023). However, systemic gender inequalities such as discriminatory land tenure laws, limited access to credit and inputs, exclusion from climate adaptation programmes, and undervaluation of women's informal labour impede their ability to respond to food insecurity and climate shocks (UN Women, 2022). These intersecting dynamics render rural women disproportionately vulnerable to hunger and malnutrition while also positioning them as vital agents of change in transitioning toward sustainable and equitable food systems.

In recent years, sustainability scholars and development practitioners have turned their attention to the intersectionality of food security, gender, and climate resilience. Research highlights that food insecurity is not merely a function of scarcity but a consequence of structural inequality and governance failures (Sen, 1981; Nyantakyi-Frimpong & Bezner Kerr, 2015). Rights-based frameworks have increasingly been invoked to demand accountability in the realisation of the right to food, particularly in contexts where women are excluded from decision-making spaces and lack legal recognition for their agricultural contributions (De Schutter, 2014). However, mainstream food security policies remain largely technocratic, focusing on yield, infrastructure, and market efficiency while neglecting the socio-political dimensions of rural livelihoods (Harris, 2019). Gender is often treated as a cross-cutting theme rather than a core structuring force in the distribution of food, resources, and risks.

This article addresses this gap by undertaking an integrative literature review and interpretive synthesis grounded in Crenshaw's intersectional feminist framework (Crenshaw, 1989). Intersectionality argues that multiple forms of social identities and structures of power, such as gender, class, race, caste, and age, interact to produce distinct lived experiences that cannot be reduced to single experiences of disadvantage and marginalisation. When applied to the study of food systems and SDG 2, it enables a more nuanced understanding of how policies, institutional norms, and socio-economic structures together produce differentiated outcomes for rural women. This approach moves beyond descriptions of gender gaps to an analysis of how a variation of intersecting structural forces systematically constrain opportunities for food security and sustainable livelihoods. Using Case illustrations from Sub-Saharan Africa and South Asia regions where climate vulnerability intersects with entrenched gender disparities, the study illuminates how existing food security and adaptation frameworks often fail to address the specific needs and agency of rural women (Tavener & Crane, 2021). The significance of this inquiry lies not only in understanding the scale of gendered food insecurity but also in contributing to actionable solutions that advance SDG 2 in a socially just and sustainable manner. Achieving SDG 2 for rural women requires more than incremental inclusion; it necessitates structural transformation in how food systems are governed, how climate risks are managed, and how rural women's rights and knowledge are valued and institutionalised. Sustainability, in this regard, is not merely an environmental imperative but a political one that calls for a redefinition of whose knowledge counts, whose labour is protected, and whose food needs are prioritised.

Accordingly, the study centres around three central research questions that reflect its interpretive review logic:

- a) How do climate change and structural gender inequalities intersect to produce food insecurity for rural women in contexts highly vulnerable to climate change and socioeconomic shocks, particularly in the Global South?
- b) In what ways do current food security and climate adaptation policies marginalise or exclude rural women from equitable access to food, land and decision-making resources?
- c) What policy frameworks and governance models are necessary to align SDG 2 implementation with intersectional justice, sustainability, and gender equity in climate-affected rural contexts?

In responding to these questions, the article contributes to ongoing debates in sustainability studies, feminist development theory, and food justice research. It provides a policy-relevant, empirically grounded, and theoretically robust analysis of gendered food insecurity and calls for a reorientation of SDG 2 implementation strategies to align with the lived realities and leadership of rural women.

## 2. Conceptual Framework: Intersectionality as an Integrative Analytic Framework

### 2.1. Crenshaw's intersectionality: from legal theory to policy-oriented sustainability analysis

Intersectionality theory emanated as a critical intervention in legal theory with the primary focus of highlighting the limitations of single-axis frameworks in addressing multiple dimensions of social injustice. The term was popularised by Kimberlé Williams Crenshaw in the scholar's seminal treatise on race and gender discrimination, where the author averred that the experiences of Black women in the United States could not be understood solely through analyses of race or gender in isolation but required attention to the interlocking nature of multiple systems of power (Crenshaw, 1989; Crenshaw, 1991). Crenshaw illustrated how antidiscrimination legislation failed to protect Black women precisely because its conceptualisation of race and gender as distinct categories, thus leaving affected black women with legal remedies (Crenshaw, 1989). Utilising key metaphors, including traffic flowing through an intersection, to pinpoint how overlapping structures of discrimination can create unique patterns of exclusion that single-axis analyses overlook (Crenshaw, 1991)

Building on this legal critique, the utilisation of the theoretical framework expanded to become one of the most influential theoretical pillars of Black feminist thought, advanced by black scholars such as Patricia Hill Collins, who emphasised the matrix of domination, the interdependent systems of race, class, gender, and other social hierarchies that shape lived experience (Collins, 1986). Expanding on Crenshaw's Thesis, Collins argued that subjectivities and power are produced through overlapping social structures rather than discrete, additive dimensions of identity. Thus, intersectionality challenges the assumption that inequalities operate along separate, measurable axes; instead, it contends that oppression is constitutively interwoven intertwined with the lived realities of marginalised groups and can therefore not be adequately captured by one singular category alone (Cooper, 2016).

While intersectionality is a product of racial critique of anti-discrimination laws and feminist theories, its conceptual and analytical applicability has since been extended to multiple scholarship domains, including public policy, development studies, and sustainability research. Contemporary policy scholarship identifies that intersectionality can illuminate how formal governance structures and institutional norms produce differential access to rights, resources, and opportunities across populations stratified by gender, class, race, age, and other social markers (La Barbera et al, 2024). For instance, a Kenyan Study used an intersectionality-based policy analysis approach in urban food economies to investigate how recovery policies after the COVID lockdown disproportionately marginalise women food vendors due to intersecting constraints related to gender, education, class, and economic status (Kiplagat et al, 2026).

In the context of sustainability and SDGs, intersectionality offers a critical corrective to technocratic and siloed approaches that often privilege universal benchmarks over situated social dynamics. Although the SDGs are designed to be indivisible, governance frameworks often struggle to manage those practical and conceptual interconnections, and importantly, how intersecting inequalities shape vulnerability and access to services (Glass & Newig, 2019). As argued by sustainability scholars, sustainability is inherently political and involves contending with structural power imbalances, beyond the ends of environmental or economic targets (Fukuda-Parr & McNeill, 2019). Intersectionality thus becomes a methodological resource for understanding how inequalities are reproduced within policy spaces, and how those inequalities condition the potential for transformative change across multiple SDGs. Within this frame, intersectionality has been highlighted as necessary for understanding the interdependence of SDG implementation pathways, such as how gender equity (SDG 5), climate action (SDG 13), and food security (SDG 2) intersect to shape differential outcomes across groups (McCafferty, n.d.).

More importantly, policy-oriented applications of intersectionality are not about expanding the categories of existing analyses; rather, it is about highlighting the effects of institutional norms and policy frameworks in the reproduction of some gender-related hierarchies while obscuring others. In doing this, researchers can identify not only gender gaps but intersectional blind spots that standard gender mainstreaming approaches discount (McDougall, 2021).

In summary, the theory of intersectionality has evolved from a mere critique of law and identity politics to a policy-relevant analytical lens for examining how intersecting systems of power shape both vulnerability and resilience in socio-ecological systems. This evolution makes intersectionality a valuable foundation for examining the governance of food security and SDG 2 implementation, especially in climate-vulnerable contexts where overlapping inequalities, rooted in gender, land access, socio-economic status, and institutional exclusion, produce distinct patterns of marginalisation that single-axis frameworks cannot capture. The study's co-option of intersectionality theory enables a robust interrogation of policies that produce differential outcomes and what alternative governance strategies might better align with goals of equity, sustainability, and social justice.

## 2.2. Operationalizing intersectionality the Study's Integrative Review

The study moves beyond the theory's initial critical legal studies conceptual framing and operationalises it as a policy-oriented framework (Collins & Bilge, 2020; Hancock, 2007). This approach avers that the lived experiences of food insecurity and climate vulnerability cannot be understood through gender as a unified and singular category; instead contends that it is the convergence and interaction of multiple social positions and institutional structures that produce unique forms of marginalisation and access within food systems.

For this integrative review, the study specifies and analyses five intersecting, co-constituting axes that are demonstrably critical in shaping rural women's food security in the Global South. These are gender, land tenure, economic informality, climate exposure, and policy recognition. These are not standalone variables but dynamic domains of power that interact to structure access, risk, and agency (Nightingale, 2011; Sultana, 2021). The framework is visualised in the table below, which illustrates how these axes intersect to create a compounded experience of 'gendered food security risk' template that is often overlooked by siloed policy interventions.

**Table 1.** Operationalising table

| Axis                        | Definition & SDG 2 Relevance   | Guiding Question  |
|-----------------------------|--|---|
| <b>Gender</b>               | Social norms, roles, and power relations shape rights, responsibilities, and resource access (Agarwal, 2021). Key lens for food security, but insufficient alone.                  | How do gendered divisions of labour, household decision-making, and cultural norms affect women's ability to adapt to climate shocks and secure food?                           |
| <b>Land Tenure</b>          | Rights, institutions, and processes governing land access, use, and control (FAO, 2023). Secure tenure underpins agricultural investment, climate adaptation, and economic agency. | How do laws, customary systems, and inheritance practices limit women's land ownership and control, affecting sustainable production?   |
| <b>Economic Informality</b> | Unregulated, unprotected livelihoods outside formal systems (Chen, 2012). A major site of women's activity, but a source of vulnerability.   | How does reliance on informal labour, unpaid family work, and small-scale trade affect women's economic resilience and access to adaptation resources?                          |
| <b>Climate Exposure</b>     | Nature, degree, and location of climate stressors (drought, flood, erratic rainfall) affecting agro-ecology and livelihoods (IPCC, 2022). Socially filtered impacts.               | How do location-specific climate risks interact with gender and informality to produce distinct patterns of food insecurity?  |
| <b>Policy Recognition</b>   | How institutions see, include, or exclude groups in laws, programs, and discourse (Fraser, 2009). Determines who is recognised as a legitimate beneficiary or agent.               | Do SDG 2, agriculture, and adaptation policies recognise intersectional realities of rural women, or erase differences based on tenure, informality, and climate vulnerability? |

The study's approach shifts intersectionality from solely a diagnostic tool to a transformative methodological approach for policy critique. This approach uses a form of cross-referencing method to see how different inequalities overlap, to notice what policies ignore, and to create practical, intersectional solutions. By mapping the literature in this way, the review reveals how barriers across different axes reinforce one another, for instance, how the land tenure system can exclude women from access to credit by the formal system, forcing them into informal markets, which are mostly unregulated. It also evaluates whether existing policies in the study's focal countries of Ghana and Bangladesh address these intersections or perpetuate policy blindness by framing issues from a single axis.

## 2.3. Complementary Perspectives

**2.3.1. Gender and Food Insecurity** The relationship between gender and food insecurity is well-established in development literature (Agarwal, 2022; FAO, 2023; Kabeer, 2021; Quisumbing & Meinzen-Dick, 2021). Women play critical roles in food production, preparation, and distribution, especially in rural agrarian economies (Agarwal B, 2022; World Bank, 2022). Yet, they are disproportionately affected by hunger and malnutrition (FAO, 2023). Globally, women face greater barriers to accessing productive resources such as land, credit, extension services, and agricultural inputs, which directly affect their capacity to produce or procure sufficient food (Quisumbing & Meinzen-Dick, 2021). In Sub-Saharan Africa, for instance, women cultivate between 60–80% of food crops but own less than 20% of agricultural land (UN Women, 2022).

Food insecurity among women is also multidimensional. It is influenced by cultural norms that prioritise men and boys in intra-household food distribution, as well as time poverty caused by the triple burden of productive, reproductive, and community labour (Agarwal, 2018). Structural discrimination in formal and informal labour markets further limits women's economic access to food. Feminist scholars argue that food insecurity should be understood as a consequence not only of material deprivation but also of gendered power relations that shape entitlements, access, and agency (Jackson, 2009).

Despite increasing recognition of these dynamics, many food security policies continue to adopt gender-neutral approaches that fail to address the underlying causes of women's exclusion. Terms like “women's empowerment” are often employed without adequate analysis of the structural transformations required to ensure equitable food systems (Harris, 2019). As a result, gendered food insecurity remains a persistent and under-addressed barrier to the realisation of SDG 2.

**2.3.2. Climate Change Impacts in the Rural Global South** Climate change is reshaping rural livelihoods globally, with disproportionate effects on communities in the Global South. Rural regions in Sub-Saharan Africa, South Asia, and parts of Latin America are particularly vulnerable to climatic disruptions such as erratic rainfall, prolonged droughts, soil degradation, and extreme heat, all of which adversely affect agricultural productivity and local food systems (IPCC, 2022). These environmental shifts directly reduce food availability and indirectly undermine rural livelihoods through loss of income, migration, and increased burden on natural resources (Nyantakyi-Frimpong & Bezner Kerr, 2015).

The gendered dimensions of climate impacts are increasingly documented. Women often rely on climate-sensitive crops and informal livelihood strategies, and are typically responsible for food provisioning, water collection, and fuel gathering, all of which become more burdensome in the face of ecological stress (Tavenner & Crane, 2021). Furthermore, women's limited decision-making power in household and community structures restricts their ability to adapt effectively to climate change. In many countries, adaptation resources such as climate-smart technologies, early warning systems, and agricultural extension services are not equally accessible to women (Jost et al., 2016).

Existing climate adaptation strategies have been critiqued for being gender-blind, overly technocratic, or narrowly focused on productivity gains. Many fail to incorporate the social realities and indigenous knowledge systems of women farmers, especially those in marginalised regions. This results in top-down interventions that reinforce gender inequalities while claiming to promote resilience (Arora-Jonsson, 2011). A growing body of literature thus calls for gender-transformative climate adaptation policies that centre women's agency and promote equitable access to climate resources.

## 2.4. Gaps: What Hasn't Been Sufficiently Studied?

Despite the growing literature on gender, food security, and climate change, several critical gaps remain. First, empirical studies that integrate the right to food with climate resilience and gender justice are still scarce. Much of the existing research either focuses on one dimension (e.g., climate or gender) or remains theoretical, with limited grounding in the lived experiences of rural women (Alders & Rachid-Sally, 2020).

Second, policy evaluations rarely examine how gendered power relations affect the implementation of SDG 2 at local levels. There is little disaggregated data on how food security programs differentially affect women and men, or how adaptation interventions succeed or fail in promoting gender equity. Moreover, the voices of

rural women themselves are often absent from formal food system governance, rendering them passive subjects of development rather than active agents.

Third, there is insufficient attention to the informal food systems that sustain many rural households, such as backyard gardens, wild food gathering, and informal trading. These systems, typically maintained by women, are under-recognised in sustainability planning despite their critical role in resilience and nutritional diversity (Bezner Kerr, 2013).

This article aims to address these gaps by combining a rights-based and intersectional feminist framework with case-based insights from climate-vulnerable rural communities. It argues that achieving SDG 2 for rural women requires moving beyond technocratic inclusion towards structural transformation, one that centres women's lived realities, redistributes power, and institutionalises accountability for the right to food.

### 3. Country Selection and Justification

Ghana and Bangladesh were purposively selected as the two focal study countries to serve as reference contexts through which broader structural dynamics shaping gendered food insecurity in climate-affected rural economies can be interpreted. The countries were neither selected to undertake a formal comparative case study nor to advance the claim for representative generalisation, but rather to provide rich, contrasting contexts through which to examine the interplay of gender, climate vulnerability, and food governance. For the study, the focal countries serve as only interpretive reference points, offering concrete manifestations of the structural dynamics theorised in the conceptual framework.

The focal countries are formally committed to achieving Sustainable Development Goal (SDG) 2 and have established national policy architectures for agriculture, climate adaptation, and gender equality. However, there are distinctions in their national historical, institutional, and ecological profiles that highlight how similar global goals are mediated by local contexts. These fields of national divergence provide opportunity for

nuanced exploration of how the studies identified intersecting axes of inequality- gender, land tenure, economic informality, climate exposure, and policy recognition- manifest and are governed in different settings. Therefore, the purpose of selection is to expand theoretical insight by examining complex phenomena across varied contexts, not to draw direct causal comparisons or evaluate relative policy performance (Rapley, 2018).

#### 3.1. Ghana and Bangladesh as Contrasting SDG 2 Governance Environments

While the two focal counties face the attendant risks of climate-related food security and have, in response to this challenge, integrated SDG 2 into national development frameworks, they do have different political-economic, ecological, and gender-institutional configurations. These contrasts enhance the study's capacity to interrogate how intersectional inequalities are differently produced and governed.

**3.1.1. Agrarian Political Economy** Ghana's agrarian political economy is characterised by smallholder-dominated agriculture operating within a dual land tenure system that combines statutory law with customary authority. While women contribute substantially to food crop production, access to land remains mediated by lineage, marital status, and chiefly control, limiting women's tenure security and investment capacity (Alden Wily & Hammond, 2020; FAO, 2023). Agricultural policy reforms, such as the Medium-Term Agriculture Sector Investment Plan (METASIP), emphasise productivity and market integration but only weakly address structural gender inequities in land governance.

Bangladesh, by contrast, operates within a densely populated agrarian economy shaped by high land fragmentation, widespread landlessness, and reliance on tenant farming and wage labour. Women's participation in agriculture is significant but often informal and invisible, constrained by patriarchal inheritance practices rooted in religious and customary norms (Raihan et al., 2022). State-led food security interventions prioritise rice intensification and technological adaptation, frequently sidelining questions of gendered access to assets and decision-making power (Government of Bangladesh, 2017).

These divergent agrarian structures allow the study to examine how gendered food insecurity emerges not from scarcity alone, but from political-economic arrangements that differentially allocate land, labour, and authority.

**3.1.2. Climate Exposure** Both Ghana and Bangladesh are highly climate-vulnerable, yet they face distinct ecological stressors that shape food systems governance. Ghana experiences increasing rainfall variability, droughts in its northern regions, and land degradation that disproportionately affect rain-fed agriculture (IPCC, 2022). These stresses interact with gendered livelihood roles, intensifying women's food provisioning burdens and reliance on informal coping strategies (Nyantakyi-Frimpong & Bezner Kerr, 2015).

Bangladesh is among the world's most climate-exposed countries, facing recurrent flooding, cyclones, salinity intrusion, and river erosion. These hazards disrupt agricultural livelihoods and exacerbate food insecurity, particularly for women in coastal and char areas who experience heightened displacement and livelihood precarity (Sultana, 2014; IPCC, 2022). Despite extensive adaptation planning, gender remains weakly operationalised in climate–food governance frameworks.

The contrast between drought-prone and flood-prone ecologies underscores how climate risks are socially filtered through gender, geography, and institutional response, reinforcing the need for intersectional interpretation rather than uniform policy prescriptions.

**3.1.3. Gendered Institutional Arrangements** Institutionally, both countries have ratified key international gender and human rights instruments and maintain national gender policies. However, implementation gaps persist. In Ghana, gender equality commitments coexist with decentralised governance systems that often reproduce patriarchal norms at local levels (Yaro & Teye, 2021). In Bangladesh, centralised planning structures and sectoral silos limit women's substantive participation in food and climate decision-making processes (Jahan et al., 2022).

These arrangements reveal a shared pattern of rhetorical inclusion and operational exclusion, albeit through different institutional pathways. Examining both contexts enables the study to trace how gendered governance deficits are reproduced across diverse state configurations without implying direct comparability.

## 4. Methodology

### 4.1. Research Design and Epistemological Positioning

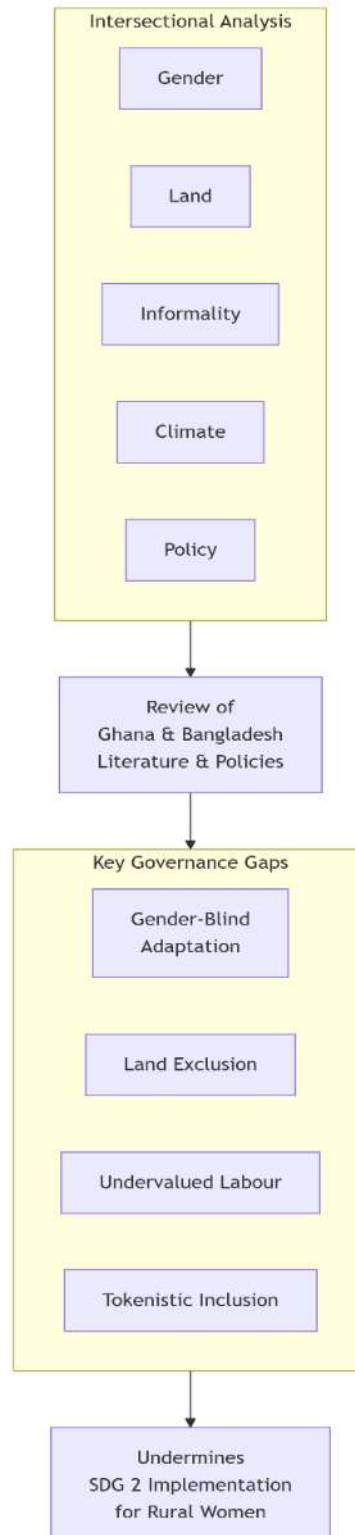
This study adopts an integrative literature review design combined with interpretive qualitative content analysis to examine how gender, climate vulnerability, and food security are conceptualised and operationalised within Sustainable Development Goal 2 (SDG 2)–related scholarship and policy frameworks. The objective is not to generate new empirical data or causal explanations, but to synthesise, interpret, and critically evaluate existing knowledge to identify recurring patterns, conceptual gaps, and governance blind spots affecting rural women in climate-affected contexts.

The review is explicitly interpretive in orientation. Documents are treated as discursive artefacts that reflect institutional priorities, normative assumptions, and power relations, rather than as neutral repositories of factual information. This approach aligns with established qualitative traditions in sustainability studies, feminist political ecology, and policy analysis, where meaning-making, framing, and omission are analytically significant (Bowen, 2009; Denzin & Lincoln, 2023).

Accordingly, the analytical outputs of the study are interpretive themes and conceptual patterns, not empirical “findings” in the conventional sense. Claims are therefore limited to what can be inferred from systematic engagement with the reviewed texts.

## 4.2. Review Strategy and Literature Corpus Construction

An integrative review approach (Torraco, 2016) was selected because it allows for the synthesis of heterogeneous sources, including theoretical scholarship, empirical studies, and policy documents, an essential requirement for interrogating SDG 2 governance across normative, institutional, and practical domains.



**Figure 1.** From Analytical Framework to Governance Implications

**4.2.1. Search and Identification** The literature corpus was constructed through iterative searches conducted between October 2025 and December 2025, using academic databases (e.g., Scopus, Web of Science, Google Scholar) and institutional repositories of multilateral organisations (FAO, UN Women, UNDP, World Bank). Search strings combined keywords related to: SDG 2, food security, zero hunger; gender, women, intersectionality; climate change, adaptation, resilience; land tenure, informal labour, agrarian governance. Backwards and forward citation tracking were used to identify influential works and policy texts frequently referenced in the literature.

**4.2.2. Inclusion and Exclusion Criteria** Documents were included if they met the following criteria: substantive relevance to SDG 2, food security, or agrifood systems; explicit engagement with gender, women's roles, or gendered outcomes; connection to climate vulnerability, environmental stress, or adaptation; empirical, theoretical, or policy relevance to low- and middle-income countries, particularly the Global South; publication in peer-reviewed outlets or by recognized policy institutions.

Documents were excluded if they focused exclusively on technical agronomy without social analysis; addressed food security without reference to gender or inequality; are purely descriptive reports lacking analytical content.

Following screening, 148 documents formed the final review corpus, comprising peer-reviewed articles, global policy reports, and national policy frameworks. Following screening, 148 documents formed the final review corpus, comprising peer-reviewed journal articles, books, global governance reports, and national policy and legislative frameworks. Supplementary Table 1 summarises the distribution of sources across analytical categories and specifies the primary analytical function each category served in the integrative review and interpretive content analysis. To strengthen transparency and replicability, the full set of reviewed documents is provided as an annotated corpus list (Supplementary Table 2), indicating author/institution, year, document type, and the specific analytical role each source played in the synthesis.

### 4.3. Case Contexts as Interpretive Reference Points

Ghana and Bangladesh were selected as illustrative national contexts, not as formal comparative case studies. Their purpose is to provide contextual grounding for the review's conceptual insights rather than to enable causal comparison or policy evaluation.

Both countries are: Highly climate-vulnerable; agrarian or semi-agrarian economies; formally committed to SDG 2 and gender equality; characterised by persistent gendered food insecurity.

At the same time, they differ in agrarian political economy, land tenure regimes, and climate risk profiles. These contrasts allow the study to examine how similar global policy commitments are mediated by distinct institutional and socio-ecological configurations. The analysis does not claim representativeness; rather, it uses these contexts to illustrate how intersectional exclusions manifest differently across settings.

### 4.4. Analytical Framework: Operationalising Intersectionality

Intersectionality, as articulated by Crenshaw (1989, 1991), serves as the primary analytical framework. Rather than treating gender as a singular variable, the analysis focuses on how gender interacts with other structures of power to shape differentiated food security outcomes.

For analytical purposes, five intersecting axes were identified inductively and deductively from the literature: gender norms and power relations; land tenure and resource access; economic informality and unpaid labour; climate exposure and environmental risk; and policy recognition and institutional inclusion.

These axes function as analytical domains, not as variables in a causal model. They structure the content analysis by guiding attention to how multiple forms of inequality co-produce vulnerability or exclusion within food systems governance.

### 4.5. Qualitative Content Analysis Procedure

The study employed interpretive qualitative content analysis (Bowen, 2009), conducted in three iterative stages. NVivo software was used to support systematic coding, memo-writing, and theme development. Stage

one involves initial coding, and documents were first coded for explicit references to the five intersectional axes and to SDG 2–related concepts (access to food, productivity, sustainability, resilience). Coding at this stage remained close to the text to minimise over-interpretation. The second stage involves thematic synthesis as descriptive codes were grouped into higher-order themes through constant comparison. This process examined how different axes intersect within texts—for example, how land tenure arrangements condition women’s access to climate adaptation resources, or how informality shapes recognition within policy frameworks. Analytical memos were used to document interpretive decisions and emerging patterns, ensuring reflexivity and traceability. The final stage involves SDG 2 mapping and cross-context interpretation. In this stage, themes were mapped against SDG 2 targets (2.1, 2.3, 2.4) to assess how gender and intersectionality are addressed, or obscured, within dominant food security narratives. Where relevant, linkages to SDGs 5, 10, and 13 were noted to examine policy coherence and fragmentation.

Throughout this process, attention was paid not only to what texts emphasised, but also to discursive silences, notably the marginalisation of informal labour, unpaid care work, and women’s decision-making authority.

#### **4.6. Reflexivity, Transparency, and Limitations**

The study acknowledges that policy and institutional documents are aspirational frames that might exaggerate gender responsiveness. To mitigate this, claims were triangulated with independent peer-reviewed studies and critical assessments from feminist and political ecology scholarship.

The study has clear limitations. As a document-based review, it cannot capture the full complexity of lived experience or implementation outcomes. Nor does it generate statistically generalizable claims. However, the approach offers conceptual clarity, policy-level insight, and analytical coherence, which are appropriate to the study’s aims.

Coding matrices, thematic summaries, and analytical memos were retained to enhance transparency and are available for editorial review upon request.

#### **4.7. Methodological Contribution**

By combining integrative review methodology with intersectional content analysis, this study demonstrates how rigorous qualitative synthesis can expose structural exclusions embedded in sustainability governance. It contributes a replicable approach for analysing SDG implementation that bridges normative theory and policy practice without conflating review-based interpretation with empirical discovery.

### **5. Analytical Outputs from the Integrative Review**

This section presents the analytical outputs generated from the integrative review and qualitative content analysis. Rather than empirical findings, the section synthesises recurring patterns, framings, and omissions identified across the reviewed literature and policy documents. These outputs emerged through systematic coding across the five intersectional axes outlined in the methodology and were subsequently mapped onto SDG 2 targets and related SDGs.

Four cross-cutting analytical themes were identified, and they are discussed below.

#### **5.1. Persistent Gender-Blindness in Climate-Responsive Food Security Interventions**

Across both scholarly and policy-oriented documents, the review reveals a persistent tendency to frame climate-resilient food security interventions as gender-neutral, despite extensive acknowledgement of women’s disproportionate exposure to food insecurity and climate risks. Climate adaptation strategies within agrifood systems frequently emphasise productivity, technological innovation, and resilience-building while treating households and farming communities as homogeneous units.

Where gender is acknowledged, it is often limited to instrumental roles, such as women as food producers, caregivers, or beneficiaries of safety nets, without interrogating the power relations that shape access to resources, decision-making authority, and adaptive capacity. This pattern is evident in both Ghanaian and Bangladeshi policy contexts, where national adaptation plans and agricultural strategies recognise women as “vulnerable groups” but rarely integrate gendered power analysis into programme design.

The literature thus suggests a disconnect between gender-sensitive rhetoric and gender-transformative practice, with implications for SDG 2.4 (sustainable food systems) and SDG 13 (climate action).

## **5.2. Structural Exclusion through Land Tenure and Resource Governance Regimes**

A second recurring theme concerns land tenure and resource access as structural constraints shaping women’s food security outcomes. Across the reviewed documents, women’s limited and insecure access to land emerges as a critical yet insufficiently addressed determinant of food availability, agricultural productivity, and climate adaptation.

In Ghana, customary tenure systems intersect with statutory frameworks in ways that often marginalise women’s land rights, particularly for widows and female-headed households. In Bangladesh, formal ownership regimes coexist with social norms that restrict women’s control over land despite legal provisions. The literature consistently highlights how these arrangements undermine women’s ability to invest in climate-resilient practices, access credit, or benefit from agricultural support programmes.

Notably, land tenure issues are frequently discussed in isolation from climate adaptation and food security strategies, rather than as foundational governance challenges. This fragmentation limits progress toward SDG 2.3 (productivity and incomes of small-scale food producers) and exposes tensions between SDG 2 and SDG 10 (reduced inequalities).

## **5.3. Systematic Undervaluation of Informal and Unpaid Labour in Food Systems**

The review further indicates a widespread undervaluation of women’s informal, unpaid, and care-related labour within food systems. While women’s contributions to food production, processing, and household nutrition are repeatedly acknowledged, they remain largely invisible in policy metrics, labour statistics, and programme evaluations.

Documents addressing food security tend to prioritise formal agricultural employment and market participation, marginalising subsistence farming, food preparation, seed saving, and caregiving roles that are central to household food access and nutritional outcomes. This omission is particularly consequential in climate-stressed contexts, where women’s unpaid labour often intensifies as a coping mechanism.

The literature suggests that this analytical blind spot undermines SDG 2.1 (access to safe and nutritious food) by failing to account for the social reproduction functions that sustain food security under environmental stress. It also weakens policy coherence with SDG 5, particularly targets related to unpaid care work and economic empowerment.

## **5.4. Tokenistic Participation and Limited Institutional Recognition**

A fourth theme relates to women’s participation in food and climate governance processes, which is frequently described in the literature as symbolic rather than substantive. While many policy frameworks endorse inclusive participation, the review indicates that women’s involvement often remains consultative, short-term, or externally driven.

Institutional mechanisms for incorporating women’s knowledge—particularly indigenous, experiential, and climate-specific knowledge—are weakly developed. Participation is rarely linked to decision-making authority, budgetary influence, or accountability mechanisms. As a result, women’s perspectives are insufficiently integrated into programme design, monitoring, and evaluation.

This pattern limits the transformative potential of participatory approaches and constrains progress across multiple SDGs, including SDG 2, SDG 5, and SDG 16 (inclusive institutions). The literature suggests that

without institutional recognition and representation, participation risks reinforcing existing power asymmetries rather than challenging them.

### **5.5. Mapping Analytical Themes to SDG 2 Targets and Cross-SDG Synergies**

When mapped onto SDG 2 targets, the reviewed literature reveals uneven attention and partial alignment. SDG 2.1 (food access) is the most frequently addressed, often through social protection and nutrition-sensitive interventions. SDG 2.3 (productivity and incomes) is discussed primarily in relation to smallholder farmers, but with limited attention to gendered constraints. SDG 2.4 (sustainable and resilient food systems) is the least operationalised, particularly in terms of gender-transformative climate adaptation.

The review further highlights weak integration between SDG 2 and related goals, notably SDG 5 (gender equality) and SDG 13 (climate action). Gender considerations are often siloed within social policy domains rather than embedded across food system governance, limiting the effectiveness of sustainability-oriented interventions

## **6. Discussion**

This discussion interprets the analytical themes identified through the integrative review and qualitative content analysis, with particular attention to their implications for the implementation of SDG 2 in climate-affected contexts. Rather than advancing new theoretical constructs, the discussion consolidates how the reviewed literature collectively frames and often constrains gender-responsive food security governance. The analysis remains grounded in the four cross-cutting themes presented above and reflects on their relevance for policy coherence, institutional design, and sustainability outcomes.

### **6.1. Gender-Blind Adaptation as a Structural Constraint on SDG 2 Implementation**

The persistence of gender-blind climate adaptation strategies identified in the review suggests a structural limitation in current approaches to food security governance. While adaptation is increasingly central to agrifood policy, the literature indicates that adaptation measures often prioritise technical efficiency and resilience metrics without engaging with gendered power relations. This framing limits the effectiveness of interventions designed to advance SDG 2.4, as sustainability is pursued without addressing who controls resources, who bears adaptation costs, and who benefits from resilience investments.

The review indicates that treating gender as a cross-cutting concern rather than as a constitutive dimension of food systems governance results in partial and uneven outcomes. In both Ghana and Bangladesh, gender is frequently acknowledged at the level of vulnerability but rarely embedded within decision-making structures or implementation modalities. As a result, adaptation initiatives risk reinforcing existing inequalities, undermining the broader sustainability objectives associated with SDG 2.

### **6.2. Land Tenure Insecurity and the Limits of Productivity-Oriented Interventions**

The analytical outputs further suggest that land tenure insecurity constitutes a foundational governance challenge that constrains progress toward SDG 2.3. The literature consistently demonstrates that women's limited access to land and natural resources reduces their ability to engage in productive agriculture, adopt climate-resilient practices, and benefit from agricultural support programmes.

Importantly, the review reveals that land tenure is often treated as a background condition rather than as an integral component of food security and climate policy. This analytical separation limits the capacity of productivity-oriented interventions to deliver inclusive outcomes. Without addressing the institutional and customary arrangements that regulate land access, efforts to increase yields or incomes risk bypassing those most affected by food insecurity, particularly rural women.

### **6.3. Informal Labour, Social Reproduction, and the Measurement Gap in SDG 2**

A third interpretive insight concerns the systematic undervaluation of informal and unpaid labour within food systems. The review highlights a persistent gap between the centrality of women's labour to household food security and its limited recognition within policy frameworks and monitoring systems. This gap has direct implications for SDG 2.1, which focuses on access to adequate and nutritious food.

The literature suggests that prevailing indicators and metrics privilege formal production and market participation, marginalising the social reproduction activities that sustain food availability and nutritional outcomes, particularly under climate stress. This measurement bias limits the capacity of SDG 2 frameworks to capture the full spectrum of food security determinants and contributes to policy blind spots that disproportionately affect women.

### **6.4. Participation Without Power: Institutional Constraints on Inclusive Governance**

The review-based themes also point to limitations in participatory approaches to food and climate governance. While inclusive participation is widely endorsed across policy documents, the analysis indicates that women's participation often remains procedural rather than substantive. Consultative mechanisms are rarely linked to decision-making authority, resource allocation, or accountability structures.

This pattern constrains the transformative potential of participation and limits progress toward integrated SDG implementation. Without institutional recognition and mechanisms for representation, participatory initiatives risk reproducing existing hierarchies rather than challenging them. The literature thus suggests that participation alone is insufficient unless accompanied by structural reforms that redistribute authority within food system governance.

### **6.5. Implications for SDG 2 Policy Coherence and Cross-SDG Integration**

Taken together, the analytical themes highlight fragmentation in the governance of SDG 2, particularly in relation to gender equality and climate action. While synergies between SDG 2, SDG 5, and SDG 13 are widely acknowledged in principle, the review indicates that these linkages are weakly operationalised in practice. Gender considerations are often siloed within social policy domains, while climate adaptation is treated as a technical challenge, limiting the scope for integrated and transformative approaches.

The interpretive analysis suggests that advancing SDG 2 in climate-affected contexts requires moving beyond additive policy alignment toward institutional coherence, where gender equality, climate resilience, and food security are addressed as interdependent governance challenges. Ghana and Bangladesh illustrate how similar global commitments can yield divergent outcomes depending on institutional arrangements, policy priorities, and socio-cultural contexts.

## **7. Conclusion and Policy Implications**

### **7.1. Conclusion**

This study set out to examine how gender, climate vulnerability, and food security are conceptualised within SDG 2-related scholarship and policy frameworks, using an integrative review and intersectional qualitative content analysis. Rather than generating new empirical evidence, the analysis synthesised patterns, framings, and omissions across the reviewed literature, using Ghana and Bangladesh as illustrative contexts, to investigate how existing frameworks are framed and operationalised.

The review highlights four interrelated constraints shaping the pursuit of SDG 2 in climate-affected contexts: the persistence of gender-blind climate adaptation strategies; structural exclusion rooted in land tenure and resource governance; the systematic undervaluation of informal and unpaid labour; and limited institutional recognition of women's participation in food and climate governance. Together, these patterns

suggest that progress toward SDG 2 is constrained less by the absence of policy commitments than by how food security, gender equality, and climate resilience are institutionally framed and operationalised.

Importantly, the analysis indicates that gender considerations are frequently acknowledged at the level of vulnerability or inclusion, but insufficiently integrated into decision-making structures, implementation mechanisms, and monitoring frameworks. As a result, SDG 2 targets—particularly those relating to productivity (2.3) and sustainable food systems (2.4)—remain only partially realised for rural women in climate-vulnerable settings. These limitations reflect broader challenges of policy fragmentation and weak cross-SDG integration, particularly between SDGs 2, 5, and 13.

By making visible the intersectional governance gaps embedded within dominant food security narratives, this study contributes a structured analytical approach for interrogating SDG implementation beyond aggregate indicators and formal commitments. The findings underscore the need for greater alignment between sustainability goals and the social and institutional conditions that shape their outcomes.

## 7.2. Policy Implications

The policy implications derived from this review are deliberately circumscribed and grounded in the analytical themes identified, rather than in normative aspiration. They are organised around the governance dimensions most directly affecting SDG 2 implementation in climate-affected contexts.

First, gender considerations must be embedded within climate-responsive food security policy design, rather than treated as ancillary concerns. Adaptation strategies linked to SDG 2.4 should explicitly account for gendered power relations in access to land, inputs, credit, and decision-making. This requires moving beyond gender-targeted programmes toward institutional arrangements that address structural inequalities shaping adaptive capacity.

Second, land tenure and resource governance should be recognised as foundational to achieving SDG 2.3. Productivity-oriented interventions are unlikely to yield inclusive outcomes where women's access to land remains insecure or informal. Policy coherence between agricultural development, land governance, and climate adaptation frameworks is therefore essential, particularly in contexts where customary and statutory systems coexist.

Third, monitoring and evaluation frameworks for SDG 2 should better capture informal and unpaid contributions to food security. The review indicates a persistent measurement gap that marginalises women's labour within food systems. Integrating indicators related to care work, subsistence production, and informal food provisioning would improve the alignment between SDG 2.1 and SDG 5 and enhance the analytical validity of food security assessments.

Fourth, participatory mechanisms in food and climate governance require institutional reinforcement. Participation that is consultative but disconnected from authority and accountability risks symbolic inclusion. Strengthening women's representation within decision-making bodies, budgeting processes, and evaluation mechanisms is necessary to translate participation into substantive influence.

Finally, while Ghana and Bangladesh illustrate how global SDG commitments are mediated by national contexts, the implications identified here are not prescriptive templates. Rather, they point to governance principles—integration, recognition, and institutional coherence—that are relevant across diverse settings but must be adapted to local political, social, and ecological conditions.

## 7.3. Limitations and Directions for Future Research

As a review-based study, this analysis is limited to the scope and framing of existing literature and policy documents. It cannot assess implementation outcomes or lived experiences, nor does it claim representativeness across all climate-affected contexts. Future research could extend this work through empirical studies examining how intersectional governance dynamics shape food security outcomes at local levels, or through comparative analyses linking SDG indicators with institutional practices.

Further work is also needed to develop gender-responsive metrics that better reflect informal labour and care economies within food systems, thereby strengthening the empirical foundations of SDG 2 monitoring and evaluation.

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**Data Availability** Data used in this study are available upon reasonable request.

## Declarations

**Competing Interests** The authors declare no competing interests.

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