THE GENDER-CLIMATE-SECURITY NEXUS

Conceptual Framework, CGIAR Portfolio Review, & Recommendations towards an Agenda for One CGIAR

Giulia Caroli, Katie Tavenner, Sophia Huyer, Carolina Sarzana, Anna Belli, Marlène Elias, Grazia Pacillo and Peter Läderach
AUTHORS
Giulia Caroli1
Katie Tavenner2
Sophia Huyer3
Carolina Sarzana1
Anna Belli1
Marlène Elias4
Grazia Pacillo1
Peter Läderach1

1 CGIAR FOCUS Climate Security
2 The Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT)
3 CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)
4 CGIAR Research Program on Forests, Trees, and Agroforestry

CITATION

COVER PHOTO: Going to the market with charcoal, Chiana, Kassena Nankana District - Ghana. Photo: Axel Fassio/CIFOR

CONTACT
CGIAR FOCUS Climate Security
climatesecurity@cgiar.org
https://climatesecurity.cgiar.org

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Climate change and conflict affect millions of people worldwide, but not equally. Deeply rooted gender and social norms, relations, and inequalities shape, and are shaped, by the impacts of both climate and conflict and influence how women and men of different backgrounds (e.g., age, race/ethnic community, class/caste) adapt to and respond to these shocks. While there has been growing attention to the gender dimensions of both climate change and conflict in recent years, gender is still at the margin of climate security research and policymaking. This is in the context of growing recognition by international institutions and development practitioners that a gender lens is crucial to understand the complex interconnections between climate change and conflict.

To move towards an integrated perspective to address these processes, this position paper introduces a new conceptual framework – the Gender-Climate-Security nexus – that meaningfully integrates gender analysis into climate security issues. To operationalize the framework in terms of how gender, climate and security issues are connected, we proposed two pathways of interactions. The first pathway details how existing gender inequalities (and other intersecting aspects of social inequalities) and relationships impact and/or constrain resilience to climate shocks. The second pathway details how climate impacts interact with gender norms, relations, and inequalities to create gender-specific human security risks related to resource scarcity, loss of livelihoods, mobility/migration, and intra-household and communal conflict.
**Resource scarcity.** Gender norms, relations and inequalities in land ownership, resource rights, use of resources and participation in natural resource management deepen the impact climate shocks have on women and marginalized groups. Deteriorating ecological conditions and resulting competition over dwindling resources often lead women to have limited access to fertile land, clean water, and livestock, generating both economic insecurity and food insecurity. Given that women often contribute directly to the food security of their households and communities through household gardens, plant management, and collection of medicinal and edible plants, resource scarcity can significantly impact women's contribution to household and community resilience. The gendered division of labour, particularly around the collection of water and fuelwood, heightens gendered-climate risks, including increased risk of sexual and gender-based violence. Despite being the guardians of natural resources and repositories of traditional ecological knowledge in many cultures, women often lack the voice to provide solutions to resource scarcity – this lack of participation can compound gender inequalities in the allocation of scarce resources.

**Loss of livelihoods.** Due to climate impacts on agriculture and food production, worsening conditions are likely to lead to different livelihood and security outcomes for women and men. Gendered differences in income and education often lead women to have fewer capacities to diversify their livelihoods in times of climate-induced economic hardship, generating both food insecurity and risks for sexual and gender-based violence. Given that women often have lower incomes and are more likely to be economically dependent than men, they have less of a “buffer” of savings during difficult times, and along with other assets, makes it harder for them to invest in alternative livelihoods. Managing climate-related risks to agricultural production requires new information, skills, and technologies, such as seasonal forecasts, risk analysis, and water-saving agricultural practices. Men are more likely to have access to these resources than women and the power to use them, and are, therefore, better equipped to adapt.

**Mobility and migration.** Gender is a key factor in shaping both women’s freedom of movement (mobility) and migration decisions and abilities. Gender norms that mediate women’s ability to move outside the home often times restrict their access and freedom to take transportation (either to self-drive bicycles or cars or to take public modes of transport in the form of taxis, buses, or trains). These restrictions effectively limit or prohibit women’s ability to access natural resources, markets, education, employment, and other services required to seek out and maintain climate-resilient livelihoods. Thus, restrictions on women’s freedom of movement directly affect their environmental and economic security and are inter-linked with women’s ability to use migration as a climate adaptation strategy. While women’s motivations for migration are diverse and range from pursuing new opportunities to cope and recover to more immediate emergencies of escaping climate risks, when used as a coping strategy from climate shocks such as floods/natural disasters and long-term impacts on livelihoods from drought/variable rainfall, out-migration from agricultural communities has tended to focus on men’s out-movements, which frequently leads to the ‘feminization of agriculture’ for the women and girls left behind to manage the farm in addition to their usual tasks.
Intra-household and communal conflict. Resource scarcity, the disruption of traditional gender roles/norms due to loss of livelihoods, and changing migratory patterns heighten the risk of intra-household and communal conflict. Masculine norms can create and perpetuate intra-household and communal conflicts that target both women and men through rigid interpretations of masculinity/socially appropriate behaviour for men. This generates risks related to sexual and gender-based violence, post-traumatic stress disorders, and intra-household and communal violence. In addition to open conflicts, less visible gendered violence in the form of femicide and attacks on women environmental defenders is a key issue at the heart of the gender-climate-security nexus.

A review of the CGIAR gender portfolio was used to further explore the gender dimensions of climate-related security risks. The findings reveal that CGIAR has extensively contributed to improving evidence and understanding about specific vulnerabilities, risks and opportunities for disadvantaged people affected by climate-induced resource scarcity and loss of livelihoods. However, less attention has been paid to explore gendered dynamics and challenges associated with climate-related migration. In addition, communal violence and resource-related conflicts have yet to be analysed from a gender lens. The results also show that targeting women and marginalized groups with climate-smart solutions increases the likelihood of achieving not only gender equality but also strengthening resilience and social cohesion. Thus, socially inclusive climate responses designed and implemented by CGIAR can support dual processes of promoting gender equality and increasing resilience to climate-related security risks.

Based on the findings from the portfolio review and broader literature, this paper formulates tailored recommendations for the One CGIAR and its partners on how to move this agenda forward.

- Apply an intersectional lens to the gender-climate-security nexus
- Address knowledge gaps within the nexus, particularly intra-household and communal conflict
- Expand the geographical focus to MENA and Latin America
- Moving from purely diagnostic towards more transformative gender research
- Explore the opportunities for women’s empowerment that could be gained in the context of climate-related security risks
- Focus on women’s and marginalized people’s agency and put their voices, knowledge, and experiences at the heart of the solutions
- Design socially inclusive responses to climate-related security risks through collective action and participatory approaches
- Mainstream gender-transformative goals into climate change adaptation and mitigation policies
- Ensure that gender equality policy frameworks at all levels account for climate-related security risks
- Build women’s and marginalized groups’ resilience to climate-related security risks through gender-responsive climate finance mechanisms
The gender-climate-security nexus provides an analytic lens to understand the gender-differentiated drivers and human security risks of climate change and conflict. Climate and conflict-related risks are not gender-neutral. Ignoring the role of gender in shaping vulnerability and resilience to these shocks threatens to disempower and exclude socially marginalized people in interventions and policies. While ‘women’ are never a homogeneous category, and research is emerging that highlights women’s resilience to climate and security impacts, existing gender gaps/inequalities indicate that women not in positions of power in their communities may experience heightened or differential vulnerability to climate-related security risks than men.

The gender-climate-security nexus facilitates gender-transformative research and policy approaches. By addressing the root causes of gender and intersecting social norms, relations, and inequalities, the gender-climate-security nexus identifies the processes through which these dynamics shape vulnerability and resilience to climate shocks and how climate impacts, interacting with these existing gender and social dynamics, create gender-specific human security risks. Using such a framing provides space for generating policy strategies to address underlying inequalities/power dynamics and create policy aimed at transforming harmful norms that inhibit equality.
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LIST OF ACRONYMS

CCAFS – Climate Change, Agriculture and Food Security Research Program
CSA – Climate-Smart Agriculture
GARDIAN – The Global Agricultural Research Data Innovation Platform
GCS – Gender-Climate-Security
GTA – Gender Transformative Approach
IPCC – Intergovernmental Panel on Climate Change
MENA – Middle East and North Africa
NAP – National Adaptation Plan
NAPA – National Adaptation Program of Action
SDG – Sustainable Development Goal
SIDA – Swedish International Development Cooperation Agency
UN – United Nations
UNFCCC – United Nations Framework Convention on Climate Change
UNFPA – United Nations Population Fund
GLOSSARY

Climate and Climate Change: The Intergovernmental Panel on Climate Change (IPCC) refers to climate as the “average weather” or more rigorously, as “the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands of years” (2018). This position paper refers to the impacts of climate change, defined as “a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer” (ibid., p. 544).

Gender: refers to the socially constructed system of classification that ascribes qualities of masculinity and femininity to people, often based on their biological sex. Gender characteristics can change over time and are different between cultures (Vinyeta et al., 2015). It encompasses the roles, behaviours, and activities deemed acceptable for people of different genders and influences the relationships between the people who fall within these groups. These attributes and relationships are socially constructed (UNFPA, 2005; UN Women Training Centre, 2017). “Gender determines what is expected, allowed and valued” (UN Women Training Centre, 2017) in a particular context at a given time, recognizing that this is changeable (NAP Global Network & UNFCCC, 2019, p.7).

Gender transformative: refers to approaches actively striving to examine, question, and change rigid social and gender norms and cultural values to address power inequalities between persons of different genders and the root causes of gender inequality and discrimination as well as seeking to redefine systems and institutions that create and perpetuate inequities. This approach aims to transform adverse gender norms and power dynamics into positive ones, thus accelerating the achievement of gender equality. In the context of climate change adaptation, it refers to approaches that “actively strive to examine, question, and change rigid gender norms and imbalances of power to increase people’s resilience. Gender-transformative activities encourage critical awareness among men and women of gender roles and norms; promote the position of women; challenge the distribution of resources and allocation of duties between men and women; and/or address power relationships between women and others in the community, such as service providers or traditional leaders” (CARE, 2010, p.3).

Intersectionality: refers to how unique lived experiences resulting from multiple identities and interacting with marginalizing structures, norms, and narratives interact (Colfer et al., 2018). The concept of intersectionality attempts to capture the complexity of social difference and how the experiences of individuals differ based on their multiple identities. It recognizes that gender intersects with other socio-cultural characteristics such as race, ethnicity, disability, sexual orientation, and age (Swedish International Development Cooperation Agency [SIDA], 2015; UN Women Training Centre, 2017) and that these intersections yield a
unique set of norms. An intersectional approach recognizes the differences among people of the same gender that must be understood for gender equality to be achieved (NAP Global Network & UNFCCC, 2019, p.7).

**One CGIAR:** refers to a dynamic reformulation of CGIAR’s partnerships, knowledge, assets, and global presence, aiming for greater integration in the face of the interdependent challenges facing today’s world. It comprises (i) a sharper mission statement and impacts focus to 2030, aligned with the Sustainable Development Goals (SDGs), in particular, SDG2 – Zero Hunger; (ii) unified governance; (iii) institutional integration, including a One CGIAR Executive Management Team, common policies and services, and a unified country and regional presence; (iv) a new research modality; as well as (v) more, and pooled, funding.

**Human security:** in the context of climate change, it refers to a condition that exists when the vital core of human lives is protected and when people have the freedom and capacity to live with dignity (Adger et al., 2014). This definition encompasses the security of survival, which entails mortality risks, and level of health; the security of livelihoods such as food, water, energy, shelter, income-generating opportunities, and environmental security; and dignity, which includes the protection of basic human rights, capacities, and participation in decision-making processes (Dankelman, 2010a).
In recent years, the nexus between climate change and security has gained considerable attention in both policy circles and academia (Busby, 2021). While it is widely established that climate is rarely the sole cause of armed conflict (Mach et al., 2019), it can act as a risk multiplier by exacerbating the economic, social, and political processes that lead to insecurity and conflict (Koubi, 2019). These effects are particularly severe in fragile and conflict-affected contexts where governance is weak or absent (Moran et al., 2018). In these settings, climate impacts on agricultural production and livelihoods (Vesco et al., 2021; Vestby, 2019), food and resource security (McGuirk & Burke, 2020; Raleigh, Choi & Kniventon, 2015) can fuel tensions between and within communities (Doring, 2020; van Weezel, 2019), lead to clashes between farmers and pastoralists (Aelloyoluwa Ikhuoso et al., 2020), as well as facilitate recruitment into non-state armed groups (Fjelde, 2015).

Largely missing from discussions around the security implications of climate change are the gender dimensions embedded in these issues (Ide et al., 2021). This is surprising given that gender norms, relationships, and power inequalities have been shown to shape vulnerability, adaptive capacity, and resilience to climate change (Huyer & Partey, 2020) and that gender dynamics can play a role in either increasing or mitigating conflict risk (Krause, 2019; Olsson & Forsberg, 2016). Although recent strides have been made towards integrating theory around the interconnections between gender, climate, and security (see Smith et al., 2021; UN Environmental Programme et al., 2020), these initiatives have been limited and narrowly focused on exploring the double impacts of climate and conflict on women and girls (Papworth, 2021).
However, such an approach is problematic for at least two reasons. Firstly, the misguided understanding of the core concept of gender leads to an oversimplification of gender issues, which includes the tendencies to equate “gender” with “women”, view gender as binary and non-intersectional, and obscures men’s roles in perpetuating, challenging, and transforming gender inequalities (de Jonge Oudraat and Brown, 2022). Secondly, conceiving of security as merely the absence of conflict or threats to state survival neglects more holistic dimensions of insecurity that people and individuals experience because of climate (Adger et al., 2021) and are shaped by gender along with other social identity markers (Tanyag & True, 2019).

Since a people-centred perspective is central to understand connections between gender, climate and security, this position paper looks beyond conflict to address how gender dynamics intersect with climate impacts to produce differential human security risks for women and men of different backgrounds.
This position paper provides a conceptual framework for the gender-climate-security nexus, a CGIAR portfolio review of work related to the nexus, and recommendations towards an agenda for One CGIAR in addressing the nexus. We anticipate the paper will help inform the One CGIAR and its stakeholders towards an understanding of the connections between gender, climate, and security through case study examples of the gender dimensions of climate-related security risks, a review of the CGIAR work to date on the gender-climate-security nexus and how this work can be used to promote gender transformative goals in climate security research, policy, and programming, as well as recommendations for One CGIAR on what actions should be taken to inform future research and policy in addressing gendered climate impacts and associated threats to human security.

The intended audience for this position paper is the One CGIAR and its partners, including donor organizations, researchers, governmental officials, policymakers, civil society groups, and other stakeholders and the public who are interested in learning more about how climate-related security risks shape and are shaped by gender and intersecting social norms, relations, and inequalities.
Climate impacts and related security risks, such as displacement, food insecurity and health risks, are not gender-neutral. Droughts, floods, and extreme weather events interact with existing gender and social norms, relations and inequalities in a way that disproportionately exposes marginalized groups to new and multi-faceted forms of insecurity. For instance, a study from UN Women Fiji (2014) finds that in the aftermaths of two tropical cyclones in Vanuatu in 2011, the reported cases of domestic violence against women and girls increased of 300% as a negative coping mechanism to deal with stress and loss of property. Similarly, a UN High Commissioner for Refugees’ report shows that transgender, intersex, and non-binary people often face increased protection risks during and after natural disasters due to unequal access to emergency reliefs and shelters (UNHCR, 2020).

Despite growing recognition by international institutions and development practitioners that an intersectional gender lens is crucial to address climate and security issues, current research streams have yet to produce a comprehensive theoretical understanding of how climate interacts with existing gender and social inequalities to affect human security. Similarly, the more holistic and different dimensions of insecurity that women and men of different backgrounds (e.g., age, race/ethnic community, class/caste) experience due to climate shocks remain largely unexplored within the climate and security literature.

This position paper aims to fill these gaps by developing a unified conceptual framework – the gender-climate-security nexus – to investigate the overarching pathways through which gender-specific vulnerabilities and risks intersect with climate impacts to produce differential
security risks for women and men within different social groups. We identify four gendered climate-related security risks: resource scarcity, loss of livelihoods, mobility and migration, and intra-household and communal conflict. While these risks materialize and interact in different ways based on local context, they facilitate investigation of the dynamics of interaction between climate impacts and gender inequalities/power relationships using a holistic approach. We anticipate this conceptual framework can be used towards projects and interventions to promote gender transformative goals and inform future agenda-setting in the gender-climate-security nexus.

This position paper focuses on three key objectives, underscored by four research questions (RQs):

**Objective 1:** To create a conceptual framework to explore the connections between gender, climate, and security that would enable an analysis of both how climate interacts with gender and intersecting inequalities to affect human security and identify the gender-specific human security challenges of climate impacts.

**RQ1:** How does climate interact with gender and intersecting inequalities to affect human security?

**RQ2:** What are the gender-specific human security challenges of climate impacts?

**Objective 2:** To engage in a Portfolio Review of the CGIAR to review the extent to which, and how, the CGIAR has engaged with the gender-climate-security nexus, and how this work can be used to promote gender transformative goals in climate security research, policy, and programming.

**RQ3:** To what extent and how has CGIAR engaged with the gender and climate security nexus, and how does this work can be used to promote gender transformative goals in climate security research, policy, and programming?

**Objective 3:** To identify the gaps in how CGIAR has tackled gender-specific vulnerabilities and insecurities and what actions should be taken to inform future research and policy.

**RQ4:** Where do gaps lie in how CGIAR has tackled gendered climate-related security risks, and what actions should be taken to inform future research and policy?

The remainder of the paper is organized as follows. The next section presents the conceptual framework, which addresses how climate interacts with gender and intersecting inequalities to affect human security and identifies several gender-specific human security challenges of climate impacts. The methodology and results from the CGIAR Portfolio review follow. The final section provides research, programming, policy, and finance recommendations emergent from the conceptual framework and CGIAR Portfolio Review.
2.1. Introducing the framework

Our framework is anchored in the work of Dankelman (2010a, 2010b, 2010c), who provides a foundational conceptualization of human security and entry points for gender analysis. Human security is people-centred and encompasses the security of survival, which entails mortality risks, and level of health; the security of livelihoods such as food, water, energy, shelter, income-generating opportunities, and environmental security; and dignity, which includes the protection of basic human rights, capacities, and participation in decision-making processes (Dankelman, 2010a). This framing of human security, tied together with a gendered analytical lens (Dankelman and Naidu, 2020), is necessary to capture holistic elements of risk that affect well-being and meaningful lives and materialize based on existing gendered and social inequalities, relations, and norms. Figure 1 presents a visual representation of our conceptualization of the gender-climate-security nexus. By incorporating core elements from different research streams, it highlights that many gender and intersecting issues that heighten social vulnerability are further exacerbated by climate impacts with dire implications for the human security of the most marginalized.
Within our conceptualization of the gender-climate-security nexus, we posit there are two reinforcing pathways to describe how these phenomena are interconnected. The first pathway (Figure 2) is informed by existing literature on gender and climate change and details how existing gender inequalities (and other intersecting aspects of social inequalities) and relationships impact and/or constrain resilience to climate shocks. By capturing the additional intersecting aspects of social inequalities, the framework facilitates analysis of how people’s multiple identities interact with marginalizing structures, norms, and narratives to produce potentially different experiences and outcomes. This pathway addresses how gender norms, relationships, and power inequalities shape vulnerability, adaptive capacity, and resilience to climate change (Huyer & Partey, 2020). For example, in climate emergencies such as floods, existing gender norms around women’s mobility, unequal intra-household relationships, and disparities in access to climate information often constrain women’s ability to adapt, making them more vulnerable (CARE, 2010).

**Figure 1.** Visual representation of the gender-climate-security nexus.

**Figure 2.** Visual representation of how gender and intersecting social dynamics affect vulnerability and resilience to climate shocks (Pathway 1).
Although intersex, transgender, and non-binary people and men’s insecurities and vulnerabilities have been largely ignored, they are equally important to understand. For example, men are also destabilized by loss of livelihoods from climate emergencies due to underlying gender norms that make them unable to address their emotional vulnerabilities/or rebuild their ‘breadwinner livelihood roles’ in post-disaster situations. During these times, men may lose their status in society and become depressed and/or abusive (Dominelli, 2020).

Gender and intersecting inequalities that could impact, constrain, and mediate vulnerability and resilience to climate shocks include inequalities in participation in decision-making at different levels, work burden, access to and use of productive resources such as agroclimatic information, technology, livelihood incomes and credit, and collective action (Huyer et al., 2021). Conversely, approaches to climate-security issues that address these inequalities could work to “reduce women and men’s vulnerabilities, promote their capacities for resilience, support the ability of women to exercise their agency, and consequently, increase gender equality” (Huyer et al., 2021, p.263).

**Figure 3.** Visual representation of how climate impacts interact with gender and intersecting social dynamics to produce gendered human security risks (Pathway 2).

While gender, along with other axes of social differentiation, influences how people experience climate shocks, the latter amplify and reinforce existing inequalities, thus locking specific individuals and groups in a trap of increased vulnerability, marginalization and insecurity. We, therefore, propose a second pathway (Figure 3) to detail how climate impacts interact with gender and intersecting social norms, relations, and inequalities to produce differential human security risks for women and men of different backgrounds. Climate impacts interact with existing gender and social norms, relations and inequalities in a way that disproportionately exposes marginalized groups to new and multi-faceted forms of insecurity (Dankelman and Naidu, 2020). This second pathway arose from the need to broaden discussions around the security implications of climate change to include specific gender considerations.
2.2. Exploring Pathway 1: How do gender and intersecting social dynamics affect vulnerability and resilience to climate shocks?

“Disasters [and climate change] encompass not only the physical reality of an eroding environment but also reveal and exacerbate the underbelly of gender inequalities” (Alston, 2021, p.343).

Gender, along with class, race, age, and other intersecting social identities, contribute to shaping the roles, power, and resources available to women and men in any culture (CARE, 2010), including the resources necessary to deal with and recover from climate change (Huyer, 2016a). For example, gender inequalities in decision-making, access and use of productive resources, workloads, and collective action affect the level of adaptive capacity women and men have towards dealing with climate shocks (Huyer et al., 2021). The first pathway has already been explored in the existing literature on gender and climate change. Several key themes/discourses have emerged from this literature: women’s vulnerability, gender-differentiated impacts, intersectionality and gendered coping strategies and resilience. These themes are synthesized below.

2.2.1. FROM WOMEN’S VULNERABILITY TO GENDER-DIFFERENTIATED IMPACTS AND INTERSECTIONALITY

The dominant theme for many years within the gender and climate change literature was that vulnerabilities related to climate and its effects on community are gendered (Morchain et al., 2015; Moosa & Tuana, 2014; Goh, 2012). The main arguments are that women and men are affected differently by adverse climatic conditions and that women and girls are generally more vulnerable than men, especially in developing countries where they directly depend on natural resources for livelihoods and subsistence income (Cooper, 2018; Beuchelt & Badstue, 2013). Nevertheless, “women” are not a homogeneous group, or inherently vulnerable to climate shocks (Arora-Jonsson, 2011). Instead, differences in vulnerability and coping strategies are influenced by social and economic structures that ascribe distinct roles to women and men of different backgrounds and dictate how access to income, resources, and decision-making is distributed (Rao et al., 2019, Colfer et al. 2018). However, to date, less attention has been paid to men’s vulnerabilities, although there are a few exceptions, including the work of Alston and Whittenbury (2013), who have drawn attention to the collapse of male farming identities and increase in male suicides following a ten-year-long drought in Australia’s agricultural basin.

In many developing countries, customary laws and institutions perpetuate unequal power relations between women and men in ownership and access to assets such as land and water rights, livestock, and agricultural inputs (Chigbu, 2019). Accordingly, rural women often control less and lower quality land than men, and land tenure insecurity excludes them from agricultural credits and extensions crucial for implementing adaptive practices (Jost et al., 2016). Gender disparities in wage and employment are other essential facets of inequality
and vulnerability (Rao et al., 2017). Moreover, the gender division of labour often places the responsibility for household care work on women by tending subsistence crops and small livestock and collecting firewood and water to ensure household well-being (FAO, 2003). These gendered roles amplify women’s vulnerability, making them highly reliant on natural resources and taking their time away from income-generating productive activities (Huyer, 2016a).

Several studies have explored the structural drivers of gender inequalities in climate change vulnerability and resilience, focusing on how gender intersects with other social factors to determine adaptive capacity (see Colfer et al., 2018; Kristjanson et al., 2017; Mishra and Pede, 2017). Intersectional analyses have revealed that low-income women and female-headed households are hindered in responding to and recovering from climate impacts based on financial and resource constraints than higher-income and married women (Davidson, 2016; Tall et al., 2014; Twyman et al., 2014). For example, educated women from powerful, wealthy, and/or high caste households are less likely to face the risks associated with collecting water or firewood and can draw on alternative resources to enhance their resilience to the impacts of climate compared to relatively poorer/less powerful women (Ide et al., 2021). Age differences and intra-household position (e.g., mothers-in-law v. daughters-in-law) among women in a household may also influence power differentials in access to resources (Leder and Sachs 2019). Furthermore, research by Tavenner and Crane (2019a) in Tanzania found that women’s access to capital, land, cows and other resources necessary to engage in climate-smart dairy production depended on whether they were in a monogamous or polygamous relationship and their position of wifedom (i.e., first, second, third, Etc.).

2.2.2. GENDERED COPING STRATEGIES AND WOMEN’S CONTRIBUTIONS TO COMMUNITY RESILIENCE

“An overemphasis on women’s vulnerability can obscure the leadership qualities, unique skill sets, and important perspectives women bring to issues of climate change, security, and natural resource management” (Smith et al., 2021, p.14).

Despite their vulnerabilities to climate change, rural women can be important agents of change and innovators (Huyer, 2016b; MacGregor 2010). Unfortunately, within the international climate policy discourse, there has been less emphasis on supporting women to actively address and participate in adaptation and mitigation actions and far greater attention on women’s vulnerability (i.e., the attitude of women as victims of climate change in need of ‘saving’) (Huyer, 2016b). This is a shame considering women have proactively adopted many different types of specific climate-smart practices, technologies, and livelihoods changes as coping strategies (Aregu et al., 2018; Shaw & Kristjanson, 2013). These strategies, including those that have used collective action, have contributed towards household and community level resilience in the form of enhanced food security, increased capacity, and leadership (e.g., Ouédraogo et al., 2018).
2.3. Exploring Pathway 2: What are the gender dimensions of climate-related security risks?

Given there is little research on how gender interacts with climate impacts to affect human security, we conducted a brief scoping study to identify the most known climate-related security risks and explored these using a gender lens. Four climate-related security risks are of relevance for this study: resource scarcity, loss of livelihoods, mobility and migration, and intra-household and communal conflict, each of which is discussed and summarized below. While we acknowledge that there is significant overlap between these risk areas (e.g., resource scarcity accelerates loss of livelihoods which can result in migration and/or lead to intra-household/communal conflict), they are distinct enough to warrant individualized discussion. For example, while access to scarce resources and livelihoods are fundamentally interlinked, in addressing resource risks, we also refer to the direct relationship women (particularly indigenous women) have with the environment through their traditional ecological knowledge and cultural valuation associated with natural resources (and how resource scarcity could impact this relationship), whereas livelihoods refer mainly to the capacity to cope and recover from shocks.

Box 1. Are climate-related security risks gendered? A case study of internal migrants from the Ganges delta of Bangladesh and India

By Tanaya Dutta Gupta1

In the Ganges delta, the loss of agricultural production due to cyclones, storm surges, and saltwater intrusion has forced landless marginal labourers to migrate to urban areas within Bangladesh and India. Each year, hundreds of thousands of male and female migrants are reported to arrive in Dhaka– the sprawling capital of Bangladesh – where they typically find informal work in brick kilns and garment factories. Men often become rickshaw pullers and women domestic workers in urban residences. Labour exploitation and hazardous working conditions or indebtedness to predatory contractors or agents are experiences commonly faced by many migrants. For those who mainly worked in fields and relied on natural resources, the abrupt change in the type of work available in urban areas likely puts their health and well-being at risk.

Female participants in Korail, one of the largest slums in Dhaka, report the disproportionate burden they carry to provide for their families, using the meagre wages they could earn as garment factory labourers or domestic workers while also taking care of their children and household chores. As Arifa, a female participant who works in a garment factory after relocating to Dhaka due to a devastating flood, says: “I would walk a long distance to work, [I] did not even have few pennies for the bus ticket. After coming here [in Korail], I could not pay the rent… How else would I feed the children? My husband was ill.”
Box 1. (continued)

Human security risks related to food, nutrition, health, and income for women in Korail slum are compounded by overcrowded living conditions and daily struggles to access basic facilities like electricity, gas, water, and sanitation. Additionally, sexual and gender-based violence, including domestic abuse, child marriage, and harassment in public places, threaten women and girl migrants.

That climate-related insecurity risks are gendered is further revealed by the COVID-19 lockdown in India. Male migrant workers stranded in various urban areas without adequate food, shelter, and income support, returned to their villages in the Indian part of the delta region. The lockdown disproportionately affects these migrants, as they face serious financial precarity and food insecurity. Kailash, a male participant, returning from another state, remembers the conundrum many found themselves in: “We did not have enough food or anything else; we had to communicate with our homes for money to be able to eat.”

Upon their return, migrants were further confronted by the devastating effects of cyclone Amphan that made landfall in the region during the pandemic. The compounding of multiple crises exacerbated livelihood insecurity for the return migrants, who also felt socially isolated from the rural community due to COVID-related fears surrounding their return. As Bikash, another male participant reflected: “those who had come from outside, they were not treated like before.” In contrast to their status as remittance senders, these men were now being regarded as potential carriers of the virus. Instances like this can stoke perceptions of discrimination and social exclusion, with negative implications for men’s self-esteem and worth in a patriarchal society.

Gendered experiences of intertwined crisis and insecurities call for focusing on the lens at the intersections of gender, income, and generation, among other axes, to advance understanding of the climate security nexus in regions like the Ganges delta.

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2.3.1. RESOURCE SCARCITY
Climate variability and extreme weather events can affect the resource base and alter resource access, with adverse effects on rain-fed agriculture and pastoralism. While both women and men are affected by climate change, socially constructed gender roles and power relations generate differential vulnerabilities and resilience to withstanding climate impacts (Muchacha & Mushunje, 2019; Arora-Jonsson, 2014). Women across all types of households generally face
unique risks compared to men based on their position in their households and communities (Nyantakyi-Frimpong & Bezner-Kerr, 2015; Perez et al., 2015). These gendered security risks related to resource scarcity are evident across several gender issues: gender norms, relations and inequalities in land ownership, resource rights, use of resources and participation in natural resource management deepen the impact climate shocks have on women and marginalized groups (Ribot, 2013; Buechler, 2009). Deteriorating ecological conditions and resulting competition over dwindling resources lead women to have limited access to fertile land, clean water, and livestock (Kristjanson et al., 2014), generating both economic insecurity and food insecurity (Karmakar, 2021). Given that women often contribute directly to the food security of their households and communities through household gardens, plant management, and collection of medicinal and edible plants, resource scarcity can significantly impact women’s contribution to household and community resilience (Yang et al., 2018).

The gendered division of labour, particularly around the collection of water and fuelwood, heightens gendered-climate risks, including increased risk of sexual and gender-based violence (Castañeda Camey et al., 2020). Worldwide, in almost two-thirds of households, women are responsible for fetching water for drinking, cooking, and sanitation (FAO, 2011). This gender division of labour makes women highly sensitive to changing climatic conditions as, during dry seasons, they need to travel longer distances to gather water, as well as food and fuelwood (Resurreccion, 2013). Thus, any instances of resource scarcity increase women’s workload and may place new or intensify domestic and agricultural burdens on girls, resulting in them missing or leaving school (Yadav & Lal, 2017; Swarup et al., 2011). Several examples reveal that women and girls disproportionately suffer from verbal, physical and sexual violence both within and outside the household as a spill-over effect of water insecurity (Owren, 2021; Le Masson et al., 2019). For instance, a study from Bangladesh reveals that women and girls who coped with changing climatic conditions by walking longer distances to gather water or wood experienced instances of stalking, verbal threats, and harassment (Zaman, 2020).

Due to their reliance on the environment, indigenous women and women in resource-dependent communities are often the first to feel climate impacts via the reduction of resources through environmental degradation and climate variability (Lau et al., 2021). Given that women’s knowledge of natural resources contributes to community and cultural resilience (Tavenner, 2018), new strategies for integrating their knowledge and strategies into more formal natural resource management policies and practices are essential. A growing body of research is dedicated to this objective, with strategies aimed at engaging men/masculinities in approaches to more gender-responsive natural resource management (Bonatti et al., 2019).

**2.3.2. LOSS OF LIVELIHOODS**

Due to climate impacts on agriculture and food production, worsening conditions are likely to lead to different livelihood and security outcomes for women and men (Kristjanson et al., 2014; Peterman et al., 2014). Much of the literature on loss of livelihoods in agrarian contexts has focused on women’s increased vulnerability to climate shocks based on existing gender
and social norms, relations, and inequalities (Glazebrook et al., 2020; Call & Sellers 2019). For example, in many agrarian contexts, men have greater access to agricultural credits, markets and technical assistance, which increases their capacity to cope with changing climatic conditions (Jost et al., 2016). Conversely, women farmers often face barriers in accessing productive resources, climate and agricultural information, training opportunities, and technologies crucial to sustaining livelihoods under climate stress (Huyer et al., 2015). Moreover, women are not always considered to be farmers, and this, in turn, limits their participation in adaptation decision-making, implying that their specific needs in farming are rarely addressed (Davidson, 2016).

Despite their significant contribution to the agricultural labour force, women generally hold lower-wage, part-time and informal positions, meaning that they are less able to invest in new livelihood strategies or purchase agricultural inputs to reduce production volatility (Rao, 2012). Moreover, customary law often does not guarantee the same access to land and other assets such as wells and livestock to women and men, and insecure land tenure further constrains women’s livelihood coping mechanisms (Tuana, 2013). These dynamics lead to major economic and food insecurity, subjecting women to severe food shortages, gender-based violence and, in some instances, to join an armed group or entering prostitution to secure their access to food and staple commodities (Chandra et al., 2017). Overall, much of the existing literature has focused on how the loss of traditional means of production amplifies women’s economic insecurity and leaves them with fewer capacities to cope with and recover from climate extremes (McKune et al., 2015).

Effects on men and impacts on masculinities of loss of livelihoods due to climate change and climate-related conflict has not been explored to the same extent, although this trend appears to be changing, as evidenced by recent studies (e.g., Dominelli, 2020). Men and boys often are privileged in terms of access to resources and skills, however, when these are unavailable, young men may be forced to join armed groups or migrate into urban areas as ways to overcome poverty (UNHCR, 2020). High rates of youth unemployment are often seen as root causes of violence and conflict. The lack of economic opportunities, political inclusion, and social capital in poor performing economies, characterized by weak governance and a large youth population, are often ingredients for youth engagement in violence. Discontent with economic opportunities can lead to competition for limited educational and employment. However, evidence from the Near East, North Africa, Europe, and Central Asia suggest that, rather than being instigators of conflict, young people are affected more often as refugees, with long-lasting negative consequences on education and welfare (Bullock et al., 2020).

While less is known as to the situation in fragile contexts/less-developed countries, the social impacts associated with long-term climate changes in the form of drought are well-documented in Australia, with a significant body of work dedicated to the impact of loss of farming livelihoods on men’s sense of self and expressions of masculinity (Alston & Whittenbury 2013). For example, during the ten-year Millennium Drought in the Murray-Darling Basin, men
lost their ‘masculine’ identities as farmers as many were bankrupted due to livestock death and no longer able to serve as ‘breadwinners’ for their families. As a result, they became socially isolated due to the constant need to hand feed and water livestock, and they experienced significant rises in levels of stress, anxiety, and other health impacts, including a four-fold increase in male suicides (Alston & Whittenbury, 2014).

For both women and men, climate change is transforming rural communities’ economic activities that have historically relied on farming, in the form of off-farm income for economic stability and mitigation of risk. Recent studies have begun to engage with what these transformations mean for gendered livelihoods in terms of the disruption of traditional gender norms and the possibility of women’s empowerment through livelihood change (e.g., Casey et al., 2021; Cely-Santos et al., 2021). For example, paid labour on large farms and in agribusiness has become a central feature of the diversification of rural labour (IFAD, 2021) alongside entrepreneurship (Kawarazuka & Prain, 2019). However, there is still a need to document how rural women and men operationalize entrepreneurship in their communities, and how these practices challenge traditional norms and potentially generate new opportunities for equality.

2.3.3. MOBILITY AND MIGRATION

Gender is a key factor in shaping both women’s freedom of movement (mobility) and migration decisions and abilities. Unequal gender relations and norms may restrict women’s mobility as they dictate how access to resources, income, and decision-making power is distributed between each social group (Sultana, 2013). For example, gender norms that mediate women’s ability to move outside the home may restrict their access and freedom to take transportation (either to self-drive bicycles or cars, or to take public modes of transport in the form of taxis, buses, or trains). These restrictions effectively limit or prohibit women’s ability to access natural resources, markets, education, employment, and other services that are required to seek out and maintain climate-resilient livelihoods (Hafzia & Neelormi, 2015). Thus, restrictions on women’s freedom of movement generate gender-differentiated environmental and economic insecurities. For example, women who are less mobile would be directly exposed to climate risks, which further compromises their ability to cope with and recover from environmental shocks (Gioli et al., 2014; Hunton & Davis, 2009).

While studying the linkages between climate, gender inequality and migration in East Africa, Abebe (2014) found that rural women’s immobility was due to a lack of assets, property ownership, employable skills, and social networks. Furthermore, even when adequate resources are available, women may be more likely to remain in the environmentally affected areas to live up to their prescribed reproductive and caregiving obligations (Pandey, 2019; Velan & Mohanty, 2015). This is posited to be caused by traditional gendered roles that often circumscribe women’s work to the household and the farm while placing the responsibility of providing for their families on men (Lama, Hamza & Wester, 2020). However, these dynamics have been questioned recently by Boas et al. (2022), who advocate for a more fluid framework to understand gender relations in the context of environmental change and human mobility,
and to eschew assumptions that mobility is unidirectional or moncausal, or inherently positive or negative. For example, staying in place, whilst the husband moves to another area for seasonal work, may, in some cases, increase women’s mobility used to co-design their families’ futures in environmental change. But for others, it can exacerbate women’s mobility dependencies on other men (e.g., in decision-making on their local mobility to markets).

While the casual linkages between climate change and migration are contested and are clearly influenced by a mix of climatic, socio-economic, cultural, and political factors (Boas et al., 2019), restrictions on women’s freedom of movement are intrinsically interlinked with their ability to migrate (Bettini & Gioli, 2016; Chikandar, 2012). While women’s motivations for mobility and migration are diverse, out-migration from agricultural communities has tended to focus on men’s out-movements (Tiwari & Joshi, 2016; Bezu et al., 2020). These dynamics frequently lead to the ‘feminization of agriculture’ for the women and girls left behind to manage the farm in addition to their usual tasks (Najjar, 2021). Male outmigration can have dramatic consequences for rural households, especially for those who do not benefit from remittances sent from male migrants (Le Masson et al., 2019). Changes in the family composition increase women’s workload; they must fulfil their traditional domestic responsibilities and engage in income-generating activities to maintain the household in the absence of men, and often are not able to access the resources and services available to men, such as extension, credit, and agricultural inputs (Gioli et al., 2014; Bhatta et al., 2015; Rao et al., 2019). Moreover, when women take on new roles in the absence of men, when men return to their households and communities, this can generate intra-household conflict and disruptions with the expectation that women will return to their traditional roles. These dynamics push back on women’s gains in status and economic empowerment.

Extreme climate events in conflict-prone agrarian communities appear to force women to migrate, and may also result in increased discrimination, loss of customary rights to land, resource poverty and food insecurity. Research in the Philippines finds that women may migrate to urban areas and overseas as a voluntary coping strategy for conflict and natural disasters (Chandra, 2017). Interestingly, recent figures suggest that households in rural areas have more or less equal rates of international migration between young women and men (ILO, 2021), which suggests a critical gap in the literature on women’s migration practices.

2.3.4. INTRA-HOUSEHOLD AND COMMUNAL CONFLICT
Resource scarcity and the disruption of traditional gender roles and norms due to loss of livelihoods can heighten the risk of intra-household conflicts, which have direct implications for the security of women and sexual minorities in everyday contexts, including in the form of sexual and gender-based violence (Thurston et al., 2021). For instance, evidence from Pakistan indicates that, in some instances, women who were no longer capable of fulfilling their traditional tasks over water collection experienced domestic violence and physical abuse from their husbands for failing to secure water (Sawas et al., 2020). Similarly, a case study from Uganda reveals that agricultural failure led men to take control of and sell crops traditionally grown by women for domestic use and this increased household tensions
and physical violence against women as means to assert control over resources and land (Castañeda Camey et al., 2020).

While changing climatic conditions can amplify the risk of domestic and intimate partner violence by creating the conditions for disrupting traditional gender norms, they can also increase competition and tensions over access and use of scarce resources, which in some instances may turn violent (Fjelde & von Uexkull, 2012; Raleigh, 2010). Gender norms and rigid interpretation of masculinity and socially appropriate behaviour for men can play a role in facilitating the violent escalation of resource-related conflicts, especially at the local level (Ide et al., 2021). Moreover, climate-induced conflicts and communal violence have gender-differentiated impacts that depend on the specific position assigned to each group in the respective social structures (Fröhlich & Gioli, 2015). Existing research refers to women and men’s ‘traditionally’ different roles in conflict: men and boys are more likely to actively participate in the fighting while women and girls are expected to maintain the household in men’s absence (Bandarage, 2010). The fact that women during combat are responsible for their families makes them particularly susceptible to violence. For example, a study from north-western Kenya shows that conflicts over dwindling water supplies between pastoralist communities posed major risks to women, as they were not able to flee during raids because of their caregiving roles (Omolo, 2010).

Sexual and gender-based violence is probably the most acute manifestation of the security implications of climate-induced conflicts (Brody, Justina and Esplen, 2008). While it can target both men and women, the latter remains the largest percentages of victims. For instance, evidence from Nigeria shows that sexual abuse and direct attacks were common threats faced by women and girls during farmer-herder conflicts, especially when men were away combating (Ademola-Adelehin et al., 2018). Similarly, a study from Northern Nigeria reveals that rape of women and adolescent girls is often considered a tactic of conflict perpetrated by both farmer and pastoralist men (Nagarajan, 2020). Violence against women and sexual exploitation, in some instances, are found to intensify conflict dynamics as masculine norms impel men to retaliate when their families’ well-being is endangered (Nagarajan, 2020; Ademola-Adelehin et al., 2018).

Women often bear the brunt of the consequences of communal conflict (Krause, 2020). Loss of male family members in conflict can cause trauma and post-traumatic stress disorders, which manifest in poor mental and physical health and difficulties in managing the household (Krause, 2019). The loss of male family members places a heavy economic burden on women left to generate income for their families. Female-headed households are likely to face severe food and livelihood insecurity as they have poor customary rights to land, wells, and livestock (Omolo, 2010). In addition to conflicts, the hidden conflict of femicide among attacks and assassinations of women environmental defenders is a key issue at the heart of the gender-climate-security nexus. For example, in the Amazon, attacks and assassinations on women environmental defenders have become disturbingly commonplace (Orwen, 2021).
Building on the CGIAR’s body of gender research, we reviewed its past and ongoing portfolio to investigate to what extent and how it has engaged with the gender-climate-security nexus to further expand understanding of the gender-differentiated vulnerability, risks and opportunities associated with the impacts of climate change.

3.1. Methodology

This portfolio review provides an overview of CGIAR gender-oriented research and programming as it relates to climate security. The purpose is to analyse CGIAR contributions to address the gender dimensions of climate-related security risks and explore how this work informs gender-responsive approaches to climate security research and policymaking. Moreover, this review sets out to understand gaps in CGIAR engagement and draws a set of targeted recommendations for future investments and research priorities based on these gaps.

3.1.1. IDENTIFICATION AND SELECTION OF PUBLICATIONS

First, we developed a comprehensive list of keyword combinations to help identify relevant publications. Keyword combinations were then entered into two CGIAR digital databases, the GARDIAN\textsuperscript{2} and the CCAFS publication repository\textsuperscript{3}, which returned 2581 information products. The first screening of publications based on their titles and abstracts expelled 2163

\textsuperscript{2} https://gardian.bigdata.cgiar.org/#/
\textsuperscript{3} https://ccafs.cgiar.org/resources/publications
publications, leaving 418 items. We then examined the remaining publications by reading the entire piece to assess their eligibility according to four criteria.

Firstly, the publication must focus on low and middle-income countries with an emphasis on Africa, Asia, MENA, and Latin America. This is because these regions are marked by relatively high levels of climate exposure, state fragility and gender inequality (Boyer, Meijer & Gilligan, 2020). Secondly, the publication must be published between 2011 and 2021 as CGIAR gender research has increased significantly since the first system wide CGIAR gender strategy in 2011 (Paez Valencia et al., 2019). This also ensures that the findings are relevant to ongoing discourses and developments in the field of climate security, which has seen a rapid expansion in the last decade (von Uexkull & Buhaug, 2021).

The third inclusion criterion was that the publication must explore some aspect of the relationship between climate change and conflict. Although most CGIAR research does not directly address this nexus, it frequently deals with the environmental, economic, social, and political processes assumed to influence the causal pathways linking climate and violent conflict (see Liebig et al., forthcoming). Therefore, we included publications focusing on one or more of these processes. Our final criterion was that the publication must suggest at least one gender equality outcome defined in terms of greater gender parity and increased women’s agency across key domains/areas of gender power inequalities (see Table 1 below). This condition was used to ensure that publications aligned with our operationalization of the gender-climate-security nexus and adopted, albeit implicitly, a human security perspective. Indeed, the gender equality outcomes are meant to reflect one or multiple dimensions of human security identified in our conceptual framework.

The screening procedure with the four criteria identified 211 relevant publications. We then expanded the sample by consulting the CGIAR Gender Platform to ensure the inclusion of all relevant publications. The overall selection process led to the inclusion of 234 publications.

3.1.2. INFORMATION EXTRACTION

We established several fundamental categories to extract information from each of the information products included in the review. Firstly, key publications attributes (e.g., gender groups targeted, thematic and action area, year and geographical focus, type of publication and methodology used) were recorded to provide an overview of CGIAR gender portfolio. Secondly, each publication was classified based on the risk area (i.e., resource scarcity, loss of livelihoods, mobility and migration, and intra-household/communal conflict), and data on the key gender issues at stake were collected. Finally, information on the gender equality outcome

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4 The gender equality outcomes were developed by connecting multiple framings. First, Huyer et al (2021) present a framework for the prioritization of gender issues in climate policy that highlights four critical dimensions of gender inequality in climate-resilient agriculture: (1) participation in decision-making at all levels; (2) work burden; (3) access to and use of productive resources; and (4) collective action. We then expanded it following Evans and Nambiar (2013) and Dankelman (2010a) to ensure that all dimensions of human security identified in our conceptual framework were reflected.

5 https://gender.cgiar.org/publications-data
### Table 1. Gender equality outcomes and how they relate to the GCS nexus

<table>
<thead>
<tr>
<th>Gender Equality Outcomes</th>
<th>Description of relation to the GCS nexus</th>
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<tbody>
<tr>
<td>Access to, use, and control over resources</td>
<td>Greater gender parity and women’s increased agency in access to, use, and control over productive resources (such as agroclimatic information, technology, livelihoods, and credit) enhance resilience to climate change and mitigates gender-specific human security risks related to resource scarcity and loss of livelihoods.</td>
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<tr>
<td>Income and economic opportunities</td>
<td>Greater gender parity and women’s increased agency in income and economic opportunities (such as formal and informal labour market opportunities, diversified income streams) enhance resilience to climate change and mitigates gender-specific human security risks related to loss of livelihoods.</td>
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<tr>
<td>Work burden and time allocation</td>
<td>Greater gender parity and women’s increased agency in time allocation (such as climate-smart agricultural technologies and practices for adaptation that reduce workloads and negative impacts on women) enhance resilience to climate change and mitigates gender-specific human security risks related to resource scarcity and migration/mobility.</td>
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<tr>
<td>Participation in decision-making</td>
<td>Greater gender parity and women’s increased agency in decision-making at all levels (community, intra-household) enhance resilience to climate change and mitigates gender-specific human security risks related to loss of resources, livelihoods, and migration/mobility.</td>
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<tr>
<td>Enhanced food security</td>
<td>Gender parity and women’s increased agency towards enhanced food security enhances resilience to climate change by ensuring access, availability, and consumption of nutritious and culturally appropriate food and mitigates gender-specific human security risks related to resource scarcity and loss of livelihoods.</td>
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<tr>
<td>Collective action</td>
<td>Gender parity and women’s increased agency in collective action to address and mitigate climate impacts enhances resilience to climate change by creating a platform for access, agency, and voice, and mitigates gender-specific human security risks related to loss of livelihoods and intra-household/communal conflict.</td>
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<tr>
<td>Freedom of movement</td>
<td>Gender parity and women’s increased agency in freedom of movement enhances women’s resilience to climate change and mitigates gender-specific human security risks related to immobility.</td>
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<tr>
<td>Freedom from violence</td>
<td>Gender parity and women’s increased agency in freedom from violence enhances women’s resilience to climate change and mitigates gender-specific human security risks related to intra-household/communal conflict.</td>
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<tr>
<td>Transforming gender norms</td>
<td>Transforming gender norms addresses how the root causes of gendered inequalities influence both vulnerabilities and resilience to climate change, thus creating opportunities for policies and interventions to be gender-responsive/gender-transformative in mitigating gender-specific human security risks related to resource scarcity, loss of livelihoods, migration/mobility, and intra-household and communal conflict.</td>
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was reported to provide a comprehensive picture of how CGIAR has contributed to addressing the gender-climate-security nexus. It is important to underline that, depending on the nature of the information product analysed (see Table 2 below), the gender equality outcomes were presented either in the form of a recommendation to move towards greater gender parity or as tangible outcomes, as in the case of project reports.
Table 2. Publications based on type of source and information product analysed

<table>
<thead>
<tr>
<th>TYPE OF SOURCE</th>
<th>Research</th>
<th>Project</th>
<th>Tools</th>
<th>Partnership</th>
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<td>18</td>
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<tr>
<th>Information product type</th>
<th>Journal articles</th>
<th>Policy and research briefs</th>
<th>Working and discussion papers</th>
<th>Reports</th>
<th>Books, manuals and guides</th>
<th>Posters and presentations</th>
<th>Conference papers</th>
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3.2. Results and discussion

This section presents and discusses the results of the descriptive analysis. It begins by briefly synthesizing key attributes of the publications reviewed, followed by findings for each of the risk areas identified in our proposed conceptual framework. Finally, the key findings related to the gender equality outcomes are provided.

3.2.1. KEY PUBLICATIONS ATTRIBUTES

**Gender groups targeted**

Figure 4 below shows which gender groups within our sample of 234 publications were the most targeted. As can be seen, information products that targeted both women and men were the largest group (52%), followed by youth (19%), marginalized groups (15%), and women-only (8%). Ethnic minorities and other groups, including the elderly and disabled made up 4% and...
2%, respectively. There were no information products mentioning non-binary people. These results indicate that, while some information products have used a broader analytic lens to examine other intersecting identities/inequalities, they represent a minority in terms of how the CGIAR has engaged with more diverse targeting in the Gender-Climate-Security nexus.

**Thematic and action areas**

Figure 5 shows that the majority of CGIAR contributions to the gender-climate-security nexus dealt with the CSA technologies and practices thematic area (45%), followed by priorities and policies for CSA (23%), climate services and safety nets (17%), and climate mitigation (14%). Only three publications focused on climate finance, accounting for 1% of the sample.

![Figure 5. Distribution of publications by thematic area (in percentages).](image)

On the one hand, it is positive that gender issues have been explored across these diverse CGIAR thematic areas, as this illustrates the effective mainstreaming of gender concerns more broadly into agenda-setting. However, this mainstreaming has been uneven, with climate mitigation and climate finance representing the minority of the sample. These results are perhaps unsurprising, as climate change mitigation has been identified as an area where women are very much absent, except as providers of labour for carbon reduction programs (Huyer et al., 2021), and climate finance remains an important albeit relatively novel concept in the gender literature (Atmadja et al., 2020a). Clearly, much more needs to be done to support women's agroforestry activities and low-emissions development strategies in low-carbon frameworks, and to explore the role of climate finance in promoting gender equality in climate change adaptation and mitigation.

Regarding the gender action areas, information products displayed a certain degree of heterogeneity (Table 3). Most publications were diagnostic in nature aimed at either exploring gendered preferences, needs and priorities for adapting to/mitigating climate change (30%) or investigating the gender-differentiated impacts of climate change and resource degradation (7%). Others were instead concerned with gender-transformative goals, such as gender equality and women’s empowerment in climate policies and interventions (23%), as well as social inclusion and intersectional approaches to gender equality in climate change policies/interventions (16%). Finally, 23% of the sample consisted of information products that integrated gender to strengthen resilience to climate change.
Table 3. Number of publications by gender action area

<table>
<thead>
<tr>
<th>GENDER ACTION AREA</th>
<th>NUMBER OF PUBLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gendered preferences, needs, priorities and barriers for adapting to/mitigating</td>
<td>70</td>
</tr>
<tr>
<td>climate change</td>
<td></td>
</tr>
<tr>
<td>Gender equality and women’s empowerment in climate policies/interventions</td>
<td>54</td>
</tr>
<tr>
<td>Integrating gender to strengthen resilience to climate change</td>
<td>54</td>
</tr>
<tr>
<td>Social inclusion and intersectional approaches to gender equality in climate</td>
<td>38</td>
</tr>
<tr>
<td>policies/interventions</td>
<td></td>
</tr>
<tr>
<td>Gendered impacts of climate change and resource degradation</td>
<td>18</td>
</tr>
</tbody>
</table>

These findings are in line with broader observations that most gender research in the area of climate-resilient agriculture has focused on diagnostic analysis of women’s vulnerability, and on differences in how women and men perceive, are affected by, and respond to climate change (Kristjanson et al., 2017, cited in Huyer et al., 2021). Huyer et al. (2021) has argued that given the existing strong empirical base of diagnostic research, more attention should be paid towards research in gender action areas that actively promote gender equality, women’s agency, and transform harmful gender norms, as well as in exploring successful approaches /best practices towards these goals. While not all resilience research/programmes are aimed at transforming gender norms, at minimum they should be gender-aware, and when possible, gender-responsive.

**Year of publication**

Figure 6 illustrates trends in the number of items being published that dealt, albeit implicitly, with the gender-climate-security nexus. As can be seen, since 2011, the evidence base has grown exponentially, with a seven-fold increase between 2011 and 2020.\(^6\)

\(^6\) It is important to highlight that the online keyword search was performed in July 2021; information products published afterwards have not been included in this review.
Geographical focus

Figure 7 shows the geographical coverage of the information products analysed, indicating whether they focus on a specific continent or have a global focus, meaning that they are cross continent publications or have no explicit geographical focus (e.g., manuals, toolkits, and guidelines). More than half of the publications have tended to cluster in Africa (53%), while others are distributed across Asia (22%), Latin America (7%) or are based on a global sample (17%).

Within continents, certain regions have received more attention than others. For example, East and West Africa were the most targeted, comprising 26% and 17% respectively. Research and projects conducted in Asia have primarily focused on South Asia (12%) and Southeast Asia (10%). Meanwhile Central and South America have a similar distribution of publications, accounting for 4% and 3%, respectively. Finally, publications focusing on the MENA region were extremely small in number, accounting for only the 1% of the total. At the country-level (see Figure 8), Kenya and Uganda were the most frequently targeted (both 30 items), followed by Ghana (24 items), as well as Tanzania (16 items) and India and Vietnam (both 15 items).

Figure 8. Distribution of publications based on their geographical focus (country level)
The methodology and methods used in the publications are detailed in Table 4. It is important to note that information was not provided for 51 of the 234 items included in the portfolio review, so these findings are based on a sample of 183 information products. As can be seen, the majority relied on qualitative methodology (55%), followed by quantitative (26%) and mixed methodology (19%). In terms of research methods, qualitative publications employed a variety of techniques, the most common of which was document analysis (22%), followed by focus groups (11%), interviews (10%), and a combination of methods (11%). Quantitative items primarily used surveys (21%), while mixed methodology publications mainly relied on a combination of different methods (18%). The use of participatory approaches was observed in 75 publications. Across methodologies, they were mainly used in qualitative publications (25%), followed by mixed methodology publications (13%), and quantitative publications (4%).

### Table 4. Publications based on publication methodology and methods

<table>
<thead>
<tr>
<th>METHODOLOGY USED</th>
<th>Qualitative</th>
<th>Quantitative</th>
<th>Mixed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Information product type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>101</td>
<td>55%</td>
<td>47</td>
</tr>
<tr>
<td>TYPE OF METHOD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focus groups</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>Interviews</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>10%</td>
<td>2</td>
</tr>
<tr>
<td>Surveys</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>39</td>
</tr>
<tr>
<td>Document analysis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>41</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>Document screening</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Participant observation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Historical analysis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Combination of methods</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>11%</td>
<td>2</td>
</tr>
<tr>
<td>Participatory approach</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45</td>
<td>25%</td>
<td>7</td>
</tr>
</tbody>
</table>

In interpreting these results, the use of participatory approaches in nearly 40% of the publications reviewed is promising, as these approaches are well-suited to unpack the complexities and interconnections of the gender-climate-security nexus, especially in how local gender norms, relations, and inequalities shape climate and security outcomes. The use of mixed methods should be further explored, as this methodology can provide powerful tools and analytics towards exploring the extent of/types of gendered climate security risks (quantitatively), as well as gaining more in-depth qualitative information related to women’s,
The ability to triangulate data using mixed methods approaches would strengthen the contextual validity of future studies in the gender-climate-security nexus.

### 3.2.2. RISK AREAS

Table 5 shows the distribution of publications based on the risk area to which they are most related. Most of the information products reviewed dealt with loss of livelihoods (132 items). Fewer but a still significant number of publications focused on resource scarcity (93 items). Publications dealing with mobility and migration were limited (9 items). While vital to a holistic understanding of the gender-climate-security nexus, information products related to intra-household and communal conflict were not identified in this portfolio review. This indicates a crucial gap that needs to be filled through future One CGIAR research.

<table>
<thead>
<tr>
<th>Risk Area</th>
<th>Number of publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource scarcity</td>
<td>93</td>
</tr>
<tr>
<td>Loss of livelihoods</td>
<td>132</td>
</tr>
<tr>
<td>Mobility and migration</td>
<td>9</td>
</tr>
<tr>
<td>Intra-household and communal conflict</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Resource scarcity

The portfolio review highlighted two key resources at risk of scarcity: land (predominately agricultural land and to a lesser extent forest land resources) and water. The changing availability of land and water has gendered implications given existing disparities in the quality and quantity of these resources between women and men. As shown in Table 6, two key gender issues emerged from information products reviewed that dealt with resource scarcity: i) unequal access to, use and control over land and water resources; and ii) unequal participation in decision-making, influenced by gender and social norms.\(^7\)

Unequal access to, use and control over land and water resources places women at considerable disadvantage with respect to the options available for adaptation (Bamanyaki, 2020). The findings from the review suggest that there is a global gender gap in terms of land ownership, and that when women smallholders do access land for production, weather rented, allocated, or purchased, it is generally of lesser quality and a smaller plot compared to men (Kristjanson et al., 2017; Nelson & Huyer, 2016). Findings from the review also indicate that women have generally less secure land tenure and less decision-making power over land than men (Huyer, 2016). Despite these inequalities related to land, women smallholders generally contribute significant amounts of unpaid labour time to household plots (Rosimo et al., 2018; Sahu, 2012;).

\(^7\) A full list of the gender issues is provided in the Annex.
When it comes to water, the findings illustrated that women often experience unequal access to, and control over shared (collective) water resources (e.g., irrigation canals, small reservoirs) (Balana et al., 2016) and that when women do have access, their water resources are typically smaller, with poorer water quality than men (Theis et al., 2016). Moreover, men’s water sources (often for productive usage) are usually located closer to permanent rivers, while women’s sources (for both domestic and productive usage) are often located near seasonal rivers/streams (Bryan & Garner, 2020). Dynamics of gender inequality in access to water are compounded by scarcity and increased competition among users (Ambaw et al., 2019).

Gender and social norms often inhibit women’s participation in collective management regimes for natural resources (Yobo, Awono & Ingram, 2020), and in household-level decision-making over resources, including which plots or crops are irrigated and how income from the sale of irrigated produce is spent (Bryan & Garner, 2020). Given that women’s contributions to commercial agriculture and water management are often under or unrecognized (Hariharan et al., 2020), women irrigators are discouraged from engaging in decision-making in these areas (Bernier et al., 2015). When women do participate in decision-making, their active and independent participation can be constrained by norms about speaking in front of or disagreeing with men or extended family (ibid.).

When resources are collectively managed, women face challenges in gaining access to and participating in decisions related to the resources (Mwangi & Evans, 2018; Pham et al., 2016). Collective institutions generally allocate certain quantities of water to farmers and may also regulate when farmers get access to irrigation canals. Women’s membership in these institutions is frequently limited by exclusive formal or informal factors, including membership
contingent on land ownership or household headship, the timing and location of meetings, and social norms that define public participation as the domain of men (McKinley et al., 2016; Nicol et al., 2015). Indirect exclusion of women from collective schemes/scheme management decisions can occur through rules governing when irrigation water is available (for example only at night, when women do not feel safe working in the field) and where irrigation is available (for example, a canal or a small reservoir may prioritize men’s plot).

Finally, findings reveal that the limited participation of women and marginalized groups in natural resource management processes not only prevents gender and social equity but also affects the resilience of the socio-ecological system. Given that gender division of labour and differential use and access to resources influence the knowledge and skills that women and men have of specific species (Elias, 2015), excluding women implies that potentially relevant information, experiences, and perceptions are not reflected in management and conservation decisions. Engaging with socially excluded, resource-dependent groups, through the use, for instance, of social learning and participatory approaches, facilitates knowledge sharing and sustainable management of resources while providing socio-economic and environmental benefits to marginalized groups (Hedge et al., 2017).

**Box 2. Empirical and analytic gaps for resource scarcity**

- Empirics on how marginalized men (e.g., poor, landless, low-caste/class) experience resource scarcity and how they are also excluded from participation in decision-making bodies, and how these dynamics influence gendered insecurity.

- Additional disaggregation based on how women’s intersecting social identities (e.g., age, ethnicity, marital status, caste/class, wealth status) influence both their access to, use, and control over natural resources and their participation in decision-making bodies. In this vein, using a binary understanding of gender would only partially account for the social dynamics of resource exclusion.

- Specific cases of women’s resilience in navigating resource scarcity as contributing towards community resilience. For example, how women’s traditional ecological knowledge associated with biodiverse natural resources sustains households and communities in times of resource scarcity.
The Gender-Climate-Security Nexus: Conceptual Framework, CGIAR Portfolio Review, and Recommendations towards an Agenda for One CGIAR

Loss of livelihoods

Climatic shocks to agriculture and food production have differential impacts on women and men farmers given that gender mediates opportunities and challenges for adaptation. This portfolio review highlighted a number of key gender issues that make disadvantaged groups particularly vulnerable to livelihood insecurity (see Table 7).

Table 7. Top ten gender issues addressed in publications dealing with loss of livelihoods

<table>
<thead>
<tr>
<th>Gender Issues</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gendered socio-cultural norms</td>
<td>78</td>
</tr>
<tr>
<td>Participation in decision-making</td>
<td>77</td>
</tr>
<tr>
<td>GDOL and inequitable work burden</td>
<td>73</td>
</tr>
<tr>
<td>Access to, use and control over natural resources</td>
<td>69</td>
</tr>
<tr>
<td>Access to inputs and technology</td>
<td>64</td>
</tr>
<tr>
<td>Access to information and extension services</td>
<td>62</td>
</tr>
<tr>
<td>Land-ownership inequality</td>
<td>52</td>
</tr>
<tr>
<td>Access to education, knowledge, and capacity-building</td>
<td>49</td>
</tr>
<tr>
<td>Livelihood income inequality</td>
<td>37</td>
</tr>
<tr>
<td>Access to markets and finance</td>
<td>32</td>
</tr>
</tbody>
</table>

Findings revealed that women have generally less adaptation options compared to their male counterparts due to gender and social norms that hinder the adoption of CSA practices, such as agroforestry and irrigation using treadle pumps (Theis et al., 2018), and access to farm inputs (Silvestri et al., 2014) and agricultural training (Nchanji, 2018). Moreover, gender roles and responsibilities can constrain women’s ability to participate in adaptation decision-making (Bomuhangi et al., 2016) and the lack of land ownership and other membership requirements can prevent women from joining farmers’ groups and cooperatives (Gumucio & Schwager, 2019).

Gendered differences in access to information and agricultural technologies are other important determinants of adaptive capacity (Morgan et al., 2015; Tall, Davis & Agrawal, 2014; Twyman et al., 2014). For instance, limited access to weather and climate-related information can prevent women and marginal farmers from predicting and mitigating future climate risks (Mungai et al., 2017; Tall et al., 2014), while restricted access to agricultural information may generate situations where women are not aware of which technologies and practices are available (Nsengiyumva et al., 2018; Bernier et al., 2015). These inequalities are further compounded by women’s work burden, as time constraints limit women’s ability to learn about new agricultural practices (Nelson & Huyer, 2016). Moreover, the additional labour requirements associated with implementing some types of agricultural and CSA practices could increase women’s work burden and preclude their uptake (Rosimo et al., 2018).
Findings from the review suggest that unequal access to credits is a significant constraint to investment in and adoption of agriculture technologies (Arora, 2019; Okello et al., 2018). Credit is often unavailable or is accessible only on unfavourable terms to smallholder farmers. For women, limited ability to provide collateral, less favourable repayment terms, and credit agencies’ discrimination in the application process often make this constraint more pronounced. In addition, definitions of economic versus domestic uses of water may hamper women’s access to credit. For example, in Ethiopia, some rural financial institutions do not extend credit for household wells because they are not considered economically productive, even though they are used for homestead gardening and critical livelihood activities (Hadgu et al., 2019).

Another cluster of findings highlighted how women’s access to, and adoption of technologies could be hampered by gender-blind intervention design that did not consider factors such as affordability, cultural acceptability, and suitability for women’s specific needs (Mastenbroek et al., 2020; Gumucio, Twyman & Clavijo, 2017). For example, with regards to land-based interventions, men’s and women’s preferences for household irrigation and crops are quite often different, given differences in the crops they cultivate, unequal access to land, credit, information, labour, and markets (Nchanji, 2018). Similarly, for water-based interventions, irrigation practices are often designed without taking into consideration their appropriateness for women’s diverse uses of water, including drinking, cooking washing, agricultural production, and other economic livelihood activities (Colgan et al., 2019).

**Box 3. Empirical and analytic gaps for loss of livelihoods**

- Data related specifically to the impacts of men’s loss of livelihoods due to climate change and climate-related conflict at the individual and community level were absent from the review. This reflects the dearth in the broader literature that has not explored how men and masculinities are implicated in these risks. Filling this gap is crucial to a more holistic understanding of the social impacts of loss of livelihoods.

- Intersectional differences between women and men in how loss of livelihoods is experienced, including intra-household positioning, class/caste, ethnicity, and age, are largely unaccounted for. Loss of livelihoods among intersex, transgender, and non-binary people have not been documented at all.

- Loss of livelihoods are creating rapid economic and social transformations in rural and peri-urban agrarian communities. Changing employment patterns and technologies have knock-on effects on gender roles, relations, and norms. However, what these gendered livelihood changes mean in the context of other human security risks (especially migration and intra-household and communal conflict) have yet to be investigated.
Mobility and migration have been framed as gendered adaptive strategies to diversify livelihoods and secure income. While climate was not the sole driver of migration, all publications referred to climatic factors as increasingly mediating/intensifying other socio-economic pressures, the most being decreased food and agriculture production. Different types of labour migration were observed (e.g., temporal, seasonal, and permanent migration) although a common characteristic across the publications analysed was that migration was mainly undertaken by men. As shown in Table 8, two key gender issues emerged from information products that dealt with mobility and migration: i) gender and social norms inhibiting women’s mobility out of rural life; and: ii) increase in women’s work burden following male out-migration.

Table 8. Top five gender issues addressed in publications dealing with mobility and migration

<table>
<thead>
<tr>
<th>Gender Issues</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gendered socio-cultural norms</td>
<td>7</td>
</tr>
<tr>
<td>Male out-migration</td>
<td>6</td>
</tr>
<tr>
<td>GDOL and inequitable work burden</td>
<td>6</td>
</tr>
<tr>
<td>Land-ownership inequality</td>
<td>5</td>
</tr>
<tr>
<td>Participation in decision-making</td>
<td>5</td>
</tr>
</tbody>
</table>

Findings show that increased work burden for women and marginalized people left behind is the most likely outcome of male out-migration. Women carry out more labour both on and off farm; indeed, in addition to domestic work, they often take on activities that were previously in the male domain, such as marketing, livestock and irrigation (Najjar, 2021; Basnett, 2013; Djoudi & Brockhaus, 2011). Results reveal that growing workload was a challenge mainly faced by poorer socioeconomic groups as wealthier women tend to compensate labour shortages by hiring workers from outside (WLE, 2017). The same holds for remittances. For households
that did not take loans and incur debts to send facility members abroad, male out-migration can generate opportunities to empower women and increase their control over household decision-making and cash (Karn et al., 2020; Simelton, Doung & Houzer, 2021). This suggests that an intersectional lens is crucial to explore the gendered impacts of male out-migration.

When remittances are not available, as is increasingly the case of rural-to-urban migration of marginal and landless farmers, male out-migration can have negative impacts on women’s livelihoods. Findings show that the feminization of agriculture oftentimes translates into low agricultural productivity and additional layers of socioeconomic marginalization (Najjar, 2021; Sudgen et al., 2014). For example, in Nepal, women were not able to access agricultural technology in the absence of men and work in the public sphere (WLE, 2017). Results suggest that increased agrarian labour combined with unequal access to resources, and decision-making power worsens women’s food security (Najjar, 2021), and difficulties in managing both the house and the farm can increase women’s mental and health stress (Sudgen et al., 2014).

However, women left behind can be powerful agents in coping with labour deficiency. For instance, Djoudi & Brockhaus (2011) found that in Mali, women developed a variety of local strategies, including technological improvement in daily activities, such as mills for millet, and diversification of livelihoods based on charcoal, livestock, and handicraft to overcome heavy workload. While male out-migration can potentially create positive shifts in gender roles and opportunities for women’s empowerment (Karn et al., 2020), results suggest that this must be accompanied by policies and interventions that support women’s increased role in farming (Najjar, 2021).

While three fourths of the publications reviewed focused on gendered impacts of male out-migration and broader implications for agricultural productivity, two publications included in the review focused on youth out-migration. Climate change is reported to be an important mediating factor in shaping the movement of youth out of the agriculture sector, especially when combined with changing cultural aspirations, such as limited interest in becoming farmers (Nansambu & Sudgen, 2017). Youth often face challenges in accessing productive resources like land, finances, and farm inputs and this significantly increases their incentives to migrate.

Findings suggest that youth are more likely to engage in international migration compared to other members of the community as they are often unencumbered by family and social responsibility. While for both female and male migrants, securing formal sector employment can be challenging, Bezu and colleagues (2020) showed that young women face greater economic insecurity in the destination areas compared to their male counterparts due to fewer skills and education. Similarly, women, especially single women, are more exposed to trafficking and sexual abuse during international migration (Bezu et al., 2020).
Box 4. Empirical and analytic gaps for mobility and migration

• Despite contributions to improve understanding of the human security challenges faced by women (mainly from poorer households) following male outmigration, future CGIAR research should explore how other “trapped” groups (e.g., marginal farmers, youth, and the elderly) experience insecurity in the context of a changing climate.

• More evidence is needed on how male outmigration and resulting feminization of agriculture can offer opportunities to empower women and provide them with more autonomy and decision-making power (even when men return to work on-farm).

• Given that women and men landless farmers are increasingly migrating as a survival strategy to overcome crop failure, an intersectional lens should be applied to analyse the lived experiences of insecurity faced by migrants in destination areas, and how these experiences vary according to gender, ethnicity, religion, class, and age conditions. This is crucial to inform more inclusive social protection schemes.

3.2.3. GENDER EQUALITY OUTCOMES

The distribution of publications based on the gender equality outcomes is depicted in Table 9. The most frequently reported outcome was access to, use and control over resources, followed by participation in decision-making, transforming gender norms, income and greater economic opportunities, collective action, enhanced food security, and work burden and time allocation. Freedom from violence was the least reported outcome, while freedom of movement did not appear in the publications reviewed. A brief synthesis outlining the key points of each of these gender equality outcomes is provided below.

Table 9. Publications grouped by gender equality outcome

<table>
<thead>
<tr>
<th>Gender equality outcome</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to, use and control over resources</td>
<td>172</td>
</tr>
<tr>
<td>Participation in decision-making</td>
<td>137</td>
</tr>
<tr>
<td>Transforming gender norms</td>
<td>98</td>
</tr>
<tr>
<td>Income and greater economic opportunities</td>
<td>93</td>
</tr>
<tr>
<td>Collective action</td>
<td>49</td>
</tr>
<tr>
<td>Enhanced food security</td>
<td>32</td>
</tr>
<tr>
<td>Work burden and time allocation</td>
<td>26</td>
</tr>
<tr>
<td>Freedom from violence</td>
<td>4</td>
</tr>
<tr>
<td>Freedom of movement</td>
<td>-</td>
</tr>
</tbody>
</table>
Access to, use and control over resources

The most commonly occurring gender equality outcome, greater gender parity and increased women’s access to, use and control over resources was articulated as fundamentally vital to ensure local and global food security. Within the review, many information products (e.g., Chanana & Aggarwal, 2020; Nchanji, 2018; Kristjanson, 2017) included data related to the necessity of closing the gender gap in agricultural productivity to enhance resilience at both individual and community levels. Gender equality outcomes linked to access to, use and control over resources tended to focus on both natural resources (land and water) as well as productive resources, including training, information, inputs, technologies, irrigation, credits, assets, and markets. The publications reviewed tended to focus more on improving the productivity of already accessed natural resources, as opposed to looking at how women and marginalized groups may be excluded from accessing natural resources/alternative sources. The information products were highly clustered as pertaining to either the resource scarcity or loss of livelihoods climate-related gender security risks.

For example, a project implemented by CCAFS and partners in the climate-smart village of Kapa-Zarma, in Niger, supported women to address the negative impacts of resource scarcity (Ouédraogo et al., 2018). As women had access to poor and degraded lands, the introduction of the zaï techniques improved degraded land productivity and empowered women. Instead, the leaves of the Cassio tora were used for human consumption and contributed to reducing the food shortage faced by vulnerable farmers during the dry months.

An example related to the loss of livelihoods was a USAID funded project in Madhya Pradesh, Uttar Pradesh, and Bihar states of India that aimed at scaling up climate-smart agriculture through the CCAFS’s Climate-Smart Village (CSV) approach (Chanana et al., 2018). This provided an enabling platform for women to manage and lead climate change adaptation and mitigation interventions in their villages. Local women’s self-help groups (SHGs) and other women-led groups were included in the design and implementation of the project to ensure effective dissemination of the CSA practices and strengthening women’s agency and voice. The SHGs participated in Village Climate Management Committees (CHCs) to manage and implement climate-smart agriculture. Women-led custom-hiring centers were set up to rent out climate-smart technologies at affordable rates. Women farmers became aware of and implemented new practices learned through agro-advisory and weather information services. They also participated equally – or in some cases more than men – in capacity-building, technology prioritization and community consultations. This project increased women’s and households’ productivity, reduced women’s workload, and enhanced their capacity to participate in community decision-making. Moreover, women no longer relied solely on their social networks and regularly accessed ICT advisories for weather, practices, and technology information (Chanana et al., 2018).
Participation in decision-making

The information products reviewed suggested gender equality outcomes related to participation in decision-making across different scales (e.g., intra-household, community, and national levels), strategies related to climate-smart agriculture (e.g., adaptation and mitigation strategies), and decisions related to agricultural production and natural resource management. Within these diverse information products, several key themes emerged. First, at the institutional level, arrangements and linkages which facilitate multistakeholder engagement should be put in place (Aura et al., 2017; Arwida et al., 2017; Bomuhangi et al., 2016; Sills et al., 2014). This will work to ensure equal representation in community-decision making bodies, and to include the voices of historically underrepresented groups including women, youth, and other marginalized groups. Indeed, evidence from the review suggests that limited participation of women and marginalized groups in natural resource management processes not only prevents gender and social equity, but also affects the resilience of the socio-ecological system (Hadgu et al., 2019; Pham et al., 2016; Elias, 2015). By engaging in participatory approaches to natural resource management and agriculture that engage with all resource-users (both in decision-making and access, and control over resources), increased social cohesion and the reduction of degradation and deforestation could effectively promote sustainable use of resources (Hedge et al., 2017).

A powerful example of these dynamics was illustrated in a project implemented by CIFOR and partners in the districts of Mpiigi, Rakai and Masaka in central Uganda, aimed at enhancing women’s involvement in forest management and promoting equitable benefit-sharing (CIFOR, 2018). Using a process called Adaptive Collaborative Management (ACM), all resource-dependent users were brought together to develop shared visions, plan, and implement them. Local government, domestic and international NGOs, and private-sector forest owners were also involved in the process. Following the ACM processes, action plans were developed for income-generating projects such as beekeeping, tree nurseries, fish farming and restoring degraded forests. Having become effectively engaged in the process, non-community actors provided resources and support to help with implementation, such as training in tree nursery management and apiculture. They also supplied development funds, which were invested in income-generating projects outside of the forest. Overall, women were given leadership roles and strong support within mixed-gender ACM project groups so that their capabilities were made visible and apparent. They led planting projects in the Central Forest Reserve adjacent to the villages, which they co-managed with the National Forest Authority (NFA) and to which they hold harvesting rights. More than 50,000 trees were planted on 33 hectares of degraded forest reserve thorough the project – over 8,500 of these by women. Following their leadership experiences in the project, women began to lead in other spheres; for the first time ever in the region, they were elected to leadership roles at group and local government level, and in executive committees.
Transforming gender norms

The relatively high frequency of this outcome is perhaps unsurprising as interventions and initiatives aimed at increasing women’s and marginalized groups’ resilience to climate-related security risks are unlikely to succeed without transforming harmful gender norms that inhibit equality. However, it should be noted that, in the publications reviewed, gender transformative approaches to climate change, agriculture and natural resources interventions, policies and regulations were only reported in the form of a recommendation instead of as a tangible outcome. For example, a cluster of findings (Bamanyaki, 2020; Paudyal et al., 2019) focused on current policy gaps in achieving gender equality and social inclusion in national and sub-national adaptation and mitigation policies. While across contexts these frameworks have become increasingly gender responsive, they often equate gender issues with “women’s issues” and focus on addressing the symptoms of gender inequalities rather than the root causes, which would be foundational to a gender-transformative approach. Several of the publications (Deering et al., 2019; Godek & García, 2018; Bernier et al., 2015) included recommendations for actions towards more gender-transformative policies and interventions, including gender budgeting mechanisms and gender quotas for women in leadership positions.

There were examples in the review of how empowering women’s groups, increasing their access to information and ITCs and economic opportunities that could change the perception of women, which could lead to broader gender transformative changes at the household and community level (Gumucio & Schwager, 2019; Cole et al., 2016). Another example was related to how increased access to irrigation can create shifts in traditional gender roles in ways that enhancing women’s strategic decision-making and agency (Theis et al., 2016). While the importance of engaging with men and the broader community to support more equitable changes in gender relations has been highlighted outside the review as important, this perspective was missing from the sources reviewed.

Income and greater economic opportunities

Gender equality outcomes related to greater gender parity and women’s increased agency in income and greater economic opportunities were evidenced in several facets of the review. Increased revenue from CSA practices and economic benefits from increased agricultural productivity were commonly cited as contributing towards women’s empowerment (Gumucio et al., 2018; Najjar, Abubakr & Alma, 2016). Indeed, women’s ability to add value to their agricultural and livestock activities and diversify their income opportunities was framed as a key climate resilience strategy (Mbosso et al., 2018; Tavenner, Saxena, Crane, 2018). However, constraints regarding women’s investment capacity and the types of market and employment opportunities available (e.g., entrepreneurial activities, value addition, new products) were also cited as inhibiting economic stability, particularly in the absence of social safety nets.

The FoodSTART project implemented by the International Potato Center (CIP) and partners in the Philippines aimed to strengthen farmers’ entrepreneurial capacity (CIP-FoodSTART+,
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The project applied the Farmer Business School (FBS) approach, which promotes farmer groups’ participation in agricultural value chains through a series of group-based experimental learning activities over a production marketing cycle, including interactions with chain actors and stakeholders. The FBS was implemented with more than 80 farmer groups, which received the livelihood assistance fund for developing the new agri-enterprises. As a result, 1,387 farmers enrolled in the learning processes, of which 83% were women, and FBS groups launched their new micro-enterprises focused on root crops. This project empowered women and men while enhancing trust and collaboration between farmers and other value chain actors.

**Collective action**

Women’s groups, cooperatives and organizations play an instrumental role in addressing gender differences in climate change adaptation and mitigation (Huyer & Gumucio, 2020), as they generate initiatives that reflect women’s needs and constraints, provide a platform for accessing information and training, and increase women’s agency and voices. Nevertheless, this outcome was reported in a relatively small number of publications; this perhaps reflects current gaps in the broader literature on gender and agriculture where still little is known on the role of women’s collective action in building gender equality in climate-resilient agriculture (Huyer, 2021). A notable exception was the project implemented by CCAFS and partners in the climate-smart village of Daga-Birame, in Senegal, which offers a striking example of how collective action can mitigate the gendered human security risks associated with loss of livelihoods (Ouèdraogo et al., 2018). Women and men were provided equal participation in a local forest management committee, and a women-run microenterprise was established to process and sell fruit powder made from local baobab trees. In addition, marketing and income management were carried out exclusively through the women-run enterprise, with a village savings pool set up to invest in community resilience activities. As a result, women’s resilience and control over livelihood revenue increased as well as their participation in decision-making. Moreover, ensuring the equal participation of all resource-dependent users in decisions related to the resources led to improved forest management and environmental conservation. By strengthening social cohesion, empowering women, and increasing socio-ecological resilience, this example shows how a collective action approach could potentially mitigate human security risks related to intra-household and communal conflicts.

**Enhanced food security**

Although food security as a tangible outcome was observed in a small number of publications, this result should be interpreted in perspective, given that, in this review, research outputs significantly outweighed specific reporting on programming contributions. However, the findings shed light on potential ways to support dual processes of addressing human security risks associated with resource scarcity and loss of livelihoods and promoting gender equality. For instance, a project implemented by the International Potato Center (CIP, 2019) in the Southern Nations, Nationalities and Peoples’ (SNNP) region in Ethiopia, improved the food and security
nutrition of drought-affected smallholder farmers while creating momentum for empowering women. Women and men farmers were provided access to improved seed potato and sweet potato and equally engaged in capacity-building activities to ensure effective dissemination and build long-term community resilience to drought. As potato and sweet potato cultivation expanded, women were involved in production and marketing, thus increasing their income, and enabling them to play a greater role in household decision-making.

**Work burden and time allocation**

While work burden alleviation is a crucial dimension of gender equality in climate-resilient agriculture (Huyer & Gumucio, 2020), it was only reported in a relatively small number of publications. It is unclear whether this is because gender-responsive labour-saving technologies are still being identified in certain sectors of climate-resilient agriculture (e.g., low-emissions dairy development), or because most publications analysed were diagnostic in nature rather than promoting gender transformative goals. Nevertheless, some actionable insights can be drawn on the potential for gender-responsive technologies and practices to reduce women’s heavy workload and negative livelihood impacts associated with resource scarcity and male out-migration. For instance, agroforestry and clean cookstoves can reduce fuelwood collection time (Khatri-Chetri et al., 2020; Libaisi & Njenga, 2018), while irrigation through solar pumps can reduce the time women spend in fetching water (Bryan & Garner, 2020). Moreover, the use of these technologies has important human security benefits, including health risk reduction, and more time for education and engaging in income-generating and leisure activities (Huyer & Gumucio, 2020). The CCAFS-supported “Women-led agroforestry and improved cookstoves” project in Honduras is a striking example of how clean cookstoves and fuel can promote women’s empowerment and provide women with more free time (Hottle, 2015). Women and men smallholder farmers were involved in the design and implementation of the “Eco-Justa” model cookstoves, a relatively simple stove which leads to cleaner burn, and were trained on how to use it. Women reported significant benefits associated with the use of cookstoves, including decreased cooking time, cleanliness, and lower household expenditures on cooking fuel.

**Freedom from violence**

Despite this outcome being only marginally reported in the publications reviewed, findings suggest that the use of cookstoves and biogas technology have the potential to reduce the risk of sexual violence and harassment by reducing either the time women spend collecting firewood or the distances women have to travel to buy or collect it (Njenga & Mendum, 2018).
4. RECOMMENDATIONS

“If climate actions do not identify, address, and confront the discriminatory social norms and structural causes that are creating gender inequalities in the first place, the gender equality initiatives and policies will likely neither be sustainable nor reach their maximum potential” (Acosta, 2021).

This section provides recommendations for the One CGIAR and its partners, including donor organizations, researchers, and policymakers, on how the gender-climate-security nexus can be applied towards developing inclusive, gender-responsive solutions to address climate-related security risks. The implications of the portfolio review findings and broader literature are synthesized to provide methodological, and climate risk-specific recommendations where relevant and to highlight key priority areas for future action and investments. While the gender-climate-security nexus is helpful towards identifying different climate and conflict-related risks faced by women and men, the framework also provides space to explore the opportunities for enhancing gender equality and empowerment of marginalized people towards strengthening resilience.
**RESEARCH**

- **Apply an intersectional lens to the gender-climate-security nexus.** Despite contributions from the broader gender and climate change literature highlighting the importance of recognizing other axes of social differentiation that intersect with gender in ways that influence development outcomes (Wood et al., 2021; Tavenner et al., 2019; Gonda, 2017), intersectional analyses have been largely absent in climate and conflict research. By virtue of capturing the nuances that exist between gender and other social identities, using an intersectional lens will enhance the social inclusivity of research programming and inform more inclusive approaches to address the gender dimensions of climate-related security risks.

- **Address knowledge gaps within the gender-climate-security nexus, particularly intra-household and communal conflict.** While CGIAR has contributed significantly to improving understanding of the vulnerability and human security risks associated with resource scarcity and loss of livelihoods, future research (within and outside CGIAR) should build better and more localized evidence on the gendered dynamics and impacts of climate-related migration and intra-household/communal conflict. This is particularly important considering the increasing number of resource-related conflicts and the role that gender relations and distinct norms of masculinity can play in amplifying or mediating hostilities (Ide et al., 2021; Ensor, 2013). Hence, a more nuanced understanding of the gender dynamics of communal violence has important implications for conflict prevention and local peacebuilding and can create momentum for gender equality.

- **Expand the geographical focus to MENA and Latin America.** While more research on the gender-climate-security nexus is needed across the global landscape, the portfolio review highlighted a few critical geographical gaps in CGIAR work. For example, the MENA is an extremely water-scarce region with the women’s lowest level of land ownership in the world, yet CGIAR has only marginally explored gender-specific human security challenges and opportunities associated with climate variability and water scarcity in the region. The same applies to Latin America, where the interaction between compounded climate-fragility risks and gender and social inequalities exposes women and indigenous minorities to multiple layers of marginalization and discrimination. Given that the gender dimensions of climate-related security risks vary considerably across contexts, case study analysis is of foremost importance to provide a comprehensive understanding of this triple nexus.

- **Moving from purely diagnostic towards more transformative gender research.** The majority of CGIAR work to date has focused on diagnostic gender research, which has been used to identify agricultural practices and preferences between women and men (oftentimes using sex-disaggregated surveys). While these studies have provided an important empirical foundation for gender dynamics in agriculture, research in the gender-climate-security nexus must move beyond a diagnostic focus to consider the ways in which power, institutional, and structural dynamics of gender relations shape and are shaped by climate-related security risks.
• Explore the opportunities for women’s empowerment that could be gained in the context of climate-related security risks. Climate-related security risks create/heighten the conditions for disrupting traditional gender norms. While much of the existing literature has been framed around women’s vulnerability in these disruptions, there is much to be gleaned from how climate-related security risks may generate new opportunities for women’s resilience and empowerment. For example, how risks may facilitate women’s participation in traditionally male-dominated occupations/community leadership positions or allow them to pursue entrepreneurship opportunities in emerging sectors. Documenting these types of livelihood transformations and transitions as opposed to relying on generic narratives that paint all women as ‘victims’ is necessary to better capture the stabilizing role that women often play in their household and communities and the role they play in strengthening resilience to climate-related security risks.

PROGRAMMING

• Focus on women’s and marginalized people’s agency and put their voices, knowledge, and experiences at the heart of the solutions. Thought must be given to which groups of women and which groups of men (based on their ethnicity, social status/economic class, and age) might be excluded based on these intersecting identities, and whose voices need to be empowered through targeted actions to have them represented based on their role in project-relevant activities. For example, if a project identifies that a specific group of women, such as women from indigenous and/or natural resource-dependent communities, are primarily responsible for safeguarding natural resources, then the project must address the barriers that specifically hinder them from fully participating and benefiting from relevant interventions.

• Design socially inclusive responses to climate-related security risks through collective action and participatory approaches. Qualitative discussion tools can contribute to effective planning, problem identification, and prioritization in programming aimed at tackling gendered climate security risks, and aid discussion around the community power dynamics that reinforce vulnerability, the challenges and adaptation priorities for different intersectional/intergenerational groups, and what opportunities exist for increasing climate resilience across different populations. These activities provide the basis for planning at the local level, which may contribute to gender-transformative adaptation responses that reflect the different needs and aspirations among different intersectional groups.
POLICY

• **Mainstream gender-transformative goals into climate change adaptation and mitigation policies.** While over the past years, international and national climate change policies have become more comprehensive and gender-sensitive, they have yet failed to achieve gender equality (Huyer et al., 2020; Acosta et al., 2015). The common tendency to focus on women’s greatest vulnerability to climate change has led to inconclusive policies targeting practical “gender symptoms” rather than addressing the structural causes of gender inequalities. To move towards this perspective, policy should be designed and implemented in a way that supports women’s agency in climate adaptation and mitigation processes and transforms gender relations and power imbalances between women and men.

• **Ensure that gender equality policy frameworks at all levels account for climate-related security risks.** Despite recognition that gender equality, climate resilience and security are inextricably linked, climate change and conflict issues have been treated as separate – oftentimes siloed – agendas in policy responses for gender equality and women’s empowerment. At the international level, coordinated and integrated initiatives are needed to increase awareness and understanding of the climate-related human security challenges. Moreover, ensuring that policy frameworks have transparent and actionable commitments made in terms of allocating appropriate budgeting to these areas is vital. At the national level, climate security considerations should be integrated into policy instruments to promote gender equality and the pivotal role of women’s collective action in addressing these risks should be supported.

FINANCE

• **Build women’s and marginalized groups’ resilience to climate-related security risks through gender-responsive climate finance mechanisms.** Due to inequality in eligibility criteria, such as assets ownership, business skills, access to information, and membership in cooperatives, women and disadvantaged groups often face significant barriers in accessing climate financing (Atmadja et al., 2020b). Thus, to avoid widening inequalities between women and men, the rich and the poor, climate finance mechanisms should ensure that gender responsiveness is mainstreamed in their design, implementation, and monitoring and frameworks. By increasing women’s and marginalized men’s/non-binary people’s ability to manage risks by, for example, diversifying crops, storing food, saving seeds or putting money into savings, climate finance could play a pivotal role in achieving gender equality and poverty reduction.
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# ANNEX 1

## List of keyword combinations used for the online search

**Keyword combinations**

- Gender AND disasters
- Gender AND fragility
- Gender AND resilience
- Gender AND vulnerability
- Gender AND peace
- Climate AND youth
- Climate AND gender AND intersectionality
- Climate AND gender AND agriculture
- Climate AND gender AND food security
- Climate AND gender AND resources
- Climate AND gender AND information
- Climate AND gender AND water
- Climate AND gender AND technology
- Climate AND gender AND participation
- Climate AND gender AND land
- Climate AND gender AND risks
- Climate AND gender AND livestock
- Climate AND gender AND decision-making
- Climate AND gender AND income
- Climate AND gender AND market
- Climate AND gender AND forestry
- Climate AND gender AND fisheries
- Climate AND gender AND migration
- Climate AND gender AND credit
- Climate AND gender AND collective action
- Climate AND gender AND conflict
- Climate AND gender AND security
- Climate AND gender AND violence
### ANNEX 2

#### Frequency distribution of gender issues (full sample)

<table>
<thead>
<tr>
<th>Gender Issues</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gendered socio-cultural norms</td>
<td>132</td>
</tr>
<tr>
<td>Participation in decision-making</td>
<td>132</td>
</tr>
<tr>
<td>Access to and control over natural resources and assets</td>
<td>128</td>
</tr>
<tr>
<td>GDOL and inequitable work burden</td>
<td>120</td>
</tr>
<tr>
<td>Access to inputs and technology</td>
<td>109</td>
</tr>
<tr>
<td>Land-ownership inequality</td>
<td>102</td>
</tr>
<tr>
<td>Access to information and extension services</td>
<td>100</td>
</tr>
<tr>
<td>Access to education, knowledge and capacity-building</td>
<td>79</td>
</tr>
<tr>
<td>Membership in local and community institutions</td>
<td>66</td>
</tr>
<tr>
<td>Access to markets and finance</td>
<td>55</td>
</tr>
<tr>
<td>Livelihood income inequality</td>
<td>46</td>
</tr>
<tr>
<td>Productivity gap</td>
<td>35</td>
</tr>
<tr>
<td>Male out-migration</td>
<td>30</td>
</tr>
<tr>
<td>Livelihood diversification strategies</td>
<td>23</td>
</tr>
<tr>
<td>Access to social networks</td>
<td>21</td>
</tr>
<tr>
<td>Inequitable working conditions</td>
<td>20</td>
</tr>
<tr>
<td>Access to state and basic services</td>
<td>18</td>
</tr>
<tr>
<td>Gender-based violence</td>
<td>5</td>
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</tbody>
</table>