

Women, Resilience, and Gender Inequality amid Climate Change in Rural Ethiopia

Donne, resilienza e disuguaglianza di genere di fronte al cambiamento climatico nell’Etiopia rurale

Sara Cosatti and Paola Ottino

Abstract

Despite policy efforts over the last decades, gender inequality remains a persistent issue in Ethiopia, rooted in patriarchal norms and social structures. In rural areas, women continue to face disadvantages in education, economic participation, and social empowerment. Concurrently, Ethiopia is highly vulnerable to climate change, with rising temperatures, desertification, and erratic rainfall disproportionately affecting populations reliant on rainfed agriculture and fragile ecosystems. Using a wide range of secondary sources – peer reviewed literature, policy and NGO reports, statistical publications and research-institute analyses – this article adopts a hybrid feminist theoretical framework that integrates Intersectional Environmentalism and Feminist Climate Justice to examine the intersection of climate change and gender in Ethiopia. Aiming at comprehensively portraying the subaltern status of rural women, it deconstructs their social identity to understand their disproportionate exposure, while also emphasizing their pivotal role in community-level resilience and adaptation strategies. The study highlights the gap between policy intentions and outcomes, underscoring the need for effective gender-responsive climate policies to promote sustainable, inclusive, and people-centred development.

Nonostante gli sforzi politici, la disuguaglianza di genere rimane una sfida persistente in Etiopia, radicata in norme patriarcali e strutture sociali profondamente consolidate. Nelle aree rurali le donne rimangono soggette a disuguaglianze nell’istruzione, nelle possibilità economiche e nell’empowerment sociale. L’Etiopia è altresì altamente vulnerabile ai cambiamenti climatici: l’aumento delle temperature, i processi di desertificazione e le alluvioni colpiscono in modo sproporzionato le popolazioni che dipendono dall’agricoltura pluviale e da ecosistemi fragili. Utilizzando fonti secondarie – letteratura peer-reviewed, rapporti politici e delle ONG, pubblicazioni statistiche e analisi di istituti di ricerca – questo articolo adotta un quadro teorico che integra l’ambientalismo intersezionale e la giustizia climatica femminista per analizzare in che modo il cambiamento climatico esacerba le disuguaglianze di genere in Etiopia. Il lavoro decostruisce la loro identità sociale per comprendere le ragioni dell’esposizione sproporzionata delle donne che vivono in Etiopia rurale dinanzi agli eventi climatici estremi, evidenziandone al contempo il ruolo fondamentale nelle strategie di resilienza e adattamento a livello comunitario. L’analisi evidenzia il divario tra gli obiettivi politici e i risultati effettivi, sottolineando la necessità di adottare politiche climatiche sensibili al genere, efficaci e realmente attuabili, per promuovere uno sviluppo sostenibile, inclusivo ed efficace.

Keywords

Climate change, Gender inequality, Ethiopia, Rural women, Resilience

Cambiamento climatico, disuguaglianza di genere, Etiopia, donne rurali, resilienza

Introduction

In Ethiopia gender inequality represents a core issue, rooted in prevailing customary patriarchal social norms and structures. Despite the government's commitment and efforts in making it a top priority since 1993, when the National Women Policy¹ was enacted rising awareness on the need for targeted and coordinated interventions, women continue to represent a subaltern category when compared to men. The Global Gender Gap Index 2025 ranks Ethiopia 75th out of 148 analysed countries, revealing very promising data regarding the political empowerment of women, where it ranks 12th, albeit very negative performances in terms of economic participation and educational attainment, areas in which it ranks respectively 124th and 141st. There is evidence of a deep urban-rural dichotomy in terms of educational access and attainment, employment opportunities and access to healthcare, with concrete progress hindered by the country's low-income economy (Guo et al. 2025). This feature prevents the transformation of policy content into action.

Over the last decades, climate change has become a widely debated security issue on both national and international stages, sharply intersecting with the country's structural inequalities. Despite only limitedly contributing to greenhouse gas (GHG) emissions, Ethiopia figures among the most vulnerable countries to the worsening climate crisis (Climate Watch 2022). Higher temperatures, desertification and unpredictable patterns of prolonged droughts and erratic rainfalls have been heavily impacting the country. Features such as extensive reliance on rainfed agriculture and pastoralism, high poverty rates, low levels of readiness, topography and the landlocked status all contribute enhancing the population's exposure (Teku and Eshetu 2024). Despite the Government's commitment to tackling the negative consequences, notably through the Climate Resilient Green Economy (CRGE) Strategy², the National Adaptation Plan (NAP)³ and the Green Legacy Initiative⁴, Ethiopia's weak institutional capacity and limited financial resources limit change and resilience-building.

Literature has recently started integrating climate change and gender dynamics, yet it is essential to capture the contextual nuances of gendered climate vulnerability.

¹ The Office of the Prime Minister of the Transnational Government of Ethiopia enacted the National Policy on Ethiopian Women in 1993.

² The Climate Resilient Green Economy (CRGE) Strategy was launched in 2011, led by the Prime Minister's Office, the Environmental Protection Authority (EPA) and the Ministry of Finance and Economic Development (MoFED).

³ The Federal Democratic Republic of Ethiopia submitted the National Adaptation Plan (NAP) in 2019.

⁴ The Federal Democratic Republic of Ethiopia launched the Green Legacy Initiative in 2019 to address deforestation, land degradation, and climate change.

Despite the Paris Agreement frames climate change as a human concern, the effects of changed environmental balances cannot be considered gender neutral. Women, especially those living in rural areas of developing countries, are disproportionately affected (Zegeye 2018; World Bank Group 2021). As the climate crisis worsens, people living further away from urban centres where services are provided are the most disadvantaged and, considering the data above mentioned, women are on the forefront. Moreover, despite their inherent ability of representing powerful agents of change and gender equality being fundamental for pursuing sustainable, people-centred long-term development strategies, they are not involved in discussions regarding climate policies. The analysis aims at addressing first, which are the factors that heighten the exposure of rural women to climate change in Ethiopia; second, to illustrate whether and how they could play a more prominent role in shaping more effective and locally grounded adaptation strategies.

This article's objective is analysing the intersection between gender inequality and climate vulnerability addressing case studies from rural Ethiopia. Following this introduction and the methodology section, the second paragraph briefly presents a literature review on climate change and gender in Ethiopia. The third paragraph illustrates the hybrid theoretical framework used to analyse climate change from a gender perspective. The fourth paragraph briefly describes environmental and climatic scenario and analyses how climate change intersects existing gender inequalities shaping vulnerabilities in rural Ethiopia. The fifth paragraph explores how and why women living in rural Ethiopia are particularly exposed to the effects of the phenomenon, but also their role as agents of resilience and how this could be enhanced. Finally, the conclusions will shortly resume the obtained results and advance recommendations for future actions.

Methodology

Methodologically, the article employs a qualitative research approach to effectively address the research objective. This study draws on a wide range of secondary sources, including peer-reviewed literature, policy and NGO reports, and research-institute analyses. Together, these sources examine the impacts of changing climate patterns and the climate crisis, with particular attention to the subaltern status of women and the challenges faced by rural, primary-sector-dependent populations in Ethiopia. These sources were identified to ensure country-wide representativeness, capturing perspectives from diverse rural areas across all regions and socio-economic settings. Data selection followed two phases: first, we aimed to identify patterns that transcend specific localities; second, we prioritized sources presenting case studies from contexts in rural Ethiopia

that explicitly addressed climate-related vulnerabilities linked to gender and class, to understand how these dimensions intersect in shaping differentiated climate outcomes. Through thematic analysis we focused on recurring categories, such as gender, rural, exposure, vulnerability, resilience, adaptive capacity and political and socioeconomic marginalization, to compare findings between different regions and identify common structural features that contribute to rural women's enhanced exposure to the climate crisis.

Although it could be argued that the sole use of secondary data does not allow to generate new empirical evidence, this analysis contributes to the existing literature for three reasons. First, tracing a recurring pattern reveals that the issue is not confined to specific localities, but is expression of underlying structural dynamics that should be prioritized by policy-makers and decision-makers in Ethiopia. Second, relying on documented case studies allows to produce a strong analysis by grounding broader claims in context-specific observations. Third, the extensive range of selected sources provides a nuanced understanding of gendered and class-based climate vulnerability across rural Ethiopia. Thus, even though conducting in-person interviews could further strengthen the results presented, we believe that the multi-layered lens used in this article can contribute to the literature conceptualizing climate change as a non-traditional security threat.

Literature review: climate change from a gender-based perspective

Over the last three decades, a substantial body of literature has addressed the relationship between security and environmental degradation. Climate change has been defined a threat multiplier of latent crises, even though the debate over how higher temperatures, rapid desertification, prolonged droughts and erratic rainfalls concur in exacerbating security-related risks remains open (Goodman 2007; Goodman and Baudu 2023). In Ethiopia, which is part of a region endemically prone to violence, the phenomenon has been mainly analysed in relation to conflicts and migration patterns, as provided by state-centred security frameworks characterizing major international agendas (Gavin 2022; Gómez-Álvaro and Caro-Carretero 2024; Brown and Madar 2025). Interdisciplinary approaches have been rare and phenomena such as gender dynamics have long been considered non-causal implications of climate change (Mujere 2012; Joshua 2018; Markkanen and Anger-Kraavi 2019; Mersha 2019; Zenebe 2022; Alonso-Epelde, García Muros and González-Eguino 2024; Serraglio and Thorton 2024).

Only recently scholars started adopting a gender-sensitive lens in Ethiopia, agreeing on the enhanced exposure of women to negative effects. Among the most relevant works

are those of Assefa and Gebrehiwot (2023) and Devonald et al. (2024). Respectively, they provide insights from a micro-perspective, assessing specifically the scenario in the rural Adwa district in the Tigray Regional State, and a macro-perspective, including observations from urban and rural areas. Their results demonstrate that in Ethiopia the effects of climate change cannot be considered gender neutral. Women and girls are disproportionately exposed to the adverse effects of climate change, facing higher risks of poverty, food insecurity, school dropout and violence, due to rooted inequalities between males and females relegating them to a subaltern social position. This occurs despite the existence of climate policies taking into consideration the gender dimension, such as the Climate-Resilient Green Economy (CRGE) Strategy and the National Policy on Gender Equality and Women Empowerment (NP-GEWE)⁵, and evidence that women represent powerful change agents towards resilience-building and adaptation processes. These findings are coherent with those previously provided by Aryal et al. (2021) whose analysis outlines that in Ethiopia existing social norms and gender inequalities enhance the exposure of women to the adverse conditions of climate change. These contributions underscore three consistent patterns. First, gender inequalities in Ethiopia—particularly in land ownership, credit access, education, and participation in decision-making—multiply the challenges posed by rising temperatures, erratic rainfall, and resource degradation. Second, households headed by women generally have fewer assets and lower adaptive capacity, making them more vulnerable to climate-related shocks. Third, despite their marginalized status, rural women often play essential roles in sustaining local economies, managing natural resources, and supporting community resilience. Yet these contributions rarely translate into meaningful political influence or inclusion in climate governance processes. What remains underdeveloped in the literature is how gender, class, and spatial marginality intersect to shape climate vulnerability and resilience in Ethiopia. While studies identify important causal links, they often treat gender as an isolated variable rather than embedding it within a broader analysis of social stratification. Similarly, although research increasingly highlights women's agency, these insights are not consistently connected to normative debates on climate justice or to policy critiques concerning Ethiopia's adaptation strategies.

Building on these contributions and adopting a hybrid theoretical perspective that brings together Intersectional Environmentalism and Feminist Climate Justice, this paper aims at outlining a coherent image of the disproportionate exposure to climate change faced by women residing in rural areas of Ethiopia and depending on nature-based resources. The goal is uncovering the features enhancing their vulnera-

⁵ The Federal Democratic Republic of Ethiopia is currently finalizing an updated version of the National Policy on Gender Equality and Women Empowerment (NP-GEWE).

bility – namely gender, class and geographic collocation – while also and how women represent powerful resilience and change agents, highlighting the potential benefit of inclusive strategies based on justice and equity.

Theoretical Framework: integrating Intersectional Environmentalism and Feminist Climate Justice

This paper uses a hybrid theoretical framework, blending Intersectional Environmentalism and Feminist Climate Justice. Both approaches have been recently developed and provide a useful analytical means for critically examining how worsening environmental conditions intersect gender, class and spatial identity. Together they allow to highlight the existence of disparities not only between the Global North and the Global South. Social identities related to gender, class and space play a prominent role in shaping outcomes and only inclusive decision-making process can lead to effective solutions.

Intersectional Environmentalism evolves from the framework originally outlined by Kimberlé Crenshaw (1989), who used the term “intersectionality” to address the condition of multidimensional disadvantage faced by African-American women. Through the Intersectionality Theory, the author explains that oppression (or privilege) cannot be considered a monolithic concept as there is a wide spectrum of social identities, including race, gender, class, sexuality and disability, entangling to create such condition. Thus, approaching discrimination addressing either race or gender or class issues individually is excessively simplistic as one same person might be disadvantaged due to overlapping features. Drawing on Crenshaw’s objective of de-structuring complex oppression systems, environmental activists Leah Thomas (2022) coined the term “Intersectional Environmentalism” to advocate for justice for people and the planet as the climate crisis is progressively worsening. Using intersectionality to deconstruct political, socio-economic and cultural processes that create inequalities, allowed to bring evidence upon how marginalized groups are the most exposed to the worsening effects of climate change. The author argues that multiple factors contribute to such condition and advocates for an envisioned inclusive reality where communities and sections mostly impacted by the adverse consequences of climate change dispose of power and means to react.

Climate change intersects a complex web of social factors, which result in great disparities in terms of exposure (Sultana 2010; Ergas, McKinney and Bell 2021). This framework provides a useful lens for analysing why women and girls living in rural Ethiopia are on the forefront fighting the climate crisis and how deeply rooted cultural and social norms trap them in a cycle of vulnerability. Over recent years, the urban-cen-

tric growth model pursued within development policies has widened the rural-urban dichotomy, further exposing people living far away from centres providing goods and services (Dula et al. 2023; PSC 2023). Trapped in poverty and hit by the aggravating climate crisis, rural women and girls are disproportionately affected due to a combination of rooted gender inequalities, class and geographical collocation.

In support of the path to justice, the Feminist Climate Justice framework, outlined by UN-Women (2024), provides a concrete guidance towards sustainability and the recognition of women's agency as change drivers. This model develops from the assumption that climate change intersects economic and representation inequalities between men and women, with the latter over-exposed. This action-based framework identifies four critical dimensions to ensure effective solutions. To begin with, recognizing women's rights, expertise and social value through a bottom-up perspective is fundamental. Second, resources – including land, employment and technologies – should be equally distributed and women should be able to access public finance as men. Third, women (and other marginalized population sectors) should be included in decision-making and policy-making procedures, as they could provide critical insights and perspectives towards concrete solutions. Ultimately, it would be mandatory to recognize the limited historical responsibility of this context in terms of GHG emissions and thus to today's scenario, outlining adequate coping systems to tackle economic and non-economic negative fallouts.

Climate-related disasters occurring more frequently, unexpectedly and violently have contributed constraining 10% of women to extreme poverty globally and coincided with an increase of gender-based violence, higher incidence of food and water insecurity and erosion of women's political rights (ibid). Still, women emerge as powerful actors within resilience-building processes, especially during harsh times, intervening in post-disaster scenarios and defining short-term adaptation strategies. Paradoxically, they are excluded from recovery programs and decision-making processes (UN Climate Action 2022). This issue has been recently debated during the Africa Climate Week, held in Addis Ababa ahead of COP30. In Africa, where the whole continent has contributed to less than 4% of GHG, the economic consequences of climate change are disastrous and women – especially those living in poorer rural communities – are disproportionately affected. Yet, they spend on average three times more hours than men in unpaid labour and are the first to intervene in post-risk scenarios. Thus, not only finance programs must be coherent with community needs, but decision-making and implementation processes must be inclusive (Molina 2025).

If viewed complementarily, the Intersectional Environmentalism and Feminist Climate Justice frameworks provide a comprehensive analytical tool, not fully provided by either one independently. Intersectional Environmentalism clarifies why rural Ethiopian women face heightened climate risks by highlighting how gendered labour burdens,

limited mobility, insecure land rights, and socioeconomic marginalization reinforce one another. Feminist Climate Justice, in turn, identifies how these intersecting inequities should be addressed through policy and governance reforms that promote substantive equality rather than merely formal recognition. This hybrid model thus enables an integrated examination of both the causes and consequences of gendered climate exposure in Ethiopia, and it provides a foundation for assessing the potential of women's agency in adaptation and resilience processes. On the one hand, understanding how cut-crossing issues overlap enhancing the exposure to vulnerability is crucial to fully conceptualize that climate change does not have uniform impacts. On the other hand, assessing how women react as the environment conditions deteriorate and climate-related risks become more severe helps comprehending the importance of advocating for gender equality and climate justice. In the following chapters, this framework is applied to the environmental and climatic context of rural Ethiopia, focusing on the elements necessary to understand how physical changes intersect with existing gender inequalities.

The Gendered Dimensions of the Climate Crisis in Ethiopia

Ethiopia provides a compelling case for deconstructing the impacts climate change for two reasons. First, structural gender inequalities fundamentally underlie and shape rural livelihoods, conditioning how climate change becomes a gender-differentiated stressor. Second, the country is characterized by an exceptional ecological diversity coupled, growing climatic unpredictability, high dependence on climate-sensitive livelihoods, and rapid social and environmental transformations.

Deconstructing Structural Gender Inequalities in Rural Livelihoods

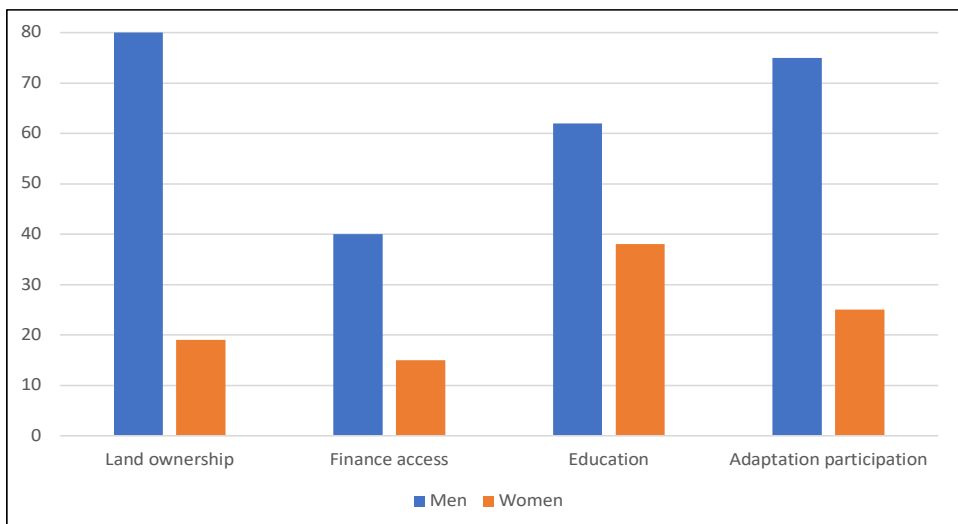
Rural women's access to productive assets, financial resources, education, and decision-making remains systematically constrained by patriarchal norms that prioritize men in land inheritance, agricultural authority, and household resource allocation. The same patriarchal norms assign women responsibility for water collection, firewood gathering, and household provisioning. Such roles increase women's dependence on local natural resources while reducing time available for education, paid work, or participation in adaptation initiatives.

According to the World Bank, only 19% of rural landholders are women, compared with 81% men, despite women representing about half of the agricultural labour force (World Bank Group 2025b; FDRE 2022). Droughts and soil degradation, not only limit women's ability to invest in soil or water management, but also reduces their eligibility

for agricultural credit and insurance programs. Furthermore, women-headed households own approximately 35% less livestock and generate 30–40% lower agricultural income than male-headed households, reinforcing economic dependency and reducing adaptive capacity (World Bank Group 2025a).

According to Ethiopia’s Country Gender Profile (UN Women 2024), women remain under-represented among users of climate-smart agriculture, irrigation and other resilience-building services, due in part to limited access to land, inputs, irrigation systems and extension services. Only 22% of women farmers reported receiving technical training related to climate-smart agriculture, compared to 48% of men (UNDP 2024). Low financial literacy and access to formal requirements further hinder women’s access to credit: less than 15% of rural women have ever applied for a bank loan, compared to nearly 40% of rural men (AfDB Group 2023). Educational inequalities further exacerbate these structural constraints. Female literacy in rural areas remains at 38%, compared to 62% of men, and women represent less than 30% of participants in formal agricultural extension services (FDRE 2022). These disparities translate into lower awareness of adaptation options and less participation in community decision-making. Reported in Figure 1, comprehensively these inequalities create disadvantages from multiple perspectives, forming the baseline upon which climate shocks exert their effects.

Figure 1 - Gender-disaggregated access to key resources and opportunities in rural Ethiopia (%)

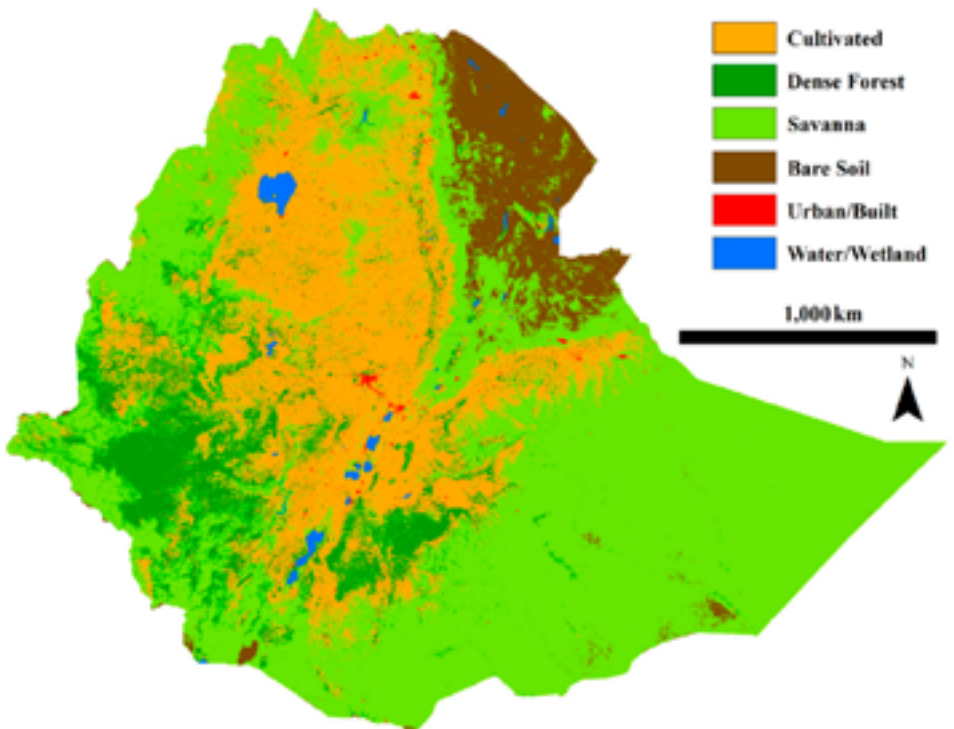


Source: elaborated by P.Ottino, based on institutional data.

A Landscape of Ecological Diversity, Climatic Uncertainty and Socio-Economic Transformation

The country's complex topography and ecological variety—from Afroalpine regions to arid and semi-arid lowlands—generate a mosaic of rural contexts that exhibit distinct climate vulnerabilities (for further extended ecosystem typologies description see the Appendix A). Figure 2 displays the land-cover and ecosystem diversity that conditions women's daily resource responsibilities. The map facilitates a clear understanding of how gendered vulnerability is shaped by the interaction between inequality and specific environmental stressors. People living in forest margins, savannahs, montane grasslands, or semi-desert zones face different combinations of labour demands, resource scarcity, and exposure to environmental degradation.

Figure 2 - Land-cover map of Ethiopia for 2017 at 30 m spatial resolution.



Source: Khatami et al. 2020.

As cultivated areas in central and western Ethiopia expand at the expense of forests or savannahs, access to firewood and wild food decreases, increases the distances women in charge of these tasks must travel to collect firewood and water. Consequently, workloads intensify and time for education or income-generating activities reduces. During crisis peaks this condition is exacerbated: seasonal water shortages in the savannah regions of eastern and south-eastern Ethiopia exacerbate food insecurity and increase the time spent collecting water. The scarcity of resources in the bare soil of the northeast forces women to travel longer distances to collect firewood, fodder, and water, increasing physical labour and reducing the time devoted to other household or economic activities. Urbanization further reduces access to traditional firewood and increases dependence on purchased fuels and, although water supplies may improve in cities, for low-income women with no access to adequate infrastructure living in urban areas, conditions do not get better. These contrasts demonstrate that gendered climate vulnerability is not uniform but shaped by how gender norms interact with local ecosystems, resource endowments, and livelihood systems. This variation helps reveal the mechanisms by which climate stressors magnify structural gender inequalities.

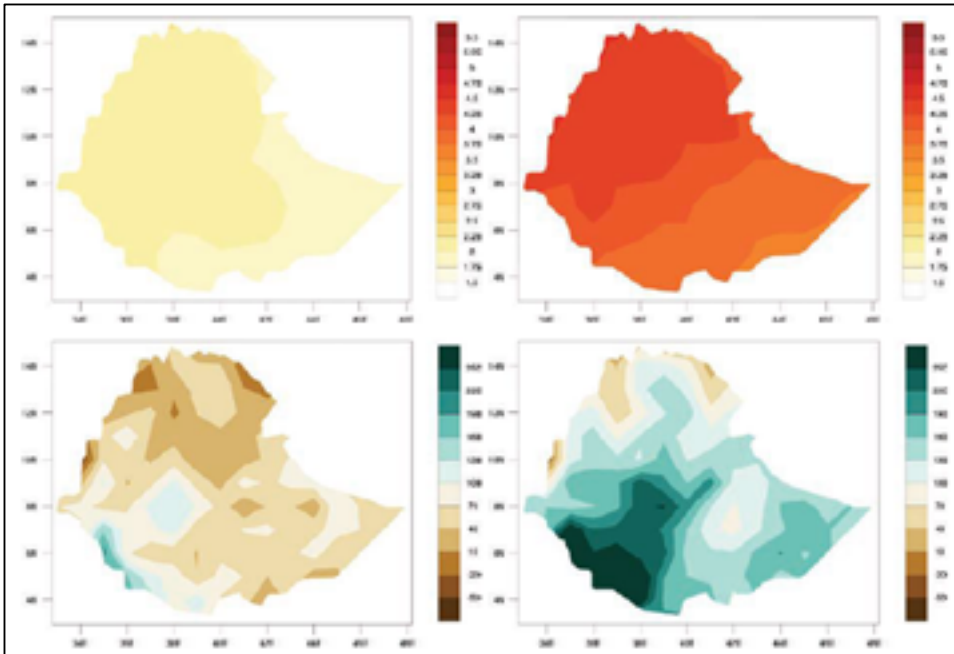
Being a predominantly agricultural country, and home to of which 76.34% live in rural areas (World Bank Group 2025b), Ethiopia is largely dependent on biodiversity resources for its food production. This rich variety of ecosystems supports the national economy and local livelihoods, strengthens food security, and enhances climate-change resilience. However, despite its ecological richness, Ethiopia remains one of the most vulnerable countries to climate change, mainly due to its particular ecological context and level of socio-economic development. Livelihoods depend heavily on rainfall patterns, soil fertility, grazing lands, and local water availability, which are highly sensitive to climate variability.

In Ethiopia, the general pattern of land use change over the past decades caused forest cover, wetlands, and rangelands to decrease and cultivated lands and settlements to increase (National Ecosystem Assessment of Ethiopia 2022). Over thousands of years, agricultural and agropastoral communities have converted many natural ecosystems into agroecosystems, giving rise to new, heterogeneous agricultural landscapes rich in agrobiodiversity and contributing to new climatic regimes.

The last five decades have seen mean annual temperatures rising by approximately 0.28°C per decade, with future projections estimating increases of 0.5-2°C by mid-century (Conway and Schipper 2011; FDRE 2022). Precipitation data analysis confirms that in southern, south-western, and south-eastern Ethiopia small rainy season and main rainy season rainfall decreased from 15-20% between the 1970s and 2000s (FDRE 2022). These shifts are compounded by recurrent droughts associated with the El Niño-Southern Oscillation, accelerating evapotranspiration and degrading soil moisture even in

areas where annual rainfall may rise. Figure 3 shows the spatial distribution of projected temperature and precipitation changes, demonstrating the differentiated climate exposures that rural populations have to face.

Figure 3 - CMIP5 ensemble projected change (32 GCMs) in annual temperature (top) and precipitation (bottom) by 2040-2059 (left) and by 2080-2099 (right), relative to 1986-2005 baseline under RCP8.5. Source: World Bank 2021.



Source: World Bank 2021.

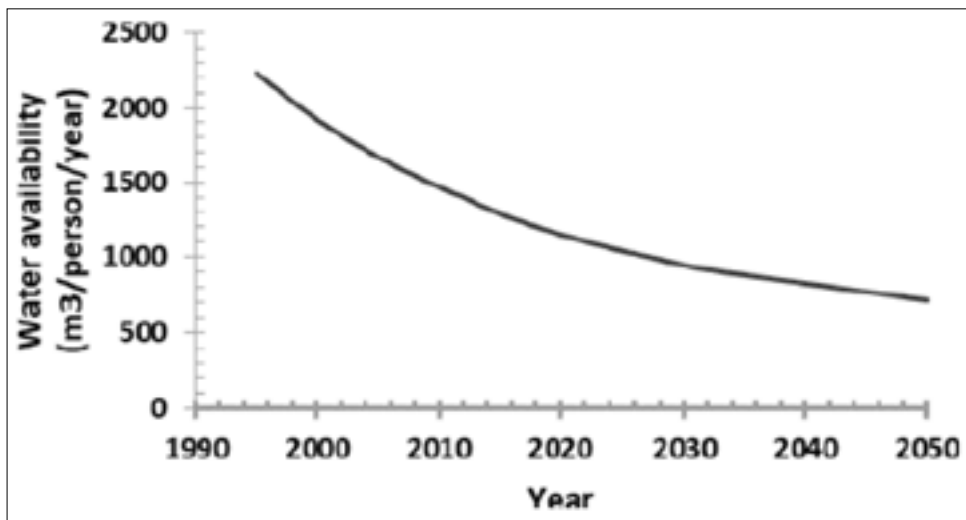
Considering a high emissions scenario (RCP8.5)⁶, data analysis provided by the National Ecosystem Assessment of Ethiopia (2022) highlight that temperatures will increase significantly across the country, while rainfall will increase in some areas and decrease in others. Even in areas of potential increased rainfall, warmer temperatures will accelerate the rate of evapotranspiration and reduce the benefits from the increased rainfall. The

⁶ Emission scenarios are plausible representations of the future development of GHG concentrations and aerosols. Representative Concentration Pathways (RCP) indicate a representative trend in greenhouse gas and aerosol concentrations for a given climate target (in terms of radiative forcing in 2100), which in turn corresponds to a given trend in human emissions. The extent of future anthropogenic emissions depends heavily on international political decisions, population growth, and technological progress. The RCP8.5 scenario assumes humanity continues to emit increasingly more greenhouse gases as before. This corresponds to a radiative forcing of 8.5 W/m² at the end of the century.

figure strengthens the argument that climate risks are neither temporally nor spatially uniform, which has direct implications for the gendered distribution of labour and vulnerability. The sectors most vulnerable to the effects of climate change are agriculture and livestock, which are of great importance to the Ethiopian economy. Agriculture's share of GDP was 32% in 2023 (AfDB Group 2024), contributing 62% to employment (World Bank Group 2025a). However, it is based on smallholder subsistence farming with an average farm size of less than 0.5 hectares (FDRE 2022).

Furthermore, rapid population growth leads to unsustainable exploitation of water and land resources. Rural households face growing livelihood insecurity, which is driving increased rural-urban migration. Rapid urbanization and unplanned expansion of urban settlements further negatively affects the availability of agricultural land, food production, and water resources. Figure 4 illustrates the dramatic decline in per capita water availability from the 1990s to projections for 2050 (National Ecosystem Assessment of Ethiopia 2022).

Figure 4 - Surface water availability per capita.



Source: FDRE/MEFCC 2018.

This trend is crucial for understanding women's specific vulnerabilities. Their socially assigned responsibility for water collection means that diminishing water access translates directly into longer travel distances, heavier physical burdens, and reduced time for education, rest, or income-generating work.

Land-use changes, especially deforestation, the expansion of cultivated land, and large-scale land transactions, further reshape the environmental conditions under which women operate. Forest degradation in central and western Ethiopia forces women to travel farther for firewood; savannah depletion in the east and south increases the labour required for water and fodder collection; and ecosystem decline in the northeast's bare-soil landscapes generates acute resource scarcity. The everyday consequences of ecosystem degradation cannot be separated from gender norms: women's responsibility for fuel and water collection intensifies precisely in those areas where environmental decline is most pronounced. The land-cover map in Figure 2 thus supports a key conceptual point: heterogeneity in ecological settings produces heterogeneity in the gendered impacts of climate change. However, women's disproportionate exposure represents a common feature.

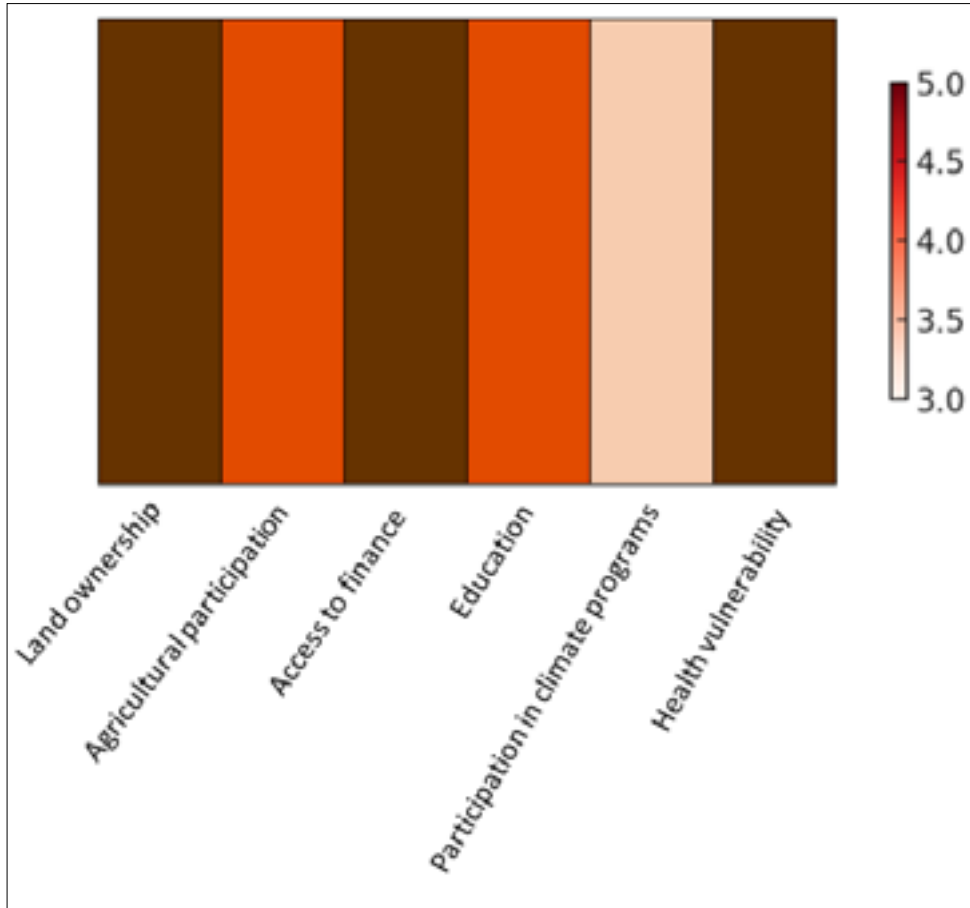
Moreover, large-scale land transactions for the cultivation of biofuels and cash crops, which also have direct negative impacts on ecosystems and ecological services, should not be forgotten. Ethiopia has recently recorded some of the highest numbers and areas of land transactions, often occurring without adequate land-use planning, land assessment, and risk analysis, and without respecting and institutionally recognizing residents' customary land tenure rights (Teklemariam et al. 2016).

Intersecting Changing Environmental Dynamics and Social Disparities

These environmental dynamics interact with pre-existing social inequalities to produce deeply gendered vulnerability patterns. Land tenure insecurity, for instance, diminishes women's ability to adopt soil conservation or irrigation technologies, which in turn reinforces income disparities that already place women at the margins of agricultural productivity. Their exclusion from credit markets and extension services reduces their engagement in adaptation programmes—an asymmetry visible in the fact that women constitute less than a quarter of beneficiaries of formal resilience-building initiatives. Limited participation in community decision-making exacerbates these inequities, as women have fewer opportunities to influence how resources are allocated or which adaptation strategies are prioritized.

Figure 5 shows a heat map of gender-differentiated vulnerability indicators and provides an analytic bridge between structural inequalities (e.g., unequal land rights, financial exclusion, differential health risks) and climate exposure (e.g., resource scarcity, labour burdens, reduced economic buffers, exclusion from adaptation knowledge). The heat map highlights how pre-existing inequalities intensify the impacts of climate stressors. For detailed explanation of how the figure was generated, see Appendix B.

Figure 5 - Heat map of gendered vulnerability dimensions in rural Ethiopia.



Source: elaborated by P. Ottino, based on institutional data.

Darker shades highlight where structural inequalities most acutely undermine women's adaptive capacity, particularly in land ownership, access to finance, and health security. Lighter but still significant disparities in education, agricultural information access, and participation in adaptation programmes complete the picture of cumulative disadvantage. The map demonstrates that climate change does not introduce new inequities but amplifies existing ones through mechanisms such as resource scarcity, labour intensification, limited economic buffers, and exclusion from knowledge systems. At the same time, the map identifies priority areas for interventions where inequalities most intensify climate exposure.

Between Vulnerability and Agency: Perspectives of Rural Women in Ethiopia

The described scenario has been probably exacerbated by the Urban Institutional and Infrastructure Development Program (UIIDP) (2018-2024), designed to address challenges related to improve infrastructure development, services systems and employment in Ethiopian cities, cofounded by World Bank's International Development Association (IDA), the Government of Ethiopia, and the French Development Agency (AFD) (World Bank Group 2025b). As limited financial and adaptation capabilities enhance the negative consequences of climate change, there is greater risk that in rural and less developed areas the deepening climate crisis results in drastic declines in land productivity, jeopardizing the very survival of rural communities. Consequently, it leads to competition for natural resources between herders and farmers, rising food insecurity, with about 20% of the population currently being undernourished, and uncontrolled migration patterns, especially from rural to urban areas (Thornton et al. 2024; Amoah et al. 2025; Global Hunger Index 2025). Comprehensively, these dynamics created insecurity and instability, disrupting fragile environmental and socioeconomic balances and exacerbating ethnic confrontations that not rarely turn to conflicts or other forms of violent confrontation.

As seen, morphological, climatic, eco-systemic, ethnic, and security factors intersect gender inequality. Women and girls face enhanced risks to their personal and economic security due to gender constraints and there is evidence that compared to those living in urban areas, women living in rural contexts suffer from stricter social barriers (Sender and Cramer 2021; Guedas et al. 2024). Deeply rooted patriarchal values anchor women to a lower social status, limit their access to crucial resources and prevent inclusive decision-making processes. Women are generally the last to eat among family members and a formerly entrenched tradition, recently discontinued in most rural areas, was that widowed women could not live without a man's protection and thus re-married to one of the former husband's brothers (Mekonnen 2022; Tesemash and Leta 2022). However, notably during crisis peaks, they emerge as powerful agents of resistance within households and communities, demonstrating inherent adaptive capacities. To fully grasp this paradox, it is necessary to deconstruct women's roles within rural societies by examining the contexts and mechanisms that heighten their exposure.

Intensive Work Obligations

Customarily, women are not compatible with farming or herding and are considered better suited for (unpaid) domestic duties and non-agricultural activities. However, evidence from the Meket rural district in the Amhara Region, and the rural Oda Dawt

Kebele in the Oromia Region proves that their workload is comprehensively heavier: they consistently contribute to agricultural production and distribution, are responsible for gathering, storing and securing water, food and wood, and carry out domestic chores (Chandel et al. 2022). Similarly, an analysis addressing the rural Arsi Negele district in central Rift Valley in the Oromia Regional State, highlighted women's crucial role in diversifying household's incomes and thus their contribution to its resilience against climate variability (Mekonnen 2022). This leads to an inherent paradox: rural women are politically, culturally and socioeconomically neglected and constraint but are key contributors to food security and income generation. They represent key actors within communities, engaging contemporarily in on-farm, non-farm and off-farm activities, but are not involved in decision-making and implementation processes. As forwarded by the theory of Intersectional Environmentalism, persisting structural social barriers downplay their role and force them to bear the brunt of the negative effects of the worsening climate crisis. Women disempowerment translates in more limited reactive capacities, enhancing the exposure of whole households to the adverse effects of climate change, with effects echoing at the community level, regional level and national level. Thus, as displayed by the Feminist Climate Justice model, recognizing the expertise and social value of women becomes imperative for resilience-building processes.

Financial Dependence and Educational Devaluation

Key elements contributing to women's subaltern position in rural Ethiopia are economic dependence on men and the tendency of considering female education expendable. Whereas the lack of economic autonomy limits women's chances of investing in adaptation strategies, unequal access to education, training and technology knowledge directly impacts on their ability of fully understanding the issue and reduces their awareness levels (Natnael 2025; Brodtkorb et al. 2025). Evidence from the rural Halaba district in Central Ethiopia Regional State proves both points. First, women access land ownership through marriage whereas men are rightfully entitled to inherit property and women-headed households own a lower number of livestock, which translates fewer assets to rely on. Second, only 21% of the female population received a proper education, with higher levels of illiteracy rates among women (Tesemash and Leta 2022). On a similar note, data suggests that in the Afar Regional State, financial instability and lack of knowledge force pastoralist women into a condition of enhanced exposition to water, sanitation and hygiene shortcomings as the negative effects related to climate change become more severe (Fostvedt-Mills 2021).

Poverty, low literacy rates, economic dependence and conservative practices comprehensively contribute to keeping their voices unheard. In rural areas, discrepancies

between men and women combine in limiting adaptation and resilience capabilities of females. Women-headed households have lower chances of accessing climate-smart agriculture, irrigation systems or technologies, which would contribute to valuable medium-term and long-term resilience strategies, and men are generally privileged when it comes to obtaining financial support from formal state institutions, leading to higher chances of accessing loans compared to women, which are hampered by their social status (Delavallade et al. 2025). Consistent with the Intersectional Environmentalism framework, women are more exposed to insecurity and climate change due to structural injustices. However, there is another side of the coin: during crisis peaks, they become key resilience actors, providing for their families and outlining temporary adaptation solutions, despite a higher exposition to food insecurity and heavier workloads. In Ethiopia rural women do not represent passive victims of the climate crisis, demonstrating dynamism and great potential of driving progress, despite lacking financial resources, proper education and social recognition. The implementation of the Feminist Climate Justice framework – notably ensuring equal distribution and access to resources – would maximize their potential.

Vulnerabilities Arising from Maternal Obligations

Although motherhood is a social responsibility for women in rural Ethiopia, physiological processes associated with maternity enhance vulnerabilities to external shocks. Confirming the theory of Intersectional Environmentalism, climate change becomes a multidimensional threat for expecting women living in poor rural areas. There is scientific evidence that, when pregnant, women suffer the consequences of having weaker immune systems and decreased thermoregulation capacities. Thus, issues such as unavailability of clean water, food shortages and higher temperatures can become problematic and eventually lead to postpartum infections, stillbirths, dangerous preterm deliveries and development problems such as low birth weight (Dumbuya et al. 2024). In Sub-Saharan Africa maternal mortality still represents an issue and although Ethiopia made exceptional advancements in reducing maternal and neonatal mortality over the last two decades, climate change risks hindering progress (Melesse et al. 2024). Evidence from rural areas in the Somali Regional State testifies that anaemia and undernutrition represent major threats for expecting women and girls, with considerable deteriorations coinciding with the peaks of the climate crisis. Additionally, most healthcare centres are in urban or semi-urban centres meaning that rural women must walk long distances for checkups or for delivering with the assistance of a medical specialist (UNFPA 2024). In line with the principles of Intersectionality, as the effects of climate change worsen, pregnant women living in rural developing areas, further away from centres providing

healthcare services, are more exposed to food and water insecurity with a wide range of consequences for the mothers' and newborns' health. Yet, they are still expected to fulfil their duties as caregivers, wives and mothers, and thus continue representing key figures and exceptional examples of resilience. Ensuring the recognition of women's rights and social value and implementing an equitable and just system would be beneficial from a broader perspective, fostering sustainable development on the medium and long term.

Difficulties Arising from Migratory Processes

Gender inequalities starkly emerge when addressing chances and perils linked to migration, which has long been defined as an adaptive strategy to the intensifying climate crisis (McLeman and Smith 2006). However, climate migration is still a very debated category and, adopting a theoretical neoclassical realist interpretation, the decision of moving within or across state borders depends on an individual's or household's needs and chances. Consequently, migration emerges as a deeply gendered process, with great differences in terms of possibilities and encountered risks between men and women. The most utilized cross-border migration route by Ethiopian women is the Eastern Route, through which they reach Yemen or one of the Gulf States, where they aim at finding economic benefits and being integrated within the domestic labour sector. However, the sea crossing phase is disproportionately dangerous for women, who face various forms of discrimination and violence, such as sex trafficking and human exploitation by smugglers and non-state exponents. Women coming from poorer contexts with no economic means, especially if single mothers with children or travelling alone in search for opportunities, figure as the most exposed to these adverse conditions (Powell and Botti 2021; Nyberg Sørensen 2023). From an intra-state perspective, although the number of females moving from rural to urban contexts has increased over the last two decades, still they are constrained by socioeconomic barriers (Yorke et al. 2021). A concrete example is represented by migration tendencies from rural households in the Mariamshewito and Simret kebeles in the Adwa district, in the Tigray Regional State, where the adverse consequences of a prolonged conflict and of climate change are intertwined. Despite rural-urban seasonal migration emerging as an adaptation strategy, less than 10% of the female-headed households (compared to over 35% of the male-headed households) utilize it (Assefa and Gebrehiwot 2023). This can be explained by multiple factors, including their responsibilities as caregivers for community members, a more restraint ability of travelling long distances, especially if children are involved, and a general discouragement by community members, which see negatively women moving alone. Combining Intersectional Environmentalism and Feminist Climate (in)Justice, rural women's disproportionate exposition stems from their entrenched subaltern social role

but is enhanced by the lack of recognition of women's rights, social value and expertise, an unequal distribution of resources and exclusive decision-making processes.

Exposure to Gender-Based Violence

By compromising the role of men as breadwinners and spiking stress levels, climate change and its effects inherently cause higher risks of gender-based violence. During and shortly after natural disaster occurrences, girls and women are 14 times more likely to be physically harmed (UNFPA 2024). Walking long distances to fetch water and firewood enhances exposure and a correlation has been identified between rising temperatures and domestic intimate violence (Riyad Fatema et al. 2019). The worse-case scenarios are registered in refugee camps, hosting a growing number of people fleeing from conflicts and areas destroyed by climate disasters and mostly lacking safety, protection measures and basic goods and services. Evidence from the Okugu Refugee Camp, in Gambella Regional State, testifies that over 60% of women have experienced gender-based violence, notably by husbands or family members, and over 30% experienced sexual violence (Shifera et al. 2025). Clearly the effects of climate change are multi-faceted, manifesting directly and indirectly, with women being on the frontline bearing the consequences, due to a complex network of social features, highlighted by theory of Intersectional Environmentalism. Still, they demonstrate instinctive reaction capabilities, which could be undoubtedly enhanced by improved gender equality and recognition measures, advocated by the Feminist Climate Justice framework.

Ultimately, climate-related insecurity risks have been linked to adverse consequences such the increase of early marriages and Female Genital Mutilation (FGM), namely in rural areas. These can be framed as deeply intertwined traditional social practices involving women with low levels of education and living in poor rural areas, where cultural and gender norms are deeply rooted, perpetuating gender disparities. In Ethiopia, FGM practices have been declared illegal since 2005 and the definitive elimination of this practice figures among the objectives of the 2030 Agenda. However, cases are still registered across the country, notably in the Afar Regional State, despite the government's efforts and constant progress towards a complete eradication (Presler-Marshall et al. 2024). Over the past years, a direct nexus has emerged between the incidence of these practices and the levels of insecurity enhanced the climate crisis, especially in poor contexts (UNFPA 2024). Between 2021 and 2022, during the peak of the drought crisis, the number of women and girls experiencing these practices spiked. In rural areas of the Somali Regional State, Oromia Regional State and former Southern Nations, Nationalities and Peoples' Regional State, child marriages rose in average by 119%, emerging as an adaption strategy for families that could not provide for all members. Simultaneously,

cases of FGM rose at alarming rates, augmenting by 27% in former Southern Nations, Nationalities, and Peoples' Region area (UNICEF 2022; Baroraho et al. 2023).

As outlined by the theory of Intersectional Environmentalism, climate change represents a multifaceted phenomenon that cannot be considered gender neutral, as demonstrated by women in rural Ethiopia. Their contribution within households and at the community level is key for outlining sustainable solutions and resilience-building processes, mirroring an immense social value. Yet, features such as gender, lower availability of economic means, higher levels of illiteracy, and subaltern social status prevent their inclusion within discussion forums and decision-making processes. This enhances their exposure to any adverse consequence and fosters the need for a more just and equitable system, where rights are recognized, resources are equitably distributed and coping processes are inclusive. Despite the importance of including women's voices in policymaking is recognized on a theoretical level, a shift from theory to practice is still to be seen. Progress towards gender equality, education, financial possibilities and representation, and inclusive decision-making processes could lead to concrete results. Medium and long terms resilience-building and development processes would be possible within a context that bears the burden of a situation that has not contributed to creating.

Conclusions and Recommendations

Ethiopia is one of the African countries with the greatest morphological and climatic diversity, generating a high biodiversity. In recent years, increasingly violent effects of climate change resulted in a steady increase in temperatures, especially during the dry seasons and in arid and semi-arid zones, and variations in rainfall patterns, primarily linked to the El Niño-Southern Oscillation and changes in ocean currents. Other than rising temperatures and unpredictable patterns of droughts and rainfalls, Ethiopia has been experiencing events such as floods, landslides, mudslides, and droughts, with extensive impacts on agropastoral systems and water and food security. These conditions hit most harshly rural communities, characterized by dependency on subsistence practices, social fragility and financial uncertainty. As conceptualized by the theory of Intersectional Environmentalism, within this context, women combat climate-related adversities from the frontline and are the most affected by direct and indirect effects of the climate crisis.

In rural Ethiopia, climate change and gender inequality are mutually reinforcing dynamics. Women's limited control over land, livestock, finance, and training—combined with resource- and labour-intensive gender roles—creates a baseline of structural vulnerability. Climate change exacerbates this vulnerability by degrading natural resources, increasing labour burdens, and reducing economic resilience. Deeply rooted gender

inequalities and rural-urban disparities limit rural women's access to decision-making processes and discussion forums, with consequences on medium-term and long-term development. In rural areas, customary social traditions and patriarchal norms prevent access to education, healthcare and job opportunities, anchoring women to multidimensional subalternity. Simultaneously, women remain central actors in household and community resilience, managing agricultural production, ensuring food security, and sustaining households during climate shocks, often without adequate institutional support. Their position at the intersection of high exposure and critical resilience functions highlights both the inherent potential of a population section that, despite rhetoric, is neglected and the importance of situating gender analysis at the centre of climate research and policy.

Understanding how climate change intersects with existing gender inequalities, while also recognizing the diversity of rural ecological contexts, is essential for explaining why the impacts of environmental stressors are socially differentiated. This perspective also highlights the need for climate policies that address both biophysical vulnerabilities and entrenched social hierarchies. Gendered climate vulnerability cannot be reduced to individual or household characteristics but must be understood within broader structures of land access, cultural norms, ecological conditions, and political institutions.

Implementing a framework based on inclusivity and recognition such as the Feminist Climate Justice, advocating for the recognition of rights, expertise and social values of women, an equal distribution of resources and opportunities and inclusive decision-making processes, would be greatly beneficial from a micro and macro perspective. However, to translate these principles into practice into practice, political commitment political commitment is not sufficient. This is precisely why, at date, women empowerment figures among the Ethiopian government's priorities, in line with the UN Sustainable Development Goals and the 2030 Agenda, but theory and practice are mismatching.

Integrating the principles of Feminist Climate Justice into both national and local strategies, action could become both socially transformative and environmentally effective. Other than implementing policies to empower and emancipate women such as creating income-generating opportunities, ensuring inclusive decision-making processes, promoting access to information and reduce the burden of family responsibilities, there are multiple inspiring valuable examples of successful inclusive strategies implemented across Africa that can be drawn upon (Mayhew and Muinga 2024).

Building on the successful approaches of Kenya's Women Enterprise Fund, targeted microfinance programs and revolving loans funds for women farmers represent a promising approach. Targeted microfinance programs and revolving loans funds for women farmers, building on the successful approaches of Kenya's Women Enterprise Fund, represent another promising approach. Supporting women's cooperatives in value-added

chains (seed banks, food processing, local markets) while ensuring access to extension services, information, and climate training, would further strengthen women's adaptive capacities. Additionally, reinforcing the mechanisms of implementation of women's rights regarding land use and inheritance remains critical. Experiences from Tanzania (Fredrick et al. 2025) and Uganda (Poulin and Pierotti 2025) show that joint land ownership can substantially increase women's bargaining power, offering a valuable model for broader application. The "Building WOMen Smallholder Farmers'empowerment and adaptive capacities: A pathway to Enhancing women's Resilience to climate change" (WOSFER) project, running in Uganda from 2023 to 2026, and the "Grainothèque" project, implemented in Côte d'Ivoire in 2017, are emblematic. Through a direct involvement of women farmers, they both seek to enhance women's adaptive capacities to changing environmental trends, towards strengthening their resilience and leading abilities. They aim at fostering bottom-up gender transformative solutions based on capacity building. Similarly, the "Adaptation Learning Programme for Africa" (ALP) active between 2010 and 2015 aimed at supporting vulnerable communities struggling with the effects of changing climate patterns in Ghana, Niger, Kenya and Mozambique, implementing a leaning-by-doing approach and paying particular attention to integrating gender equality within resilience-building and risk reduction processes. The implementation of these virtuous projects demonstrates that despite difficulties linked to entrenched social norms and traditions, through awareness, information and training change is possible and tangible.

With climate change becoming an irreversible tendency, outlining concrete solutions becomes imperative and it has become starkly clear that only inclusive, bottom-up strategies can effectively foster lasting resilience capacity. Starting by ensuring the recognition of women's rights and social value, an equitable distribution of resources, inclusive processes and coping systems to tackle fallouts, Ethiopia has the change of shifting from recognition to implementation, from participation to decision-making power, and from isolated projects to systemic change.

Bibliography

AfDB Group

2023 'Annual Report', *African Development Bank Group*, pp. 1-40, <https://www.afdb.org/en/documents/annual-report-2023>, retrieved on 9 Oct 2025.

- 2024 'AFRICAN ECONOMIC OUTLOOK 2024. Driving Africa's Transformation. The Reform of the Global Financial Architecture', *African Development Bank Group*, 205, https://www.afdb.org/sites/default/files/2024/06/06/aeo_2024_-_chapter_1.pdf Alonso-, retrieved on 10 Oct 2025.
- Alonso-Epelde, E., García-Muros, X. and M. González-Eguino
2024 'Climate action from a gender perspective: A systematic review of the impact of climate policies on inequality'. *Energy Research and Social Science*, 112. Doi: 10.1016/j.erss.2024.103511.
- Amoah, E.A., Bloomer, J. and T. Campbell
2025 'Beyond resource scarcity: developing an integrated framework for analysing farmer-herder conflicts in the Global South', *Pastoralism*, 15, 15245. Doi: <https://doi.org/10.3389/past.2025.15245>
- Aryal, J. P., Sapkota, T. B., Rahut, D. B., Gartaula, H. N. and C. Stirling
2022 'Gender and climate change adaptation: A case of Ethiopian farmers', *Natural Resources Forum*, 46, 3, pp. 263–288. Doi: 10.1111/1477-8947.12259.
- Baroraho, T., Heimsoth, E., Islam, F. et al.
2023 'Global Girlhood Report 2023: Girls at the Centre of the Storm – Her planet, her future, her solutions', *Save the Children*, pp. 1-37, https://resourcecentre.savethechildren.net/pdf/STC_Global_Girlhood_Report_2023.pdf, retrieved 9 Oct 2025.
- Brodtkorb, I. B., Magalhães Teixeira, B., Baldwin, G. et al.
2025 'The Climate, Peace and Security Thematic Fact Sheet. Women, Peace and Security', *NUPI and SIPRI*, pp. 1-4, https://www.sipri.org/sites/default/files/2025-10/wps_sipri-nupi_fact_sheet.pdf, retrieved 8 Oct 2025.
- Brown, O. and S. Madar
2025 'The Intersection of Mobility, Environmental and Climate Change, and Conflict in the East and Horn of Africa', *European Union and International Centre for Migration Policy Development*, pp. 1-23, https://mixedmigration.org/wp-content/uploads/2025/08/The-Intersection-of-Mobility-Environmental-and-Climate-Change-and-Conflict-in-the-East-and-Horn-of-Africa_FINAL.pdf, retrieved 7 Oct 2025.
- Climate Watch
2022, 'Ethiopia', <https://www.climatewatchdata.org/countries/ETH>, retrieved 8 Oct 2025.
- Conway, D. and E.L.F. Schipper
2011 'Adaptation to climate change in Africa: Challenges and opportunities identified from Ethiopia'. *Global Environmental Change*, 21, 1, pp. 227–237. Doi: 10.1016/j.gloenvcha.2010.07.013.
- Crenshaw, K.
1989 'Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics', *University of Chicago Legal Forum*, 1, 8, pp. 139-167, <https://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?article=1052&context=uclf>, retrieved 1 Oct 2025.
- Delavallade, C., Gittard, M. and J. Vaillant
2025 'Women and Climate Adaptation in Rural Sub-Saharan Africa. Constraints and Research Priorities', Policy Research Working Paper n. 11095, *The World Bank Group*, pp. 1-54. Doi: <https://doi.org/10.1596/1813-9450-11095>.

Dula, T., Yasin, J., Meseret, H. and A. Seyoum

2023 'Determinants of inequalities in welfare among households in Ethiopia: A comparative study of urban and rural Ethiopia', *Cogent Economics & Finance*, 11, 2. Doi: 10.1080/23322039.2023.2290371.

Dumbuya, S., Chabinga, R., Ferede, M. A. et al.

2024 'Climate change impacts on maternal health and pregnancy outcomes in Africa', *Journal of Water and Health*, 22, 11), 2113. Doi: 10.2166/wh.2024.254.

Ellis, F. and H. A. Freeman

2004 'Rural Livelihoods and Poverty Reduction Policies', *Routledge*, pp. 1-423 Doi: 10.4324/9780203006214.

Endale, K., Jones, N., Presler-Marshall, E. et al.

2022 'Exploring the patterning and drivers of FGM/C and child marriage in pastoralist Ethiopia. Baseline report from Afar and Somali regions', *London: Gender and Adolescence: Global Evidence*, pp. 1-94, <https://gace.odi.org/wp-content/uploads/2022/08/FGM-and-Child-marriage-Ethiopia.pdf>, retrieved 3 Oct 2025.

Ergas, C., McKinney, L. and S.E. Bell

2021 'Intersectionality and the Environment', *Springer, Cham*. Doi: 10.1007/978-3-030-77712-8_2

Ethiopian Biodiversity Institute.

2022 'Syntheses of the Status of Biodiversity and Ecosystem Services, and Scenarios of Change', *National Ecosystem Assessment of Ethiopia*, pp. 1-714, <https://www.ecosystemassessments.net/content/uploads/2022/06/Composite-Book-06.06.2022.pdf>, retrieved 6 Oct 2025.

FDRE

2015 'National Biodiversity Strategy and Action Plan 2015-2020 (NBSAP II)', *Ministry of Infrastructure, Natural Resources and Environment*, pp. 1-49, <https://www.cbd.int/doc/world/et/et-nbsap-oth-en.pdf>, retrieved 7 Oct 2025.

2022 'Ethiopia's Third National Communication to the United Nations Framework Convention on Climate Change' *UNFCCC*, pp. 1-349, <https://unfccc.int/sites/default/files/resource/TNC%20Ethiopia%20Submission%20V5.pdf>, retrieved 4 Oct 2025.

Fostvedt-Mills, C.

2021 'Empowering pastoralist women in Afar region, Ethiopia: the value of photovoice in Covid-sensitive research', *The sanitation learning lab*, <https://reliefweb.int/node/3737571>, retrieved 4 Oct 2025.

Fredrick, L. A., Lucian, C. and J. Urassa

2025 'Women and land rights: The impact of formalization in Tanzania's Coastal Region', *Research in Globalization*, 10. Doi: 10.1016/j.resglo.2025.100288.

Gavin, M.

2022 'Climate Change and Regional Instability in the Horn of Africa', Discussion Paper Series on Managing Global Disorder, *Center for Preventive Action of the Council on Foreign Relations*, 10, pp. 1-38, <https://www.cfr.org/report/climate-change-and-regional-instability-horn-africa>, retrieved 5 Oct 2025.

Gómez-Álvarez, G. and R. Caro-Carretero

2024 'Climate change and migration dynamics in the Horn of Africa: A comprehensive review and future research direction', *European Public and Social Innovation Review*, 9, pp. 1-21. Doi: 10.31637/epsir-2024-412.

Goodman, S. and P. Baudu

2023 'Climate Change as a "Threat Multiplier": History, Uses and Future of the Concept', *Center for Climate and Security*, 38, pp. 1-25, <https://councilonstrategicrisks.org/wp-content/uploads/2023/01/38-CCThreatMultiplier.pdf>, retrieved 6 Oct 2025.

Goodman, S. et al.

2007 'National Security and the Threat of Climate Change', *CAN Corporation*, pp. 1-35, <https://www.cna.org/reports/2007/national%20security%20and%20the%20threat%20of%20climate%20change%20%281%29.pdf>, retrieved 6 Oct 2025.

Guedes, W.P., Branchi, B. A., Sugahara, C. B. et al.

2024 'Gender-based climate (in)justice: An overview', *Environmental Science & Policy*, Elsevier, 162, 103934. Doi: 10.1016/j.envsci.2024.103934

Guo, Y., Piaget, K., Baller, S. et al.

2025 'Global Gender Gap Report 2025', *World Economic Forum*, pp. 1-395, https://reports.weforum.org/docs/WEF_GGGR_2025.pdf, retrieved 7 Oct 2025.

Horne, F.

2011 'Understanding Land Investment Deals in Africa. Country Report: Ethiopia', *The Oakland Institute*, pp. 1-65, https://www.oaklandinstitute.org/sites/default/files/files-archive/OI_Ethiopia_Land_Investment_report.pdf, retrieved 8 Oct 2025.

Joshua, E.

2018 'Climate change and gender equality in developing states', *World Development*, 107, pp. 289-305. Doi: 10.1016/j.worlddev.2018.02.021.

Khatami, R. et al.

2020 'Operational Large-Area Land-Cover Mapping: An Ethiopia Case Study', *Remote Sensing*, 12,6, 954. Doi: 10.3390/rs12060954

Levine, D. N.

2024 *Greater Ethiopia: The Evolution of a Multiethnic Society*, The University of Chicago Press.

Mayhew, E. and G. Muinga

2024 'Building Gender-Inclusive Infrastructure Strategies for Climate Resilience in Africa', *Global Centre on Adaption*, <https://gca.org/building-gender-inclusive-infrastructure-strategies-for-climate-resilience-in-africa/>, retrieved 7 Oct 2025.

Markkanen, S. and A. Anger-Kraavi

2019 'Social impacts of climate change mitigation policies and their implications for inequality', *Climate Policy*, 19, 7, pp. 827-844. Doi: 10.1080/14693062.2019.1596873.

McLeman, R. and B. Smit

2006 'Migration as an Adaptation to Climate Change', *Climatic Change*, 76, pp. 31-53. Doi: 10.1007/s10584-005-9000-7.

- Mekonnen, A.W., Asres, A.M., Waga, A.A. and D.G. Damtie
2025 'Determinant factors of rural Women's livelihood diversification in Meket Woreda, Ethiopia', *Social Sciences & Humanities*, 12, 101929. Doi: <https://doi.org/10.1016/j.ssaho.2025.101929>.
- Mekonnen, Z.
2022 'Intra-household gender disparity: effects on climate change adaptation in Arsi Negele district, Ethiopia', *Heliyon*, 8, 2. Doi: [10.1016/j.heliyon.2022.e08908](https://doi.org/10.1016/j.heliyon.2022.e08908).
- Melesse, D. Y., Tadele, A., Mulu, S. et al.
2024 'Learning from Ethiopia's success in reducing maternal and neonatal mortality through a health systems lens', *BMJ Global Health*, 9, e011911. Doi: [10.1136/bmjgh-2023-011911](https://doi.org/10.1136/bmjgh-2023-011911).
- Mersha, A. A. and F. van Laerhoven
2019 'Gender and climate policy: a discursive institutional analysis of Ethiopia's climate resilient strategy', *Regional Environmental Change*, 19, 2, pp. 429-440. Doi: [10.1007/s10113-018-1413-8](https://doi.org/10.1007/s10113-018-1413-8).
- Mikulewicz, M., Caretta, M.A., Sultana, F. et al.
2023 'Intersectionality & Climate Justice: A call for synergy in climate change scholarship', *Environmental Politics*, 32,7, pp. 1275-1286. Doi: [10.1080/09644016.2023.2172869](https://doi.org/10.1080/09644016.2023.2172869).
- Molina, L.
2025 'African women unite in the fight for equality and access to climate finance', *COP 30, United Nations Climate Change*, <https://cop30.br/en/news-about-cop30/african-women-unite-in-the-fight-for-equality-and-access-to-climate-finance>, retrieved 1 Oct 2025.
- Mujere, N.
2016 'Gendered Vulnerability and Adaptation to Climate Change', *IGI Global Scientific Publishing*, pp. 171-184. Doi: [10.4018/978-1-4666-8764-6.ch009](https://doi.org/10.4018/978-1-4666-8764-6.ch009).
- Natnael, T.
2025 'Knowledge about the health impact of climate change and associated factors among women in Northeastern Ethiopia', *Scientific Reports*, 15, 24768. Doi: [10.1038/s41598-025-06235-y](https://doi.org/10.1038/s41598-025-06235-y).
- Nyberg Sørensen, N.
2023 'Climate change, mobility and human trafficking in Ethiopia', *DIIS Policy Brief*, <https://www.diis.dk/en/research/climate-change-mobility-and-human-trafficking-in-ethiopia>, retrieved 7 Oct 2025.
- Poulin, M. and R. S. Pierotti
2025 'Joint Land Titles and Women's Status in Uganda', *The World Bank*, Policy Research Working Paper, 11241, pp. 4-21, <http://documents.worldbank.org/curated/en/099233510272536960>, retrieved 8 Oct 2025.
- Powell, W. and D. Botti
2021 'Opportunities and Risks: Ethiopian women on the eastern mixed migration route between the Horn of Africa and Yemen', *Mixed Migration Centre*, pp. 1-24, https://mixedmigration.org/wpcontent/uploads/2021/06/180_Opportunities_and_risks_Ethiopian-women_on_the_Eastern_route.pdf, retrieved 7 Oct 2025.
- Presler-Marshall, E., Endale, K., Jones, N. et al.
2024 'Female Genital Mutilation in Ethiopia's Afar Region: Patterning, Drivers, and Decision-Making', *Journal of Adolescent Health*, 75, pp. 496-501. Doi: [10.1016/j.jadohealth.2024.05.012](https://doi.org/10.1016/j.jadohealth.2024.05.012).

PSC Report

2023 'African women bear the brunt of climate change', *ISS*, <https://issafrica.org/pscreport/psc-insights/african-women-bear-the-brunt-of-climate-change>, retrieved 8 Oct 2025.

Riyad Fatema, S., Islam, M. S., East, L. and K. Usher

2019 'Women's health-related vulnerabilities in natural disasters: a systematic review protocol', *BMJ Open*, 9, 12, e032079. Doi: 10.1136/bmjopen-2019-032079

Sender, J. and C. Cramer

2021 'Desperate, deceived and disappointed: women's lives and labour in rural Ethiopia and Uganda', *Journal of Contemporary African Studies*, 40, 2, pp. 153–171. Doi: 10.1080/02589001.2021.1998393

Serraglio, D.A. and F. Thornton

2024 'Women on the move? Mainstreaming gender in policies and legal frameworks addressing climate-induced migration', *CMS*, 12, 53. Doi: 10.1186/s40878-024-00412-0

Shifera, N., Matiyas, R., Keyzema, D. K. et al.

2025 'Hidden gender-based violence and its causes among women in Okugu Refugee Camp, Ethiopia: a cross-sectional study', *BMJ Open*, 15, 5, e086405. Doi: 10.1136/bmjopen-2024-086405.

Sultana, F.

2010 'Living in hazardous waterscapes: Gendered vulnerabilities and experiences of floods and disasters', *Environmental Hazards*, 9, 1, pp. 43–53. Doi: 10.3763/ehaz.2010.SI02.

Teklemariam, D., Azadi, H., Nyssen, J. et al.

2016 'How Sustainable Is Transnational Farmland Acquisition in Ethiopia? Lessons Learned from the Benishangul-Gumuz Region', *Sustainability*, 8, 3, 213. Doi: 10.3390/su8030213.

Teku, D. and S. Eshetu

2024 'Impact of climatic variabilities and extreme incidences on the physical environment, public health, and people's livelihoods in Ethiopia', *Frontiers in Climate*, 6, 1435138. Doi: doi.org/10.3389/fclim.2024.1435138.

Tesemash, A. and B. Leta

2022 'Impacts of Climate Change on Rural Women Households and their Adaptation Strategies: Halaba District, Ethiopia', *International Journal of Environmental Science and Natural Resources*, 30, 2, 556285. Doi: 10.19080/IJESNR.2022.30.556285

Tesfaye, A., Mohammed, A., Andoshe, M. et al.

2024 'Climate Change Gender Action Plan of the Federal Democratic Republic of Ethiopia', *Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA)*, <https://hdl.handle.net/10568/169247>, retrieved 8 Oct 2025.

Thomas, L.

2022 *The Intersectional Environmentalist: How to Dismantle Systems of Oppression to Protect People + Planet*, Voracious.

Thornton, A., Serraglio, D. A., Thornton, F., Gleixner, S. et al.

2024 'Assessing the Evidence: Climate Change and Migration in the Federal Democratic Republic of Ethiopia', *Potsdam Institute for Climate Impact Research (PIK) and International Or-*

ganization for Migration (IOM), pp. 1-67, <https://ethiopia.iom.int/sites/g/files/tmzbd1996/files/documents/2024-11/climate-change-and-migration-in-ethiopia.pdf>, retrieved 9 Oct 2025.

UN Climate Action

2022 'Why women are key to climate action', *United Nations Climate Action*, <https://www.un.org/en/climatechange/science/climate-issues/women>, retrieved 9 Oct 2025.

UNDP

2024 'Annual Report 2023', pp. 1-21, <https://www.undp.org/sites/g/files/zskgke326/files/2024-03/annual-report-2023.pdf>, retrieved 10 Oct 2025.

UN Women

2024 'Feminist Climate Justice: A Framework for Action', pp. 1-9, <https://www.unwomen.org/sites/default/files/2023-12/Feminist-climate-justice-A-framework-for-action-en.pdf>, retrieved 9 Oct 2025.

2024 'Federal Democratic Republic of Ethiopia: Country Gender Equality Profile 2024', pp. 1-116, https://africa.unwomen.org/sites/default/files/2024-06/ethiopia_country_gender_profile-final.pdf, retrieved 9 Oct 2025.

UNFPA

2024 'A sisterhood of support: Improving maternity care in Ethiopia's climate change-ravaged Somali region', *United Nations Population Fund*, <https://www.unfpa.org/news/sisterhood-support-improving-maternity-care-ethiopia%E2%80%99s-climate-change-ravaged-somali-region>, retrieved 7 Oct 2025.

2024 'Domestic violence in sub-Saharan Africa will triple by 2060 due to extreme heat epidemic and stalling development, new UNFPA research finds' *The United Nations Population Fund*. Press release, <https://www.unfpa.org/press/domestic-violence-sub-saharan-africa-will-triple-2060-due-extreme-heat-epidemic-and-stalling>, retrieved 7 Oct 2025.

World Bank Group

2020 'Ethiopia's Climate Resilient Green Economy (CRGE) Strategy (2011-2019) – Implementation Progress Assessment Report', pp. 1-100, <https://documents1.worldbank.org/curated/en/099431406152240521/pdf/P1711160560c540d50a1ae0261b2c6c4de3.pdf>, retrieved 2 Oct 2025.

2021 'Climate Risk Country Profile: Ethiopia', pp. 1-32, <http://documents.worldbank.org/curated/en/099432006152216345>, retrieved 8 Oct 2025.

2025a 'Employment in agriculture (% of total employment) (modeled ILO estimate) – Ethiopia', <https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?locations=ET>, retrieved 6 Oct 2025.

2025b 'How an Urban Program in Ethiopia Delivered More than a Million Jobs', <https://www.worldbank.org/en/news/feature/2025/09/02/ethiopia-urban-institutional-and-infrastructure-development-program>, retrieved 5 Oct 2025.

2025c 'Ethiopia – Rural Population', *Trading Economics*, <https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=ET>, retrieved 5 Oct 2025.

Yorke, L., Gilligan, R. and E. Alemu

2021 'Exploring the dynamics of female rural-urban migration for secondary education in Ethiopia', *Journal of Comparative and International Education*, 53, 4, pp. 693–709. Doi: 10.1080/03057925.2021.1951665.

Zegeye, H.

2018 'Climate change in Ethiopia: impacts, mitigation and adaptation', *International Journal of Research in Environmental Studies*, pp. 18-35, https://www.academia.edu/42827784/Climate_change_in_Ethiopia_impacts_mitigation_and_adaptation, retrieved 4 Oct 2025.

About the Authors

Sara Cosatti is a PhD Candidate at the Department of Political and Social Sciences of the University of Trieste, Italy. Her research interests include the climate-peace-security nexus, regional political dynamics and gender perspectives in the Horn of Africa.

SARA COSATTI

Department of Political and Social Sciences of the University of Trieste, P.le Europa 1, 34127 Trieste - Italy.

e-mail: sara.cosatti@phd.units.it

Paola Ottino is Adjunct Professor of The Role of Natural Resources in International Crises at the Department of Political and Social Sciences of the University of Trieste, Italy. Her research interests focus on the integration of environmental science with socioeconomic and security issues.

PAOLA OTTINO

Department of Political and Social Sciences of the University of Trieste, P.le Europa 1, 34127 Trieste - Italy.

e-mail: paola.ottino@dispes.units.it

Appendix A

Ethiopia encompasses both Ras Dashed (4,620 metres above sea level), one of the highest peaks in Africa, and the Danakil Depression (116 metres below sea level), one of the lowest points on Earth. This remarkable ecological range makes Ethiopia's biodiversity among the most unique in Africa, including many endemic or economically important plant and animal species. The Ethiopian agroecosystem also form part of the Vavilovian centre of origin and diversity for several domesticated crops and livestock populations (Ethiopian Biodiversity Institute n.d.).

Ethiopia's rural environments are distributed across the diverse ecosystems that characterise the country and are linked to the agricultural and pastoral traditions of the various ethnic groups who have successfully exploited the unique soil and climate characteristics. The central and northern highlands are the most productive agricultural areas (cereals, legumes, and vegetables), while the humid hilly and mountainous areas are important for coffee production. Extensive livestock farming of cattle, goats, sheep, and camels, as well as irrigated crops, are primarily developed in the arid and semi-arid plains of the eastern region and in the lowlands. Traditional pastoralism, meanwhile, is typical of the savannahs (Ogaden, Afar and Borena), which are home to nomadic or semi-nomadic communities, the most vulnerable to drought and water conflicts.

In particular, the northern and Somali regions of the country are largely occupied by agro-pastoralism, while in the southern and western parts, shifting cultivation using the slash-and-burn method is used (Horne 2011). Pastoralism areas mainly include north-eastern, eastern, south-eastern, and some parts of southern Ethiopia (see Table A below).

The structural configuration of Ethiopia's landscape explains a large degree of historical differentiation in the livelihoods of Ethiopia's varied peoples (Prunier and Ficquet 2015). In the first half of the 20th century, cultivation was common in the central and northern highlands, among the Agew, Amhara, and Tigrean peoples, as well as in the highlands of the South, where the Gurage, Sidama, and Omo tribes practiced ensete and other cereal grain cultivation. In the more arid and semi-arid lowlands, nomadic and semi-nomadic pastoralism and agro-pastoralism characterized the livelihoods of the Afar, Saho, and Somali peoples in the east, the Oromo across the south, the Nuer in the West (Levine 2000).

Table A - Traditional classification of the major agro-ecological zones of Ethiopia

| Agro-ecological zones (traditional) | Altitude range (m) | Geographical regions | Main crops grown/suitability |
|--|--------------------|--|--|
| <i>Kur</i> (extreme cold and dry highlands) | >3700 | Central and eastern highlands | Only for grazing |
| <i>Wurk</i> (cold and dry highlands) | 3200-3700 | Central and eastern highlands | Barley |
| <i>Dega</i> (cool and moist highlands) | 2300-3200 | Central and eastern highlands | Barley, wheat, highland oil seeds, highland pulses |
| <i>Woina Dega</i> (mid-highlands) | 1500-2300 | Central and eastern highlands | Wheat, teff, barley, maize, sorghum, chickpeas, field peas, haricot beans, faba beans, coffee, tea |
| <i>Kola</i> (humid and moist lowlands) | 500-1500 | Rift Valley, eastern, western, southern lowlands | Sorghum, finger millet, sesame, cow peas, ground nuts, coffee, spices, sugarcane |
| <i>Bereha</i> (hot and dry lowlands) | <500 | Arid east and humid west lowlands | Maize and sorghum, root crops in the humid west |

Source: FDRE 2022.

Appendix B

Figure 5 is a one-row heat map representing a set of gender-differentiated vulnerability indicators in Ethiopia. It visualizes the relative severity of inequality-driven climate vulnerability across several domains. The heat map was produced using standard scientific-plotting tools. It is used an absolute-gap/inverted-share plus min–max normalization approach. The map shows synthetic values as the scores come from a normalization method applied to heterogeneous indicators disaggregated by gender.

A set of six vulnerability indicators was selected, each representing a structural factor known to shape gender-differentiated climate vulnerability:

- Land ownership
- Agricultural participation
- Access to finance
- Education
- Participation in climate programmes
- Health vulnerability

Each indicator is positioned along the x-axis of the heat map. The y-axis contains only one category, so the visualization is a single strip of colour blocks. Darker colours correspond to greater structural inequality and thus higher climate vulnerability.

The original dataset contained absolute values representing the actual levels of inequality, not normalized scores. The raw indicators were in different units; to make them visually comparable on one heat map, they must be converted to a single inequality metric.

For each indicator, an inequality metric was calculated and each indicator was expressed as a raw gender gap; large gaps correspond to higher inequality.

To calculate a simple raw inequality metric, it has been proceeded as follows:

- if there was a male comparator, absolute gender gap (male – female) was used;
- if there was no male comparator and the metric is female-specific harm (maternal mortality ratio), the female metric was directly used (the higher it is, the worse it is);
- if there was only a female share (e.g., female share of landowners), it was used (100 – female%) to represent vulnerability (i.e., low female share means greater vulnerability).

To compare very different types of indicators (e.g., finance vs. health) the gaps have been normalized to a 0–1 scale (respectively low inequality and high inequality), where

min and max are defined based on observed data, or theoretical bounds (e.g., minimum 0, maximum 100% gap).

Then the values were rescaled to the 3–5 inequality/vulnerability score (3 = low/moderate; 5 = extreme; values below 3 are omitted to focus on meaningful disparities) used for visualization in the heatmap. Higher values represent greater gender-differentiated vulnerability (i.e., larger inequities disadvantaging women).

These values were then placed into a 1×6 matrix, which is the input structure for most heat-map functions.

No single national database reports “Participation in climate programmes” by sex at the national level for Ethiopia. Researchers therefore commonly use female participation in agricultural extension/cooperatives as a proxy for participation in adaptation/climate-related programs.