

On Women's Shoulders: Care-Based Immobility and Climate Adaptation in Rural Ghana

Sobre los hombros de las mujeres: inmovilidad basada en el cuidado y adaptación climática en las zonas rurales de Ghana

Mariachiara Boldrini

Università per Stranieri di Perugia

E-mail: m.boldrini@unistrapg.it

ORCID: <https://orcid.org/0009-0001-9957-4834>

Valeria Saggiomo

Università degli Studi di Napoli L'Orientale

E-mail: vsaggiomo@unior.it

ORCID: <https://orcid.org/0000-0002-5630-0702>



Authors



This article examines the gendered dynamics of climate-related migration and immobility in rural Ghana, focusing on the Bono and Bono East regions. Drawing on ethnographic fieldwork conducted between 2022 and 2023, it explores how male out-migration, often framed as an adaptive response to environmental stress, reshapes the gendered distribution of labor, women's responsibilities, and their opportunities for mobility.

The study introduces the concept of care-based immobility as a central analytical contribution. It conceptualizes women's staying as a socially produced condition rooted in three inter-related domains—economic management, food security, and caregiving. These responsibilities simultaneously anchor women geographically while enabling household and community survival, demonstrating that immobility operates as both a structural constraint and an active strategy of climate adaptation.

By integrating feminist political ecology with critical mobility and immobility frameworks, the analysis moves beyond environmentally deterministic narratives of climate migration and situates women's (im)mobility within relational socio-ecological hierarchies. The article thus underscores the importance of gender-sensitive and locally grounded approaches to climate resilience.

Este artículo analiza las dinámicas de género que articulan la migración y la inmovilidad en contextos de cambio climático en el Ghana rural, con especial atención a las regiones de Bono y Bono East. A partir del trabajo de campo etnográfico realizado entre 2022 y 2023, se examina cómo la migración masculina de salida, habitualmente interpretada como una estrategia



Abstract

adaptativa frente al estrés ambiental, reconfigura la división sexual del trabajo, amplía las responsabilidades asumidas por las mujeres y condiciona sus márgenes de movilidad.

El estudio introduce el concepto de inmovilidad basada en el cuidado como su principal aportación analítica, proponiendo comprender la permanencia de las mujeres no como una decisión individual aislada, sino como una condición socialmente producida. Esta se sustenta en tres ámbitos estrechamente interrelacionados —la gestión económica, la seguridad alimentaria y el trabajo de cuidados— que articulan su arraigo en el territorio. Tales responsabilidades, lejos de ser accesorias, garantizan la sostenibilidad cotidiana y la resiliencia de los hogares y las comunidades. Así, la inmovilidad emerge simultáneamente como una restricción estructural y como una forma activa de adaptación al cambio climático.

Al integrar la ecología política feminista con marcos críticos de movilidad e inmovilidad, el análisis va más allá de las narrativas ambientalmente deterministas sobre la migración climática y sitúa la (in)movilidad de las mujeres en jerarquías socioecológicas relacionales. El artículo subraya así la importancia de enfoques de resiliencia climática sensibles al género y arraigados en los contextos locales.

Climate change adaptation; care-based immobility; feminist political ecology; Ghana; women's agency



Adaptación al cambio climático; inmovilidad por responsabilidades de cuidado; ecología política feminista; Ghana; agencia de las mujeres

Received: 30/08/2025. Accepted: 25/02/2026



1. Introduction

A man can migrate, but this means that fewer young, strong men will work the land or help women with daily tasks. New challenges will arise for women, as they will be left to shoulder the entire burden of work and responsibility. (Dennis, Interview no. 6, 2023)

This observation, articulated by a Ghanaian male agronomist working with an Italian non-governmental organization (NGO) on rural development projects, captures a central tension in local responses to climate change in rural Ghana. While male migration is often framed as a viable adaptation strategy to climate-related livelihood stress, it simultaneously redistributes labor, responsibility, and risk within households and communities. As men migrate, women are left to sustain agricultural production, household economies, and social reproduction under increasingly adverse environmental conditions, often in ways that constrain their mobility.

The relationship between climate change and migration has been widely debated with scholars cautioning against deterministic narratives that portray environmental stress as a direct, linear driver of migration (Hoffmann et al., 2021; Kwanhi et al., 2024; Marchiori et al., 2012; Wodon et al., 2014; Abel et al., 2019). Instead, migration is increasingly understood as a so-

cially mediated process, shaped by structural inequalities, livelihood configurations, and differentiated capacities to respond to risk. Within this debate, gender has emerged as a key axis through which climate vulnerability and mobility are unevenly experienced, yet protection policies have largely failed to recognize and address this dimension (Saggiomo, 2024; Ferris, 2020). To date, much of the existing policy literature continues to interpret women's lower mobility primarily as a function of cultural norms or caregiving roles, often implicitly treating immobility as a residual or failed outcome of adaptation (Women Development Organization, 2024, p. 129).

Drawing on qualitative and ethnographic fieldwork conducted between 2022 and 2023 in the Bono and Bono East regions of Ghana, this article seeks to move beyond such interpretations. It examines how gendered responsibilities, climate vulnerability, and migration aspirations intersect in everyday life, and how women negotiate survival and adaptation in contexts where mobility is unevenly available. Rather than focusing solely on migration outcomes, the article centers on the processes through which (im)mobility is produced, negotiated, and embodied within households affected by environmental change and male out-migration.

The primary objective of this study is to analyze how women's (im)mobility in rural Ghana is shaped by the intersection of climate change, gendered divisions of labor, and household responsibilities, and how women exercise agency within these constraints. Specifically, the article aims to conceptualize women's staying not as passive immobility, but as a relational and socially produced condition, embedded in care obligations and livelihood strategies.

Guided by this objective, the article addresses the following research question:

How does climate-related male migration reshape women's vulnerability, agency, and (im)mobility in rural Ghana, and in what ways do women negotiate staying as both a constraint and a survival strategy?

By answering this question, the article contributes to debates on environmental migration by giving prominence to women's lived experiences and by reframing immobility as an active, though constrained, outcome of gendered socio-ecological relations.

Climate change risk is commonly defined as exposure to environmental hazards over which individuals have limited control, while vulnerability refers to the capacity to manage such hazards without enduring long-term or irreversible losses of well-being (UNDP, 2007). Crucially, vulnerability is not evenly distributed: people's ability to adapt is mediated by the social, economic, and political structures in which they are embedded (UNDP, 2009). From this perspective, climate vulnerability is neither fixed nor universal, but differentiated, relational, and historically produced.

This article adopts a contextual and process-oriented understanding of vulnerability, conceptualized as a dynamic condition continuously produced and reproduced through people's engagement with their environment and one another (Taylor, 2014; Lama et al., 2021). Rather than constructing rigid comparisons between "male" and "female" vulnerability, the analysis follows scholarship that situates gender within broader livelihood systems and power relations (Daoud, 2021). Gender is thus treated not as a static attribute, but as a relational process that shapes access to resources, exposure to risk, and capacities for mobility or staying.

2. Situating Women's (Im)mobility: A Feminist Political Ecology Approach in Rural Ghana

This study adopts a feminist political ecology (FPE) framework (Rocheleau et al., 1996; Sundberg, 2017; Ojeda et al., 2022; Harcourt et al., 2023) and integrates insights from critical mobility and immobility studies (Carling, 2002; Carling & Schewel, 2018; Schewel, 2020) to examine how climate change intersects with gendered social structures to shape differentiated patterns of mobility and immobility in rural Ghana. This combined approach allows us to move beyond environmentally deterministic accounts of climate migration and beyond mobility-centered perspectives that implicitly treat movement, especially international migration, as the primary or most desirable form of adaptation (San Román et al., 2025; Ferris, 2020; Molinero-Gerbeau & Avallone, 2020). Rather than assuming a linear relationship between climate stress and migration, these critical contributions highlight how structural inequalities, socio-economic precarity, symbolic imaginaries, and policy frameworks shape both migration aspirations and constraints, with environmental pressures operating as one factor among many in complex, historically situated processes.

Feminist Political Ecology offers a particularly productive lens for this analysis, highlighting how environmental change is mediated by power relations, gendered divisions of labor, and everyday material practices. Since its foundational articulation by Rocheleau, Thomas-Slayter, and Wangari (1996), Feminist Political Ecology has challenged gender-neutral and technocratic approaches to environmental governance by demonstrating how access to resources, ecological knowledge, and decision-making power are unevenly distributed along lines of gender, class, age, and social position. Subsequent scholarship has further emphasized the importance of lived experience, embodiment, and relationality in understanding how environmental transformations are felt, negotiated, and resisted in everyday life (Sundberg, 2017; Ojeda et al., 2022). From this perspective, climate change is not simply an external shock, but a process that becomes meaningful through socially situated practices, moral economies, and historically produced inequalities.

In this study, Feminist Political Ecology enables us to analyze women's (im)mobility not as an individual choice detached from context, but as a relational outcome embedded in household dynamics, care obligations, and socio-ecological dependencies. Women's daily interactions with land, water, food production, and caregiving place them at the intersection of environmental stress and social reproduction. These interactions are not merely symbolic or discursive; they are materially enacted through physically demanding labor, time-intensive routines, and bodily exposure to climatic variability. As Nightingale (2006) argues, gendered relationships to the environment are not rooted in biological essentialism but in the material circumstances that shape everyday engagements with nature. Our analysis follows this line of reasoning by showing how women's responses to climate stress are shaped by the responsibilities they carry and the forms of accountability they inhabit within families and communities.

To further develop this perspective, we draw on critical mobility and immobility studies, which have increasingly problematized the assumption that mobility is inherently emancipatory or adaptive (Carling, 2002; Schewel, 2020). This body of literature conceptualizes mobility and immobility as relationally produced, mutually constitutive conditions rather than as binary opposites. Immobility, in this sense, is not simply the absence of movement or the outcome of failed migration, but a socially produced condition shaped by institutional constraints, uneven access to resources, moral expectations, and place-based attachments (Carling

& Schewel, 2018). By integrating these insights with Feminist Political Ecology, it is possible to examine how women's staying is actively sustained through gendered responsibilities and how it simultaneously enables adaptation while reproducing structural inequalities.

Within this conceptual framework, we introduce and develop the notion of care-based immobility. Care-based immobility refers to a form of socially embedded staying that is actively produced through women's responsibilities for social reproduction, including food provision, health maintenance, childcare, eldercare, and broader community support. While the term itself has not been systematically theorized in the existing literature, it builds on several intersecting strands of feminist scholarship: feminist political ecology's emphasis on social reproduction and environmental labor (Rocheleau et al., 1996; Harcourt et al., 2023); feminist care ethics, which conceptualize care as a moral, relational, and material practice rather than a private or discretionary choice (Tronto, 1993; Puig de la Bellacasa, 2017); and mobility studies' recognition of immobility as a condition shaped by responsibility, obligation, and attachment.

Care-based immobility captures the ways in which women's staying is not simply imposed from above nor freely chosen but negotiated within unequal socio-ecological contexts. It highlights how care operates as both a source of agency and a mechanism of constraint. On the one hand, care anchors women to specific places, precluding long-term or international migration as a viable option, particularly when motherhood or eldercare are involved. On the other hand, care is also the basis through which women enact adaptive strategies, sustain households under climatic stress, and maintain community cohesion. In this sense, care-based immobility resonates with feminist analyses of "burdened agency" (Kabeer, 2011), in which action is exercised within tight structural constraints and under conditions of responsibility for others' survival.

3. Context of the Study: Migration, Climate, and Rural Livelihoods in Ghana

The former Brong-Ahafo Region, administratively divided since 2019 into the Bono and Bono East Regions, is predominantly inhabited by Akan-speaking groups, particularly the Bono, with Twi functioning as a lingua franca across localities. It is a largely rural area where smallholder agriculture remains the main livelihood activity (Baffour-Ata et al., 2023). National statistics and field observations confirm that these regions contribute significantly to Ghana's agricultural production and are often regarded as part of the country's food-producing backbone (Ghana Statistical Service, 2022), a role that has become increasingly precarious due to climate variability and declining yields.

From an agro-ecological perspective, the Bono and Bono East regions lie within Ghana's "transitional zone," a climatic corridor between the humid forest of the south and the drier northern savannas, historically conducive to diverse crop cultivation. However, the recent expansion of dry Guinea savanna and dry deciduous forest patches, coupled with rising temperatures and erratic rainfall, have exacerbated challenges for rain-fed agriculture and soil fertility (Yamba et al., 2022). These dynamics, combined with persistent gaps in basic services such as education, water, and energy, have made the area a development hotspot for NGO interventions aimed at supporting livelihood resilience and reducing vulnerability (Ghana Voluntary National Report on SDGs, 2025).

The shifts in agricultural productivity and economic precarity contribute to a broader context in which migration emerges as a salient livelihood strategy. Although there is a robust literature emphasizing climate change as one among multiple drivers of migration (Hoffmann et al., 2021; Kwanhi et al., 2024; Marchiori et al., 2012), scholars also note that reduced income without viable alternatives can inhibit mobility, particularly among economically constrained populations (Cattaneo & Peri, 2016).

Ghana's migratory profile, as revealed by the 2021 Population and Housing Census Thematic Report, situates the country as a significant origin, transit, and destination point within the West African and global migration landscape (Ghana Statistical Service, 2023; IOM, 2022). According to the most recent national census results, approximately 28.9% of Ghana's population are migrants, defined as persons whose place of birth differs from their place of enumeration, with internal migration representing a substantial share of mobility dynamics (Ghana Statistical Service, 2023). Internal migration is more prevalent in rural areas (33.9%) than urban ones (22.2%), and women slightly outnumber men among internal migrants (52.5% vs. 47.5%). Interregional migration remains the dominant form, although its rate has declined over the past two decades, from 63.8% in 2000 to 55.1% in 2021, reflecting evolving socio-economic drivers (Ghana Statistical Service, 2023).

At the international scale, Ghanaian emigrants numbered over 1 million by 2024, marking sustained growth in the country's diaspora over recent decades. This stock of emigrants includes Ghanaians residing in ECOWAS countries, OECD nations, and beyond, with substantial populations in Nigeria, Côte d'Ivoire, Europe, and North America (UN DESA, 2024; Ghana Migration Brief, 2025). The diaspora contributes significantly to the national economy through remittances, estimated at USD 4.7 billion annually, making Ghana one of the leading remittance-receiving countries in sub-Saharan Africa, while also reinforcing transnational connections that shape migration aspirations and strategies (Ghana Migration Brief, 2025).

Historically, regions encompassing today's Bono and Bono East have been important sources of both internal and irregular international migration. Studies of irregular migration routes to Libya identified that a disproportionate share of Ghanaians encountered along these corridors originated from the former Brong-Ahafo area, illustrating longstanding mobility patterns rooted in economic and social marginality (Bob-Milliar & Bob-Milliar, 2013; Tanle, 2012).

Contemporary data suggest that migration aspirations remain high, particularly among rural youth facing limited local opportunities and climate-related livelihood stress. International organizations, such as the International Organization for Migration (IOM), along with many NGOs, operate in the region to raise awareness of the risks of irregular migration, support returnee reintegration, and provide vocational and agricultural training for young people, interventions that reflect the dual pressures of structural exclusion and migration demand.

4. Positionality of the Researchers and Methodology

The fieldwork underpinning this article was conducted by the first researcher as part of her master's thesis in Relations and Institutions of Asia and Africa, during a professional internship with an international NGO active in Ghana. Her dual role, as both a trainee within the NGO and an independent researcher, created an ambivalent positionality. On the one hand,

her proximity to local projects facilitated access to communities, prolonged engagement with women participants, and fostered trust-based relationships. On the other hand, her institutional affiliation posed potential risks for influence or perceived bias. To mitigate these concerns, interviews were conducted primarily during the final months of her stay, with explicit clarification that the research was autonomous and independent from NGO activities and structured to foreground participants' experiences rather than organizational agendas. Additional safeguards included reflexive consideration of her role during interactions and iterative cross-checking of narratives.

The second researcher co-supervised the research, guiding the study design, interview planning, and conceptual framing within feminist political ecology and mobility/immobility studies. While field data were collected by the first researcher, data analysis, thematic coding, and integration into the theoretical framework were conducted collaboratively, ensuring interpretive triangulation and enhancing the robustness, credibility, and reflexivity of the findings.

Fieldwork was carried out over eight months in the Bono and Bono East Regions of Ghana, focusing on rural contexts. These regions were selected as case study sites due to their historical role as key out-migration hubs (Ghana Statistical Service, 2022) and based on preliminary observations of climate change impacts on local livelihoods. Research activities were organized across four localities: the city of Sunyani and the villages of Kranka, Senase, and Yawhima.

Although the research originated from the opportunity to live near local communities while participating in NGO activities, it was conceived as entirely autonomous. The researcher did not reside directly in the study villages, but frequent field visits and ongoing interactions with project beneficiaries enabled observation of everyday survival practices. Interviews were conducted primarily during the latter part of the stay, minimizing potential interference from NGO-related activities concentrated in the initial months. Ghanaian colleagues also acted as "gatekeepers," providing insights into local mentalities and gender relations and facilitating access for participants.

The study engaged 12 open interviews, six with women project beneficiaries, three with local institutional representatives, and three with NGO officers. Interviews with men from the same communities were not conducted because the research conditions did not allow for the sustained trust necessary for ethnographic engagement. To ensure anonymity, only first names are reported. Participants were selected through purposive sampling, prioritizing women who articulated agency and were willing to share personal experiences. This approach aligns with a feminist political ecology perspective (Harcourt, Ojeda, & Sundberg, 2023), emphasizing situated everyday practices over statistical representativeness.

Interviews in Kranka were conducted in local languages, with a Ghanaian assistant experienced in social work and women's rights serving as a simultaneous translator. Her longstanding engagement with the community facilitated trust and enabled culturally sensitive discussion of personal topics, although her mediation inevitably shaped the interactions. In Yawhima and Senase, translation was provided by a male local NGO staff member, which affected participants' willingness to discuss certain issues. The research team acknowledged these dynamics in the analysis, reflecting on how translation and positionality shaped the data.

Data were analyzed using a qualitative thematic approach. Interview transcripts were iteratively reviewed, with recurring keywords, meanings, and narratives identified and organized into broader analytical themes. Collaborative interpretation by both authors ensured cross-

validation of findings and careful contextualization within the theoretical framework, integrating feminist political ecology and mobility/immobility perspectives.

5. Analysis

5.1. Men's Absence and the Gendered Burden of Climate Vulnerability

In the communities studied in rural Ghana, male migration emerges as a widely perceived and socially legitimate response to increasing livelihood insecurity, shaped by the combined effects of economic precarity, environmental stress, and powerful imaginaries of success and social recognition. Men often frame migration, particularly international migration, as a realistic and desirable pathway to improve living conditions, reduce exposure to climate-related risks, and overcome the perceived stagnation of local agricultural livelihoods. While climate change plays a significant role in shaping these aspirations, it does not operate as a singular or deterministic driver. Rather, male migration is typically pursued as a last-resort option, activated when local adaptive strategies such as livelihood diversification, combining farming with animal husbandry, or engaging in petty trade are no longer perceived as sufficient.

Local institutions and community leaders similarly identify declining agricultural productivity as a key factor influencing young men's disengagement from farming. A traditional chief from Kranka, Ahyemang K. B., explicitly linked climate variability to young men's loss of interest in agriculture, noting the growing reliance on chemical fertilizers to compensate for declining soil fertility and unpredictable rainfall. According to him, rather than investing further in increasingly unproductive fields, younger generations are more inclined to pursue commerce or overseas migration (Ethnographic Interview no. 10, Kranka, 2023). This perception resonates with broader national trends showing declining youth engagement in agriculture, even among those most directly affected by climate change (Ghana Statistical Service, 2022).

At the same time, framing migration from the former Brong-Ahafo region as purely climate-driven would constitute a significant oversimplification. Participant observation and interviews suggest that aspirations to migrate to Europe circulate widely among both farmers and non-farmers, particularly among younger men. Migration abroad is commonly imagined as a turning point, a symbolic rupture capable of transforming one's life trajectory and social status. The idea of a European "El Dorado" operates as a powerful social imaginary, cultivated over long periods and reinforced through transnational networks, remittances, and narratives of success. In this sense, environmental stress interacts with pre-existing aspirations, cultural expectations of masculinity, and global inequalities, rather than generating migration in a linear or mechanical way (San Román et al., 2025).

This interpretation aligns with critical scholarship that situates migration decisions within complex socio-economic, cultural, and policy landscapes. Ferris (2020) cautions against reducing migration to an adaptive response to climate change, emphasizing the multiplicity of drivers and the role of structural constraints instead. Similarly, Molinero-Gerbeau and Avalone (2020) argue that climate-related narratives often obscure the political and economic conditions that shape mobility, shifting responsibility onto individuals while depoliticizing broader processes of inequality. In the Ghanaian case, climate change acts as an important stressor, but one that intersects with labor market exclusion, limited educational opportunities, and entrenched imaginaries of mobility as success.

Women, however, find themselves in a markedly different position. Not only do they rarely consider international migration a viable option for themselves (Ethnographic Interview no. 11, Sunyani, 2023), but they are also frequently opposed to the idea of their male counterparts migrating overseas. While male migration may be perceived by men as a strategy to escape climate-related vulnerability, for women, it often represents a source of increased insecurity. Men's absence tends to translate into reduced material and social support, heavier workloads, and heightened exposure to environmental and economic risks (Baada & Najjar, 2020). It is within this gendered asymmetry that care-based immobility takes shape: women's staying is actively produced through responsibilities for household survival and community well-being, combined with constrained access to resources and mobility opportunities.

Although agricultural challenges caused by climate change are not inherently gender-specific, their consequences are unevenly distributed. As a local agronomist commissioned by an international NGO made clear, the burden of climate-related agricultural problems falls disproportionately on women when men migrate or withdraw from farming altogether (Ethnographic Interview no. 6, Sunyani, 2023). Women are left to absorb the cumulative effects of labor shortages, declining yields, and increasing environmental unpredictability. Rebecca, a farmer from Yahwima, articulates this dynamic with striking clarity. Faced with declining rainfall and increasingly arid land, she identifies the presence of a man as the most effective solution to sustaining agricultural production: "The only solution is to have a man around, so that instead of cultivating two acres, you can cultivate three... men are naturally stronger and work harder" (Interview no. 4, 2023).

Her statement does not reflect an essentialist belief in male superiority, but rather a pragmatic assessment of embodied labor capacity under worsening climatic conditions. Cultivating hardened soil during prolonged dry seasons requires physical strength, endurance, and access to tools and resources, which women often lack.

Other women echo similar concerns. In the absence of a man in the household, they report significant difficulties cultivating land during the dry season, when farming "requires more energy" and often necessitates hiring paid labor. Yet, as Alyah and Stella explain, this option is frequently inaccessible due to rising costs and gendered economic exclusion: "Since the land is harder, these people [male paid workers] raise the prices they charge, and we often do not have the money" (Interviews no. 1 and 8, 2023). Here, gender-based discrimination intersects with climate stress to constrain women's adaptive capacity, limiting their ability to compensate for men's absence through market mechanisms.

When present, men can mitigate vulnerability not only by sharing physical labor but also by facilitating access to key resources. Annah's experience illustrates how male support can make a decisive difference during periods of heightened vulnerability such as pregnancy. During her first pregnancy, she continued working in the fields with minimal adjustments. During her second, however, her husband recognized the increased strain and took on greater responsibility, hiring additional labor and assuming heavier tasks himself (Ethnographic Interview no. 8, Kranka, 2023). Such examples highlight how gender relations can function as sites of solidarity, even within structurally unequal systems.

Access to resources crucial for climate adaptation further reveals the gendered implications of men's absence. Land ownership, irrigation infrastructure, and financial capital remain predominantly controlled by men, shaping differential capacities to respond to environmental stress (Mukherjee & Fransen, 2024). While land is formally inherited by both men and

women, women's effective access is often mediated through relationships with husbands or male relatives. Among the married women interviewed, all cultivated land owned by their husbands, whereas only younger or older single women attempted to rent land independently (Ethnographic Interviews no. 4, 7, 8, 10).

Water scarcity offers a particularly stark illustration of these inequalities. As rainfall patterns become increasingly erratic and drought intensifies, irrigation becomes essential. Yet transporting water requires financial means, vehicles, or hired labor, resources more readily available to men. Alyah explains: "Men usually have enough money to rent a car and transport water, whereas for many of us, the irrigation system is too far from our land... the cost of transporting water is very high" (Interview no. 1, 2023). Consequently, men are often assigned water-intensive and more profitable crops, while women shoulder heavier labor burdens with fewer resources (Thompson-Hall et al., 2016).

Similar dynamics emerge in Senase, where women now walk up to thirty minutes to reach water sources that were previously sustained by rainfall. Esther explicitly links her vulnerability to the absence of a husband: "With a husband, it would have been twice the water, and I could have solved part of the problem" (Interview no. 6, 2023). Even when referring to hypothetical or absent male figures, such statements underscore how male presence is perceived as a form of human capital, enhancing both agricultural productivity and daily well-being.

When men are absent, women often rely on children to fill labor gaps, although this strategy is fraught with moral and practical tensions. While both boys and girls can assist from a young age, women are generally reluctant to withdraw children from school, recognizing education as a crucial long-term investment (Interviews no. 4, 5, 7, 8, 2023). As a result, women frequently remain the sole workforce within the household, intensifying their vulnerability.

This vulnerability becomes particularly acute during physiologically sensitive periods. Several women report being unable to work for days during menstruation, while others are confined for extended periods during pregnancy. Stella's account poignantly captures how ageing, climate change, and men's absence intersect over time:

The first time, I was able to work with a little help; now I am older, it is hotter... I have no husband to help me, but it is too risky. (Interview no. 8, 2023)

Her testimony illustrates embodied vulnerability and the cumulative burden of care-based immobility. Women remain geographically anchored to sustain household and community livelihoods, negotiating adaptation through incremental, compensatory strategies rather than migration. In this sense, men's migration, often framed as an adaptive response, produces inverse effects for those left behind, deepening gendered vulnerability and reinforcing immobility as both necessity and responsibility.

5.2. Care-Based Immobility: Anchored by Responsibility, Adaptation, and Survival

Women in Kranka, Senase, and Yahwima consistently describe climate change not as an abstract or distant phenomenon, but as a force that permeates their everyday lives, reshaping routines, responsibilities, and possibilities. Across interviews and ethnographic observations, it emerges clearly that men and women experience environmental change in profoundly dif-

ferent ways and develop distinct strategies to cope with declining agricultural productivity and environmental uncertainty. These differences are not simply a matter of exposure to climate risks but are deeply rooted in historically sedimented gender roles that organize social reproduction and ensure community survival. In particular, women identify three interrelated domains of responsibility: food provision, health care, and the economic sustenance of households and extended families, which together anchor them geographically and constrain their ability to pursue mobility as an adaptive strategy.

As the research progressed, it became evident that these responsibilities cannot be analytically separated. Rather, they are woven together through a dense fabric of everyday practices that structure women's time, labor, and bodily endurance. These practices are themselves shaped by the broader historical construction of women's roles within rural Ghanaian communities, as well as by the legacies of the colonial and postcolonial economic order, which have long positioned women at the intersection of subsistence production, care work, and informal economies (Coquery-Vidrovitch, 1994). Climate change intensifies these pre-existing dynamics, increasing both the volume and the uncertainty of women's labor, and reinforcing a form of immobility that is not passive or imposed from outside, but actively produced through responsibility, obligation, and survival-oriented decision-making.

Ensuring food provision emerges as a central axis around which women's everyday lives revolve. While women are traditionally responsible for food preparation, their role extends far beyond domestic labor. Both the literature (Boserup, 1970; Clark, 1994) and empirical data confirm that women are deeply involved in agricultural production, primarily through subsistence farming but increasingly through modest market-oriented activities. Hillsides, roadsides, and fields surrounding the villages bear visible traces of women's agricultural labor, reflecting their centrality in sustaining household food security. Yet this role has become increasingly precarious as climate variability disrupts established agricultural rhythms.

Women repeatedly emphasized the importance of water at specific moments in the cultivation process, particularly during planting and fertilizer application. As Stella explained, "when you plant, and when you apply the fertilizer, about a week after sowing, so that the soil can absorb the nutrients better" (Interview no. 2, 2023). However, the growing unpredictability of rainfall increasingly undermines these critical phases. Rain that arrives too late can damage fragile seedlings, while prolonged dry spells or sudden downpours during the growing phase compromise crop development and reduce yields. As Stella further noted, "not being able to control the water means that the tomatoes either get burned by the heat and sun or they grow too small" (Interview no. 2, 2023). Annah echoed this experience, describing a sharp decline in yam production: "There is too much sun and the rain doesn't come. Then, when it does come, there is too much and spoils the seeds" (Interview no. 3, 2023).

Such accounts reveal that the problem is not simply water scarcity, but the increasing volatility of climatic conditions, which destabilizes agricultural cycles and undermines reliability. This pattern was consistently reported across the three research sites, where women described seeds failing to yield as expected and harvests becoming increasingly uncertain. In places like Kranka, the situation is particularly acute. Women reported that during the 2023 rainy season, it rained only three times, making it nearly impossible to plan agricultural activities. Water-intensive crops such as tomatoes are especially affected, producing paradoxical outcomes: periods of erratic abundance followed by scarcity. During episodes of excessive rainfall, tomatoes may overproduce, overwhelming storage and market capacities. Wooden crates filled with unsold produce line market roads, forcing women to sell spoiled or overripe tomatoes at ex-

tremely low prices to avoid total loss. A few months later, when rainfall becomes scarce, tomatoes are difficult to cultivate, and those that reach the market are often nutritionally poor yet prohibitively expensive.

Because tomatoes are a cornerstone of Ghanaian cuisine, this climate-driven cycle of surplus and shortage has contributed to a growing reliance on imported tomatoes from countries such as China and Italy, with significant implications for local food security and nutrition. Ultimately, it is women who absorb the physical and emotional burden of this instability, constantly negotiating how to respond in place and ensure that their children are adequately fed. Their immobility is thus not the absence of adaptation, but rather the condition through which adaptation is enacted.

Closely intertwined with food provision is women's responsibility for safeguarding health, which constitutes another powerful constraint on mobility. Fieldwork reveals a striking duality in women's health that operates as part of a self-reinforcing cycle of vulnerability and immobility: women are both the primary caregivers and among the first to experience declining health themselves. On the one hand, their daily routines reflect an implicit expectation that they will care for children, elders, and other vulnerable community members. Caregiving often extends across wide kinship networks, encompassing multiple levels of lineage and reinforcing women's central role in sustaining collective well-being (Okali, 2013). On the other hand, women's own bodies bear the cumulative effects of environmental stress, nutritional decline, and physically demanding labor.

Concerns about health frequently center on the degradation of food quality and quantity, which women directly link to climate variability. Where food becomes scarce or nutritionally inadequate, health inevitably suffers, particularly for pregnant and breastfeeding women. As one interviewee explained, "We don't have good food to buy in Kranka and have health problems, especially as we become mothers, because climate change affects agriculture" (Interview no. 1, 2023). Childbirth remains one of the most physically demanding and risky experiences, especially under conditions of chronic drought and limited access to medical care, endangering both maternal and child health.

Climate instability also exacerbates existing medical conditions and generates new ones. Some women described chronic ailments that worsen during prolonged rainy periods, which have become more frequent and destructive. At the same time, the sheer physical intensity of women's daily routines, magnified by climate change, takes a heavy toll. As Alyah vividly stated, "We carry children on our shoulders and water on our heads. We farm with children on our shoulders and return home with harvests on our heads. The work on us is heavier" (Interview no. 1, 2023). Balancing reproductive, productive, and community roles is already demanding, but climate change amplifies this burden by increasing the labor required for food production and water collection (Patil & Babu, 2018).

Ethnographic observation made the embodied nature of this burden particularly visible. Women often return from the fields around midday to prepare food, but those whose fields are far away cannot do so. Childcare, especially for toddlers not yet attending school, further constrains women's time and mobility. Annah described leaving home early in the morning but reaching her fields only hours later because of poor roads and the need to walk with her young children. "Since they're all tired, I have to cook some cassava under a tree before I can start working," she explained (Interview no. 8, 2023). Such accounts illustrate how health,

care, and labor intersect to produce a cycle in which declining well-being both necessitates and limits women's presence in place.

Finally, women's responsibility for sustaining household and community economies further anchors them locally. While economic provision is often assumed to be the domain of men, particularly through participation in formal labor markets, this assumption does not hold in rural Ghanaian contexts. Our data challenge the notion that women's agricultural work is confined to unpaid subsistence production, showing instead that women actively combine subsistence goals with market-oriented strategies. In an environment of growing economic insecurity, shaped by environmental instability, women plan modest surpluses for sale in local markets to diversify livelihoods, even though systemic inequalities in land access, labor, and crop differentiation limit their returns (Carr & Thompson-Hall, 2014).

Women's economic roles thus blur the boundary between the "reproductive" and "productive" spheres. Their care-based responsibilities are dynamically intertwined with economic decision-making, requiring constant presence to manage household expenditures, support extended family members, and respond to emergencies. Even subsistence farming involves monetary costs, particularly for women who farm independently due to widowhood, single motherhood, or male migration. As one woman explained, "With the rains it's really difficult. If rain is expected and doesn't come, everything spoils. You end up having to buy seeds again, and you go bankrupt" (Interview no. 5, 2023).

These financial pressures often extend beyond the nuclear household to the extended family, as women are expected to contribute to school fees, healthcare costs, and communal obligations such as funerals. Stella's case is emblematic: in addition to caring for her own children, she supports seven relatives, including her sick mother and siblings, for whom she pays school fees (Interview no. 2, 2023). In contexts affected by climate change and male outmigration, women's economic responsibilities expand rather than diminish, further limiting the feasibility of migration as an adaptive option.

These intertwined responsibilities, food provision, health care, and economic sustenance, produce what can be conceptualized as care-based immobility. Women's staying is not the result of inertia or lack of aspiration, but a socially embedded response to climate change that prioritizes responsibility, adaptation, and collective survival. Within this constrained space, women exercise agency by negotiating labor, resources, and endurance strategies. Situating women's immobility within this socio-environmental context aligns with critical scholarship that emphasizes how gender norms, care obligations, and climate pressures intersect to shape adaptive possibilities, revealing immobility itself as an active, relational, and deeply embodied form of adaptation (Ferris, 2020; Molinero-Gerbeau & Avallone, 2020; San Román et al., 2025).

5.3. Negotiating Agency: Internal Mobility, Education, and Farming as Adaptive Strategies

While international migration is rarely perceived as a viable or desirable option for women in the communities studied, mobility nonetheless plays a significant role in their life trajectories. Fieldwork reveals that women's agency often unfolds through forms of internal mobility that are spatially limited, temporally circumscribed, and deeply shaped by family relations, gender norms, and life-course stages. This finding aligns with existing literature that challenges the

persistent stereotype of women as largely immobile or excluded from migration processes. According to Lattof et al. (2018), 31.1% of Ghanaian women migrated internally in 2000, a figure that rose to 37.4% by 2010. Women's migration trajectories are particularly oriented toward southern and middle-belt regions of Ghana, including the Bono Region, which emerges not only as a point of origin but also as a destination for women seeking livelihood opportunities (Abdul-Korah, 2007; Baada et al., 2019; Lawson et al., 2020).

Our fieldwork confirms these broader trends, showing that many women have experienced internal migration at some point in their lives, even if they do not aspire to long-distance or international mobility as many of their male peers do. Migration tends to occur primarily during youth or the pre-motherhood phase, when women have fewer caregiving responsibilities and greater room to negotiate autonomy. Once women become mothers, however, their responsibility for their children's survival and well-being often leads them to favor staying close to kin networks and livelihood resources, making immobility appear as a more viable and responsible strategy than further movement.

Importantly, women's internal migration trajectories are not uniform. Some are the result of constrained family circumstances, while others reflect deliberate strategies aimed at improving socio-economic conditions. Environmental stressors, including climate variability and ecological degradation, often contribute, but rarely operate in isolation. Instead, they intersect with economic hardship, gendered power relations, and family expectations, shaping highly contextualized migration decisions. Several women described leaving more arid savannah regions in northern Ghana due to declining agricultural productivity, while others migrated from areas affected by ecological disruption linked to infrastructure projects, such as dam construction in the Volta borderland region.

Rebecca's life history vividly illustrates how mobility can be shaped by coercion rather than choice. As the fifth of twelve children, she was raised by her grandmother before being sent, as a pre-adolescent, to live with an aunt near the Togo border. Although the move was framed as an opportunity for education, it resulted instead in a prolonged experience of informal domestic servitude. Rebecca became a "house girl," responsible for childcare and domestic labor, without access to schooling or meaningful autonomy. Her story exemplifies how kinship-based arrangements can reproduce forms of exploitation, particularly for young girls, embedding caregiving obligations within family hierarchies. It was only after several years that she managed to leave this situation and return to the Bono Region, where engaging in agriculture offered a pathway toward self-reliance. As she explained, "Now I do things my own way: I'm a farmer, and I support myself" (Interview no. 5, 2023). In this sense, agriculture did not merely represent a return to a traditional livelihood, but rather a means of reclaiming agency after a period of profound vulnerability.

Other migration trajectories reveal a markedly different configuration of agency, characterized by conscious decision-making and a willingness to take risks to pursue empowerment. Letitia's story is emblematic of this dynamic. Dissatisfied with the lack of opportunities in her home area, she independently decided to migrate to the Western Region, attracted by the perceived profitability of the cocoa sector. Although she did not ultimately work on cocoa farms, her account reveals a period of experimentation at the margins of formal legality, including cross-border labor and informal economic activities linked to border control and forest protection. Her narrative reflects a high degree of strategic adaptability, even as it underscores the precariousness of women's livelihoods in male-dominated and informal sectors.

Similarly, Stella's migration to Techiman at the age of eighteen to pursue formal training in auto body painting, a field traditionally dominated by men, represents a deliberate investment in skills acquisition and symbolic empowerment. She described the training as equivalent to "a master's degree," emphasizing both its duration and its transformative significance (Interview no. 8, 2023). For Stella, education and vocational training were not only tools for economic advancement but also mechanisms for challenging gender norms and expanding the horizon of what women could aspire to. Yet her trajectory also illustrates how life-course events, particularly motherhood, can abruptly reshape possibilities. After the birth of her daughter, her parents could no longer support her financially, and returning to her village to farm became the only feasible way to sustain herself and her child.

Across the interviews, education and vocational training consistently emerged as central aspirations, both for women themselves and, even more strongly, for their children. The existing literature highlights the role of formal and informal education in promoting socio-economic mobility, dignity, and disrupting intergenerational cycles of dependency (Darkwah, 2010; Namooog & Agyekum, 2024). The narratives collected during fieldwork strongly corroborate these findings. Many women described having been forced to leave school prematurely due to financial hardship, parental decisions, or gendered expectations that prioritized boys' education. These experiences were often internalized, with some women attributing their educational discontinuation to perceived personal inadequacy rather than structural exclusion.

Despite these experiences, women consistently expressed a strong commitment to their children's education, often articulating ambitious aspirations for them to become professionals such as engineers or pharmacists. Notably, none of the women interviewed viewed their children's involvement in farming as a desirable or acceptable option, even on a temporary basis. Education thus becomes a future-oriented strategy through which women seek to secure upward mobility for the next generation, even when their own opportunities have been curtailed.

At the same time, women's pursuit of education does not end with formal schooling. Many continue to seek vocational training opportunities later in life, often facilitated by NGOs rather than state institutions. These training programmes, ranging from organic agriculture to poultry farming and small-scale entrepreneurship, provide women with practical skills that can be immediately translated into livelihood improvements. In several cases, accessing such opportunities required short-distance mobility, reinforcing the idea that movement and immobility coexist as intertwined strategies rather than opposites.

Agriculture itself occupies a particularly ambivalent yet central position in women's adaptive strategies. While climate change has pushed many men away from farming and toward international migration or male-dominated sectors such as construction, women's narratives suggest that agriculture often becomes part of the solution rather than the problem. For many women, returning to farming after unsuccessful migration attempts is not a passive fallback, but a context-sensitive survival strategy shaped by necessity, caregiving responsibilities, and limited alternatives.

Rebecca, Letitia, Annah, and Stella all returned to agriculture after other livelihood strategies proved unsustainable. Annah, for instance, migrated from Kranka to Kumasi in search of work, but returned to farming after becoming pregnant, as urban livelihoods became incompatible with childcare and economic precarity. Letitia, after selling oranges on the streets of Berekum, found it impossible to combine petty trade with caring for a young child, mak-

ing farming the only viable alternative. In these cases, agriculture provides not only food and income, but also a degree of temporal and spatial flexibility that allows women to reconcile productive and reproductive responsibilities.

Importantly, women's engagement with agriculture is not limited to subsistence. Many actively embrace agricultural innovation and development projects promoted by local and international NGOs, particularly those focused on organic farming and small-scale animal husbandry. These initiatives are valued not only for their economic potential but also for their contribution to food quality and health, addressing concerns exacerbated by climate change. The circular economy mechanisms embedded in such projects foster self-sufficiency and collective resilience, enabling women to support one another and reduce dependence on external markets.

Stella's trajectory illustrates how individual empowerment can translate into community-level resilience. Through sustained engagement with NGO training programmes, she transformed her farm into a mentoring site, providing training opportunities for other women in the village. Her experience shows how agency exercised within immobility can generate localized structures of adaptation, challenging the assumption that meaningful change requires physical exit.

These findings reveal that women in rural Ghana actively negotiate agency through a combination of internal mobility, educational aspirations, and agricultural innovation. Their strategies are relational, contextually situated, and deeply embedded in family and community structures. Rather than representing passive victims of climate change or structural constraint, women emerge as adaptive actors who creatively navigate limited options to sustain livelihoods, care for dependents, and invest in future generations. This analysis challenges dominant narratives that equate mobility with empowerment and immobility with failure, showing instead that women's staying and selective moving constitute meaningful and proactive responses to vulnerability under conditions of environmental and social uncertainty.

6. Conclusions

This article examines how climate-related male migration reshapes women's vulnerability, agency, and (im)mobility in rural Ghana, and how women negotiate staying as both a constraint and a survival strategy. By integrating feminist political ecology with mobility and immobility studies, the analysis shows that women's immobility is not simply the absence of migration, nor the outcome of individual preference, but a socially produced and gendered condition rooted in care responsibilities and uneven access to resources.

The findings show that climate change affects women not through an essentialized or biological relationship with nature, but through the material and relational circumstances that structure their everyday engagement with land, labor, and social reproduction. Male migration, sometimes, though not exclusively, linked to climate stress, redistributes labor and risk within households, intensifying women's workloads and deepening their exposure to environmental and economic insecurity. In this context, women's staying emerges as what we conceptualize as care-based immobility: a condition sustained through intertwined economic, nutritional, and care responsibilities that anchor women to place while simultaneously enabling household and community survival.

Conceptualizing women's staying as care-based immobility allows us to move beyond binary framings of mobility versus immobility. The Ghanaian case shows that immobility under climate stress is neither accidental nor apolitical. Rather, it is actively negotiated within gendered socio-ecological hierarchies, where women's labor sustains livelihoods even as it constrains their capacity for long-term or international migration. In this sense, immobility functions both as a structural constraint and as a situated adaptation strategy, embedded in moral economies of care and responsibility.

At the same time, the article challenges interpretations that equate caregiving obligations with a lack of agency. While women's responsibilities often generate cycles of dependency and limit access to the resources needed for radical mobility, the empirical evidence reveals multiple forms of agency exercised within these constraints. Women navigate climate stress through internal and circular mobility, vocational training, agricultural diversification, and community-based initiatives. These practices demonstrate that agency is not necessarily expressed through movement across borders, but through contextually grounded strategies that prioritize social reproduction, intergenerational well-being, and collective resilience.

The study also highlights important gendered divergences in climate adaptation. Whereas climate change often acts as a push factor encouraging men to disengage from agriculture and pursue international migration, women's responses tend to be place-based and compensatory. Agriculture, internal mobility, and skill acquisition become survival strategies through which women adapt to environmental change while remaining geographically rooted. This distinction underscores the need to rethink dominant policy and academic narratives that privilege mobility, especially international migration, as the primary indicator of adaptive capacity.

By centering the analysis on care-based immobility and framing immobility as an analytically meaningful and politically charged condition, we aim to contribute to the literature on gender, migration, and climate change in Africa, with empirical evidence of how climate vulnerability is mediated through household and community relations, revealing the gendered redistribution of labor and risk triggered by male migration. The narratives we collected show how women's adaptive strategies, though often less visible and less mobile, are central to sustaining livelihoods under climate stress.

Our research calls for greater attention to the everyday, gendered practices through which climate adaptation is lived and enacted, and to the ways in which staying can represent both a burden and a form of situated agency. We believe that recognizing care-based immobility as a key dimension of environmental (im)mobility opens new analytical and policy-relevant avenues for understanding adaptation, resilience, and gender justice in contexts of climate change.

Data access statement

The data analyzed in this study are not publicly available due to confidentiality restrictions. They may be requested directly from the corresponding author.

Acknowledgements

The authors would like to extend their heartfelt gratitude to VIS – Volontariato Internazionale per lo Sviluppo for facilitating this research. In particular, we would like to express our sincere appreciation to the project manager in charge at the time of data collection for making the implementation of this research possible, and to the NGO's local staff, whose on-the-ground support was invaluable. We are deeply thankful to all the participants who generously shared their time, experiences, and insights. Their openness allowed us to appreciate the complexity, strength, and beauty of being a woman, a mother, and a central figure in the life of rural Ghanaian communities. Their contributions made this work possible and enriched it beyond measure.

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