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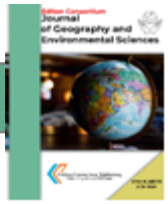

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Intersecting Inequalities: Climate Change, Migration, and Gendered Vulnerability in Northern Kenya's ASALs

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Abstract
This study examines how climate-induced migration interacts with existing social inequalities to produce differentiated gendered vulnerability outcomes among pastoralist and agro-pastoralist communities in Marsabit, Turkana, and Wajir counties of Northern Kenya's Arid and Semi-Arid Lands (ASALs). Guided by Feminist Political Ecology and Intersectionality Theory, the study analyses how gender intersects with four axes of social differentiation to produce distinct vulnerability and adaptation profiles. Feminist Political Ecology frames the analysis of gendered resource access and multi-scalar power dynamics, while Intersectionality theory enables disaggregation of vulnerability across overlapping social positions. The study employed a concurrent mixed-methods design over a 12-month fieldwork period (2024 to 2025), comprising a stratified random sample of 720 household survey respondents (240 per county), 18 focus group discussions, 45 life-history interviews, 30 key informant interviews, and sustained participant observation. Qualitative data were thematically analysed in NVivo and triangulated against survey findings. Key findings revealed that male labour migration, reported by 68 per cent of households as the primary coping strategy, increased women's caregiving burden by an average of 4.2 hours per day and reduced economic security by 41 per cent in female-headed households, and elevated exposure to gender-based violence. The study concludes that climate change and migration systematically amplify pre-existing intersectional inequalities while creating adaptive opportunities that remain disproportionately accessible to those with greater social and educational capital. It recommends gender-responsive climate policies, expanded access to productive resources for women, livelihood diversification programmes, and integration of indigenous knowledge into communitybased early warning systems.

Key words: ASALs, climate change, gendered vulnerability, migration, Northern Kenya.

INTRODUCTION

Northern Kenya's Arid and Semi-Arid Lands (ASALs), defined here as dryland ecosystems characterised by annual rainfall below 700 mm, high evapotranspiration, and marked climatic variability, encompass Marsabit, Turkana, and Wajir counties, which collectively support predominantly pastoral and agro-pastoral livelihoods. The central problem this study addresses is the lack of integrated empirical evidence on how climate-induced migration interacts with existing social inequalities, particularly gender, age, marital status, ethnicity, and educational attainment, to produce differentiated vulnerability outcomes among these communities. Without such evidence, climate adaptation policies risk reinforcing existing inequalities and failing to address the specific needs of the most vulnerable groups.

Climate change has emerged as one of the most pressing global challenges of the twenty-first century, profoundly affecting livelihoods, ecosystems, and socio-economic development, particularly in ecologically fragile regions highly dependent on natural resources. The ASALs of Northern Kenya have experienced recurrent droughts, erratic rainfall patterns, and accelerating environmental degradation, all of which threaten the viability of pastoral and agro-pastoral livelihoods. These climatic changes have triggered widespread migration and altered social, economic, and gender relations within affected communities.

Migration, understood in this study as the movement of individuals or households, primarily male labour migrants, away from their home communities to urban centres or other regions in search of wage employment as a livelihood response to climate stress, has been increasingly recognised as an adaptation strategy. However, while migration may provide economic benefits through remittances and livelihood diversification, it also generates unintended social consequences. Women left behind often assume additional responsibilities related to household management, livestock care, food security, and caregiving, compounded by pre-existing gender inequalities that limit their access to productive resources, education, decision-making structures, and financial opportunities. Consequently, climate change and migration interact to create differentiated vulnerabilities that affect women disproportionately. Gendered vulnerability, as used in this study, refers to the differential exposure, sensitivity, and adaptive capacity to climate stressors that arise from socially constructed gender roles, power relations, and unequal access to resources. Intersectionality, the analytical principle that vulnerability is shaped by multiple overlapping social identities rather than any single category, further refines this understanding by revealing how factors such as age, marital status, ethnicity, and educational attainment interact with gender to produce distinct risk profiles.

Recent scholarship has increasingly recognised the importance of examining climate change through gendersensitive and intersectional perspectives (Kaijser & Kronsell, 2014). However, much of the existing literature focuses on material aspects of adaptation, including income, assets, and livelihood outcomes, while paying insufficient attention to social relations, power structures, and the non-material dimensions of vulnerability. Furthermore, limited research has explored how climateinduced migration specifically reshapes gender roles and adaptive capacities within the pastoralist and agropastoralist communities of Northern Kenya.

This paper is organised as follows: Section 2 reviews relevant literature on climate change, migration, and gendered vulnerability across global, African, and Kenyan contexts, identifying the critical gaps that motivate this study. Section 3 presents the theoretical framework grounding the analysis in Feminist Political Ecology and Intersectionality Theory. Section 4 details the mixed-methods research design, including sampling strategy, data collection instruments, and analytical procedures. Section 5 reports the empirical findings on how intersecting social inequalities shape vulnerability and adaptive capacity, and Section 6 concludes with policy recommendations and directions for future research.

LITERATURE REVIEW

This section reviews literature on climate change, migration, and gendered vulnerability, with particular emphasis on pastoralist and agro-pastoralist communities in Northern Kenya's ASALs. The review is organised progressively from global to African to Kenyan perspectives, moving from broad theoretical and empirical foundations to the specific context of the present study. At each level, the review critically identifies the strengths and limitations of existing work, and the section concludes by specifying the research gaps that justify this study.

Global Perspectives on Climate Change, Migration, and Gendered Vulnerability

At the global level, the Intergovernmental Panel on Climate Change (IPCC) provides the foundational evidentiary basis for understanding climate change as a principal driver of livelihood transformation across dryland regions. Rising temperatures, shifting rainfall regimes, and increased frequency of extreme weather events have profoundly affected rural livelihoods dependent on natural resources (Trisos et al., 2022). Vulnerability to these changes is markedly uneven: lowlatitude economies with significant rain-fed and subsistence agriculture are projected to experience reductions in agricultural income of 60 per cent or more by 2100 (Trisos et al., 2022). This global evidence base establishes the macro-context within which regional and local dynamics in the Horn of Africa must be situated.

The relationship between climate variability and human mobility has evolved in scholarly discourse from environmentally deterministic explanations to more sophisticated accounts that recognise migration as a multi-causal phenomenon (Vinke et al., 2020). Contemporary research views migration not merely as a consequence of environmental stress but as a complex adaptive response shaped by intersecting social, economic, and political factors (Warner & Afifi, 2014). A strength of this literature is its shift away from monocausal explanations, but a significant limitation is its tendency to treat migration as gender-neutral, obscuring the differentiated impacts on women who remain in origin communities while male household members migrate.

Feminist political ecology scholarship has been particularly instrumental in challenging reductionist framings of the climate-migration nexus. Rocheleau et al. (1996) demonstrate that climate-migration interactions cannot be understood in isolation from the multi-scalar power relations that structure vulnerability and agency. Radel et al. (2018) extend this insight in their political ecology of migration, showing that overlooking the power relations underlying environmental degradation and forced mobility can lead to interventions that accentuate rather than remediate vulnerabilities. However, much of this scholarship remains theoretically oriented, with limited empirical application in dryland Africa. On gender specifically, Carr and Thompson (2014) document that women often experience greater vulnerability due to unequal resource access, limited decision-making participation, and socially prescribed gender roles. Awiti (2022) further demonstrates that in African contexts, climate change intensifies women's domestic responsibilities as environmental resources become scarcer. A notable weakness in global genderand-climate literature is its frequent treatment of women as a homogeneous category, an analytical limitation that Kaijser and Kronsell (2014) address by calling for intersectional approaches that disaggregate vulnerability across overlapping social identities. While this intersectional turn is theoretically compelling, empirical operationalisation across multiple axes of difference remains rare in global literature.

African Perspectives: Dryland Transformation, Migration, and Gender

Across Africa's drylands, climate change has accelerated livelihood transformation with significant implications for pastoral and agro-pastoral systems. Pastoralism underpins the livelihoods of millions across approximately 40 per cent of Africa’s land mass, contributing substantially to marketed and subsistence production (Herrero et al., 2016). However, these communities experience some of the highest poverty rates on the continent, with poverty in Kenya’s pastoral drylands ranging from 60 to 80 per cent compared to a national average of 34 per cent (Sala et al., 2020). The Horn of Africa exemplifies these intensifying challenges, where climate change exacerbates pre-existing fragility, increases resource-based tensions, and drives both internal and cross-border mobility (Trisos et al., 2022).

The strength of African pastoralism scholarship lies in its documentation of the erosion of traditional adaptive systems, including mobility, herd diversification, and communal resource management, under conditions of increasing climate variability, population growth, and policy intervention (Fratkin, 2001; Herrero et al., 2016).

A critical weakness, however, is the tendency to treat pastoral households as unified units, obscuring intrahousehold differentiation by gender and age. Research on water interventions in pastoral drylands reveals important trade-offs: while water infrastructure enhances short-term access, it can disrupt mobility, generate sociopolitical conflict, and exacerbate inequality when poorly governed (Sala et al., 2020). These findings underscore that resilience outcomes are contingent on governance arrangements, social relations, and alignment

with existing adaptive strategies; these are contextual factors that gender-blind analyses often miss.

In African pastoralist contexts, Balehey et al. (2018) demonstrate in their study of Afar pastoralists in Ethiopia that traditional gender inequalities systematically limit women's opportunities to adapt to climate change, constraining their access to livestock assets, extension services, and decision-making fora. Djoudi and Brockhaus (2011) reach comparable conclusions in northern Mali, showing that adaptation interventions are rarely gender-neutral and frequently reproduce existing inequalities.

A particular strength of these studies is their qualitative depth and community-level engagement; their limitation is a focus on single ethnic or national contexts that constrains comparative inference. Scholarship employing feminist political ecology in African pastoral contexts further demonstrates that adaptation processes produce shifting intersectional subjectivities that reshape relationships to resources and communities, creating marginalisation while simultaneously offering possibilities to challenge existing gendered subjectivities (Radel et al., 2018). Critically, top-down adaptation interventions often become maladaptive when they fail to account for the systemic processes, including loss of land access, knowledge politics, and changes in social relations, that produce vulnerability in the first place. This insight is directly relevant to policy design but has not been systematically applied in the Northern Kenya context.

On migration dynamics specifically, research documents that climate-induced mobility in the Horn of Africa exhibits distinctive regional characteristics shaped by ecological, political, and social factors (Warner & Afifi, 2014). Cross-border mobility is a longstanding feature of pastoral livelihoods, with communities in Kenya's borderlands moving into Ethiopia, Somalia, South Sudan, and Uganda in search of pasture and water. It is analytically important to differentiate between seasonal or strategic pastoral mobility and long-term labour migration. Historically, pastoral mobility, understood as the deliberate movement of herds in response to seasonal resource availability, constituted a core adaptation strategy embedded in communal governance and indigenous ecological knowledge.

In contrast, contemporary labour migration involves the permanent or semi-permanent movement of household members, predominantly men, to urban centres in search of wage employment, representing a fundamental livelihood shift triggered by the erosion of pastoral viability (Vinke et al., 2020). This distinction carries profound gender implications. While traditional pastoral mobility involved the entire household or specific age cohorts moving with livestock, contemporary labour migration fractures households, leaving women to manage both domestic and productive responsibilities without corresponding increases in decision-making authority or access to resources.

Research on migration's differential impacts by gender in Africa reveals that while men migrating in search of resources face risks including violence and economic uncertainty, women who remain behind assume heightened responsibilities for household food, water, and security, often with limited resources to cushion them from climate impacts (Awiti, 2022; Djoudi & Brockhaus, 2011). Children, particularly girls, experience educational disruption and elevated risks of early marriage and sexual exploitation during periods of protracted climate crisis. Minority groups and persons with disabilities experience heightened climate impacts compounded by exclusion from decision-making and inadequate resource access. These differentiated impacts are well documented in general terms in the African literature but have not been empirically examined with intersectional rigour in the specific ASAL counties of Northern Kenya that form the focus of this study.

Kenyan Perspectives: Climate Vulnerability, Pastoralism, and Gender

In Kenya, the ASALs are the country's most climatevulnerable regions due to ecological fragility and a heavy reliance on climate-sensitive livelihoods. Historical adaptive systems among pastoral communities, including mobility, herd diversification, and communal resource management, enabled effective coping with environmental variability (Fratkin, 2001; Kagunyu et al., 2016). However, increasing climate variability, population growth, environmental degradation, and policy interventions have progressively eroded these mechanisms (Sala et al., 2020). Research demonstrates that prolonged droughts have reduced livestock productivity, increased mortality rates, and diminished household assets across pastoralist communities.

Beyond economic impacts, climate change has fundamentally altered social structures: household roles have shifted as families seek alternative livelihood options, traditional support systems have weakened due to resource scarcity, and conflicts over water and grazing resources have intensified (Odongo et al., 2025).

Evidence from Kenya's ASALs reveals that women's vulnerability is not solely a consequence of environmental hazards but is fundamentally rooted in social and institutional inequalities (Human Rights Watch, 2003). Limited access to education, financial services, extension support, and political representation constrains women's adaptive capacity. During droughts, food and water scarcity disproportionately affect women, who often forego meals to prioritise their children and elders. Gender-based violence, including intimate partner violence and sexual exploitation, escalates during climate-induced crises. The National Drought Management Authority (NDMA, n.d.) has documented these patterns, yet Kenya's climate policy frameworks, including the Climate Change Response Strategy (2010), National Adaptation Plan (2015), and National Climate Change Action Plan (2018), reference migration and gender vulnerabilities without providing integrated approaches that address their intersection.

A notable strength of Kenya-focused scholarship is its growing documentation of women's agency in adaptation. Research documents women's engagement in savings and credit groups, petty trade, beadwork, poultry keeping, water harvesting, and small-scale entrepreneurship as strategies to generate alternative income and reduce dependence on climate-sensitive pastoral livelihoods (Kagunyu et al., 2016). Indigenous knowledge systems remain central to adaptation: traditional weather forecasting, strategic livestock mobility, communal resource sharing, and drought preparedness planning continue to inform community responses. However, a significant limitation is that existing studies often emphasise material outcomes while neglecting the social, emotional, and cultural dimensions of vulnerability, and few employ intersectional frameworks that would reveal how outcomes differ systematically across social positions within the category of 'women.'

Recent research in Kajiado County has taken important steps toward intersectional analysis, demonstrating that adaptive capacity varies markedly among women according to access to land, credit, schooling, and social networks (Sala et al., 2020). Elders' ecological expertise stabilises herds only when labour and institutional recognition are available; livelihood diversification delivers secure gains for women with land, credit, or schooling, but channels the asset-poor into precarious, time-intensive work; and collective savings groups buffer shocks when inclusive but reproduce class and marital hierarchies when their fees and governance rules are exclusionary. These findings are analytically valuable but are geographically limited to Kajiado County, a southern Kenya ASAL with a predominantly Maasai population, and cannot be assumed to generalise to the distinct social, ecological, and ethnic configurations of Marsabit, Turkana, and Wajir counties in Northern Kenya.

Summary of Research Gaps and Justification for the Study

The foregoing review reveals four specific gaps that this study addresses. First, while global and African literature recognises migration as a climate adaptation response, and Kenyan scholarship documents its gendered consequences in general terms, no study has empirically examined how male labour migration specifically reshapes gender relations and vulnerability patterns among women left behind in Marsabit, Turkana, and Wajir counties with the methodological rigour this study employs. Second, existing Kenyan ASAL research frequently emphasises material outcomes, including income, livestock assets, and food security, while neglecting the social, emotional, and institutional dimensions of vulnerability that feminist political ecology theory identifies as central; this study addresses that gap through its integration of life-history interviews, focus group discussions, and participant observation alongside quantitative household survey data.

Third, despite the theoretical advances of intersectionality scholarship (Kaijser & Kronsell, 2014; Crenshaw, 1989), intersectional empirical analysis disaggregating vulnerability across age, ethnicity, marital status, and educational attainment simultaneously remains absent from Northern Kenya's ASAL research, a gap that has direct consequences for the design of targeted policy interventions. Fourth, Kenya's climate policy frameworks treat women as a homogeneous vulnerable group and fail to recognise migration as a gendered adaptation strategy with differentiated consequences, a policy gap that this study's integrated findings directly address. Together, these gaps justify the

adoption of an integrated Feminist Political Ecology and Intersectionality framework to examine climate change, migration, and gendered vulnerability in the three study counties.

Theoretical Framework

This study is anchored in two complementary theoretical frameworks: Feminist Political Ecology (FPE) and Intersectionality Theory. These frameworks are not applied separately but are integrated to enable a multiscalar and multi-dimensional analysis of how climate change and migration interact with gender and other social inequalities to produce differentiated vulnerability and adaptive capacity outcomes.

Feminist Political Ecology

As developed by Rocheleau et al. (1996), Feminist Political Ecology, challenges both the gender-blindness of mainstream political ecology and the apolitical tendencies of mainstream feminist environmental scholarship. FPE asserts that access to and control over natural resources, namely land, water, pasture, and livestock, are not neutral technical matters but are structured by gender-differentiated power relations operating at household, community, institutional, and policy scales. In this study, FPE frames the analysis of three core empirical questions: how gendered divisions of labour in pastoral households determine women's differential exposure to climate stressors; how the power relations governing resource access shape women's adaptive capacity when male migration alters household structure; and how multi-scalar institutions, ranging from customary gender norms to national climate policies, enable or constrain women's agency.

FPE constructs are operationalised through specific empirical indicators. Gendered resource access is measured using household survey data on land tenure, livestock ownership, credit access, and extension service access, disaggregated by gender. Workload distribution is operationalised as hours per day devoted to domestic and productive labour, including water and firewood collection, livestock management, and caregiving, compared before and after male migration events. Power relations are examined through key informant interviews with local authorities and NGO staff alongside household survey questions on decision-making authority over agricultural and domestic expenditures. The multi-scalar institutional environment is analysed through document review of national climate policies and qualitative data on how county-level institutions mediate women's access to resources.

Intersectionality Theory

As formulated by Crenshaw (1989) and applied to environmental politics by Kaijser and Kronsell (2014), Intersectionality Theory provides the analytical tools to move beyond aggregate gender comparisons and reveal how overlapping social identities produce distinct configurations of vulnerability and adaptive capacity. The foundational insight of intersectionality is that categories such as 'women' are not internally homogeneous: vulnerability and agency are shaped by the simultaneous interaction of gender with age, marital status, ethnicity, class, and educational attainment, such that the experience of being a young, unmarried, ethnicminority woman with no formal education differs qualitatively and not merely quantitatively from that of a married, educated woman of a majority ethnic group. In this study, intersectionality is operationalised by disaggregating the category of 'woman' along four axes: age (young women aged 18 to 35, adult women aged 36 to 55, elderly women aged 56 and above); marital status (married, widowed, divorced or separated); ethnicity (Borana, Rendille, and Gabra in Marsabit; Turkana in Turkana County; Somali sub-groups in Wajir); and educational attainment (no formal education, primary level, secondary level, tertiary level).

These intersecting identities are examined in relation to seven vulnerability indicators drawn from the household survey and qualitative data: food security, economic hardship, workload burden, access to resources (land, livestock, credit, information), decision-making authority, exposure to gender-based violence, and adaptive capacity (participation in savings groups, livelihood diversification, access to climate information). Qualitative thematic analysis using axial and selective coding in NVivo further explores how particular configurations of social position shape lived experiences of vulnerability and adaptation in ways that quantitative indicators alone cannot capture. The integration of FPE and intersectionality thus enables both structural analysis of power and fine-grained attention to how that structure is experienced differently across social positions.

METHODOLOGY

This study employed a concurrent mixed-methods design in which quantitative and qualitative data were collected simultaneously during the 12-month fieldwork period

(2024 to 2025) and integrated at both the interpretive and reporting levels. The decision to use a concurrent rather than sequential design was driven by the study's dual analytical goals: the quantitative strand was designed to generate statistically representative estimates of vulnerability indicators and their variation across intersecting social positions, while the qualitative strand was designed to explain the mechanisms, meanings, and power relations that underlie the patterns revealed by the quantitative data. Integration was achieved through a two-stage process. First, quantitative and qualitative data were analysed independently using their respective methods (statistical analysis for survey data; thematic coding in NVivo for qualitative data).

Second, the findings were merged through systematic triangulation at the interpretation stage: quantitative patterns were used to identify subgroups or relationships warranting deeper qualitative investigation, and qualitative findings were used to contextualise, explain, or challenge quantitative results. Where divergences emerged, for instance between survey-reported gender-based violence rates and FGD accounts of under-reporting, these were explicitly documented and analysed as substantive findings about reporting dynamics and social desirability effects, rather than treated as data quality problems. This integration strategy ensures that the study's conclusions are grounded in both breadth and depth of evidence.

The study was conducted in Marsabit, Turkana, and Wajir counties, selected on the basis of their documented climate vulnerability, predominantly pastoralist and agropastoralist livelihoods, and their status as sites with significant male labour out-migration in response to recurrent drought. Within each county, the sample was stratified across livelihood zones (pastoral, agro-pastoral, and peri-urban), ethnic groups, and gender to ensure representative coverage. A total of 720 household survey respondents were recruited, 240 in each county, using stratified random sampling guided by NDMA ward-level household enumeration lists as the sampling frame. Sample size was determined using Cochran's (1977) formula for proportionate stratified sampling at a 95 per cent confidence level and 5 per cent margin of error, with proportionate allocation across strata.

For the qualitative strand, 18 focus group discussions were conducted (six per county), each comprising 8 to 12 purposively selected participants stratified by gender, age, and marital status. Forty-five life-history interviews were conducted with women across the three counties, selected through theoretical sampling to ensure coverage of diverse intersectional positions. Thirty key informant interviews were held with county government officials, NDMA staff, NGO programme officers, religious leaders, and community elders. Sustained participant observation was undertaken at community meetings, water point gatherings, market spaces, and household settings throughout the fieldwork period.

The selection of a diverse target population was methodologically strategic, ensuring that the study captures the full spectrum of lived experiences, power dynamics, and contextual knowledge necessary to understand climate-induced vulnerability and adaptation in Marsabit, Turkana, and Wajir counties. By including household heads alongside women whose spouses had migrated, the study was able to empirically examine FPE's premise that male labour migration reshapes gendered power relations and resource control, while using Intersectionality to explore how a woman's experience of her spouse's absence varies according to her age, education, ethnic affiliation, or economic status. The inclusion of elderly community members and youth representatives added generational and temporal dimensions to the analysis, revealing how historical patterns of mobility and shifting cultural norms intersect with current climate stressors to produce distinct vulnerabilities across age cohorts. Engaging community and religious leaders, livestock officers, county climate change officers, women group leaders, and community health workers ensured that the study captured institutional, political, and service-delivery perspectives in addition to household-level narratives.

This comprehensive sampling strategy supported the study's policy-relevant objectives by enabling the research to identify, through the triangulation of experiences across these varied actors, both the differential vulnerabilities and the agency of diverse women and men, as well as the specific entry points for transformative interventions. The target population categories are summarised in Table 1.

Table 1: Target Population Categories

Category	Description
Household Heads	Men and women responsible for household decision-making
Women Left Behind	Women whose spouses migrated for employment
Community Elders	Custodians of indigenous knowledge
Youth Representatives	Young men and women affected by migration
Religious Leaders	Priests, pastors and imams
Livestock Officers	County livestock experts
Climate Officers	Climate and drought management officials
Women Group Leaders	Leaders of community adaptation initiatives
Community Health Workers	Frontline health service providers

The study employed both probability and non-probability sampling techniques.

Household Survey Sampling

A multi-stage sampling procedure was used to select households for the quantitative survey. In the first stage, Marsabit, Turkana, and Wajir counties were purposively selected because of their high climate vulnerability. In the second stage, sub-counties and villages were selected using purposive and stratified sampling methods. In the third stage, households were selected through systematic random sampling. Using Cochran's (1977) sample size determination formula for large populations, a sample size of approximately 384 households was considered adequate. To account for non-response, the sample was adjusted upward to 400 households, distributed proportionately across the three counties, as shown in Table 2.

Table 2: Distribution of Household Survey Respondents by County

County	Number of Households
Marsabit	133
Turkana	134
Wajir	133
Total	400

This near-equal distribution across the three counties was a deliberate strategy to ensure comparative rigour, allowing the study to discern how county-specific ecological, political, and ethnic contexts intersect with gender and other social categories to produce distinct vulnerability profiles, while the sample size provided the statistical power necessary to detect meaningful variations among subgroups of women and men.

Qualitative Sampling

Complementing the household survey, nine Focus Group Discussions (FGDs) were conducted, with three organised in each county, comprising 10 to 12 participants per group. Participants were disaggregated into distinct age and gender cohorts, summarised in Table 3, in order to operationalise Intersectionality Theory's core tenet that vulnerability is not uniformly experienced.

Table 3: Focus Group Discussion Cohorts

Cohort	Age Range
Young Women	15–25 years
Adult Women	30–50 years
Young Men	15–25 years
Adult Men	30–45 years
Elderly Men	55–75 years

Twelve life-history interviews were conducted, targeting Elderly Women, Elderly Men, and Young Married Women, with four interviews per category. These interviews provided a longitudinal and personal dimension to the study, allowing researchers to trace how individual lives unfold across decades of climatic and socio-economic change, honouring FPE's emphasis on situated, embodied knowledge and agency. Twenty-one Key Informant Interviews (KIIs) were purposively conducted, as summarised in Table 4, providing institutional and expert insight into the structural barriers and policy contexts that shape gendered vulnerability.

Table 4: Key Informant Interview Distribution

Informant Category	Number
Chiefs and Elders	6
Women Group Leaders	3
Livestock Officers	3
Religious Leaders	3
Community Health Workers	3
Conservancy Managers	3
Total	21

The triangulation of these diverse data sources, surveys, FGDs, life histories, and key informant interviews created a methodological synergy in which quantitative patterns from the 400 households could be illuminated, challenged, or deepened by qualitative narratives, while key informants provided the structural and policy context necessary to translate empirical findings into actionable recommendations.

The household survey instrument collected data on demographic characteristics, livelihood activities, migration histories, resource access, decision-making authority, hours of work, food security status, economic hardship indicators, and experience of gender-based violence. Survey data were entered into SPSS and analysed using descriptive statistics, chi-square tests of association, and binary logistic regression to model the determinants of severe food insecurity and other vulnerability outcomes across intersecting social positions. Qualitative data from focus group discussions, life-history interviews, and key informant interviews were audio-recorded with consent, transcribed verbatim, and imported into NVivo for thematic analysis. These followed the three-stage coding procedure of Braun and Clarke (2006): open coding to identify emerging themes, axial coding to establish relationships among categories, and selective coding to distil core patterns related to vulnerability, adaptation, and the mechanisms linking migration to gendered outcomes. Triangulation across the quantitative and qualitative strands was the primary strategy for ensuring the validity of integrated conclusions.

Ethical Considerations

The study adhered to standard ethical research practices, including obtaining informed consent, ensuring voluntary participation, protecting anonymity and confidentiality, respecting cultural norms and community protocols, securing institutional review board approval, and obtaining the relevant government research permits.

Limitations of the Study

The study acknowledges several limitations, including logistical challenges posed by the vast ASAL geography, cultural sensitivities that may constrain open discussion, accessibility issues due to climatic conditions and insecurity, and recall bias affecting historical reporting. The deployment of multiple data collection methods and the principle of triangulation helped mitigate these constraints by enabling convergence of findings across the survey, FGDs, life histories, key informant interviews, and participant observation.

FINDINGS AND DISCUSSION

The findings presented in this chapter offer empirical validation of the integrated theoretical framework, demonstrating how Feminist Political Ecology (FPE) and Intersectionality Theory work in tandem to illuminate the layered dynamics of climate-induced vulnerability and adaptation across Marsabit, Turkana, and Wajir counties.

Perceptions of Climate Change

Respondents demonstrated near-unanimous recognition of intensifying climate stress, as summarised in Table 5. These perceptions align closely with meteorological

records and institutional reports from the National Drought Management Authority (NDMA, n.d.), grounding the study in both local knowledge and scientific evidence.

Table 5: Respondent Perceptions of Climate Change Indicators

Indicator	Percentage of Respondents
Increased drought frequency	91%
Reduced rainfall	87%
Heightened temperatures	84%
Escalating water scarcity	89%

Livelihood Transformation

The cascading effects of climate stress on livelihood systems were stark. Reduced pasture availability, widespread livestock deaths, diminished milk production, and declining household incomes have fundamentally disrupted traditional pastoralism, forcing communities to confront the unreliability of a livelihood system that had sustained them for generations. This was poignantly captured by a Turkana elder who lamented the loss of predictable seasonal patterns, and by a Marsabit woman who observed that families can no longer depend entirely on livestock. These accounts signal a reluctant but necessary transition toward diversified strategies involving petty trade, charcoal production, casual labour, and migration, a shift that FPE interprets as a gendered process in which men and women experience and respond to livelihood disruption differently based on their distinct positions within the political economy of pastoral production.

Household Structural Changes

Climate change has reshaped household organisation, gender relations, and intergenerational dynamics in ways that extend well beyond environmental impact, as Table 6 illustrates.

Table 6: Household Structural Changes Attributed to Climate Stress

Indicator	Percentage of Households
Male migration	74%
Female-headed households	68%
School dropout cases	42%
Increased household dependency ratios	71%
Reliance on relief aid	79%

The rise in female-headed households is directly attributable to male labour migration, a finding that underscores FPE's argument that environmental stress interacts with patriarchal structures to produce new configurations of vulnerability and agency. Women left behind must assume unprecedented responsibilities for livestock management, household provisioning, and decision-making while simultaneously facing the emotional and practical challenges of family separation.

Migration as a Climate Adaptation Strategy

Migration emerged as a complex duality, simultaneously serving as a vital survival mechanism and a source of new vulnerabilities. Employment search (58%) and drought-induced livestock losses (24%) emerged as the primary drivers of migration. Table 7 summarises the benefits and costs reported by surveyed households.

Table 7: Reported Benefits and Costs of Migration

Benefits of Migration	%	Costs of Migration	%
Household remittances	81%	Increased female workload	85%
Improved food security	72%	Family separation	71%
School fee support	68%	Emotional stress	67%
Medical assistance	53%	Reduced livestock management capacity	52%

These findings illustrate that migration redistributes risk rather than eliminating it, resonating with FPE's emphasis on how adaptation pathways are shaped by, and simultaneously reshape, gender power relations. Men's physical departure reconstitutes household dynamics and often intensifies women's labour burdens while providing critical cash inflows that enable survival during drought periods.

Gendered Division of Labour

Table 8 provides quantitative evidence of the entrenched inequalities that FPE foregrounds, with women bearing overwhelming responsibility for domestic tasks while men dominate productive assets and decision-making.

Table 8: Gendered Division of Labour

Responsibility (Women)	%	Responsibility (Men)	%
Water collection	82%	Livestock ownership	84%
Childcare	88%	Household decision-making	79%
Food preparation	93%		
Firewood collection	86%		

This disparity is exacerbated by climate change, as resource scarcity extends the time and energy women must devote to domestic provisioning, a reality vividly captured by a Marsabit participant's description of women waking before sunrise and returning after sunset in search of water. Environmental degradation thereby intensifies gendered labour burdens and constrains women's opportunities for education, income generation, and political participation.

Structural Inequalities in Resource Access

Table 9 further validates FPE's core argument that vulnerability is produced through unequal control over productive assets.

Table 9: Male Dominance in Resource Access and Control

Resource or Service	Percentage Controlled or Accessed by Men
Livestock ownership	81%
Land ownership	76%
Access to credit	63%
Community leadership positions	78%
Climate information services	58%

This pattern systematically limits women's capacity to make independent adaptation decisions and reinforces their dependence on male-controlled resources during periods of climatic stress, a dependence that becomes particularly precarious when male household members migrate, leaving women to manage resources they do not formally own.

Intersectional Differences in Vulnerability

The intersectional analysis enriches and complicates these gendered patterns, revealing that vulnerability among women is not uniform but varies significantly according to age, marital status, education, and social position. Young women face distinct challenges related to early marriage, limited educational opportunities, and heavy caregiving burdens, while elderly women contend

with mobility constraints, poor health, and social isolation. Widows emerge as one of the most marginalised groups, systematically excluded from land access, livestock ownership, decision-making processes, and even relief services, consistent with documented patterns of customary-law discrimination against widows in Kenya's pastoral counties (Human Rights Watch, 2003).

This is illustrated by a Turkana widow who observed that without a husband, people ignore her voice during community meetings, a powerful illustration of Intersectionality's insistence that multiple, interlocking systems of power shape vulnerability in context-specific ways.

Conversely, women with secondary education and above demonstrate significantly greater adaptive capacity through small business ownership, access to mobile banking, and participation in development programs. This highlights how education intersects with gender to mediate resilience outcomes and suggests that investments in girls' education could yield substantial dividends for climate adaptation.

Women's Adaptive Agency and Indigenous Knowledge

Despite these structural constraints, the study documents remarkable agency and resilience among women, who are actively engaged in a range of livelihood diversification activities, summarised in Table 10.

Table 10: Women's Engagement in Adaptation Strategies

Adaptation Activity	Percentage of Women Engaged
Savings groups	72%
Petty trade	65%
Beadwork	54%
Poultry keeping	43%
Water harvesting	38%
Kitchen gardening	31%

This finding demonstrates that women are not passive victims of climate change but active agents who creatively leverage collective action, indigenous knowledge, and livelihood diversification to build household and community resilience, aligning with FPE's insistence on recognising women's adaptive agency and challenging deficit-based narratives that portray women solely as vulnerable subjects.

The continued importance of indigenous knowledge systems, including traditional weather forecasting, strategic livestock mobility, communal resource sharing, and drought preparedness planning, further underscores the need for adaptation policies that integrate local expertise with modern climate information systems (Kagunyu et al., 2016), respecting the wisdom accumulated over generations of pastoralist experience while leveraging scientific advances to enhance predictive capacity and early warning systems.

Synthesis of Findings

Ultimately, the findings affirm that climate vulnerability in Northern Kenya's ASALs is fundamentally a socially differentiated and politically mediated phenomenon, shaped by the intersection of environmental stress, gender inequalities, age hierarchies, marital status, educational attainment, and ethnic affiliations. Effective adaptation strategies must address not only the biophysical impacts of climate change but also the structural barriers that constrain women's access to resources, decision-making power, and adaptive opportunities, while simultaneously building on the existing resilience strategies and indigenous knowledge that communities have developed over generations of coping with environmental variability, a dual imperative that the integrated FPE and Intersectionality framework illuminates with clarity.

CONCLUSION AND RECOMMENDATIONS

Conclusion: This study demonstrates that climate change in Northern Kenya's ASALs is not merely an environmental phenomenon but a profound driver of socio-economic transformation, reshaping household structures, livelihood systems, gender relations, and

community dynamics across Marsabit, Turkana, and Wajir counties. Recurrent droughts, erratic rainfall, rising temperatures, and environmental degradation are systematically undermining traditional pastoralism and compelling communities to adopt migration as a critical survival strategy.

While male labour migration has enabled households to access remittances that support food security, education, and healthcare, this adaptation pathway has generated significant unintended consequences: women left behind shoulder expanded responsibilities in livestock management, household provisioning, and caregiving without corresponding increases in decision-making authority or access to productive resources. This finding validates Feminist Political Ecology's central argument that climate vulnerability is produced through the intersection of environmental stress and entrenched patriarchal structures that constrain women's adaptive capacity.

The study further establishes that vulnerability among women is not a uniform condition but a socially differentiated experience shaped by multiple intersecting identities. Widows face systematic exclusion from land, livestock, and relief services; elderly women contend with mobility constraints and social isolation; young women confront early marriage and limited educational opportunities; and educated women demonstrate significantly greater adaptive capacity through business ownership and access to financial services. These findings affirm Intersectionality Theory's insistence that interlocking systems of power based on age, marital status, education, ethnicity, and economic position produce context-specific vulnerabilities that demand nuanced, targeted interventions.

Despite these structural constraints, the study documents remarkable evidence of women's adaptive agency through savings groups, petty trade, poultry keeping**,** water harvesting, and informal support networks, demonstrating that women are not passive victims of climate change but active agents who creatively leverage collective action, indigenous knowledge, and livelihood diversification to build household and community resilience.

Recommendations: Based on these conclusions, the study proposes the following recommendations to address both the immediate drivers of vulnerability and the underlying structural inequalities that perpetuate it. First, national and county climate policies should mainstream gender considerations to ensure that women's needs, priorities, and capacities are explicitly addressed and that their meaningful participation in climate governance is guaranteed. Second, women's access to productive resources, including land ownership, livestock assets, credit facilities, extension services, and climate information, should be enhanced to strengthen their economic empowerment and adaptive capacity.

Third, investment in livelihood diversification programs that support small enterprises, vocational training, and climate-smart income-generating activities is essential for reducing dependence on climate-sensitive livelihoods. Fourth, the expansion of water harvesting technologies, boreholes, dams, and mobile health services in ASAL regions should be prioritised to alleviate the disproportionate burdens borne by women and girls.

Fifth, educational interventions aimed at reducing school dropout rates, preventing early marriages, and addressing gender-based violence should be strengthened as a foundation for enhancing future adaptive capacities. Sixth, indigenous knowledge systems, including traditional weather forecasting, strategic livestock mobility, and communal resource sharing, should be integrated with modern climate information services to improve the effectiveness and cultural acceptability of adaptation interventions.

Finally, community peacebuilding mechanisms and resource-sharing arrangements should be strengthened to reduce conflicts associated with climate-induced resource scarcity, with women actively involved in local conflict resolution and natural resource governance structures.

Contribution to Knowledge

This study advances the literature in four significant ways. First, it provides empirical evidence from Northern Kenya's ASALs on how climate-induced migration reshapes gender relations and household structures. Second, it demonstrates that vulnerability is multidimensional and influenced by intersecting social identities. Third, it extends the application of Feminist Political Ecology and Intersectionality Theory within climate change research. Fourth, it highlights women's adaptive agency and the critical role of community-based initiatives in strengthening resilience amid climatic uncertainty.

The policy implications are clear: climate adaptation strategies that ignore gender dynamics risk reinforcing existing inequalities and undermining the effectiveness of resilience-building efforts, necessitating transformative approaches that prioritise social inclusion, gender equality, and community participation.

Areas for Further Research

The study identifies several areas for further research that would deepen and extend these findings, including longitudinal studies examining the long-term impacts of climate-induced migration on household resilience; comparative studies across different ASAL counties and pastoral communities in East Africa; the role of digital technologies and mobile communication in supporting climate adaptation among women; climate change and youth migration dynamics; gendered impacts of climate related conflicts and displacement; and evaluation of county-level climate adaptation programs and their effectiveness in addressing gender inequalities.

Ultimately, this study affirms that building climate resilience in Northern Kenya's ASALs requires a fundamental commitment to social justice, gender equality, and inclusive governance, recognising that the well-being of pastoralist communities depends not only on addressing environmental challenges but on transforming the structural inequalities that perpetuate vulnerability and constrain the adaptive agency of women and marginalised groups.

REFERENCES

Awiti, A. O. (2022). Climate change and gender in Africa: A review of impact and gender-responsive solutions. *Frontiers in Climate, 4*, Article 895950. https://doi.org/10.3389/fclim.2022.895950

Balehey, S., Tesfay, G., & Balehegn, M. (2018). Traditional gender inequalities limit pastoral women's opportunities for adaptation to climate change: Evidence from the Afar pastoralists of Ethiopia. *Pastoralism, 8*, Article 23. https://doi.org/10.1186/s13570-018-0129-1

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Carr, E. R., & Thompson, M. C. (2014). Gender and climate change adaptation in agrarian settings: Current thinking, new directions, and research frontiers. *Geography Compass, 8*(3), 182–197. https://doi.org/10.1111/gec3.12121

Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). John Wiley & Sons.

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, 1989*(1), 139–167. https://scholarship.law.columbia.edu/faculty_scholarship/3007/

Djoudi, H., & Brockhaus, M. (2011). Is adaptation to climate change gender neutral? Lessons from communities dependent on livestock and forests in northern Mali. *International Forestry Review, 13*(2), 123–135. https://doi.org/10.1505/146554811797406606

Fratkin, E. (2001). East African pastoralism in transition: Maasai, Boran, and Rendille cases. *African Studies Review, 44*(3), 1–25. https://doi.org/10.2307/525591

Herrero, M., Addison, J., Bedelian, C., Carabine, E., Havlík, P., Henderson, B., van de Steeg, J., & Thornton, P. K. (2016). Climate change and pastoralism: Impacts, consequences and adaptation. *Revue Scientifique et Technique, 35*(2), 417–433. https://doi.org/10.20506/rst.35.2.2533

Human Rights Watch. (2003, March 4). *Double standards: Women's property rights violations in Kenya*. https://www.hrw.org/report/2003/03/04/double-standards/womens-property-rights-violations-kenya

Kagunyu, A., Wandibba, S., & Wanjohi, J. G. (2016). The use of indigenous climate forecasting methods by the pastoralists of Northern Kenya. *Pastoralism, 6*, Article 7. https://doi.org/10.1186/s13570-016-0054-0

Kaijser, A., & Kronsell, A. (2014). Climate change through the lens of intersectionality. *Environmental Politics, 23*(3), 417–433. https://doi.org/10.1080/09644016.2013.835203

National Drought Management Authority. (n.d.). *Drought information*. NDMA. Retrieved June 21, 2026, from https://ndma.go.ke/drought-information/

Odongo, R. A., De Moel, H., Wens, M., Coumou, D., Limones, N., Otieno, V., & Van Loon, A. F. (2025). From indices to impacts using environmental and socio-economic clustering in Kenya. *Journal of Hydrology: Regional Studies, 58*, Article 102269. https://doi.org/10.1016/j.ejrh.2025.102269

Radel, C., Schmook, B., Carte, L., & Mardero, S. (2018). Toward a political ecology of migration: Land, labor migration, and climate change in northwestern Nicaragua. *World Development, 108*, 263–273. https://doi.org/10.1016/j.worlddev.2017.04.023

Rocheleau, D., Thomas-Slayter, B., & Wangari, E. (Eds.). (1996). *Feminist political ecology: Global issues and local experiences*. Routledge.

Sala, S. M., Otieno, D. J., Nzuma, J., & Mureithi, S. M. (2020). Determinants of pastoralists' participation in commercial fodder markets for livelihood resilience in drylands of northern Kenya: Case of Isiolo. *Pastoralism, 10*, Article 18. https://doi.org/10.1186/s13570-020-00166-1

Trisos, C. H., Adelekan, I. O., Totin, E., Ayanlade, A., Efitre, J., Gemeda, A., Kalaba, K., Lennard, C., Masao, C., Mgaya, Y., Ngaruiya, G., Olago, D., Simpson, N. P., & Zakieldeen, S. (2022). Africa. In H.-O. Pörtner et al. (Eds.), *Climate change 2022: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 1285–1455). Cambridge University Press. https://doi.org/10.1017/9781009325844.011

Vinke, K., Bergmann, J., Blocher, J., Upadhyay, H., & Hoffmann, R. (2020). Migration as adaptation? *Migration Studies, 8*(4), 626–634. https://doi.org/10.1093/migration/mnaa029

Warner, K., & Afifi, T. (2014). Where the rain falls: Evidence from 8 countries on how vulnerable households use migration to manage the risk of rainfall variability and food insecurity. *Climate and Development, 6*(1), 1–17. https://doi.org/10.1080/17565529.2013.835707