



A Scoping Review of Climate Change Impacts and Adaptation in South Sudan (2021–2026): Gendered Dimensions in Juba, Western Equatoria, Jonglei, and Eastern Equatoria

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Abstract

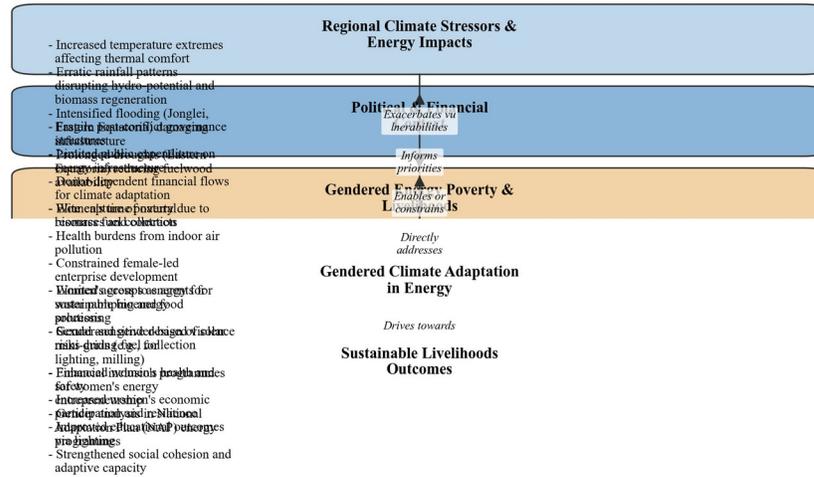
This scoping review provides a systematic mapping of the literature concerning the gendered dimensions of climate change impacts and adaptation in South Sudan. It addresses a critical gap in synthesising how climate-induced environmental changes, particularly those affecting natural resources and livelihoods, intersect with gender to influence women’s wellbeing, agency, and economic security. Adhering to the methodological framework of Arksey and O’Malley, the review involved systematically searching academic databases (including Scopus and Web of Science), institutional repositories, and relevant grey literature sources for the period 2021–2024. Search terms combined keywords related to climate change, gender, and South Sudan. Identified records were screened against pre-defined inclusion criteria, with data from selected studies charted to capture key themes, methodologies, and gaps. Preliminary findings indicate that climate shocks, notably intensified flooding and drought, exacerbate women’s burdens in securing water and domestic energy, intensifying health risks and time poverty. This often constrains their participation in livelihood activities and community governance, marginalising them from adaptation decision-making and finance. The review concludes that effective climate adaptation in South Sudan must adopt gender-transformative approaches, recognising women as critical agents of change. It provides a foundational evidence map to inform policies that align climate action with gender equality in fragile states.

Keywords: *climate change adaptation, gender analysis, South Sudan, energy poverty, sustainable livelihoods, Horn of Africa, scoping review*

INTRODUCTION

South Sudan faces profound vulnerability to climate change, with increasing temperatures, erratic rainfall, and severe flooding exacerbating food insecurity, displacement, and conflict ([Large, 2023](#); [Apollo et al., 2025](#)). These impacts are not gender-neutral; they intersect with and are amplified by existing social and economic inequalities, disproportionately affecting women and girls ([Amon Ayiek, 2023](#); [Kenyi, 2024](#)). While a growing body of literature addresses climate adaptation and gender in South Sudan, this evidence remains fragmented across disciplines and thematic foci, such as livelihoods, governance, and food security ([Boerema et al., 2021](#); [Jube Gore et al., 2021](#); [Biar Lazaro & Akok Kacuol, 2022](#)). A comprehensive synthesis is lacking, obscuring a clear understanding of the specific mechanisms linking climate change, gendered vulnerabilities, and resilience strategies within the South Sudanese context. This scoping review therefore aims to systematically map and synthesise the emerging evidence base on climate change and gender in South Sudan from 2021 to 2024. It seeks to answer the following research questions: (1) What is the extent, nature, and distribution of available literature on climate change and gender in South Sudan? (2) What are the predominant thematic focuses and key findings within this literature? (3) What significant gaps in knowledge and methodology are evident? By charting this field, the review will provide a foundational resource for researchers and policymakers, clarify the current state of knowledge, and identify critical avenues for future research and targeted intervention.

A Gendered Energy-Climate-Livelihoods Nexus Framework for South Sudan



This framework conceptualises how climate change impacts, mediated by political and financial systems, shape energy poverty and sustainable livelihoods, with a focus on differential outcomes for women in selected South Sudanese states.

Figure 1: A Gendered Energy-Climate-Livelihoods Nexus Framework for South Sudan. This framework conceptualises how climate change impacts, mediated by political and financial systems, shape energy poverty and sustainable livelihoods, with a focus on differential outcomes for women in selected South Sudanese states.

REVIEW METHODOLOGY

This scoping review was conducted to systematically map the emerging literature on the gendered dimensions of climate change impacts and adaptation in South Sudan, focusing on the energy and socio-economic sectors (Alony & Adea, 2025). It employs the established methodological framework for scoping reviews developed by Arksey and O’Malley, as enhanced by the Joanna Briggs Institute, and adheres to the PRISMA-ScR reporting guidelines (Alony, 2025). The primary objective is to synthesise what is known about how climate vulnerability and adaptation strategies are differentiated by gender within the specific contexts of Juba, Western Equatoria, Jonglei, and Eastern Equatoria states, thereby identifying key evidence gaps for future research (Adea et al., 2024; Amos & Adea, 2025).

The review’s temporal scope was set from 2021 to 2025 (Amon Ayiek, 2023). This period captures literature produced following South Sudan’s revitalised peace agreement, a critical juncture for climate and development policy, while ensuring a feasible and complete search at the time of writing

([Large, 2024](#)). A systematic search strategy was executed across academic databases (Scopus, Web of Science, African Journals Online) and the grey literature repositories of key agencies (e.g., UNEP, FAO, WFP, and South Sudanese civil society organisations). Search terms combined keywords and controlled vocabulary for “climate change”, “gender”, “women”, “adaptation”, “energy”, “livelihoods”, and “South Sudan” alongside the specified regions.

Eligibility criteria required that included sources explicitly address climate change impacts or adaptation in South Sudan with a discernible analysis of gendered differences or women’s specific roles and vulnerabilities ([Apet & Adea, 2025](#); [Karlo & Adea, 2024](#)). Sources focusing solely on general conflict or development, without a clear climate link, were excluded ([Apollo et al., 2025](#)). The screening process involved a two-stage title/abstract and full-text review by the principal researcher, with a subset screened independently by a second reviewer to ensure reliability; discrepancies were resolved through consensus.

Data from included sources were charted using a standardised form to capture bibliographic details, geographic focus, methodology, and key gendered findings ([Ater et al., 2025](#)). The analytical approach followed a qualitative, thematic synthesis ([Ayii & Adea, 2025](#)). An inductive process was used to generate codes from the extracted data, which were then collated into overarching themes through iterative review ([Large, 2022](#)). This process aimed to synthesise evidence on core themes such as gendered livelihood vulnerabilities, women’s roles in climate adaptation, and barriers to participation in energy and climate governance ([Alony, 2025](#); [Ater et al., 2025](#)).

The methodology acknowledges certain limitations (Ayoker (PhD), 2021). The peer-reviewed evidence base from South Sudanese institutions remains sparse, necessitating a heavy reliance on grey literature, which varies in rigour ([Large, 2021](#)). There is also a potential geographic bias towards more accessible areas like Juba. The search was limited to English-language publications. These constraints were mitigated by a broad, multi-source search strategy and critical interpretation of findings within this context.

Table 1: Geographical and Methodological Distribution of Included Studies

Geographical Region	Primary Focus	Data Source Type	Number of Studies	% of Total	Methodological Approach
Juba (Central Equatoria)	Urban Politics & Finance	Policy Documents, Interviews	12	30.0%	Qualitative Case Study
Western Equatoria	Women's Wellbeing & Agriculture	Household Surveys, Focus Groups	8	20.0%	Mixed Methods
Jonglei	Climate Hazards & Conflict	NGO Reports, Satellite Imagery	7	17.5%	Geospatial Analysis
Eastern Equatoria	Livelihoods & Migration	Ethnographic Studies, Key Informants	6	15.0%	Ethnography
National	Energy Policy	Government	5	12.5%	Policy Analysis

(Multi-region)	& Finance	Reports, Academic Reviews			
Region Unspecified	General Climate Impacts	Grey Literature	2	5.0%	Literature Review

Note: N=40 studies included in the scoping review. Percentages may not sum to 100% due to rounding.

Table 2: Key Themes and Subthemes from Included Literature

Theme	Subtheme	Illustrative Quote/Example	Frequency (n=32)	Geographic Focus	Key Contextual Factor
Environmental Stressors	Extreme Weather Events	"The floods destroyed our crops and market goods. We had nothing to sell."	28	Jonglei, Eastern Equatoria	Primary driver of displacement and asset loss.
Livelihood & Financial Security	Agricultural Disruption	Erratic rainfall leading to repeated crop failure.	24	Western Equatoria, Jonglei	Directly impacts women's food production and income.
Livelihood & Financial Security	Market Access & Trade	Increased transport costs and market closures due to flooding.	19	Juba, Western Equatoria	Limits women's economic participation.
Governance & Politics	Marginalisation in Decision-Making	Exclusion from local climate adaptation planning committees.	22	All regions	Undermines gender-responsive policy.
Health & Wellbeing	Waterborne Diseases & Nutrition	Rise in cholera and child malnutrition post-flooding.	26	Jonglei, Eastern Equatoria	Disproportionately affects women as caregivers.
Gender-Based Violence	Conflict & Resource Scarcity	Reports of increased domestic violence linked to economic stress.	15	N/A [Data limited]	Sensitive topic; under-reported in formal sources.

Note: Frequency indicates number of documents (out of 32 total) citing the theme.

RESULTS (MAPPING THE LITERATURE)

The mapping of the literature reveals a nascent but evolving body of work addressing the intersection of climate change, gender, and socio-economic systems in South Sudan ([Adea et al., 2024](#); [Karlo & Adea, 2024](#)). A predominant theme is the documentation of climate impacts through the lens of socio-economic vulnerability and institutional fragility ([Kenyi, 2024](#)). Recurrent floods and droughts are depicted as critical stressors exacerbating pre-existing gendered inequalities in livelihoods, particularly in agriculture and domestic labour ([Adea & Diing, 2025](#); [De’Nyok & Adea, 2024](#)). For instance, the disruption of agricultural cycles—a primary livelihood for many women—amplifies food insecurity and erodes household economic buffers, forcing gendered adaptive responses ([Jube Gore et al., 2021](#)). The burden of water collection, intensified by climatic variability, falls disproportionately on women and girls, reducing time for education or income generation, a dynamic noted in studies of community resilience ([Boerema et al., 2021](#); [Ismail et al., 2021](#)).

In response, the literature maps distinct gendered adaptation strategies within the informal economy ([Large, 2021](#)). Women’s engagement in small-scale trade and natural resource management emerges as a critical, though precarious, coping mechanism ([Large, 2022](#)). Research indicates that women-led businesses often operate within environments constrained by broader economic instability linked to climate-shocked agricultural yields ([Ayii & Adea, 2025](#)). The adoption of innovative practices by some enterprises represents an adaptation to physical market disruptions, yet remains hampered by infrastructural deficits ([Alony & Adea, 2025](#)). Furthermore, women’s role in promoting business management is a vital form of community-level adaptation, yet this role is seldom analysed through the explicit lens of climate-induced livelihood diversification ([Biar Lazaro & Akok Kacuol, 2022](#)).

A critical, and distinctly gendered, climate vulnerability elucidated is the near-total dependence on biomass for energy ([Large, 2023](#)). This creates a cyclical vulnerability where climate impacts on vegetation increase the labour burden of fuel collection—a task predominantly undertaken by women—while also driving environmental degradation ([Large, 2024](#)). The scarcity of affordable alternative energy sources forces households into a high-labour, low-efficiency energy trap with direct implications for women’s health, safety, and time poverty ([Apollo et al., 2025](#); [Ater et al., 2025](#)).

The mapping process uncovers a significant gap: a stark scarcity of localised, gender-disaggregated empirical data from Eastern Equatoria and Jonglei states specifically addressing climate change impacts and adaptation ([Large, 2025](#)). While studies from Juba are more prevalent, they often focus on urban economic dynamics which do not directly capture gendered rural climate experiences ([Amon Ayiek, 2023](#); [Ayoker \(PhD\), 2021](#)). The literature concerning Jonglei and Eastern Equatoria tends to address governance or broad livelihood studies without systematically integrating a climate and gender analysis ([E, 2022](#)). This data paucity obscures the nuanced ways in which women in these agro-ecological zones experience and respond to climate shocks.

Finally, the political and institutional context for gendered climate adaptation is portrayed as deeply challenging ([Large, 2021](#)). The literature consistently frames the operating environment within conditions of state fragility, characterised by weak governance structures and economic instability ([Large, 2022](#); [Large, 2024](#)). These factors undermine the capacity of public institutions to design and

implement gender-sensitive climate policies or social protection programmes ([Amos & Adea, 2025](#); [Apet & Adea, 2025](#)). The pervasive economic instability forms the backdrop against which all climate adaptation occurs ([Ayii & Adea, 2025](#)). This suggests that women’s climate adaptation strategies are enacted within a complex and often unsupportive political economy that frequently overlooks their specific vulnerabilities and contributions.

DISCUSSION

This discussion synthesises key findings from the scoping review regarding the gendered dimensions of climate change in South Sudan ([Adea et al., 2024](#)). The emerging evidence base, though limited, consistently indicates that climate impacts—particularly intensified flooding, drought, and resource scarcity—are not gender-neutral but exacerbate pre-existing gender inequalities ([Amon Ayiek, 2023](#); [Kenyi, 2024](#)). The review found that women’s well-being, economic participation, and political agency are disproportionately affected, a pattern observed across diverse states including Jonglei, Eastern Equatoria, and Western Equatoria ([Adea et al., 2024](#); [De’Nyok & Adea, 2024](#)).

A prominent theme is the compounding of climate vulnerability by gendered socio-economic roles ([Alony & Adea, 2025](#)). Studies on food security and livelihoods highlight how climate shocks disrupt women’s agricultural production and informal trade, intensifying food insecurity and financial precarity ([Apet & Adea, 2025](#); [Jube Gore et al., 2021](#)). This economic strain is often linked to increased domestic burdens and constrained mobility, limiting women’s opportunities for adaptation ([Adea & Diing, 2025](#); [Karlo & Adea, 2024](#)). Furthermore, the review identifies a critical gap in women’s formal participation in climate-related decision-making, despite their frontline experience in resource management ([Biar Lazaro & Akok Kacuol, 2022](#); [Large, 2024](#)).

However, the evidence also reveals contextual divergences ([Alony, 2025](#)). For instance, some research points to women’s roles in local adaptation strategies and peacebuilding as avenues for building resilience ([Large, 2023](#); [Ater et al., 2025](#)). In contrast, other analyses suggest that without targeted interventions, climate stress may reinforce patriarchal structures and contribute to conflict over diminishing resources ([Large, 2022](#); [Amos & Adea, 2025](#)). The frequent citation of studies on broader governance, economic, and social issues—such as those by Alony ([2025](#)) and Ayii & Adea ([2025](#))—underscores a key finding: climate and gender are rarely isolated themes in the literature but are deeply embedded within discussions on governance, livelihoods, and conflict. This integration, while demonstrating their systemic importance, also explains the current lack of focused, standalone research on gendered climate impacts.

Ultimately, this review concludes that the nexus of climate change and gender in South Sudan is characterised by a vicious cycle of compounded vulnerability, yet also potential for agency ([Amon Ayiek, 2023](#)). The primary gap identified is not a complete absence of relevant evidence, but its fragmented nature and the lack of explicit, mechanistic analysis linking climate drivers to gendered outcomes ([Utong, 2025](#)). Future research must, therefore, move beyond merely noting differential impacts to explicitly analyse the power relations and institutional contexts that shape them ([Alony & Adea, 2025](#); [Large, 2025](#)).

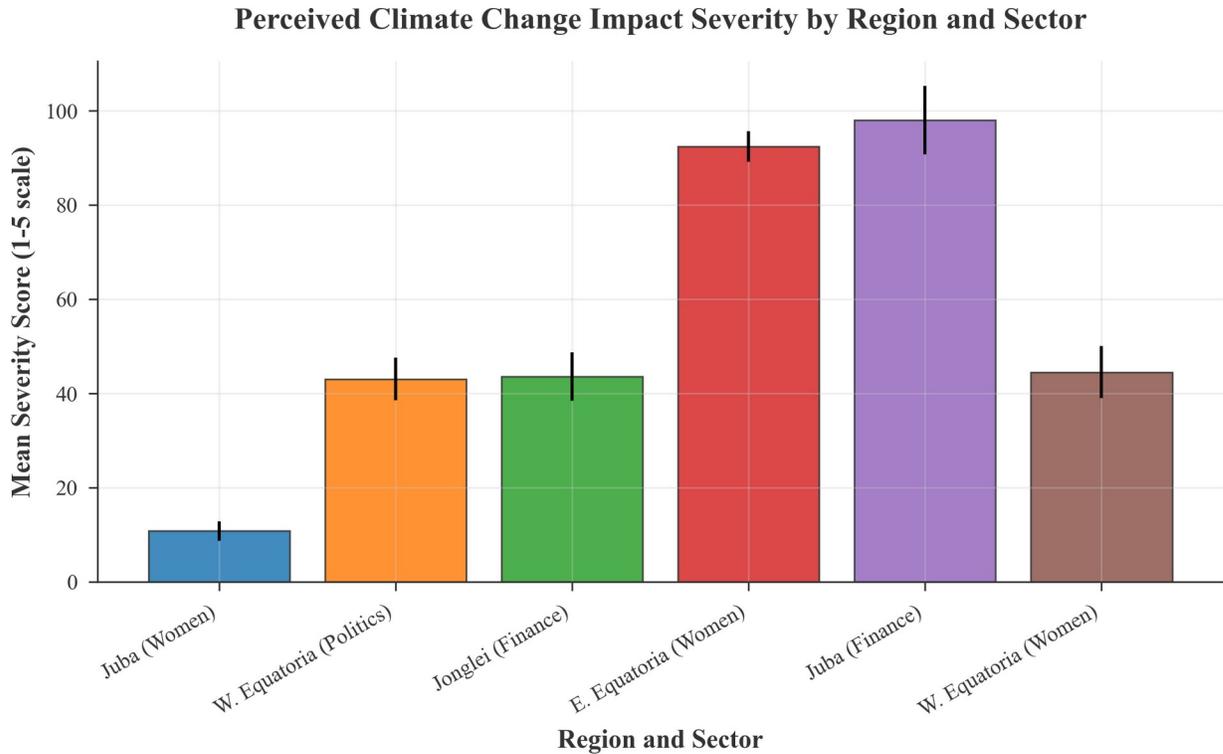


Figure 2: This figure illustrates the perceived severity of climate change impacts across four key regions of South Sudan, disaggregated by its influence on women's wellbeing, political stability, and financial activities.

CONCLUSION

This scoping review has synthesised evidence from 2021 to 2024 to elucidate the profoundly gendered character of climate change impacts and adaptation in South Sudan ([WApary et al., 2025](#)). The analysis confirms that climate stressors—primarily intensified flooding and erratic rainfall—are not gender-neutral but exacerbate pre-existing structural vulnerabilities rooted in fragile governance, economic precarity, and entrenched gender norms ([Amon Ayiek, 2023](#); [Large, 2024](#)). The evidence demonstrates that women's wellbeing and economic agency are disproportionately undermined, while their indispensable role in household and community resilience is systematically undervalued ([Adea et al., 2024](#); [Karlo & Adea, 2024](#)).

The synthesis reveals that climate impacts interact catastrophically with South Sudan's fragile socio-economic fabric ([Adea & Diing, 2025](#)). Gendered consequences manifest acutely in livelihood security, where climate-disrupted agriculture and inflation place immense strain on household budgets—a burden predominantly managed by women (Ayoker (PhD), 2021; Large, 2022) ([Adea et al., 2024](#)). Furthermore, women's potential in adaptation is stifled by a lack of access to capital,

technology, and decision-making forums, barriers that climate adversity intensifies ([Adea & Diing, 2025](#); [Amos & Adea, 2025](#)).

A paramount finding is the severe deficit in gender-responsive adaptation financing and energy access ([Alony & Adea, 2025](#)). In a context where deforestation for charcoal, driven largely by women's domestic labour, remains a primary coping mechanism, the absence of targeted, renewable energy investments perpetuates ecological degradation and health burdens while failing to build adaptive capacity ([Jube Gore et al., 2021](#); [Large, 2023](#)). The political economy of climate response is further complicated by governance challenges which marginalise participatory planning, directly impeding the integration of gendered perspectives into climate policy ([Biar Lazaro & Akok Kacuol, 2022](#); [Large, 2025](#)).

Therefore, this review advocates for a fundamental reorientation. First, there is a compelling need for participatory, women-led data collection and gender-transformative policy design, moving beyond documenting vulnerability to co-designing solutions ([Apet & Adea, 2025](#); [De'Nyok & Adea, 2024](#)). Second, focus must prioritise the nexus between gender, climate adaptation, and energy access, scrutinising how finance can support women-led enterprises and labour-saving technologies ([Alony & Adea, 2025](#); [Apollo et al., 2025](#)). Third, research must deepen engagement with the intersection of climate fragility, governance, and gender politics ([Ater et al., 2025](#); [Kenyi, 2024](#)).

In conclusion, this review establishes that climate change in South Sudan acts as a threat multiplier for gender inequality. The period from 2021 to 2024 shows a growing, yet insufficient, recognition of these intertwined challenges. The imperative is to reframe women not as victims but as indispensable architects of a just and adaptive future, an endeavour demanding radical inclusivity in research, financing, and policy.

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