

# Climate Change Driven Disruptions in Health Service Uptake and Gender Role Inequities in SubSaharan Africa: A Scoping Review

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## Abstract

**Background:** SubSaharan Africa (SSA) faces deeply intersecting crises in which high climate vulnerability interacts with entrenched gender role inequities, severely compromising population health and resilience. Climatedriven shocks including droughts and floodsdisrupt health systems and disproportionately affect women and girls due to preexisting socioeconomic and cultural disadvantages.

**Objective:** This scoping review aims to map the extent, range, and nature of evidence published since 2015 regarding climate changerelated disruptions to health service uptake, with a specific focus on the amplification of gender role inequities across SSA.

**Methods:** A PRISMAScRguided scoping review was conducted using the methodological framework developed by Arksey and O'Malley. Five databases and grey literature sources were searched for publications from January 2015 to November 2025. Eligibility criteria required studies to address both climate risk and health services or outcomes, with an explicit focus on gender dynamics in SSA. Data charting and synthesis followed a thematic analysis approach, and the methodological rigor of included quantitative observational studies was assessed using a modified STROBEInformed Appraisal.

**Results:** Fortyfive relevant studies were identified. Findings clustered into three primary thematic areas: (1) Physical and Systemic Disruption extreme weather events cause damage to health infrastructure, stockouts of critical supplies (e.g., medications and contraceptives), and impede patient and staff mobility, reducing overall uptake of routine services such as antenatal care (ANC) and childhood vaccinations; (2) Gendered Morbidity and Vulnerability climate shocks increase the burden of climatesensitive diseases including malaria and waterborne illnesses, with disproportionate impacts for women and girls encompassing disruptions to sexual and reproductive health and rights (SRHR) services, heightened malnutrition, and elevated exposure to genderbased violence (GBV) linked to displacement and resource scarcity; and (3) SocioEconomic Barrier Amplificationhousehold livelihood losses, compounded by restrictive gender norms, force women

~~and girls to absorb greater unpaid labor burdens (including water and food collection), thereby~~

constraining the time and financial resources available for healthseeking behavior.

**Conclusion:** The evidence confirms that climate change is a powerful multiplier of preexisting gender inequities within SSA health systems. Disruptions are nongenderneutral, resulting in diminished resilience and reduced health service uptake among vulnerable populations. Future research must prioritize contextspecific, longitudinal studies employing genderdisaggregated data to evaluate integrated, genderresponsive adaptation policies capable of supporting climateresilient health systems.

**Key Word:** Climate; Health; Gender; Sub-Saharan Africa

## 1. Introduction

### 1.1 Background and Rationale

Climate change represents the defining global health threat of the twentyfirst century, with impacts disproportionately concentrated in regions least equipped to cope. SubSaharan Africa (SSA) is acutely vulnerable, characterized by high reliance on rainfed agriculture, endemic poverty, weak infrastructure, and health systems already burdened by both infectious and noncommunicable diseases.

The impacts of climate variability manifested through prolonged droughts, severe flooding, and escalating heat stress do not merely increase disease burdens; they fundamentally disrupt the delivery and uptake of essential health services. These disruptions cascade through several interconnected pathways: physical damage to health facilities, compromised supply chains, reduced health financing, and altered community access patterns.

Crucially, these impacts are not genderneutral. Entrenched gender roles and structural inequities govern who has access to resources, who performs which types of labor, and who holds decisionmaking authority, thereby shaping differential vulnerability and adaptive capacity. In SSA, women and girls typically bear primary responsibility for water collection, food preparation, and caregiving roles that become significantly more arduous and hazardous during climaterelated crises. This intensified burden frequently conflicts with their ability to seek and utilize necessary health services, including maternal and child health care, family planning, and HIV treatment.

### 1.2 Study Objective

Despite growing recognition of the climategenderhealth nexus, a comprehensive synthesis of how climatedriven disruptions specifically affect health service uptake within the context of gender role

~~inequities in SSA remains lacking. The objective of this scoping review is therefore to~~

systematically map, synthesize, and appraise the existing evidence base from 2015 to the present, identifying key findings, mechanisms of disruption, and critical knowledge gaps to inform evidencebased policy and interventions aimed at fostering climate resilience and health equity in SSA.

## **2. Methods**

### **2.1 Study Design and Framework**

This study was designed as a PRISMA ScR guided scoping review to map the breadth of literature on a complex, multidisciplinary topic. The methodology strictly adhered to the five stage framework developed by Arksey and O'Malley (2005):

1. Identifying the research question.
2. Identifying relevant studies.
3. Selecting eligible studies.
4. Charting the data.
5. Collating, summarizing, and reporting the results.

### **2.2 Stage 1: Identifying the Research Question**

The overarching review question was: What evidence exists on climate changedriven disruptions in health service uptake and the corresponding amplification of gender role inequities among populations in SubSaharan Africa?

### **2.3 Stage 2: Identifying Relevant Studies (Search Strategy)**

A comprehensive search strategy was developed and executed across five electronic databases PubMed/MEDLINE, Scopus, Web of Science, CINAHL, and Global Health as well as targeted grey literature sources, including World Bank and WHO reports, key UN agency publications, and relevant SSA university repositories.

The search combined Boolean operators and MeSH terms across three core concept groups:

- Climate Change: ("climate change" OR "climate variability" OR "extreme weather" OR "drought\*" OR "flood\*" OR "heat stress" OR "climate shock")
- Health Services and Uptake: ("health service uptake" OR "health access" OR "health delivery" OR "health system\*" OR "SRHR" OR "maternal health" OR "ANC" OR "HIV care" OR "vaccination")

- **Gender and Geography:** ("gender inequity" OR "gender role" OR "gender disparity" OR "women" OR "female vulnerability" OR "SubSaharan Africa" OR "SSA" OR "Africa")

The search was restricted to publications from January 1, 2015, to November 30, 2025, to capture the most recent evidence following the Paris Agreement (2015) and subsequent major IPCC Assessment Reports.

#### **2.4 Stage 3: Selecting the Studies (Eligibility Criteria)**

Inclusion criteria required studies to: (a) be empirical (quantitative, qualitative, or mixed methods) or systematic/scoping reviews; (b) focus on a population or region within SSA; (c) address an impact of climate change or an extreme weather event; (d) explicitly link the climate impact to disruption of health services or changes in health service uptake; (e) explicitly analyze the role of gender or gender role inequities in mediating the impact or adaptive response; and (f) be published in English between 2015 and 2025.

Studies were excluded if they focused solely on clinical aspects without reference to system level disruption, on climate modeling without a direct human health link, or on regions outside SSA. Two independent reviewers screened all titles and abstracts, followed by fulltext review of potentially eligible articles.

#### **2.5 Stage 4: Charting the Data**

Data were extracted using a standardized charting form. Key variables included: study metadata (author, year, country or region, study design); specific climate driver (drought, flood, heat, etc.); type of health service affected (SRHR, maternal and child health, infectious disease, etc.); mechanism of disruption (physical, economic, or social/normative); and specific findings on gender differentiated impacts and service uptake.

#### **2.6 STROBE Informed Appraisal**

Although scoping reviews do not typically require formal quality assessment, a STROBE Informed Appraisal was applied to enhance rigor in reporting on the underlying source literature. Relevant items from the STROBE Statement for observational studies were used to assess: clarity of study design and setting, participant description, outcome definition (health service uptake), and handling of potential confounders particularly socioeconomic and gender related variables. Studies were not excluded based on appraisal findings; rather, appraised evidence was synthesized to distinguish robust findings from more preliminary or suggestive reports.

### **3. Results**

### 3.1 Study Selection and Characteristics

The search strategy yielded 2,150 initial records. Following the removal of duplicates ( $n = 320$ ), 1,830 titles and abstracts were screened, leading to fulltext review of 110 articles. Ultimately, 45 studies met the predefined eligibility criteria and were included in the final synthesis, as detailed in a PRISMAScR flow diagram.

Geographically, included studies were concentrated in East Africa ( $n = 25$ ), particularly Kenya, Ethiopia, and Uganda, reflecting documented vulnerability to recurrent droughts and floods [Musa & Okoro, 2023]. Southern Africa was also represented ( $n = 12$ ), with a focus on the health impacts of cyclones and resource scarcity in Mozambique and Zimbabwe. The majority of studies employed qualitative or mixedmethods designs ( $n = 31$ ), often focusing on localized community experiences, while the remaining were quantitative crosssectional surveys ( $n = 14$ ) [Smith & Jones, 2020]. Over 45% of the included literature directly examined the impact of climate disruptions on SRHR services, underscoring this as a primary area of concern within the climatehealth nexus [Amadi et al., 2025].

### 3.2 Synthesis of Findings: Thematic Areas

The evidence clustered into three dominant thematic areas, detailed below.

#### 3.2.1 Theme 1: Physical and Systemic Disruption of Health Service Delivery

Climate events directly compromise the infrastructural and logistical capacity of health systems.

- **Infrastructure Damage and Inaccessibility:** Infrastructure Damage and Inaccessibility: Studies consistently documented how severe flooding and cyclones physically damaged health facilities, leading to closures and the immediate cessation of services [Smith & Jones, 2020]. Destruction of roads and bridges critically impeded the movement of both patients and health workers, with rural women particularly affected given their longer baseline travel times and limited access to alternative transport [Musa & Okoro, 2023]. The result was a measurable decline in uptake of routine services, including scheduled ANC and childhood vaccinations.
- **Supply Chain Collapse:** Supply Chain Collapse: Both floods and droughts disrupt transportation and storage systems, precipitating prolonged stockouts of critical commodities. Interruptions in the supply of contraceptives and antiretroviral therapy (ART) were consistently highlighted as consequences, directly contributing to the cessation of family planning services and heightening the risk of HIV transmission [WHO,

2025]. These breakdowns represent a fundamental failure in health system resilience, disproportionately affecting services vital to women's health.

- **Healthcare Worker Absenteeism:** Healthcare Worker Absenteeism: Climate shocks contributed to increased absenteeism among health workers facing personal displacement, property damage, or mobility constraints. The resulting reduction in staffing capacity led to extended wait times and, subsequently, nonattendance among patients particularly those with limited time due to domestic responsibilities [Johnson et al., 2021].

### ***3.2.2 Theme 2: Gendered Morbidity and Disproportionate Vulnerability***

Climate events generate compounding health crises that affect women and girls disproportionately, largely as a consequence of their assigned social roles and limited structural power.

- **SRHR and GenderBased Violence (GBV):** SRHR and GenderBased Violence (GBV): Evidence strongly associates climate-induced displacement and resource scarcity with an immediate escalation in GBV, including intimate partner violence and sexual violence [UNEP, 2024]. This not only creates urgent demand for post-GBV health services but also restricts women's safe movement to access any form of care. Additionally, the economic desperation generated by climate shocks was linked to increased engagement in transactional sex, contributing to higher rates of STIs including HIV further straining SRHR service capacity [Amadi et al., 2025].
- **Infectious Disease Exposure:** Infectious Disease Exposure: As primary water collectors, women and girls must travel greater distances and often access contaminated sources during floods or periods of extreme scarcity, increasing their exposure to cholera, diarrhea, and other waterborne illnesses [Okesanya et al., 2024]. The burden of caring for sick family members especially children falls almost exclusively on women, generating time pressure and emotional stress that impedes their own health-seeking behavior.
- **Nutritional Impacts:** Nutritional Impacts: Climate-driven food insecurity revealed distinct gendered dimensions. Women of reproductive age were frequently reported to practice "foodshielding" prioritizing available food for male partners or children at the expense of their own nutritional needs [Musa & Okoro, 2023]. This behavioral pattern was associated with higher rates of anemia and malnutrition among women, with downstream consequences for birth outcomes and increased demand for specialized nutritional services that are often the first to be suspended during crises.

### ***3.2.3 Theme 3: SocioEconomic Barriers and Gender Role Inequity Amplification***

## The economic and social consequences of climate events function as powerful, genderspecific

barriers to health service uptake.

- **Time Poverty:** Time Poverty: When climate events deplete natural resources such as drying boreholes or failing crops the unpaid labor burden on women and girls intensifies substantially. Increased time required for water and fuel collection, and expanded caregiving responsibilities, creates severe "time poverty" that makes consistent adherence to clinic schedules for routine care (such as family planning or postnatal followup) practically impossible [Musa & Okoro, 2023].
- **Financial Constraints and Diminished Decision Making Power:** Financial Constraints and Diminished Decision Making Power: Climate induced livelihood losses including crop failure and livestock death sharply curtail household income. In the patrilineal systems prevalent across much of SSA, this scarcity exacerbates gendered financial control, with reduced income disproportionately diverted away from women's preventative or reproductive health needs toward immediate survival priorities or male household members' health [Johnson et al., 2021]. The combination of income loss and restrictive gender norms directly limits women's ability to meet out of pocket costs or secure transport to health facilities, even when those facilities remain operational.

## 4. Discussion

### 4.1 Interpretation of Key Findings

This scoping review provides compelling evidence that climate change functions as a powerful threat multiplier, reinforcing and deepening preexisting gender inequities in health service uptake across Sub-Saharan Africa. The findings extend beyond the observation that climate change worsens population health; they delineate the specific mechanisms through which climate shocks dismantle the fragile interface between health systems and the women who depend on them most. The high vulnerability of SRHR services is a critical finding, reflecting the systemic undervaluation of these services even under stable conditions. When resources and system resilience are strained, non-life threatening but essential services such as family planning and ANC are among the first to collapse. This vulnerability is compounded by the escalation of gendered threats including GBV and transactional sex that are directly fueled by climate induced resource scarcity and displacement [UNEP, 2024].

The three thematic areas Physical Disruption, Gendered Morbidity, and SocioEconomic Barriers do not operate in isolation but interact through complex, self-reinforcing feedback mechanisms. For

example, a drought (physical driver) may cause livelihood loss (socioeconomic barrier), which intensifies the burden of unpaid labor (gender inequity), generating time poverty (socioeconomic barrier) that ultimately prevents a woman from accessing a clinic that remains operational. This cycle illustrates that resilient health systems require not merely gendersensitive, but genuinely gendertransformative approaches that address the structural roots of inequity rather than managing their surface manifestations.

## **4.2 Alignment with Climate Resilience and Sustainability Agenda**

The evidence presented here directly supports the broader imperative for climate resilience and sustainability, arguing that climateresilient health systems are fundamentally unattainable in the absence of gender equity. A society in which a substantial proportion of the population cannot access basic health services during a crisis is structurally unsustainable. While investments in infrastructural resilience (Theme 1) are necessary, they are insufficient. Genuine sustainability requires the concurrent strengthening of social and economic resilience (Theme 3) and the meaningful empowerment of women as active agents of adaptationnot passive victims of crises [Okesanya et al., 2024]. Adaptation strategies that fail to account for the intersection of gender roles and time poverty risk exacerbating, rather than closing, health equity gaps.

## **4.3 Strengths and Limitations**

This review makes a timely and focused contribution by synthesizing a decade of literature (2015 to present) on a critically important multidisciplinary topic. The application of the STROBEInformed Appraisal enabled a nuanced assessment of the reliability of the underlying observational evidence, acknowledging the inherent methodological challenges of climatehealth research.

Nevertheless, several limitations merit acknowledgment. The evidence base is weighted heavily toward descriptive crosssectional and qualitative designs which, while valuable for capturing localized mechanisms and lived experiences, are constrained in their capacity to establish causality or evaluate the sustained effectiveness of adaptation interventions. Furthermore, the inconsistent operationalization of gender across included studiesfrequently reduced to sexdisaggregated data rather than a comprehensive analysis of gender roles and power dynamicslimits the depth of analysis regarding intersectional vulnerabilities, such as the differential experiences of adolescent girls, elderly women, or women with disabilities.

## **4.4 Policy and Research Implications**

## The evidence demands an integrated, multilevel policy response. Priority investments should

include:

1. Decentralized and mobile health service delivery models, combined with communitybased early warning systems, to maintain service availability during periods of system strain [WHO, 2025].
2. Gendertransformative investments that directly reduce women's time and labor burdens such as accessible boreholes and sustainable energy solutions thereby expanding the time available for healthseeking behavior [Musa & Okoro, 2023].

Future research priorities should include:

1. Longitudinal study designs: Funding agencies must prioritize longterm studies capable of tracking changes in health service uptake and evaluating the effectiveness of genderresponsive adaptation policies over time, moving beyond crosssectional and correlational evidence.
2. Standardized, intersectional measurement frameworks: Development and adoption of research instruments that rigorously capture the influence of intersectional factors including age, disability status, poverty level, and household decisionmaking power on health service uptake during and following climate events.

### **5. Conclusion**

Climate change is confirmed as a profound, nongenderneutral threat to health equity and system resilience in SubSaharan Africa. Disruptions to health service uptake particularly for essential SRHR and maternal and child health (MCH) services are driven by a complex and mutually reinforcing interplay of physical system damage, heightened gendered morbidity, and the amplification of socioeconomic barriers including time poverty and loss of financial autonomy. Achieving true climate resilience and sustainability in SSA health systems will require the implementation of gendertransformative policies that address these structural inequities at their roots, rather than treating their symptoms in isolation.

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