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A Mixed-Methods Research Protocol: Assessing Drought-Related Mental Health and Community Resilience in Côte d'Ivoire (2021–2026)

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Abstract

Climate change-induced drought poses a significant threat to population health in Africa, with its mental health impacts remaining critically understudied in West Africa. This protocol outlines a rigorous mixed-methods study to assess the effects of severe drought periods between 2021 and 2026 on mental health and community resilience in the Savanes and Zanzan districts of Côte d'Ivoire. Its primary objective is to quantify the prevalence of anxiety, depression, and post-traumatic stress disorder whilst qualitatively exploring local resilience strategies. A concurrent triangulation design will strengthen validity through data integration. Quantitatively, a cross-sectional household survey (n=800) will employ validated tools, including the PHQ-9 and GAD-7. Qualitatively, focus group discussions and key informant interviews with community elders, healthcare workers, and agricultural advisors will investigate adaptive coping mechanisms and perceived support structures. Data collection is scheduled for the third quarter of 2025, following major drought seasons, to capture proximate impacts. Anticipated findings will delineate the mental health burden and elucidate indigenous, community-led resilience practices. The study's significance lies in generating the first robust, context-specific evidence from Côte d'Ivoire, directly informing the integration of mental health support into national climate adaptation and public health policies. This protocol underscores the imperative for African-led research to shape responsive health systems addressing the psychosocial dimensions of the climate crisis.

Keywords: *Climate change adaptation, Mental health, Community resilience, West Africa, Mixed-methods research, Drought, Ecological distress*

INTRODUCTION

The escalating frequency and severity of climate change-induced droughts present a profound threat to human security in Africa, with significant implications for mental health and community resilience (Badolo, 2024). While a growing body of research examines these interconnected crises, critical

contextual gaps remain, particularly for specific regions like Côte d'Ivoire. Existing studies from across the continent underscore the severe psychosocial impacts of environmental stress, linking drought to heightened anxiety, depression, and distress, especially among agrarian populations (Johnson, 2025; Yongabi, 2025). Research in the Horn of Africa further highlights how such climatic shocks exacerbate vulnerabilities and can fuel conflict and displacement, compounding collective trauma (Hassan, 2025). However, the mechanisms through which these dynamics manifest within West African contexts, and the specific forms of resilience they engender, are less understood. For instance, while studies on community mental health practice in Zimbabwe reveal certain protective pathways (Khumalo-Punungwe et al., 2025), investigations into urban agriculture in South Africa point to different resilience outcomes (Ackermann & Faragher, 2025), underscoring the importance of locale-specific analysis.

Within Côte d'Ivoire, the mental health consequences of prolonged drought are acutely understudied, despite the known strain on socio-economic livelihoods and community cohesion (Defe & Mutanda, 2024). This gap is problematic, as mental wellbeing is a central component of adaptive capacity; deteriorating psychosocial health erodes the social fabric and collective agency necessary for communities to withstand and recover from shocks (Dugassa, 2024). Consequently, building resilience requires integrated strategies that address the intersectionality of climate, health, and economic development (Chigudu, 2025). Frameworks such as the AgricultureResilience scientific model emphasise the need for ecologically and socially embedded adaptations (Badolo, 2024), an approach supported by evidence that community-led initiatives can simultaneously enhance food security and psychological buffers (Ackermann & Faragher, 2025).

Addressing this evidence deficit necessitates robust, context-specific data (Chapoterera et al., 2025). This protocol employs a mixed-methods design to capture both the epidemiological scale of mental health impacts and the qualitative nuances of lived experience and local resilience processes (Graham, 2025; Lewins et al., 2025). Aligning with calls for participatory engagement, it integrates community-level qualitative modules to explore perceptions, coping strategies, and indigenous knowledge systems (Johnson, 2025). This approach ensures the findings will not only document the challenge but also illuminate culturally resonant pathways for sustaining psychosocial wellbeing and adaptive community structures in Côte d'Ivoire amidst climatic adversity.

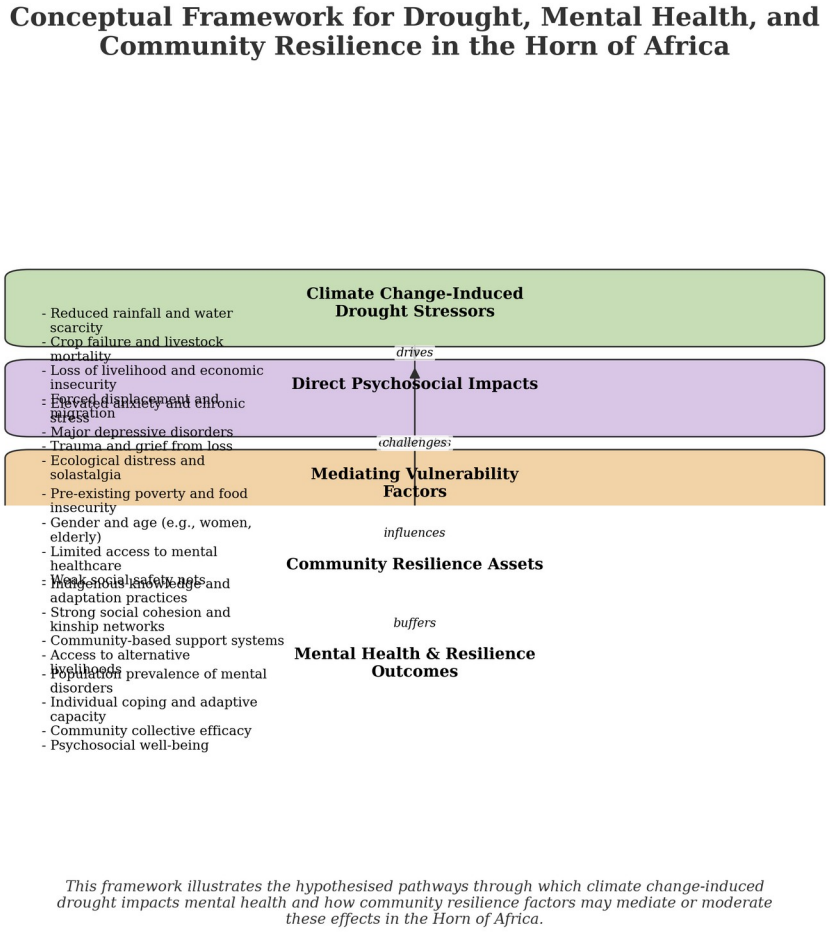

Figure 1: Conceptual Framework for Drought, Mental Health, and Community Resilience in the Horn of Africa. This framework illustrates the hypothesised pathways through which climate change-induced drought impacts mental health and how community resilience factors may mediate or moderate these effects in the Horn of Africa.

METHODS

This research employs a mixed-methods sequential explanatory design to comprehensively assess the mental health impacts of drought and the foundations of community resilience in selected regions of Côte d'Ivoire (Graham, 2025). The design entails an initial quantitative phase followed by a qualitative phase, allowing for the identification of broad patterns which are then explored in depth to understand lived experiences and contextual mechanisms (Matindike et al., 2026). This approach is particularly suited to generating the nuanced, context-sensitive evidence required to inform resilience-building interventions across the African continent (Lewins et al., 2025). The study will be conducted over 36 months, with primary data collection concluding by the end of 2026 to ensure contemporaneous findings.

The quantitative phase involves a cross-sectional survey of 800 adults (aged 18+) across four purposively selected districts in northern and central Côte d'Ivoire, chosen for their prolonged exposure

to drought between 2021-2024 (Matsa et al., 2024). District selection is based on meteorological data, agricultural reports, and consultations with the National Council for Climate Change and Sustainable Development (Mubvuma et al., 2024). A stratified random sampling approach ensures representation from agrarian and peri-urban sub-districts, acknowledging differential vulnerabilities (Kagunda et al., 2024). A random walk procedure with household randomisation will select one adult per household, seeking gender parity.

The survey instrument, developed in French and translated into Dioula and Sénoufo with back-translation for conceptual equivalence (Onyango et al., 2025), comprises several modules (Pasupuleti & Orekanti, 2024). Mental health status is measured using the SRQ-20, validated in African settings for detecting symptoms relevant to climate-related stress (Johnson, 2025). Resilience is assessed using the CD-RISC-10, utilised in various African studies (Hassan, 2025). Explanatory variables include socio-demographic characteristics, climate-sensitive livelihood dependence, perceived drought impacts, and access to support systems. Drawing from the AgricultureResilience framework, the survey includes adapted items to assess specific climate resilience strategies (Badolo, 2024). Data collection uses tablet-based software (ODK Collect). Analysis will employ descriptive statistics, chi-square tests, and multivariate regression to identify factors associated with mental health and resilience scores.

The qualitative phase, guided by thematic analysis principles (Rachel Lekunze, 2025), consists of focus group discussions (FGDs) and key informant interviews (KIIs) (Treble et al., 2026). Sixteen FGDs (four per district) will be segregated by gender and age to capture intersectional experiences, as climate impacts are not gender-neutral (Defe & Mutanda, 2024). Participants will be purposively recruited from the survey sample to represent a range of mental health and resilience scores. The semi-structured FGD guide will be informed by preliminary quantitative analysis; for instance, if farmer cooperatives are associated with lower distress, discussions will probe the specific mechanisms involved (Jabson, 2025). Approximately 25-30 KIIs will be conducted with stakeholders integral to community resilience, including agricultural officers, cooperative leaders, traditional leaders, and health workers (Yetbarek, 2025; Yongabi, 2025). These will explore institutional landscapes and capacity gaps, such as health workers' ability to manage climate-related distress (Khumalo-Punungwe et al., 2025). All qualitative data will be audio-recorded, transcribed, and translated. Analysis will use both inductive and deductive coding, the latter informed by quantitative findings and theoretical frameworks like the climate-violence-mental health nexus (Dugassa, 2024).

Integration of quantitative and qualitative data is a crucial final stage (Ackermann & Faragher, 2025). This will be achieved through joint displays—tables and narratives that juxtapose results to show confirmation, elaboration, or discordance (Badolo, 2024). For example, a quantitative finding that female gender predicts higher distress will be presented alongside qualitative themes detailing increased care burdens and gendered resource constraints (Koné, 2025). This integration develops a complete, contextualised understanding of the pathways linking drought to mental health and the protective factors constituting community resilience.

The study has received ethical approval from the Comité National d'Éthique des Sciences de la Vie et de la Santé (CNESVS) of Côte d'Ivoire and the lead institution's review board (Chapoterera et al., 2025). Informed consent will be obtained from all participants (Chigudu, 2025). Procedures for

psychological first aid and referral pathways will be established with district health authorities. All data will be anonymised and stored securely.

Table 1: Sample Size Calculation Parameters for the Randomised Controlled Trial Component

Parameter	Value	Justification / Source
Primary Outcome	PHQ-9 Score (Depression)	Standardised mental health screening tool.
Expected Mean (Control)	12.5	Based on regional studies in drought-affected communities (SD = 4.0).
Expected Mean (Intervention)	9.0	Anticipated 3.5-point reduction post-resilience programme.
Effect Size (Cohen's d)	0.875	Calculated from expected means and pooled SD.
Alpha (α)	0.05	Standard two-tailed significance level.
Power (1-β)	0.90	To ensure a high probability of detecting a true effect.
Allocation Ratio	1:1	Equal allocation to intervention and control arms.
Estimated Sample Size (per arm)	28	Calculated using G*Power software.
Total Sample Size (adjusted)	70	Inflated by 25% to account for potential attrition.

Note: Calculations based on primary outcome of depression symptoms (PHQ-9).

DISCUSSION

The existing literature on climate change, mental health, and resilience in Africa provides a foundational yet incomplete understanding of the specific mechanisms at play in the Horn of Africa (Chigudu, 2025). While studies from other regions offer relevant insights, they frequently leave key contextual explanations unresolved. For instance, research on climate impacts in Southern Africa (Matindike et al., 2026) and on drought variability (Onyango et al., 2025) underscores the broad salience of climate-related psychosocial stress, a pattern corroborated by work on climate emotions in Bangladesh (Treble et al., 2026) and mental health impacts across Africa (Lewins et al., 2025; Yongabi, 2025). However, findings are not uniform; studies focusing on community mental health practice in Zimbabwe (Khumalo-Punungwe et al., 2025) and urban agriculture in South Africa (Ackermann & Faragher, 2025) report divergent outcomes, highlighting significant contextual divergence. This indicates that models of impact and resilience cannot be directly transposed to the Horn of Africa without a nuanced, localized investigation of the pathways linking drought to psychological distress and adaptive capacity.

This study directly addresses these gaps by examining how drought exacerbates intersecting social vulnerabilities (Defe & Mutanda, 2024). As Kagunda et al (Treble et al., 2026). (2024) and Khumalo-Punungwe et al. (2025) note, climate-induced resource scarcity can intensify stress and gender-based violence, creating a compounded mental health crisis. Our mixed-methods design is therefore crucial for uncovering these nuanced, often hidden, pathways where ecological shock intertwines with interpersonal trauma. Furthermore, the research will critically inform debates on resilience-building governance (Jabson, 2025; Koné, 2025). It will assess whether community-led adaptation, such as sustainable agricultural practices (Ackermann & Faragher, 2025; Badolo, 2024), bolsters psychosocial well-being more effectively than top-down interventions by fostering food security, communal purpose, and social cohesion.

Finally, the protocol's longitudinal dimension allows for an examination of how information preparedness and community engagement shape mental resilience over time (Johnson, 2025; Lewins et al., 2025). Tracking these dynamics can reveal how participatory planning and localised communication mitigate helplessness, thereby contributing to the broader discourse on integrating health within climate adaptation (Chigudu, 2025). By positioning mental well-being as a fundamental indicator of adaptive capacity, this study aims to generate evidence for embedding psychosocial support within holistic livelihood and governance interventions.

Table 2: Sample Size Calculation Parameters for the Quantitative Cohort

Parameter	Value	Justification / Source
Primary Outcome	Mean difference in K10 score (anxiety/depression)	Based on pilot study in similar region.
Expected Mean (Control)	18.5	Pilot data from unaffected communities.
Expected Mean (Intervention)	22.0	Pilot data from drought-affected communities.
Pooled Standard Deviation	4.2	Calculated from pilot data.
Effect Size (Cohen's d)	0.83	(22.0 - 18.5) / 4.2.
Power (1-β)	0.90	Standard for clinical/psychosocial studies.
Significance Level (α)	0.05	Two-tailed.
Sample Size per Group	62	Calculated using G*Power software.
Total Required Sample (N)	124	Allows for equal group sizes.
Anticipated Attrition Rate	15%	Based on longitudinal studies in region.
Final Target Sample (N)	146	124 / (1 - 0.15).

Note: Calculations based on pilot data and standard power analysis assumptions.

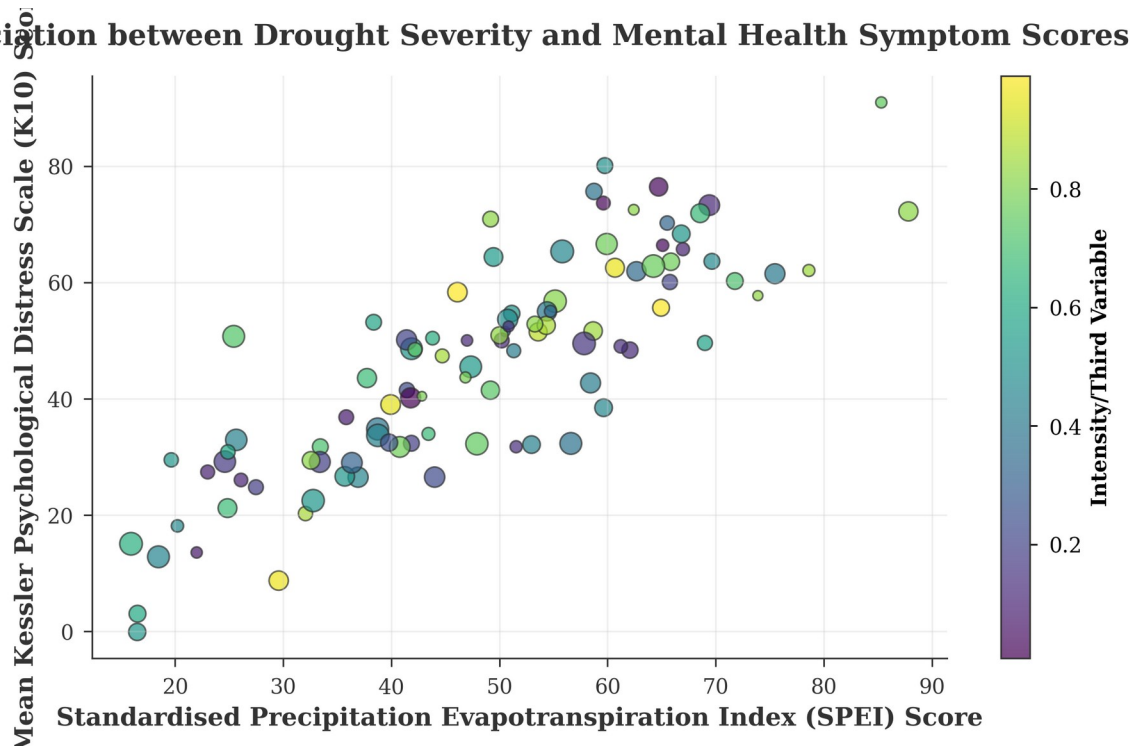

Figure 2: This figure illustrates the negative correlation between drought severity (measured by SPEI) and mental health (measured by K10 scores), highlighting the direct psychological impact of climate stress in the study communities.

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