

CLIMATE-DRIVEN RISK AND POLITICAL FRAGILITY IN SOUTH-EAST NIGERIA

OSMOND SUNDAY OBOKE¹ & PATRICIA OGONNAYA UKPAI²

¹DEPARTMENT OF POLITICAL SCIENCE & ²DEPARTMENT OF BIOLOGY,

EBONYI STATE COLLEGE OF EDUCATION, IKWO

osmondsunnys@yahoo.com

Abstract

Climate change is reshaping ecological systems and public health worldwide, with South-East Nigeria particularly vulnerable due to rapid deforestation, flooding, and fragile governance. These pressures increase disease risks, strain weak health infrastructures, and erode public trust. A sequential mixed-methods design was applied across Abia, Ebonyi, and Enugu States. Data included climate records, land-use indices, disease surveillance, and governance indicators. Household surveys ($n = 360$), focus groups ($n = 9$), and key informant interviews ($n = 12$) were analyzed using SPSS and NVIVO to explore links between environmental change, illness, and political fragility. Over half of households (58.1%) reported a climate-sensitive illness in the past year, mainly malaria (62.2%). Living near deforestation/mining doubled illness odds ($OR = 2.18$), while flooding increased odds by 89%. Illness experience reduced trust in government ($B = -0.42$), though perceived effective response increased it (+0.55). Findings confirm that ecological disruption heightens disease risk and weakens institutional legitimacy. Community coping exists but is strained, and awareness of environment-disease links is low. Integrated One-Health surveillance, environmental safeguards, and transparent outbreak responses are critical to protect health and sustain governance resilience in South-East Nigeria.

Keywords: Climate Change, Political Fragility, Zoonotic Diseases, One Health, South-East Nigeria

INTRODUCTION

Background to the Study

Climate change has emerged as one of the defining challenges of the 21st century, reshaping ecological processes, threatening human health, and undermining governance systems across the globe (Rawat et al., 2024). Its effects are no longer abstract projections but lived realities, particularly in regions where environmental degradation converges with weak institutional frameworks and fragile health infrastructures. Across Africa, climate variability has been linked to declining agricultural productivity, increased food insecurity, the spread of vector-borne and zoonotic diseases, and heightened risks of conflict. Nigeria, as Africa's most

populous country, exemplifies these vulnerabilities, and the South-East region has become a focal point where environmental stressors and political fragility intersect.

In South-East Nigeria, rapid deforestation, land-use conversion, and poorly regulated urban and industrial expansion have intensified ecological disruption (Mafiana et al., 2022; Ojeyinka et al., 2024). These processes have contributed to widespread habitat fragmentation and biodiversity decline, eroding ecosystem resilience and altering long-established patterns of human–environment interaction. As natural habitats shrink and wildlife populations are displaced, humans are brought into closer contact with animal species, creating ideal conditions for zoonotic spillover events in which pathogens cross from animals to humans (Agyarko et al., 2025). The risk is further compounded by inadequate surveillance systems, weak environmental management policies, and the absence of coordinated disease preparedness frameworks. These realities render the region especially vulnerable to outbreaks of emerging infectious diseases.

The consequences of zoonotic disease outbreaks in such fragile contexts extend far beyond public health. In South-East Nigeria, where healthcare systems are already under-resourced, even small-scale outbreaks can overwhelm capacity, leading to delayed response, high mortality, and long-term health burdens for affected populations. Beyond their immediate health impact, these crises disrupt local economies by reducing productivity, undermining livelihoods, and exacerbating poverty. At the political level, recurring outbreaks expose systemic governance weaknesses and reduce public confidence in state institutions responsible for managing crises. In a region already marked by insecurity, socio-political tensions, and economic marginalization, climate-sensitive health shocks can function as “threat multipliers” that magnify grievances, trigger social unrest, and further weaken fragile political structures (Erondu et al., 2025).

While there is growing global recognition of the interconnections between climate change, health, and governance, empirical research in Nigeria remains fragmented. Existing studies tend to approach these phenomena in isolation, framing climate change primarily as an environmental issue, zoonoses as biomedical concerns, and political instability as a socio-political or economic problem. Such compartmentalization overlooks the feedback loops through which environmental degradation accelerates health risks, health crises erode governance legitimacy, and political fragility undermines effective responses to climate and health challenges. This siloed perspective limits our ability to develop integrated, evidence-

based strategies capable of addressing the compounded risks facing South-East Nigeria. The inadequacy of region-specific, multidisciplinary research constitutes a critical knowledge gap, particularly as the region experiences the convergence of ecological stress, heightened zoonotic risks, and fragile governance with increasing intensity (Femi, 2020; Okon et al., 2021).

This study responds to that gap by adopting a multidisciplinary perspective that brings together environmental science, epidemiology, and political analysis to examine the nexus between climate change and political fragility in South-East Nigeria. Focusing on Abia, Ebonyi, and Enugu states, the research investigates the ways in which climate-induced habitat loss and land-use changes contribute to disease emergence, and how outbreaks influence public trust, social cohesion, and political stability. It also evaluates the adequacy of current policy responses, emergency frameworks, and institutional capacities for managing these interconnected risks. Furthermore, the study aims to develop and validate predictive models that integrate environmental, health, and political indicators to forecast the likelihood of future outbreaks and their socio-political consequences.

By embedding these objectives into a single analytical framework, the research provides a comprehensive understanding of how climate-driven risks interact with fragile governance systems in South-East Nigeria. The findings are expected to inform the development of actionable, evidence-based strategies that strengthen public health preparedness, enhance governance resilience, and promote sustainable adaptation.

Justification of the Study

The accelerating ecological disruption in South-East Nigeria manifested through rapid deforestation, land-use change and more frequent flooding has created conditions that increase human contact with wildlife and disease vectors, heightening the risk of climate-sensitive and zoonotic infections. Preliminary data from the region underscore this urgency (for example, a high household burden of climate-sensitive illness and elevated odds of illness near deforested/mined areas), but causal pathways, spatial hotspots and the specific environmental drivers remain insufficiently mapped. Rigorous, mixed-methods investigation is therefore required to clarify how these environmental processes translate into disease emergence and spread across Abia, Ebonyi and Enugu States.

Equally important is a focused assessment of the socio-political consequences of these health shocks. Early findings indicate that illness experience can erode public trust in government while timely and effective responses can restore confidence. Understanding how climate-sensitive outbreaks affect social cohesion, perceptions of legitimacy, and political fragility will help anticipate threat-multiplying dynamics and inform interventions designed to protect both public health and institutional stability.

Finally, the region's weak surveillance systems, limited environmental regulation and under-resourced emergency response capacities constrain timely detection and control of emerging threats. Evaluating the adequacy and responsiveness of existing surveillance, environmental management and governance mechanisms will identify operational gaps and practical entry points for integrated One-Health interventions. By generating region-specific evidence and developing predictive models that link environmental, health and political indicators, this study will produce actionable recommendations to strengthen preparedness, enhance governance resilience, and support sustainable adaptation across South-East Nigeria.

Statement of the Problem

South-East Nigeria is experiencing accelerating ecological disruption driven by deforestation, land-use change and more frequent flooding that brings humans into closer contact with wildlife and vectors, increasing the risk of climate-sensitive and zoonotic disease emergence. These health risks occur within contexts of weak environmental regulation, under-resourced health surveillance and emergency response systems, and low public confidence in state institutions, all of which limit early detection, control and community protection. Recurrent health shocks therefore have the potential not only to worsen morbidity and livelihoods, but also to undermine social cohesion and deepen political fragility. Despite these interlinked risks, empirical research in the region remains fragmented and largely disciplinary, leaving a critical gap in integrated, region-specific evidence and predictive tools that link environmental change, disease emergence and governance outcomes to guide coherent One-Health and policy responses.

Purpose of the Study

The following purposes guided the study:

1. Investigate how climate-driven environmental changes (deforestation, land-use change, flooding) influence the emergence and spread of climate-sensitive and zoonotic diseases in Abia, Ebonyi, and Enugu States.
2. Assess the impacts of these climate-sensitive health shocks on public trust, social cohesion, and political fragility in South-East Nigeria.
3. Evaluate the adequacy and responsiveness of existing surveillance, environmental management, and governance mechanisms for detecting and managing outbreaks.

Research Questions

The following research questions guided the study:

1. How does deforestation, land-use change, and flooding influence the emergence and spread of climate-sensitive and zoonotic diseases in Abia, Ebonyi and Enugu States?
2. How do these climate-sensitive health shocks affect public trust, social cohesion, and political stability in South-East Nigeria?
3. How adequate and responsive are current surveillance, environmental management, and governance systems for detecting and managing outbreaks in the study states?

Scope of the Study

This study is limited to Abia, Ebonyi and Enugu states in South-East Nigeria and examines the nexus between climate-driven environmental change and political fragility. It uses a sequential mixed-methods design combining analysis of climate records, land-use indices, disease surveillance and governance indicators with primary data (household surveys, focus-group discussions and key-informant interviews).

RESEARCH METHODOLOGY

Study Design

A sequential mixed-methods design will be used. Phase 1 (exploratory) maps environmental vulnerabilities and stakeholder priorities; Phase 2 collects quantitative and qualitative data,

Study Area and Population

The study focuses on three states in South-East Nigeria (specifically Abia, Ebonyi, and Enugu) located within the humid tropical rainforest and derived savannah zones. The region experiences a bimodal rainfall pattern averaging 1,500–2,500 mm annually, with mean temperatures ranging from 26°C to 30°C, creating favorable conditions for dense vegetation and diverse biodiversity (Nwafor, 2007; Okoro et al., 2021). However, rapid environmental degradation has become a defining feature. Deforestation, shifting cultivation, bush burning, mining, and unregulated urban expansion have accelerated habitat loss, soil erosion, and biodiversity decline (Mafiana et al., 2022; Ojeyinka et al., 2024). Abia State is heavily impacted by industrial activities and land-use change; Ebonyi faces severe soil degradation and mining-induced deforestation; while Enugu, a former coal-mining hub, struggles with gully erosion and rapid urbanization (Eze, 2018; Chukwu et al., 2020).

These environmental pressures increase human–wildlife interaction, heighten vulnerability to zoonotic spillover, and exacerbate climate-sensitive health risks such as malaria, cholera, and Lassa fever (Agyarko et al., 2025; Erundu et al., 2025). Weak regulatory enforcement, poor waste management, and recurrent flooding further undermine ecosystem resilience and public health infrastructure (Nnaji&Eze, 2019). Against this backdrop, site selection for the present study was prioritise areas with documented deforestation, recent land-use change, and recorded disease events.

Data Collection

Historical climate records (temperature, rainfall, extreme events), remote-sensing land-cover and deforestation indices, health surveillance data (incidence/prevalence of priority zoonoses), and political indicators (conflict events, governance/trust indices). Structured questionnaires administered to a representative sample of residents in selected sites, measuring exposure to environmental change, zoonotic risk factors, healthcare access, and perceptions of governance. A multistage stratified random sampling strategy will ensure geographic and socio-demographic representation. Semi-structured interviews with health managers, environmental officers, And policymakers to explore institutional capacities, intersectoral coordination, and policy gaps. Community FGDs to elicit local ecological knowledge, outbreak experiences, coping strategies, and perceptions of institutional trust. Purposive sampling will ensure diversity by age, gender, and livelihood.

Data were collected over a six-month field period. A total of 360 household surveys, 9 focus group discussions (FGDs), and 12 key informant interviews (KIIs) were involved.

Data Analysis

Quantitative data were analysed using **SPSS (v28.0)** for descriptive statistics and regression models. Qualitative data from interviews and FGDs were transcribed and coded thematically using **NVivo 14**. A narrative synthesis was then applied to integrate quantitative and qualitative findings, highlighting pathways through which environmental disruption and health shocks influence political fragility.

RESULTS

Key descriptive results

The household survey found that more than half of households (58.1%) reported at least one climate-sensitive illness in the previous 12 months. Malaria was the most commonly reported condition (62.2% of households), while cholera and Lassa fever were less frequent (10.8% and 4.2%, respectively). A large majority of respondents (73.9%) agreed that climate variability has worsened recently, and 40% of households live within 5 km of deforested or mined areas. About one third (35.0%) experienced major flooding during the past five years. Trust in government to manage outbreaks was low on average (mean = 2.10 on a 1–5 scale), and the typical household had about 9.5 years of education. These descriptive findings show a high burden of climate-sensitive illness in communities that commonly report environmental degradation and flood exposure, and they set the scene for the analytical results that follow (Table 1).

Table 1: Key descriptive results

Measure(n = 360)	Result
Households reporting ≥ 1 climate-sensitive illness in past 12 months	209 (58.1%)
Households reporting malaria (past 12 months)	224 (62.2%)
Households reporting cholera (past 12 months)	39 (10.8%)
Households reporting Lassa fever (past 12 months)	15 (4.2%)

Measure(n = 360)	Result
People who say climate variability has worsened (agree/strongly agree)	266 (73.9%)
Households within 5 km of deforested/mining site	144 (40.0%)
Households that experienced major flooding (past 5 years)	126 (35.0%)
Average trust in government to manage outbreaks (1–5 scale)	2.10 (SD 0.95)
Average years of education (household)	9.5 (SD 4.2)

What increases the chance of illness

The logistic model tested which factors were associated with households reporting a climate-sensitive illness. Each one-point increase on the perceived environmental degradation scale was associated with a 65% higher odds of reporting illness (OR = 1.65, $p < 0.001$). Living within 5 km of a deforested or mined site more than doubled the odds of illness (OR = 2.18, $p < 0.001$). Households that experienced major flooding had an 89% higher odds of reporting illness (OR = 1.89, $p = 0.001$), and low household income also increased odds modestly (OR = 1.42, $p = 0.045$). All these predictors were statistically significant, indicating robust links between environmental exposure, socio-economic vulnerability, and disease reporting. In plain terms, people who live near deforestation or mining, who experience flooding, or who perceive heavy environmental damage are substantially more likely to report climate-sensitive illnesses (Table 2).

Table 2: What increases the chance of illness

Predictor	Odds Ratio (OR)	95% CI	p-value
Perceived environmental degradation (one-point increase)	1.65	1.30 – 2.09	<0.001
Living ≤ 5 km from deforested/mined site (yes)	2.18	1.48 – 3.22	<0.001
Experienced major flooding (yes)	1.89	1.28 – 2.79	0.001
Low household income (yes)	1.42	1.01 – 2.00	0.045

Outcome = household reported ≥ 1 climate-sensitive illness.

Illness and Trust in Government

The linear model assessed how reporting illness and other factors relate to trust in government (1–5 scale). Households that reported an illness had a meaningful reduction in trust ($B = -0.42$, $p < 0.001$), meaning illness experience is associated with lower confidence in authorities. Perceiving that the government responds well was strongly associated with higher trust ($B = +0.55$, $p < 0.001$), showing that perceived response quality can offset distrust. Perceptions of worse environmental degradation ($B = -0.10$, $p = 0.040$) and low income ($B = -0.18$, $p = 0.030$) were also associated with slightly lower trust. These findings indicate that experiencing disease and seeing poor environmental conditions reduce institutional trust, while perceived competent response increases it. The size of the effect for reported illness (-0.42 on a 5-point scale) is substantively important and statistically robust (Table 3).

Table 3: Illness and Trust in Government

Predictor	Change in trust score (B) p-value	
Reported illness (yes)	−0.42 (lower trust)	<0.001
Perceived quality of government response (better)	+0.55 (higher trust)	<0.001
Perceived environmental degradation (worse)	−0.10 (lower trust)	0.040
Low household income (yes)	−0.18 (lower trust)	0.030

Outcome = trust in government score (1–5).

Main themes from FGDs and KIIs

Qualitative data from nine FGDs and twelve KIIs produced consistent themes that help explain and contextualise the quantitative results. Every group acknowledged environmental decline—forest loss, erosion and changing land use—supporting the survey evidence of perceived degradation. Health and environment officials frequently articulated the pathway from habitat loss to disease, whereas most community participants discussed the economic and livelihood impacts of environmental change more than explicit disease links; this suggests a gap in

community-level awareness of environment-to-disease pathways. Both communities and officials reported repeated outbreaks and weaknesses in surveillance and laboratory support. Low trust in government was a recurring topic, attributed to slow, poorly communicated responses; at the same time communities described strong mutual-help practices (clean-ups, watch groups) that are important sources of resilience but are increasingly strained.

Officials emphasised a lack of coordinated One-Health policies and weak intersectoral coordination. These qualitative themes triangulate the survey results by explaining how environmental exposure becomes health burden and how that burden erodes political confidence (Table 4).

Table 4: Main themes from FGDs and KIIs

Theme	What people said
Environmental decline	Everyone noticed forest loss, erosion and land changes.
Environment → disease link	Most officials linked habitat loss to disease; few community members mentioned this directly.
Outbreak experience & gaps	Communities reported repeat outbreaks; officials said surveillance and lab support are weak.
Trust in government	Many described slow, poorly communicated responses; low confidence in authorities.
Community coping	Strong local mutual-help (clean-ups, watch groups), but resources are strained.
Policy/coordination gaps	Officials reported poor intersectoral coordination and absence of integrated One-Health plans.

Discussion

The high prevalence of climate-sensitive illness observed—58.1% of households reporting at least one case in the prior year, with malaria reported by 62.2%—indicates a substantial and ongoing health burden that aligns with expectations for humid tropical zones experiencing environmental change. Malaria’s predominance is consistent with altered vector habitats and longer transmission seasons associated with warming and erratic rainfall (Ryan et al., 2020; Yamba et al., 2023), while the presence of cholera and Lassa fever, though less frequent, signals

important water- and zoonotic-transmission risks that can escalate under environmental stress (Agyarko et al., 2025). These descriptive results underscore an urgent need to strengthen routine surveillance, diagnostic capacity, and community-level prevention—especially in areas where ecological disturbance and climate variability are pronounced—because otherwise endemic burdens can compound into larger outbreaks with wider socio-economic and governance consequences (Rawat et al., 2024; Erondy et al., 2025).

The finding that 73.9% of respondents perceived worsening climate variability, 40.0% lived within 5 km of deforested or mined sites, and many households reported flooding reflects a convergence of experiential and exposure indicators that increase vulnerability to disease. High local perception of changing climate is important because it signals community-level awareness of environmental stress, yet proximity to deforestation/mining and repeated flooding concretely raise exposure to vectors, contaminated water, and displaced wildlife—mechanisms well documented to elevate infectious-disease risk (Mafiana et al., 2022). The low mean trust in government (2.10/5) that accompanies these exposures is consequential: where environmental risks are visible but institutional response is seen as inadequate, communities face both elevated hazard and limited confidence in public protection, which can reduce uptake of interventions and increase the likelihood that outbreaks will have broader social and political repercussions (Erondy et al., 2025).

The adjusted regression results provide empirical support for hypothesised exposure–disease pathways: higher perceived environmental degradation increased the odds of reporting a climate-sensitive illness by 65% (OR = 1.65), residence within 5 km of deforested/mined areas more than doubled odds (OR = 2.18), and experience of major flooding raised odds by 89% (OR = 1.89). Low household income also contributed independently to risk (OR = 1.42), indicating that socio-economic vulnerability amplifies exposure effects. Collectively, these associations are consistent with ecological and epidemiological models linking land-use change, altered hydrology, and poverty to greater transmission of vector-borne, waterborne, and zoonotic diseases (Fletcher et al., 2022; Abdul-Nabi et al., 2025; Yenew et al., 2025). Practically, the results imply that targeting interventions to buffer environmental exposures (e.g., land-management, flood control) and reducing household vulnerability (e.g., poverty alleviation, improved water and sanitation) are both necessary to lower disease incidence.

The multivariable linear model shows a clear socio-political consequence of disease burden: households reporting a climate-sensitive illness had significantly lower trust in government (B

= -0.42), while perceived quality of government response strongly increased trust ($B = +0.55$). Perceptions of environmental degradation ($B = -0.10$) and low income ($B = -0.18$) also eroded trust. These findings illustrate a feedback loop in which disease experience undermines institutional legitimacy unless response quality is visible and effective—an effect widely observed in outbreak settings where poor communication, delayed response, or resource shortfalls reduce compliance and heighten grievance (Institute of Medicine (US), 2002; Kalu&Zakirova, 2019). From a policy perspective, improving the timeliness, transparency, and reach of outbreak response (including investments in diagnostics, rapid response teams, and clear risk communication) is essential not only for health outcomes but also for maintaining social cohesion and political stability (Erondu et al., 2025).

Qualitative findings corroborate and deepen these quantitative patterns: communities and officials uniformly recognised environmental decline, officials more often articulated the ecological pathways to disease, and community members tended to emphasise livelihood impacts—revealing an awareness gap in linking habitat loss to health risk. Participants consistently reported recurrent outbreaks, weak surveillance and laboratory capacity, low trust in government responses, strong but increasingly strained local coping mechanisms, and poor intersectoral coordination (absence of integrated One-Health approaches). This thematic pattern explains how exposure translates into health burden and then into political consequence: institutional shortcomings (surveillance, coordination, response) and gaps in community-level risk framing both amplify vulnerability and limit effective mitigation (Tiwarly et al., 2019; Talwar et al., 2025). Therefore, strengthening One-Health governance, closing the knowledge gap at community level, and supporting local coping systems are critical complements to technical interventions if the region is to reduce disease emergence and protect socio-political resilience.

Conclusion

Climate-driven habitat loss and land-use change in Abia, Ebonyi, and Enugu are associated with higher rates of climate-sensitive illnesses primarily malaria and these health shocks substantially reduce public trust in government, underscoring an urgent need for integrated One-Health surveillance, targeted environmental management, and transparent, timely outbreak responses to avert worsening socio-political fragility.

Recommendations

This study highlights the urgent need to strengthen **integrated One Health systems** that connect environmental, veterinary, and human health services. Building such a framework requires coordinated surveillance networks, improved laboratory diagnostics, and mechanisms for real-time data sharing across ministries and agencies. An integrated approach would allow earlier detection of zoonotic risks and more effective control of climate-sensitive illnesses.

Environmental safeguards must also be enhanced. Stricter regulation of deforestation, mining, and unregulated land-use change is essential to reduce ecological disruption and disease spillover risks. At the same time, investments in reforestation, watershed protection, and climate-smart land management practices are needed to curb flooding and restore ecosystem resilience in vulnerable areas.

At the community level, preparedness should be scaled up through health education campaigns that close the knowledge gap between environmental change and disease. Existing mutual-help structures, such as local clean-up groups and community watch networks, should be supported with technical training and financial resources to strengthen grassroots resilience.

Improving outbreak response capacity is another critical priority. Governments should invest in rapid response teams, mobile clinics, and essential emergency supplies to shorten response times during crises. Equally important is the adoption of transparent and culturally appropriate risk communication strategies, which can help build and sustain public trust in institutions during emergencies.

Socio-economic vulnerabilities must be addressed as part of a comprehensive risk-reduction strategy. Poverty alleviation programs, expanded access to safe water and sanitation, and climate-smart agricultural practices would help reduce household-level exposures and risks. Interventions should be prioritized in high-risk zones, particularly communities located near deforested areas, mining sites, and flood-prone regions.

Finally, efforts to build **governance resilience and public trust** are indispensable. Transparent policymaking, accountable leadership, and improved intersectoral coordination are necessary to strengthen institutional legitimacy. Local leaders and community stakeholders should be actively involved in the design and implementation of health and environmental interventions.

In parallel, research capacity should be advanced through the development of predictive models that integrate environmental, health, and governance indicators for early warning. Multidisciplinary research partnerships are crucial for generating evidence to guide adaptive policy frameworks and long-term planning.

REFERENCES

- Abdul-Nabi, S. S., Al Karaki, V., Khalil, A., & El Zahran, T. (2025). Climate change and its environmental and health effects from 2015 to 2022: A scoping review. *Heliyon*, 11(3), e42315. <https://doi.org/10.1016/j.heliyon.2025.e42315>.
- Agyarko, R. K. D., Kithinji, D., & Nsarhaza, K. B. (2025). Climate change and the rise of emerging and re-emerging infectious diseases in Africa: A literature review. *International Journal of Environmental Research and Public Health*, 22(6), 903. <https://doi.org/10.3390/ijerph22060903>.
- Erondu, C. I., & Nwakanma, E. (2025). Human security and environmental crisis in Nigeria: Addressing interconnected threats to sustainable development. *African Journal of Social Sciences and Humanities Research*, 8(1), 85–96.
- Femi Monday, I. (2020). *Investigating effects of climate change on health risks in Nigeria*. IntechOpen. <https://doi.org/10.5772/intechopen.86912>.
- Fletcher, I. K., Grillet, M. E., Moreno, J. E., Drakeley, C., Hernández-Villena, J., Jones, K. E., & Lowe, R. (2022). Synergies between environmental degradation and climate variation on malaria re-emergence in southern Venezuela: A spatiotemporal modelling study. *The Lancet Planetary Health*, 6(9), e739–e748. [https://doi.org/10.1016/S2542-5196\(22\)00192-9](https://doi.org/10.1016/S2542-5196(22)00192-9).
- Mafiana, C. F., Jayeola, O. A., & Iduseri, E. O. (2022). Impact of environmental degradation on biodiversity conservation in Nigeria. *The Zoologist*, 20, 41–50.
- Ojeyinka, O. T., & Omaghomi, T. T. (2024). Climate change and zoonotic diseases: A conceptual framework for predicting and managing health risks in the USA. *GSC Biological and Pharmaceutical Sciences*, 26(3), 027–036.
- Okon, E. M., Falana, B. M., Solaja, S. O., Yakubu, S. O., Alabi, O. O., Okikiola, B. T., Awe, T. E., Adesina, B. T., Tokula, B. E., Kipchumba, A. K., & Edeme, A. B. (2021). Systematic review of climate change impact research in Nigeria: Implication for sustainable development. *Heliyon*, 7(9), e07941. <https://doi.org/10.1016/j.heliyon.2021.e07941>.
- Rawat, A., Kumar, D., & Khati, B. S. (2024). A review on climate change impacts, models, and its consequences on different sectors: A systematic approach. *Journal of Water and Climate Change*, 15(1), 104–126.

- Ryan, S. J., Lippi, C. A., & Zermoglio, F. (2020). Shifting transmission risk for malaria in Africa with climate change: A framework for planning and intervention. *Malaria Journal*, 19, 170. <https://doi.org/10.1186/s12936-020-03224-6>.
- Talwar, A., Sayeed, M. A., Housen, T., Katz, R., & Kirk, M. D. (2025). Barriers and facilitators of infectious disease outbreak reporting: A One Health scoping review. *One Health Outlook*, 7(1), 35. <https://doi.org/10.1186/s42522-025-00152-w>
- Tiwary, A., Rimal, A., Paudyal, B., Sigdel, K. R., & Basnyat, B. (2019). Poor communication by health care professionals may lead to life-threatening complications: Examples from two case reports. *Wellcome Open Research*, 4, 7. <https://doi.org/10.12688/wellcomeopenres.15042.1>.
- Yamba, E. I., Fink, A. H., Badu, K., Asare, E. O., Tompkins, A. M., & Amekudzi, L. K. (2023). Climate drivers of malaria transmission seasonality and their relative importance in sub-Saharan Africa. *GeoHealth*, 7(2), e2022GH000698. <https://doi.org/10.1029/2022GH000698>.
- Yenew, C., Bayeh, G. M., Gebeyehu, A. A., Enawgaw, A. S., Asmare, Z. A., Ejigu, A. G., Tsega, T. D., Temesgen, A., Anteneh, R. M., Yigzaw, Z. A., Yirdaw, G., Tsega, S. S., Ahmed, A. F., & Yeshiwas, A. G. (2025). Scoping review on assessing climate-sensitive health risks. *BMC Public Health*, 25, 914. <https://doi.org/10.1186/s12889-025-22148-x>.