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Hydrological Stress, Biodiversity Loss and Livelihood Collapse — Climate Change Challenges in Coastal Fisheries of Ondo State, Nigeria

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Abstract The coast of Nigeria is increasingly experiencing pressure due to climate change and its impact on small-scale and artisanal fisheries. This study analyzed the effects of changing rainfall patterns, rising temperatures, and hydrological variability on small-scale fisheries in Ilaje Local Government Area (LGA), Ondo State, Nigeria. Four fishing villages: Ayetoro, Bijimi, Idiogba, and Asumogha were randomly selected to represent the fishing population. Data collection combined 285 questionnaire responses with 30 years of rainfall and temperature records from the Nigeria Meteorological Agency (NiMet), complemented by government and fisheries data. Quantitative data were analyzed using SPSS (version 25) with descriptive statistics, Chi-square, ANOVA, and regression, while qualitative data captured adaptation strategies. Results revealed a measurable decrease in rainfall days (218 in 1996 to 182 in 2025), rainfall ranging between 1,700-2,200 mm, and a steady increase in mean annual temperature from 27.4°C to 28.5°C. Maximum temperatures rose from 32.6°C to 33.3°C, while minimum temperatures increased from 19.6°C to 21.3°C. Nearly all participants (98.6%) agreed that increased water levels result in greater fish catches, while 97.5% believed decreased water levels reduce catches. Climate variability in Ilaje has disrupted fisheries and livelihoods. Recommendations include improved water management, shoreline protection, livelihood diversification, stronger cooperatives, and resilience-building to sustain Nigeria's coastal blue economy.

Keywords Rainfall variability; Temperature trends; Hydrological changes; Ilaje fishing communities; Adaptation strategies

1. Introduction

Climate change is widely acknowledged as one of the most pressing global challenges of the 21st century, with profound implications for ecosystems, biodiversity, and human livelihoods. It is defined as long-term shifts in temperature, precipitation, wind patterns, and other climatic variables, largely driven by anthropogenic activities such as fossil fuel combustion, deforestation, and industrialization (IPCC, 2022). These changes are not uniform across regions; rather, they manifest differently depending on geographical, ecological, and socio-economic contexts. Coastal regions, in particular, are highly vulnerable to climate-induced stressors, including rising sea levels, flooding, saltwater intrusion, and shoreline erosion, all of which threaten both ecological integrity and human survival (FAO, 2018).

Small-scale fisheries, which provide food security, employment, and income for millions of households worldwide, are especially exposed to climate variability. Historically, artisanal fishers have endured climatic extremes such as floods, droughts, and storms. However, the intensification and increased frequency of these events under climate change have amplified ecological and socio-economic risks, undermining resilience and sustainability (IPCC, 2023). In Nigeria, where fisheries contribute significantly to nutrition and livelihoods, climate change has emerged as a critical threat to artisanal fishing communities, particularly in coastal regions such as Ilaje Local Government Area (LGA) of Ondo State.

Nigeria's fisheries sector is vital to national food security and economic development. Small-scale fisheries account for approximately 70% of total fish catches globally, and in Nigeria they contribute 3%-5% of the