

Where:

F_i = Estimated fisher population at site i

n_i = Number of fishers sampled or observed at site i

N_s = Total number of fishers sampled across all sites

N_t = Total fisher population (from census, registry, or extrapolated estimate)

Applying the proportional allocation formula, 84 questionnaires were assigned to Ayetoro, 73 to Idiogba, 76 to Bijimi, and 62 to Asumogha. Minor adjustments were introduced to maintain whole numbers, yielding a total of 295 questionnaires. This sampling strategy minimized bias and enhanced representativeness by aligning distribution with the fisher population of each community, thereby enabling robust comparisons across sites to capture differences in fishing practices, socio-economic conditions, and adaptive responses to climate change. Incorporating a non-response buffer further strengthened the validity of the analyses, establishing a reliable foundation for examining climate, fisheries, and livelihoods within Ilaje fishing communities. Ultimately, 180 fishermen returned fully completed questionnaires, providing the empirical basis for subsequent analyses.

2.4 Data collection

Primary and secondary sources were used to ensure thoroughness and unwavering accuracy. For the questionnaires, the social and demographic variables included age, gender, education level, household size, fishing tenure, and other livelihood activities. In addition to the climate-related data and adaptive measures, annual fish catch data, fish species data, fish size data, and data related to climate change were included. The climate context of the study region relied on data from Nigerian Meteorological Agency (NiMet) as the secondary data concerning the project's long-term rainfall, temperature, and water level data. Secondary sources for context regarding the coastal value fishery, climate change, and adaptive capacity included government documents, scholarly articles, books, the Ondo State Ministry of Agriculture and Fisheries, and departmental bulletins.

2.5 Data analysis

Quantitative data were analysed using SPSS (version 25), applying statistics to examine relationships between climate, fish catch, socio-economic factors, and adaptation practices (Aderinola et al., 2021).

For the goals of the research, rainfall and temperature data of the years 1996-2025 for the Ilaje Local Government Area (LGA) of Ondo State, Nigeria, were studied. The focus was on analyzing the climatic variables and identifying the presence of any trends over the years in the form of increases, decreases, or permanence. The author utilized linear trend models, which consist of a form of monotonic analysis to capture gradual changes, and step trend variability to identify sudden change in any of the climate variables (Olanrewaju, 2022).

Using Microsoft Excel, scatter plots with trendlines and moving averages to illustrate long-term variation were constructed for the purposes of time-series analysis. In order to facilitate analyses, the data were divided into three decades, which were the periods 1996-2005, 2006-2015, and 2016-2025. With this structure, both gradual and sudden changes in the variability of rainfall and temperature were detectable (Edokpa, 2020; Omitoyin et al., 2021a). SPSS (version 25) and Excel were used for the analyses, which refined the results and augmented the understanding of the climate trends of the study area.

The SPSS 25 software was used to analyze the quantitative data. Means, frequencies, and percentages were computed to describe the socio-economic variables. The relationships between rain, water levels, and fish catch volume were tested using Chi-square. ANOVA was used to test the differences among communities, and regression was used to evaluate the effects of climate variables on fish catch. The trends of rain and temperature were examined using linear monotonic and step-change models. Time series plots, scatter plots, and moving averages were created in Microsoft Excel. The qualitative data were used to adapt and analyze modifications to strategies, coding, and thematic analysis of the interviews and focus groups to the transcripts. These were the