modifications of strategies to the adaptations of the gear, cooperatives, and diversification of livelihoods. The climate-livelihood relationships were best understood through the combination of quantitative and qualitative data.

The analysis of long-term climate variability in Ilaje Local Government Area (LGA) commenced with the systematic review of rainfall and temperature records spanning the period 1996-2025. Linear monotonic trend models were applied to detect directional changes in the climatic variables, identifying whether trends indicated increases, decreases, or stability. Gradual changes were assessed using monotonic trend analyses, while step-trend analyses were employed to capture abrupt shifts in climate conditions (Akinsanola and Ogunjobi, 2020). Preliminary data processing was conducted in Microsoft Excel 2010, where time-series graphs were generated using scatter plots, fitted trend lines, and moving averages. For comparative purposes, the dataset was partitioned into three decadal intervals: 1996-2005, 2006-2015, and 2016-2025, consistent with established practices in climate and fisheries research for detecting long-term variability. Exploratory data analysis was performed in Excel, whereas advanced statistical analyses were executed using SPSS (version 25).

In addition to quantitative analyses, qualitative data were collected through focus group discussions designed to capture community-level responses to climatic stressors. These discussions facilitated the documentation of adaptation strategies, which included modifications to fishing tools, the formation of cooperative associations, and diversification into alternative livelihood activities. Together, these methodological steps provided a robust framework for examining the interactions between climate variability, fisheries, and livelihoods within Ilaje fishing communities.

3 Results and Discussion

3.1 Fish catch volume and livelihood implications in Ilaje LGA

Table 1 presents data on fishing yields among Ilaje households. Results indicate that 39.3% of fishers harvest ≥500 kg annually, equivalent to about ten rice bags, while the majority (61%) record lower catches. This disparity highlights the influence of ecological conditions, access to productive waters, and fishing practices. The predominance of catches below 500 kg suggests subsistence-level livelihoods with limited savings potential. Evidence shows that small-scale fisheries in West Africa face persistent ecological and economic constraints (Neiland and Béné, 2010). In Ilaje, low yields exacerbate household vulnerability, reflecting broader challenges of climate change, overfishing, and habitat degradation that reduce fish stocks and undermine food security (FAO, 2022). Recent studies confirm that Nigerian coastal communities experience poverty and food insecurity linked to declining fisheries (Oparinde et al., 2025). Nonetheless, higher yields among some fishers demonstrate the potential of improved resource governance, climate adaptation, and livelihood diversification to strengthen resilience (Elezuo et al., 2024). Without such interventions, Ilaje fisheries risk further decline, deepening socio-economic hardship.

Table 1 Fish catch volume in Ilaje LGA

Annual Catch Volume (kg)	Respondents (%)	Number of Respondents	Equivalent in 50kg Rice Bags
≥ 500 kg	39.3%	110	≥ 10 bags
500 kg	15.5%	43	10 bags
400 kg	17.4%	49	8 bags
300 kg	17.8%	50	6 bags
200 kg	10.0%	28	4 bags
Total	100%	280	—

Source: Field survey, 2025

3.2 Perceived effects of water level on fish catch volume

Table 2 illustrates fishermen's perceptions of hydrological influences on fish catch volumes in Ilaje coastal waters. An overwhelming majority (98.6%) affirmed that high water levels enhance fish output, while 97.5% reported that low water levels reduce catches. This consensus reflects a clear understanding of the direct link between water