These findings are consistent with Ragatoa et al. (2020), who reported alternating wet and dry decades in West Africa, stressing the vulnerability of coastal livelihoods to rainfall variability.

Temperature trends show a gradual rise, from 27.4°C in 1996 to 28.5°C in 2025, with deviations between −0.5°C and +0.8°C. This warming trajectory aligns with national observations that Nigeria's average temperature has steadily increased over the past three decades. Cohen et al. (2016) demonstrated similar warming impacts in Lake Tanganyika, where rising temperatures reduced nutrient mixing and fish productivity. Combined rainfall variability and warming pose dual risks: flooding during wetter years and drought stress during drier periods. These climatic pressures directly affect Ilaje's fishing and farming communities, reducing water availability, altering fish habitats, and threatening food security. Omitoyin et al. (2021a) linked hydrological instability to declining fish productivity in Nigeria, reinforcing the need for adaptive water and fisheries management strategies.

3.10 Decadal rainfall analysis (1996-2025)

Table 5 presents a decadal analysis of rainfall in Ilaje LGA, offering valuable insights into long-term climatic variability and its implications for fisheries and water resources. The data reveal a general upward trend in rainfall across three decades. Decade 1 (1996-2005) recorded an average of 929.2 mm, reflecting a slight decrease compared to earlier baselines. Decade 2 (2006-2015) showed a significant increase to 1,072.6 mm, representing a 15.4% rise. The modeled projection for Decade 3 (2016-2025) indicates continued growth, with an average of 1,158.0 mm, consistent with regional climate studies predicting intensified rainfall in coastal Ondo State. These findings align with the World Bank Climate Portal (2024), which reported increasingly erratic but overall rising rainfall trends in Nigeria's coastal regions. Ishaku et al. (2024) emphasized that West African rainfall patterns are highly sensitive to oceanic and atmospheric circulation changes, leading to alternating wet and dry decades. The observed increase in Ilaje mirrors broader national trends, where rainfall variability has intensified due to climate change.

While rising rainfall may enhance water availability, it also poses risks of flooding, sedimentation, and habitat disruption. Such impacts directly affect artisanal fisheries, as noted by Omitoyin et al. (2021a), who linked hydrological instability to declining fish productivity. Thus, the decadal analysis underscores the need for adaptive water and fisheries management strategies in Ilaje.

3.11 Decadal rainfall and temperature trends in Ilaje LGA (1996-2025)

3.11.1 Rainfall variability

Table 6 presents a decadal analysis of rainfall in Ilaje LGA, showing variability across three decades with a general upward trend. Decade 1 (1996-2005) recorded a mean rainfall of 929.2 mm, reflecting relatively lower precipitation. Decade 2 (2006-2015) showed a significant increase to 1,072.6 mm, representing a 15.4% rise. The modeled projection for Decade 3 (2016-2025) indicates continued growth, with an average of 1,158.0 mm, consistent with regional climate studies predicting intensified rainfall in coastal Ondo State. This pattern aligns with the World Bank Climate Portal (2024), which reported increasingly erratic but rising rainfall trends in Nigeria's coastal regions. Similarly, Ishaku et al. (2024) emphasized that West African rainfall variability is strongly influenced by oceanic and atmospheric circulation, leading to alternating wet and dry decades. The observed increase in Ilaje mirrors these broader regional dynamics.

While rising rainfall may enhance water availability, it also poses risks of flooding, sedimentation, and ecosystem disruption. Such impacts directly affect artisanal fisheries, as noted by Omitoyin et al. (2021a), who linked hydrological instability and habitat degradation to declining fish productivity in Ilaje. Ragatoa et al. (2020) similarly observed that intensified rainfall in West Africa replenished wetlands but also heightened risks of erosion and flooding, underscoring the dual nature of rainfall increases. Thus, the decadal analysis underscores both opportunities and challenges: greater rainfall may support water resources, but variability and extremes demand adaptive fisheries and water management strategies.