

ABSTRACT

For more than a decade and a half now, the percentage of the world's inhabitants living in urban areas has outstripped that living in rural areas. The population's concentration in urban area has led to spatial expansion. Spatial and demographic growth have led to environmental and climatic impacts, including heat waves, floods, and windstorms which affect urban populations throughout the world, in particular Sub-Saharan Africa. The aim of this study was to analyse the demographic and spatial dynamics of Abuja and Ouagadougou over time. The objectives were to investigate how urbanisation patterns influence the recurrence of extreme weather events in the two cities and to compare the adaptation and mitigation strategies adopted by people to address the challenges posed by climate change in urban environments. To achieve these objectives, several methods, including the Geographic Information System, remote sensing, and statistical models, were combined to analyse satellite images, population data, qualitative data and sociodemographic data from a sample of 1,680 households. Specifically, the Google Earth Engine platform was used to classify the satellite images. In this way, urban expansion indices were calculated. The Hierarchical Analysis Process approach was also used to characterise the impacts of climate change by zone. Furthermore, logistic regressions, multiple component analysis and ascending hierarchical classification were used to assess and characterise the adaptation and mitigation strategies used by households. The results showed that both cities have experienced exponential population growth, which has led to their horizontal expansion over the last three decades. In Abuja, the surface area occupied by housing increased from 100.69 to 397 square kilometres between 2001 and 2022, leading to vegetation degradation, which fell from 6059.34 to 1433 square kilometres during the same period. In Ouagadougou, between 1990 and 2022, the area occupied by housing increased from 38.03 to 371.56 square kilometres, leading to vegetation degradation, declining from 253.04 to 68.88 square kilometres. The household survey reveals that 29.58% in Abuja and 40.07% in Ouagadougou have been affected by flooding at least once in the last 30 years. Other extreme weather phenomena, such as high temperatures and windstorms, have had impacts on the health, comfort, and activities of people in these two cities. This result revealed that despite the differing geographical, socioeconomic, and political contexts, the populations of these two cities have similarities in terms of adaptation strategies but differ in climate change mitigation. Context-specific policies should prioritise strengthening local adaptation strategies, addressing socioeconomic disparities, and fostering urban design solutions tailored to each city's unique environmental and infrastructure challenge.