WASCAL West African Science Service Centre on Climate Change and Adapted Land Use

Federal Ministry of Education and Research

# POLICY BRIEF

## URBAN GREEN SPACES AS A PATHWAY TO CLIMATE CHANGE RESILIENCE IN MALI: POLICY APPROACHES FOR SUSTAINABLE URBAN DEVELOPMENT

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## EXECUTIVE SUMMARY

Addressing the impact of rapid urbanisation on human well-being, this research evaluates how Urban Green Spaces (UGS) in Mali's cities of Bamako and Sikasso contribute to climate resilience and ecosystem services (ES). The study employs methods that underline UGS's role in maintaining sustainable, livable urban environments amid climate challenges.

## INTRODUCTION

Rapid urbanization and climate change pose significant challenges for urban areas, especially in low-income nations like Mali, where green spaces are critical for climate resilience, health, and food security. Effective urban planning must prioritize green space integration to support sustainable urban development.

## RESEARCH APPROACH

By analyzing vegetation, land cover, and climate trends with Envi, RStudio, and Python, maps were produced to inform urban planning and climate resilience strategies using satellite images, climate data, and household surveys.

## KEY RESEARCH FINDINGS

1. In Bamako and Sikasso, urban expansion has replaced much of the natural vegetation with built-up areas with percentage change being 54.37% and 48.81% respectively, diminishing UGS (Figures 1 and 2);

2. The majority of the respondents perceive the status of UGS as being “good” (42%) in Bamako, and (72%) in Sikasso (Figure 3), with regulating services valued most (Figure 4).

3. Climate trends indicate warming (Figures 5, 6, 7 and 8) with increase of 21 and 22; and 35 and 34 of Tmin and Tmax for Bamako and Sikasso respectively, underscoring the need for sustainable urban planning to protect ecosystem benefits;

4. There are strong correlations between population growth and LULC classes as built-up class from 1990 to 2020 in the cities of Bamako and Sikasso (Figures 9 and 10). A Positive correlation exists between bare land, built-up, medium vegetation, and climate variability (Figures 11 and 12). The expansion of built-up areas was attributed to rapid Population growth and the potential for urbanization in the towns.

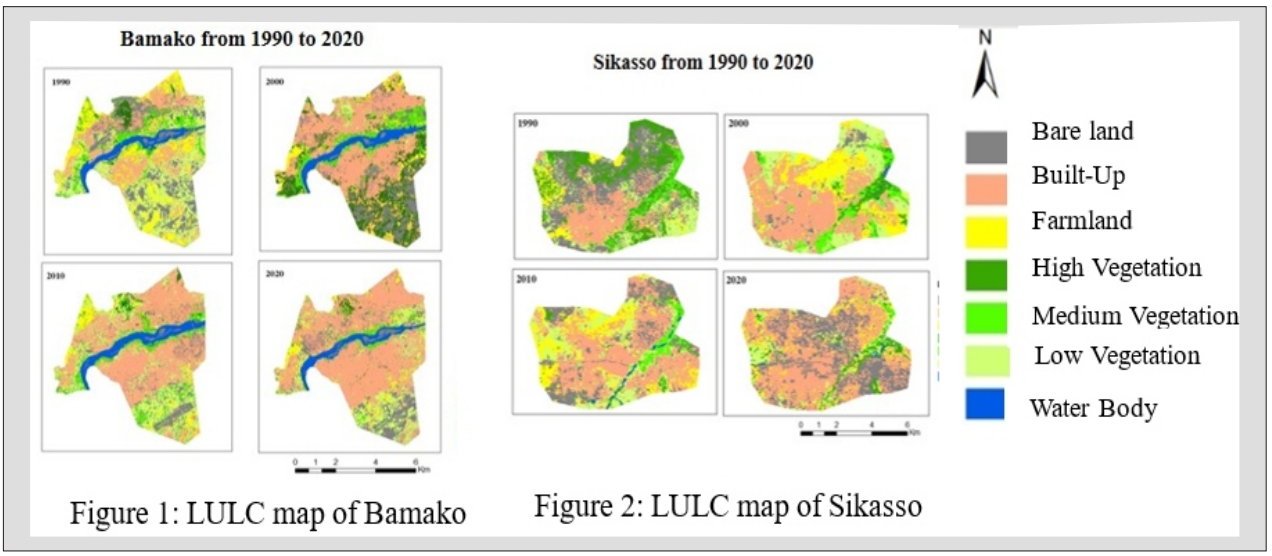



Figure 1: LULC map of Bamako

Figure 2: LULC map of Sikasso

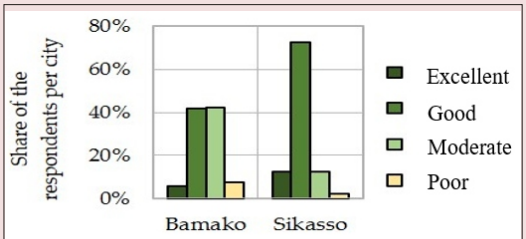



Figure 3: Perception of the status of UGS


Figure 4: Ecosystem Services Provided

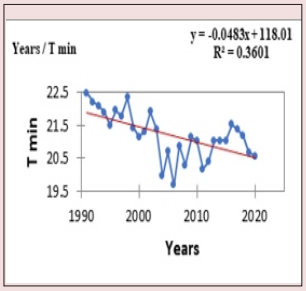



**Figure 5: Tmin Bamako Senou**

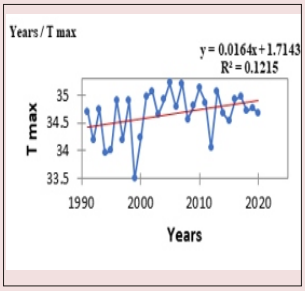



**Figure 6: Tmax Bamako Senou**

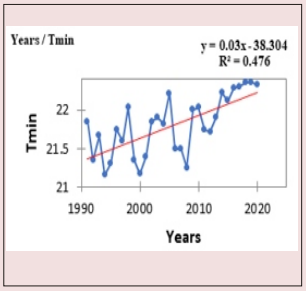



**Figure 7: Tmin Sikasso**

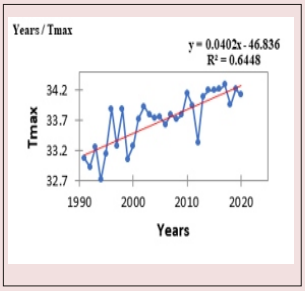
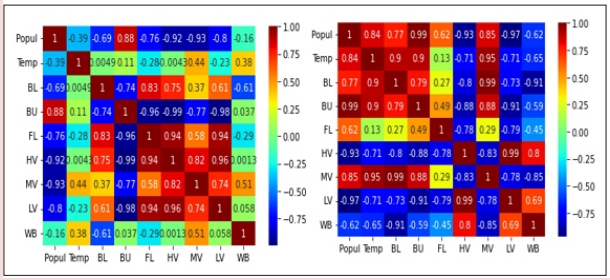
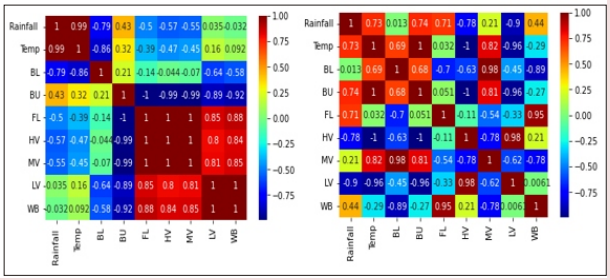



**Figure 8: Tmax Sikasso**



**Figures 9 and 10: Correlation between LULC and Demographic in Bamako and Sikasso cities**



**Figures 11 and 12: Correlations between LULC and Climate Variability in Bamako and Sikasso cities**

## IMPLICATION OF FINDINGS

The study offers valuable insights (such as the LULC analysis, climate variability and populations perception on UGS), for policymakers aiming to enhance climate resilience and sustainability in Bamako and Sikasso. By focusing on green spaces (including market gardening) and ecosystem services, these insights can guide initiatives to address climate challenges and improve urban sustainability.

## POLICY RECOMMENDATION

Based on the LULC, climate variability, and survey analyses, an overarching policy recommendation that involves interministerial collaboration of the Ministry of Land Affairs, Urban Planning and Housing; Ministry of the Environment and Sanitation, and the Ministry of Agriculture is proposed in light of the study's findings. Specifically, green spaces (including market gardening areas) and ecosystem services should be added to an updated Master Plan for Development and Urban Planning for Bamako and Sikasso, in alignment with SDG Target 11.

This approach ensures sustainable urban growth while addressing climate resilience and enhancing urban quality of life. It emphasises the preservation and development of green spaces, including market gardening areas, within the spatial dynamics of these cities, contributing to health, food security, and environmental sustainability.

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