

Evaluating Nature-Based Greening Solutions in Nairobi's Informal Settlements:

Mitigating Urban Heat Effects and Enhancing Food Security

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Executive Summary

Nairobi's informal settlements are home to nearly 60% of the city's population, yet they occupy less than 6% of the total land area (UN-Habitat, 2020). These settlements face a disproportionate burden of climate-related challenges such as extreme heat, flooding, and food insecurity due to poor infrastructure, limited access to green space, inadequate waste management, and widespread poverty. Traditional infrastructure-based interventions are often costly and unsuitable for addressing the unique and complex needs of these communities. In this context, Nature-Based Solutions (NbS) present a cost-effective and sustainable approach to climate adaptation and mitigation. However, their use and effectiveness in informal settlements remain under research and underexplored, with most existing research focusing on formal urban areas with better infrastructure and governance structures.

This project was designed to assess the role and effectiveness of community-led NbSC interventions implemented by *Project Shambani*, a youth-led initiative, in mitigating climate impacts and improving community well-being. The study focused on two primary objectives: evaluating the environmental and social effects of greening interventions, and identifying barriers and opportunities for enhancing community participation and long-term sustainability of NbSC.

A mixed-methods research design was employed. Environmental data on air quality and temperature were collected using Sentinel-5P (TROPOMI) and Nasa. Household questionnaires were administered to capture demographic profiles, perceptions of greening projects, food security status, and livelihood changes. The data were cleaned and validated using. Descriptive statistics, chi-square tests, t-tests, and ANOVA were used to compare data between control and intervention sites. Qualitative data from focus group discussions and participatory sessions were analyzed using NVIVO with thematic coding to identify patterns related to motivations, barriers, and community stewardship.

Key findings indicate that food security is a major driver of engagement in NbSC interventions, with 52.3% of respondents identifying food benefits as their primary motivation. This was followed by climate change adaptation (39.6%), beautification of surroundings (29.7%), community spirit (26.1%), and income generation (19.8%). Intervention areas demonstrated localized improvements in temperature regulation and vegetation cover, showing potential for mitigating urban heat island effects.

The dissemination strategy for the project includes community feedback workshops to share findings in simple and accessible formats, policy briefs targeted at county and national governments, and academic publications to contribute to global knowledge. Digital outreach, including infographics and videos, will raise awareness among broader audiences. The findings will inform policy and practice, contributing to the achievement of Kenya's National Climate Change Action Plan, Vision 2030, and the UN Sustainable Development Goals (SDGs), particularly goals related to sustainable cities and climate action.