

TOWARD A RESILIENT URBAN SIERRA LEONE

Increasing resilience through nature-based solutions

AT A GLANCE

Country: Sierra Leone

Risks: Landslides, Flooding, and Erosion

Thematic Areas: City Resilience Program, Digital Earth and Nature-based Solutions

To combat landslide risk and rising urban heat stress, the Resilient Urban Sierra Leone Project is supporting the capital city of Freetown in the restoration of its canopy cover through community-based reforestation.



Sierra Leone, Freetown. ©viti / istock.com

GROWING CITY, GROWING RISKS

Sierra Leone's urban population is growing rapidly. The national census shows that more than 40 percent of the country's population now live in urban areas. This migration of people from rural to urban areas has been attributed to the promise of better economic opportunities in the cities. Rapid urbanization has not come without its challenges, however, as unplanned growth has resulted in the expansion of settlements into unsuitable areas, including steep, landslide-prone areas, flood-prone river basins, and estuarine shores. This has caused deforestation, an increase in related natural hazards, and a greater number of residents living in precarious living conditions without access to basic services.

As cities grow, the built environment typically grows at the expense of the natural environment and the ecosystem services it provides. For instance, in the capital city of Freetown, 12 percent of canopy cover was lost between

2011 and 2018. This loss of green space in the city has exacerbated geohazards and climate-driven risks, especially for residents already living in unsuitable and precarious conditions. The decline of vegetation and its roots—which act to bind sediments, absorb water, and reduce wave energy—has resulted in an increased severity and impact of landslides, flooding, and coastal erosion.

REDUCING RISKS WITH COMMUNITY-BASED ACTION AND DISRUPTIVE DIGITAL TECHNOLOGIES

Acknowledging the growing challenges, the Freetown City Council established a plan to plant and grow 1 million trees as part of its Transform Freetown Strategy for 2019–2022. With financial support from the World Bank and the Global Environment Facility (GEF), and with technical assistance from the Global Facility for Disaster Reduction and Recovery (GFDRR), the Resilient Urban Sierra Leone Project (RUSLP) is working to assist the city to achieve its goal. To date,



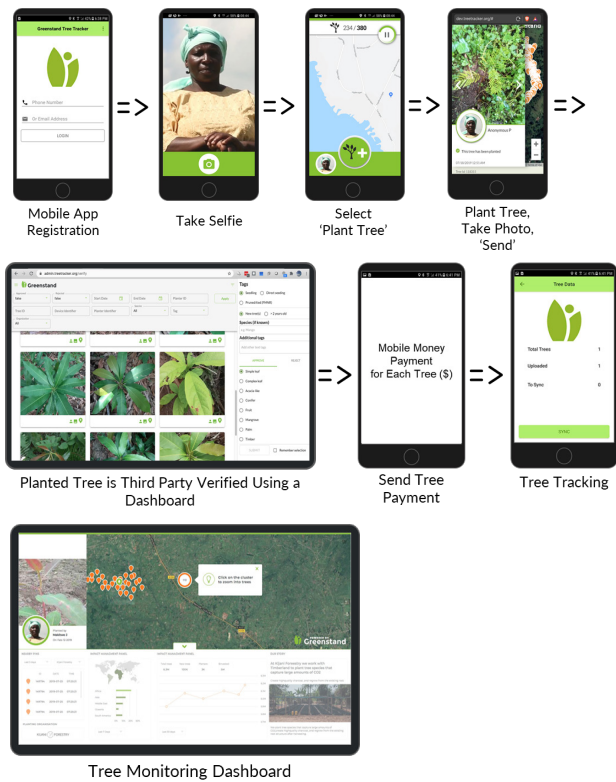
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RESULTS IN RESILIENCE SERIES



FIGURE 1. Innovative digital tools can support community-based nature-based solutions



Note: In partnership with the nonprofit Greenstand, the TreeTracker app was used to support the community-based reforestation.

more than 898 residents—mostly local residents—have been mobilized, trained, and paid to plant a variety of vegetation—including mangroves, shrubs, and other trees—throughout the city.

The project has also taken a step beyond typical projects of its kind by trialing disruptive technologies, such as the mobile-based TreeTracker app developed by Greenstand. This app provides a long-term monitoring system that incentivizes and tracks the growth of the vegetation planted by establishing digital cash micropayments to participants who nurture the new plants, and allowing third-party verification of tree growth to validate data and ensure results on the ground (see figure 1). In addition, each documented tree is tagged with a unique tree ID called an “impact token.” These tokens can be bought, sold, and traded, and can fund additional trees. So far, 5,000 of the tokens have been bought, which will fund more tree planting. The project also used GFDRR financing to pilot innovative artificial intelligence–based urban tree canopy mapping, which will support improved and cost-effective urban forest monitoring.

Phase 1 and Phase 2 of the plantings have been completed, with much success. To date, the TreeTracker app has recorded the planting of 567,000 trees, shrubs, and

grasses. This has included 66,000 mangroves in the city's estuary areas. The restoration has taken place across 300 communities across and surrounding the city, and includes schools, government buildings, and private properties. The success of this effort has given the city hope that, along with improved institutional capacity and infrastructure, restoring green space through community-based nature-based solutions will achieve the goal of reducing climate and disaster risks. Follow-up work will build support for the establishment of a more formalized urban forestry sector, including supportive guidelines and policy recommendations

LESSONS LEARNED

Risk-informed restoration and ecological analysis is critical for successful nature-based solutions for resilience projects

Identifying the areas where nature-based solutions can provide a substantive reduction of climate and disaster risks is important, as not every restoration project can produce the intended benefits and be considered a nature-based solution for resilience. It is also equally important to consider carefully the species that are selected, based on which possible vegetation options will best reduce risks along with their required growth conditions, potential negative ecosystem services, and impacts/opportunities for biodiversity enhancement.

Digital disruptive technology is critical for successful community-based nature-based solutions

Utilizing new digital technologies that could be used by community participants provided a way for the project to track tree planting and growing, establishing micropayment incentives for tree growers and creating a credible system for managing the tree impact tokens available for purchase to finance additional tree planting. Pilot tree canopy mapping performed as part of the project enhances digital tracking methodologies that will support future urban forest management and community-based tree planting and results reporting. Finally, the use of the spatial tagging of trees has been key in creating a tree inventory, which can be used to inform decision-making.



LOCAL CAPACITY BUILT

The GFDRR Africa Caribbean Pacific (ACP)-European Union (EU) Program funded a rapid assessment, called the Post-Mudslides and Floods Needs Assessment (PFNA), and the Informing Resilient Recovery Policy, Planning, and Investments in Freetown assessments, which supported establishing a new National Disaster Management Agency (NDMA) and building the capacity of the city government and local communities to enhance the use of spatial data for risk-informed decision-making. Additionally, 800 community climate action ambassadors were trained as part of the project activities.

RISK-INFORMED INVESTMENTS

The Freetown the Tree Town project focused its efforts on restoring vegetation in the upper catchment and high-slope areas identified in the Sierra Leone Multi-City Hazard and Risk Assessment, along with the support of GFDRR's ThinkHazard! tool, to address flood risk, landslide susceptibility, and threats to the water supply.

MAXIMIZING FINANCE FOR DEVELOPMENT

To support long-term sustainability and scale up of this effort, the project team is supporting city officials in acquiring additional financing from private and other public sector sources. This effort has included a successful bid for the Bloomberg Philanthropies Mayors Challenge for \$1 million dollars and the African Forest Landscape Restoration Initiative, or AFR100, financing, which will support planting and growing another 100,000 trees in the next year. Moreover, external investors are already purchasing tree impact tokens that will support sustainable tree financing.



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