



Tropentag, September 11-13, 2024, hybrid conference

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Integrating field observations and community insights to evaluate mangrove ecosystem health and conservation strategies in Funzi Bay, Kenya

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Abstract

Mangrove ecosystems are vital coastal habitats that provide various ecological services and support the livelihoods of coastal communities. These ecosystems, however, face significant pressures from both human activities and natural processes. This study presents an interdisciplinary approach to assess the health and conservation strategies of mangrove ecosystems in Funzi Bay, Kenya, integrating scientific research with local insights to enhance our understanding of these complex systems. The research uses remote sensing for quantitative analysis and detailed field observations to gain qualitative insights into the mangrove structure, environmental pressures, and socio-economic dependencies in Funzi Bay. Remote mapping techniques assess land use and environmental pressures in a 15 km radius around the mangroves, while transect surveys analyze forest structure, species composition, and the impacts of tree cuttings. The local community and fishermen contribute through questionnaires, helping to understand the socio-economic ties with the mangrove ecosystems. In addition to these methods, a system dynamics model will evaluate the impacts of various pressure drivers on the mangrove system, aiming to inform effective conservation strategies and policy decisions that align with sustainable development goals. The study aims to enhance the resilience of mangrove ecosystems by incorporating diverse types of evidence, including biological, geographical, and sociological data, to address the complexities of these ecosystems. The anticipated outcomes include an assessment of the mangrove forest structure, the ecological characteristics, and the environmental pressures affecting the mangrove ecosystem of Funzi bay. Insights from local communities will show socio-economic interdependencies and can be used for strategies to balance conservation efforts with community livelihoods. This will contribute to a broader understanding of the role of mangrove ecosystems in coastal resilience and the importance of integrating scientific research with local knowledge for effective conservation and management strategies. By using a methodological approach that integrates different sources of evidence, this thesis will provide a complete view of the ecological, socio-economic, and environmental dynamics, helping with future efforts to preserve these critical ecosystems for the benefit of both nature and local communities.

Keywords: Human pressures, Kenya, reforestation, SDGs, sustainability