

Policy Brief

IMPACT OF LAND USE LAND COVER CHANGE ON CARBON STOCKS AND FOREST PRODUCTS-RELATED LIVELIHOODS IN THE CENTRAL AND UPPER RIVER REGIONS IN THE GAMBIA

Author: Mr. Baba Drammeh,

Executive Summary

The Central and Upper River Regions (CRR and URR) of The Gambia have undergone major land use and land cover (LULC) transformations between 2002 and 2024, with projections to 2034 showing continued pressure on forested landscapes. These changes are driven largely by agricultural expansion, fuelwood extraction, and settlement growth. Using remote sensing (TerrSet CA–Markov) and the InVEST Carbon Storage and Sequestration Model, this study quantified the impacts of LULC change on carbon stocks and forest-based livelihoods. Results show significant declines in forest and woodland cover, leading to reduced carbon storage and weakened ecosystem-based livelihoods. The findings underscore the urgent need for integrated land management and reforestation strategies to safeguard The Gambia’s carbon reserves and improve rural income stability.

Background

Forests and woodlands in The Gambia play a vital role in mitigating climate change and sustaining livelihoods through fuelwood, timber, fruits, and medicinal plants. However, rapid population growth, poor land-use regulation, and limited enforcement of forest policies have intensified deforestation and land degradation in CRR and URR. Between 2002 and 2024, forest cover declined by approximately 18%, while cropland expanded by over 25%, leading to an estimated carbon stock reduction of 14,400 tons. If current patterns persist, carbon sequestration potential will continue to decline by 2034, undermining national climate goals and rural economies.

Methodology

Data Sources: Landsat satellite imagery (2002, 2013, 2024) and CA–Markov projections (2034). Tools: TerrSet software for LULC classification and prediction; InVEST model for

carbon estimation. Carbon Pools: Aboveground, belowground, soil, and dead organic matter. Livelihood Data: Household surveys assessing reliance on forest products (fuelwood, fruits, poles, and wild food).

Key Findings

Forest and woodland areas declined significantly from 2002 to 2024, leading to substantial losses in carbon stock and a decrease in non-timber forest products (NTFPs). Cropland expanded quickly, while agroforestry grew modestly, showing potential for carbon recovery. The overall regional carbon stock dropped by about 14,400 tons.

LULC Type	2002–2024 Trend	Carbon Stock (tC/ha)	Observed Impact
Forest	-18%	85.2	Major carbon sink loss
Woodland	-12%	56.7	Reduced biodiversity and NTFPs
Cropland	25%	10.4	Increased emissions, soil degradation
Agroforestry	6%	45.9	Moderate carbon gain potential

Policy Implications

The decline in carbon stocks threatens The Gambia’s contribution to its Nationally Determined Contributions (NDCs) under the Paris Agreement. Weak forest governance and limited adoption of sustainable farming accelerate degradation. Integrating carbon accounting into regional planning can strengthen climate and livelihood outcomes.

Recommendations

1. Adopt an integrated land-use framework that balances agriculture, forestry, and conservation. Promote community-based reforestation and agroforestry incentive

schemes. Establish regional carbon monitoring systems using satellite data and local reporting. Improve alternative livelihood programs to lessen reliance on forest exploitation. Build capacity for district and national institutions to utilize remote sensing and carbon modeling tools.

Conclusion

Protecting forests and promoting sustainable land management in CRR and URR is crucial for meeting The Gambia's climate goals and ensuring livelihood resilience. Evidence-based policies, strong institutional capacity, and community participation will be key to reversing land degradation and securing long-term carbon and economic benefits.

References

Food and Agriculture Organization of the United Nations. (2022). *The State of the World's Forests 2022: Forest pathways for green recovery and building inclusive, resilient and sustainable economies*. FAO. <https://doi.org/10.4060/cb9360en>
ResearchGate+2Open Knowledge FAO+2

Intergovernmental Panel on Climate Change. (2022). *Climate Change 2022: Mitigation of Climate Change* (Working Group III contribution to the Sixth Assessment Report). Cambridge University Press.

Dampha, Nfamara K (2021) 'Change detection (1985-2020): Projections on land-use land cover, carbon storage, sequestration, and valuation in Southwestern Gambia', *Sustainable Environment*, 7(1). doi: 10.1080/23311843.2021.1875556.