



# POLICY BRIEF

## Saloum Delta Woody tree Cover enhancement: A Pathway for emission reductions

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### Executive Summary

- In the Saloum Delta, Mangroves showed a significant increase along with plantations.*
- Open Woodland shows trends of increase and decrease, indicating disturbance.*
- Pattern analysis with metrics revealed insights on woody cover connectivity.*
- Current Mangroves and plantation pattern, key for land-use planning and greening policy*

### Background

Climate change, driven by greenhouse gas emissions from fossil fuels and land-use changes, poses significant challenges, particularly in Sub-Saharan Africa where rising temperatures and altered precipitation disrupt agriculture and ecosystems (IPCC 2023). Agriculture, Forestry, and Other Land Use (AFOLU) contributes 23% of global anthropogenic emissions (IPCC 2019).

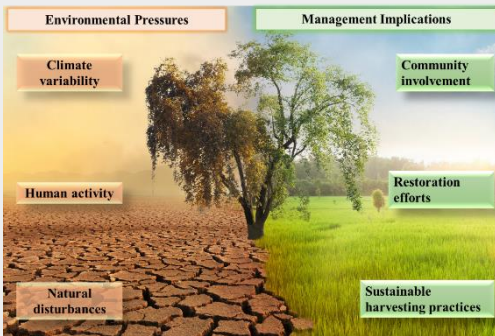


Fig. 2: Main existing interaction between Trees, Environmental stress and Management

Woody vegetation patterns and carbon storage are directly affected by climate change, altering ecosystems (Sun et al. 2021). Adaptive strategies like agroforestry, sustainable forest management, and biodiversity promotion enhance resilience and support mitigation efforts (Keenan 2015; Ontl et al. 2020). Policy interventions such as REDD+ and sustainable land-use practices are crucial for preserving carbon stocks and achieving climate goals (IPCC 2023).

### Context/Scope

The Senegal's enhanced Nationally Determined Contribution (NDC) aims to reduce greenhouse gas emissions by up to 29% by 2030, focusing on carbon sequestration, renewable energy, and improved waste and industrial practices. This brief examines the Saloum Delta, a region with under-researched vegetation dynamics. The objective is to analyze woody tree (Mangrove, Close Woodland, Open Woodland, Plantation) patterns and trends in the Saloum Delta to support carbon sequestration strategies and align with NDC goals.

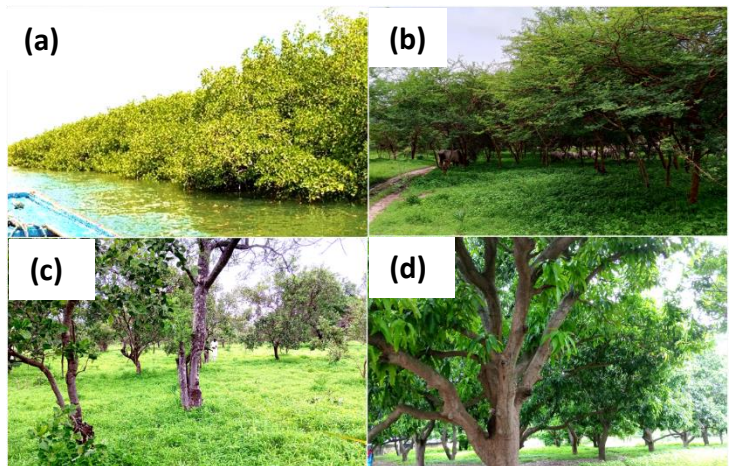


Fig. 2: Different woody covers in the study area  
With (a): Mangroves; (b): Close Woodland; (c): Open Woodland; (d): Plantation

### Approach/Methodology

Random Forest Algorithm for land-cover classification in Google Earth Engine was used to run the woody cover classification. Subsequent refinement in QGIS, area calculation, transition statistics and landscape metric calculation were done in R software.

## Results and Findings

The Fig.3 shows the dynamics of the different woody tree cover in the Saloum Delta. The results show a significant increase in Mangrove and Plantation coverage.

In Mangroves, the coverage increased from 548.29 Km<sup>2</sup> in 2002 to 628.43 Km<sup>2</sup> in 2022. Mangroves in the study area and in the specific period of our study has shown an increase, mainly toward the northern part of the locality. Over time, the quality and coverage of the mangroves ecosystem within the Saloum Delta have shown improvement, owing in part to initiatives like mangrove protection measures and development projects (Dieye et al. 2013). Studies have shown that between 1988 and 2018, mangrove forest areas experienced a notable overall increase of 51.21% across The Gambia, Saloum, and lower regions (Kauffman and Bhomia 2017).

Plantation increased from 16.24 Km<sup>2</sup> to 62.61 Km<sup>2</sup>. High plantation densities, yields, and the socioeconomic aspects of cashew cultivation are also been reported (Oumar et al. 2018). The Saloum Delta is experiencing greening due to Cashew cultivation initiated by the Senegal-German cashew project (PASA) in 1979 (Coly 2016).

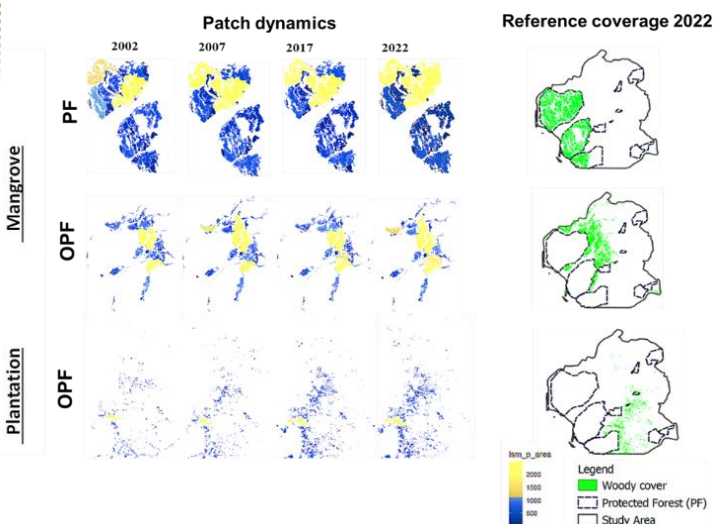


Fig.4: Pattern of the patch dynamic in Mangrove and Plantation in the study area

In contrast Close Woodland showed a slight increase while there is fluctuating trend of Open Woodland. adjacent savannah areas typically exhibit lower levels of woody vegetation coverage on average. The depletion and looming disappearance of woodlands and pastures between villages in Senegal's groundnut basins underscore the challenges confronting these ecosystems as a result of human activities (Badji et al. 2014).

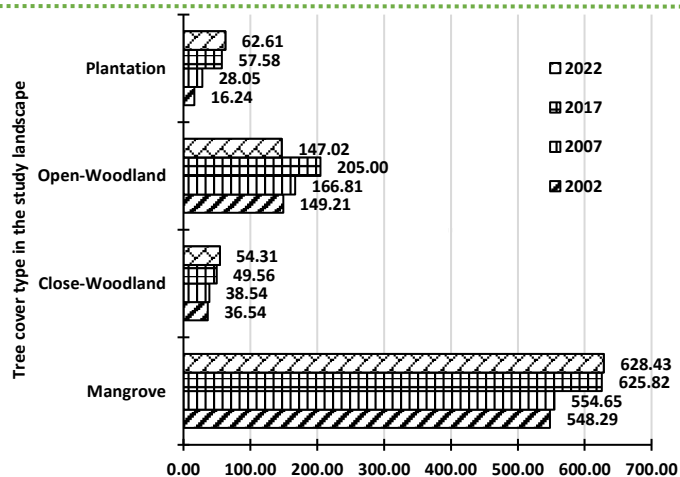





Fig.3: Coverage of the different woody covers in the study area

The Fig.4 is showing the level of connectivity of the vegetation formation from low connectivity (blue) to high (yellow). In PF, Mangrove showed more cohesive landscapes in northern side which progress Eastward over time. This ecosystem is well-suited to the low-oxygen conditions found in waterlogged mud and tends to flourish in the upper portion of the intertidal region. This specialized adaptation allows mangroves to form dense, cohesive stands in coastal areas. While mangrove overgrowth can result in a more uniform landscape structure, it also promotes the development of cohesive patches (Shih et al. 2019). In OPF, some high connectivity of mangrove patches is also observed and need more attention.

Pattern of plantation is characterized by increase number of small patches progressing Eastward. The development of plantation contributes significantly to greening of the area and by consequent to land restoration if cultivated trees don't have any impact in the health of the soil and the ecosystem in general.

## Policy Recommendations

-  **Strengthen Conservation Initiatives for (Mangroves -Close Woodlands: Enhance connectivity (protected zones) preserving biodiversity and mitigating carbon emissions.**
-  **Implement Socio-Economic Incentives for Reforestation and Afforestation: Plantations in response to socio-economic factors. Involve local communities for sustainable land management and reduce the adverse effects of agricultural expansion.**
-  **Find out drivers of woody depletion and Sustainable Land Management Practices: Prevent fragmentation and degradation of open and close woodlands in PF, controlled drivers, and the use of buffer zones.**

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