Sustainable mangrove conservation and inclusive development in the Sherbro River Estuary

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This policy brief reviews the socio-economic challenges of local communities co-located in critical ecosystems.

The authors examine the case of sustainable mangrove conservation in the Sherbro River Estuary, evaluating the potential environmental benefits of mangrove conservation against the use cases for mangroves by local communities.

To address the challenge of balancing productive use and environmental benefits, we propose a holistic approach that integrates inclusive development and mangrove conservation strategies.

Key findings reveal that:

- The region grapples with income disparities, with 45% of households reporting a decline in income over the past five years.
- Land tenure insecurity is prevalent, with 40% fearing the loss of collecting firewood rights.
- Local communities are highly dependent upon mangroves for household activities, including firewood for cooking, construction materials, and food harvesting.
- Despite awareness of mangrove benefits, there is a lack of concern for conservation, and governance structures to protect mangroves are largely absent.

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Introduction

In recent times, there has been a growing global focus on the significance of mangrove forests in terms of their capacity to sequester carbon in the form of biomass and detritus (Hamilton and Friess, 2018; Sharma et al., 2020). Despite covering only 3% of the world's surface, they contain up to one third of global soil carbon, making them valuable assets for climate change mitigation strategies (UNEP, 2022). These ecosystems also play a crucial role in providing essential services to local communities, including regulating extreme weather events, mitigating the impacts of floods and rising sea levels, supporting fish populations by providing breeding habitats, and providing fuelwood, food, and construction materials.

In Sierra Leone, the coverage of mangrove forests has experienced fluctuations over the past four decades. Notably, in the Sherbro River Estuary, we estimated that mangrove ecosystems lost approximately 20% of their cover between 2000 and 2020, based on data from Vancutsem et al. (2021). Agricultural projects, mining activities, charcoal production, and fish production are identified as significant threats to mangrove forests. Furthermore, the ownership structures of mangrove ecosystems do not effectively encourage conservation.

Consequently, various stakeholders have shown interest in developing strategies to mitigate deforestation, such as through the implementation of REDD+ projects. However, conservation projects often suffer from various weaknesses that can have detrimental economic and political effects on local communities, reproducing neo-colonial forms of power. First, the value given to mangrove ecosystems is mostly framed through the value of carbon sequestered per hectare, as defined by donors, private firms, and international organisations. This is largely driven by the expansion of the private market for carbon offsets via the voluntary carbon markets. However, such a view does not encompass local benefits derived from mangroves, such as protection against storms and floods. This valuation neglects the differences in responsibilities between high-income and low-income countries regarding global warming and the biodiversity crisis. Beyond their climate service benefits, mangroves are valuable to local communities as a source of material or food, which is not captured in the cost of offsets. Finally, conservation strategies may focus on minor causes of deforestation, thereby inadvertently imposing challenges on local communities. For instance, launching a cookstove initiative to reduce the demand for fuelwood may not be an effective approach when deforestation is largely attributed to major land-use alterations, like mining activities.

Therefore, one of the primary challenges lies in establishing mutually beneficial situations for both local communities and the mangrove ecosystem. This challenge becomes particularly significant, considering that local communities are not responsible for global warming, have one of the lowest ecological footprints on the planet, and often live in impoverished conditions.

Conservation projects that generate a global good – carbon sequestration – should not come at the cost of local populations' ability to sustain their livelihoods. This policy brief outlines the urgent need to balance conservation efforts with inclusive development to both sustain these environmental resources and ensure vulnerable populations are able to adapt to climate change through improved living standards. It focuses on the main development issues in the Sherbro cultural areas and how synergies can be met to reduce pressure on mangrove forests.

Methods

The research area encompasses 39 hard-to-reach small villages (with less than a total of 200 households) that are socio-economically dependent on mangrove resources in the Sherbro River Estuary. The area comprises eight distinct chiefdoms. The data collection aimed to explore the intertwined relationship between livelihood strategies, socio-economic needs, and material dependence on mangrove ecosystems, which are key elements to developing fair, effective, and sustainable development projects. We used a mixed-method approach, with both qualitative and quantitative data collected at the household and village level. We interviewed heads of households and village leaders to gather data on socio-economic conditions, livelihood activities, relationships with mangroves, and political attitudes. We also developed a participatory land planning activity aimed at gathering the current main livelihood stategies, their primarily socio-economic needs, and conservation and development preferences of youths, women, and leaders.

Key findings

Communities predominantly engage in fishing activities (60%), with a smaller proportion involved in self-employment (16%) and agriculture (12%). These activities are characterised by minimal capital investment, resulting in low productivity. Over the past five years, half of the respondents have reported a decline in income, frequently attributing this to the diminishing fish populations, which threatens income generation. Additionally, households depend on mangrove resources for fuelwood (84%), construction materials (71%), and, to a lesser extent, income generation (37%) and food (30%).

When queried about preferred development approaches, the majority favoured mechanised fishing (85%), followed by the provision of farming inputs (69%), fishing inputs (62%), and microfinance mechanisms (61%). Mechanised farming (33%) and food processing (27%) were identified as secondary development priorities.

Socio-economic conditions

In the Sherbro River Estuary, a significant proportion of households are confronted with insufficient access to essential requirements such as food security, energy, employment opportunities, and education. Concretely, more than half of the respondent samples do not have access to drinking water, more than 80% are considered as at least moderately food insecure, around 80% did not attend any school years, and more than 90% do not have access to electricity in their house. Within the household survey, the average monthly income is 597 Leones, with a median income of 429 Leones (around USD 20 per month). Approximately two-thirds of the population lives on less than one US dollar equivalent. Lastly, we note that a third of the surveyed population lacks adequate political representation, leaving it uncertain whether this deficiency is viewed as a pressing issue.

State of mangrove forest

At present, the extent of forest coverage encompasses around 30% of the overall territory. When specifically considering the Sherbro River estuary, it accounts for approximately 50% of the land area (based on Vancutsem data). Notably, deforestation rates have been notably high in the vicinity of the estuary, leading to a decline in forest cover from 53% of the total area in 2000 to 23% in 2020. Within the core region of the estuary, deforestation has been relatively less pronounced, resulting in a reduction in forest cover from 69% in 2000 to 52% in 2020.

Mangrove use

The mangrove ecosystem is fundamental for the livelihood of communities, with 87 % of the households stating that they have gathered mangrove products in the past year. Nearly all respondents indicate their utilisation of mangroves for obtaining firewood, while a comparatively smaller proportion utilises them for construction purposes. Approximately 41% of the respondents rely on mangroves as a source of cash by selling timber (mostly) and, to a lesser extent, non-timber forest products, highlighting the significant value of mangroves for numerous households in the area and the challenges they face in generating an adequate income. Additionally, one-third of the households utilise mangroves as a source of food, while one-fourth use wood from the mangrove forest to build fishing gear. Non-timber forest products significantly

contribute to the income of one-third of the individuals in our study. The annual income generated from the collection of non-timber forest products amounts to 1,598 Leones, constituting a substantial portion of their total annual income.

Conservation attitudes

While community members are aware of mangrove's material benefits, there is a lack of awareness regarding the benefits of mangroves for mitigating soil erosion and extreme weather events. Approximately 56% believe mangrove forests decreased in the past five years, and only 35% feel mangroves are under threat. Furthermore, half of the respondents surveyed experienced flood events in the past years and most of the respondents are concerned about those events.

Mangrove governance

Mangroves are mostly characterised by an open-access system, with few regulations governing resource extraction. In some villages (mostly in Yawry Bay), the paramount chiefs implemented by-laws to forbid access to mangrove resources such as wood to cope with deforestation issues. In such places, town chiefs who are formally in charge of monitoring and enforcing such laws said that in the absence of the development of alternative economic activities, they could not enforce such laws, fearing social unrest in their communities. Beyond these isolated instances, we lack comprehensive documentation on why paramount chiefs opted to enact by-laws that town chiefs were unlikely to enforce and that the local population was unlikely to adhere to.

Policy recommendations

Inclusive development strategies

- Promote sustainable fishing practices: the mechanisation of fishing activities and the provision of cooling facilities to preserve fish were highlighted as key development priorities. Such development activities should be provided along with stronger regulation against big foreign fishing boats and the use of chemicals that negatively impact the fish population. Further research should be done to understand the root cause of the diminished fish population and feasible governance interventions. A large proportion of respondents are also willing to engage in aquaculture practices, but its compatibility with the health of the mangrove ecosystem should be further assessed.
- Promote Sustainable Farming Practices: The challenge of providing sustainable farming inputs is critical. Encouraging self-sustaining and sustainable practices, such as improved seeds, crop rotations, natural pest control, and organic farming, are essential solutions for enhancing

socio-economic independence and meeting the needs of local communities.

- Enhance Soil Fertility: Local farmers have access to a lot of by-products that can be used to improve soil fertility and productivity (for example, crushed shells and fish waste) that can be used soil fertility. Farmers can be supported by training on the use of fertilisers and techniques to improve soil fertility. Encourage the use of compost and natural soil enrichment methods to increase crop yields.
- Commercialisation of local by-products: By-products from fishing activities are demanded in the national market. Support in linking farmers to the national markets for crushed oyster shells, for example, can provide additional sources of income.

Mangrove conservation and restoration

- Enforcement of stronger regulations: Successful enforcement of mangrove access regulation depends on the success of alternative livelihood strategies. We don't recommend the implementation of stronger regulations without the consent of communities and the promotion of successful development and income-generating projects.
- Community-Led Reforestation: Communities are largely dependent on mangrove forests for fuelwood. Mangrove restoration and reforestation projects could mitigate the impact of the wood demand. However, concrete financial incentives are required to promote such activities.

Community engagement and governance

- Mangrove Education Programs: Develop and implement educational programs that raise awareness about the vital role of mangroves in the ecosystem. This can lead to greater appreciation and support for conservation efforts, especially considering that only 8% of the respondents have already attended climate adaptation workshops.
- Participatory Governance: The literature debates which authorities best represent communities in creating equitable, sustainable conservation programs. Recognising community diversity, our findings suggest that chieftaincy authorities – town chiefs, youth, and women leaders, all together – are effective in representing diverse groups, particularly the historically marginalised, in crucial conservation aspects: deforestation and livelihood development.
- Integration of Local governance into global governance: Local governance should be part of the global governance for the conservation of areas with high environmental values. The benefits deriving from conservation include both global environmental and monetary benefits from, for example, the carbon credit market. For the

latter, local communities should know about these benefits and be involved in decisions about how those can be invested locally. Transparency between local and global actors is key both in setting the right incentive and creating accountability for local and global welfare.

Conclusions

The Sherbro River Estuary faces a challenging path ahead. Integrating inclusive development with mangrove conservation is pivotal for the sustainable future of the region and enables decoupling between socio-economic development and mangrove conservation. Collaboration, clear governance, and targeted investments will help strike a balance between conserving this vital ecosystem and improving the livelihoods of local communities.

References

Hamilton, S.E., & Friess, D.A. (2018). Global Carbon Stocks and Potential Emissions Due to Mangrove Deforestation from 2000 to 2012. *Nature Climate Change*, *8*(3), 240–44. https://doi.org/10.1038/s41558-018-0090-4.

Sharma, S., MacKenzie, R.A., Tieng, T., Soben, K., Tulyasuwan, N., Resanond, A., Blate, G. & Litton, C.M. (2020). The Impacts of Degradation, Deforestation and Restoration on Mangrove Ecosystem Carbon Stocks across Cambodia. *Science of The Total Environment*, 706, 135416. https://doi.org/10.1016/j.scitotenv.2019.135416.

UNEP (2022). *Global Peatlands Assessment – The State of the World's Peatlands: Evidence for action toward the conservation, restoration, and sustainable management of peatlands. Main Report.* Global Peatlands Initiative. United Nations Environment Programme, Nairobi.