

SLURC/DPU Action-Learning Alliance

Strategic pathways to

disrupt risk in Freetown

MSc Environment and Sustainable Development
Practice Module 2019-20

POLICY BRIEF N^o3

Ecosystem Services Management

Key points

- Freetown's rapid urbanisation and demographic growth have been coupled with the production of risk accumulation cycles that are underpinned by spatially and socially unequal development.
- Meeting the needs of local communities while maintaining the integrity of the natural environment can be challenging given the environmental impacts of certain livelihoods.
- Ecosystem services management can promote environmental resilience and reduce the degrees of exposure and vulnerability to urban and environmental hazards.
- To be effective, the policy pertaining to ecosystem services must address governance issues and ensure a clear distribution of responsibilities.
- The management of ecosystem services should also consider a more decentralised approach, as it can lead to greater efficiency and equity for all. The recognition, involvement and participation of local communities is crucial to achieve environmentally and socially just outcomes.
- In addition, the notion that "informal systems" are externalities that require fixing and formalisation needs to be challenged.
- A multi-structured, coordinated and inclusive approach is key. Freetown should seek to establish a platform where such dialogue and knowledge co-production can take place.



Figure 1: Freetown, 2016. Photo Credit: N'fa Alie Koroma.

Introduction

Ecosystems provide essential services to the population of Freetown, ranging from food and clean water, to soil stabilisation and natural barriers against floods. However, the natural landscape of the city and its periphery have suffered under the pressure of rapid demographic growth, years of resource exploitation, poor management practices, and inadequate regulatory frameworks. There is a growing need for sustainable and just ecosystem management – not only to protect Freetown's natural resources, but also to ensure the livelihoods that depend on it.

Building upon the research conducted by our colleagues under the SLURC/DPU Learning Alliance, this policy brief discusses the potential of ecosystem services management to restore Freetown's natural capital and to disrupt risk accumulation in low-income areas. Ecosystem services and related urban environmental risks are analysed thematically and spatially, and a comprehensive review of the city's governance landscape is provided. This policy brief then draws on initiatives implemented in cities facing similar challenges and outlines several strategies that would help achieve environmental resilience as well as social and environmental justice in Freetown.

Authors

Aymeric Amand, Sally Louise Roscoe, Yie Vin Chua, Natalie Kwong, Eliot Froment, Pui Sum Cheng, Nicolás Rodríguez González



1. Ecosystem Services in Freetown

Ecosystem services can be defined as the conditions and processes through which the natural environment sustains and enriches human life.¹ Figure 1 lists some of the services ecosystems provide to the residents of Freetown.

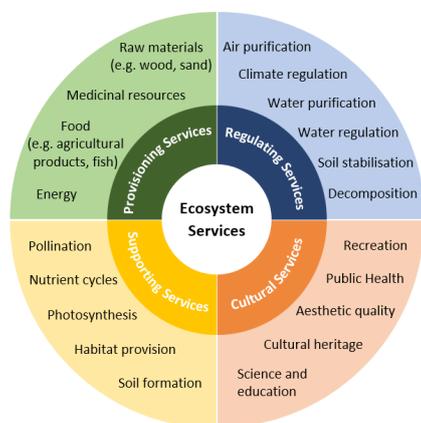


Figure 1: Non-exhaustive list of ecosystem services in Freetown. Classification inspired from the 2005 Millennium Ecosystem Assessment.²

Using an ecosystem approach forces us to conceptualise the natural environment as a system and to question the value of human interactions within that system.³ In turn, this allows us to examine who is involved in supplying and receiving ecosystem services, and to better understand how urban environmental risks are socially and spatially distributed.⁴

1.1 Ecosystem Services vs. Risk Accumulation

The city of Freetown spreads across a number of diverse and complex ecosystems. These can be grouped in three categories: marine ecosystems, coastal wetlands, and watershed forests. Table 1 shows the

different services each type of ecosystem provides and the different industries that depend on them. It also lists some of the drivers of risk accumulation – be them specific to that ecosystem or common to all ecosystems – as well as some of the constraints related to governance.

Marine ecosystems

Fishing, whether it is for commercial or touristic purposes, is a major activity in marine ecosystems. As high as 80 different species of fish have been recorded in the Sierra Leone River estuary, located North of Freetown.^{5,6} Recent studies reported a close correlation between fish abundance in the region and the large population of plankton species in West African waters.⁷ However, much of the country's infrastructural capacity was destroyed during the civil war, and total catches now amount for less than half of what they used to be.⁸ Climate change and the effects of ocean acidification are also posing new threats to the local marine ecosystems.⁹

In addition, these ecosystems are increasingly threatened by illegal fishing practices both in off-shore and in-shore waters. In 2015 alone, an estimated 42,000 tonnes of fish were illegally harvested.¹⁰ The in-shore exclusion zone, reserved for local boats, is regularly plundered by foreign fishing vessels that take advantage of the fact that the government in Freetown has little ability to police its fish-heavy waters. Estimates suggest that locals are losing nearly US \$30 million in revenue each year.¹¹ The government is toughening surveillance, but new regulations are yet to be implemented.

Coastal wetlands

Mangroves are a key ecosystem in Western Africa, and this is particularly true for

Freetown. Distributed along the coast from Cockle Bay to Levuma Beach, they form a natural habitat for many fish, shellfish and prawn species.¹² In addition, they host thousands of migratory and shore birds that attract tourists from all around the world.¹³ Freetown's mangroves also provide a wide array of ecosystem services to the local population. Mangrove wood is particularly sought after for its high resistance to termites and salinity, and it is also used as fuel for fish smoking.¹⁴ More importantly, the mangroves can address several risks linked to inland and coastal floods by creating buffer zones between the waterways and the settlements, and by strengthening banks against erosion.¹⁵

Yet many of these ecosystems have disappeared over the last decades (see Figure 2), due to the general lack of available space for Freetown's growing population and the continued demand for construction wood.¹⁶ The rate at which this resource is being exploited has exceeded the regeneration capacity of local mangroves, and the mass extraction of sand in coastal wetlands is further aggravating the risks of coastal flooding: by rapidly deepening the waters near the coast, it increases coastal erosion and prevents mangrove forests from regenerating.¹⁷ Despite this, sand mining remains largely unregulated and continues to employ many young men in Freetown.¹⁰

Global warming is posing an additional threat to these ecosystems, as sea levels continue to rise and droughts become more frequent.¹⁸ Furthermore, deforestation also occurs to clear land for urban agriculture: the fertile soil, rich in mineral salts, coupled with the atmospheric humidity and the constant presence of water makes these lands ideal sites to grow crops and raise livestock.¹⁹

Ecosystems in Freetown	Livelihoods / Industries	Localised Risks	Common Risks	Constraints (governance)
Marine Ecosystems	Fishery Maritime transport Tourism	Illegal fishing activities Marine pollution Ocean acidification		Fishing regulations International trade agreements
Coastal Wetlands	Fishery Sand mining Urban Agriculture Logging Tourism	Illegal fishing activities Deforestation Coastal erosion Flooding Hazardous urbanisation Solid waste accumulation	High population density Liquid waste disposal Air pollution	Fishing regulations Sand mining permits Logging permits Land tenure Building permits
Watershed Forests	Logging Tourism	Deforestation Land erosion Landslides Hazardous urbanisation	Climate change	Logging permits Land tenure Building permits

Table 1: Overview of the different types of ecosystems in Freetown, the various livelihoods and industries that depend on them, the risks present in each environment, and some of the constraints linked to governance.

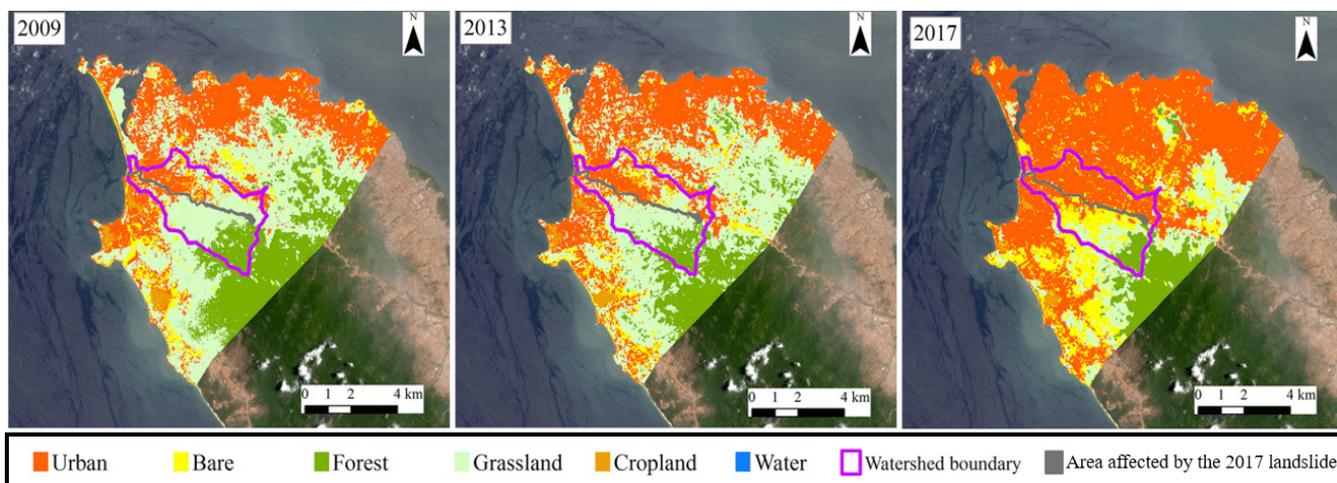


Figure 2: Changes in land use in Freetown over the period 2009-2017. The maps show the progressive expansion of the urban area into the mountains and along the coast as well as the area affected by the 2017 landslide within the Lumley Creek watershed. Source: Cui et al, 2019.¹⁶

Watershed forests

The watershed forests surrounding the city support a wide range of livelihoods and play a key role in sustaining regional biodiversity.²⁰ However, the once thickly forested hill slopes of the Freetown Peninsula have been massively deforested over the last decades (see Figure 2). Illegal logging activities coupled with poor urban planning and land encroachment have increased soil erosion and exacerbated both the effects and the prevalence of landslides in the geohazard prone area.¹⁶ In 2017, a mass mudslide occurred at the Western periphery of Freetown, resulting in at least 500 deaths and over 600 missing persons as well as the destruction of hundreds of houses.²¹ The area affected by the disaster is shown in Figure 2.

The unplanned expansion of settlements has also had major impacts on local biodiversity. The rapid changes in land cover inevitably diminishes the ecosystem's capacity to adapt, and studies show that biodiversity in Freetown has steadily declined over the last decades.²⁰ Many organisations have voiced their concerns over the environmental impacts of land encroachment, and added that the conservation of biodiversity is key to preserve the cultural identity of the region.²²

1.2 Interrelated Risks

As emphasised in Table 1, some causes and impacts of risk accumulation spread across different ecosystems. Likewise, addressing these risks will require collective strategies that are implemented across urban settlements. For instance, Freetown faces a growing issue linked to the disposal of waste uphill, which flows down through the low-lying settlements, and ends up in the ocean.²³ More than a simple problem of waste management,

this example draws attention to the elements that link settlements across the city, and to the way urban environmental risks are distributed both between and within these settlements.

In the absence of an adequate waste collection system and treatment facilities, much of the household and commercial waste is disposed in rivers and in the city's rare formal drainage channels.²⁴ It is interesting to note that the discussion around "formality" and "informality" somewhat loses its significance in this context. Indeed, it makes little difference whether the waste is flowing through these channels or in the form of surface run-off; either way, coastal settlements become the repository of every waste and risk.

The consequences for local ecosystems are great, although not always immediately noticeable. As hazardous chemicals stagnate and accumulate over time, they contaminate the water and modify the soil's pH.²⁵ Environmental impacts are then multiplied by coastal flooding and landslides, which carry the pollutants to previously untouched parts of the city and spread the associated health risks.²¹

2. Governance Landscape

2.1 Land Conflicts

While there is evidence to suggest that nature-based solutions can mitigate these risks^{15, 26}, it is crucial to examine the social composition and governance structures of these settlements to devise adequate long-term strategies.

Freetown has experienced significant demographic growth over the last decades

coupled with growing competition for land.⁸ Bordered by the Atlantic Ocean on one side and the hills of the Western Area National Park on the other, the topography of the city has limited its spatial expansion, forcing low-income groups to settle on marginal lands.²⁷ Freetown's rapid urbanisation thus led to the emergence of numerous unplanned, informal settlements, and this spatially and socially unequal development resulted in the production of risk accumulation cycles that trap entire communities in conditions of vulnerability.²⁸

The city has an active property market; however, building permits tend to favour middle- to high-income housing projects, making it difficult for poor communities to access and buy land.²⁹ In addition, many of the land sales are conducted illegally. This resulted in the distortion of land prices and caused numerous disputes as well as uncontrolled, haphazard urban development.³⁰ Figure 3 shows that informal settlements are often located in precarious areas that are prone to landslides, mudslides, and flooding. The map also indicates which areas of Freetown will require a complete rehabilitation in the future in the absence of adequate strategies.

In 2010, the Ministry of Land started working on a National Land Reform Project that aimed to establish a more equitable land tenure system. However, the plans were not implemented due to a lack of political will and limited resources.²⁹ The government has also attempted to secure land for farmers through the Wetland policy, which in theory gives them exclusive access to low-lying wetlands that are not suitable for buildings. However, illegal charges from previous owners and land encroachment continue to hinder this effort.³¹

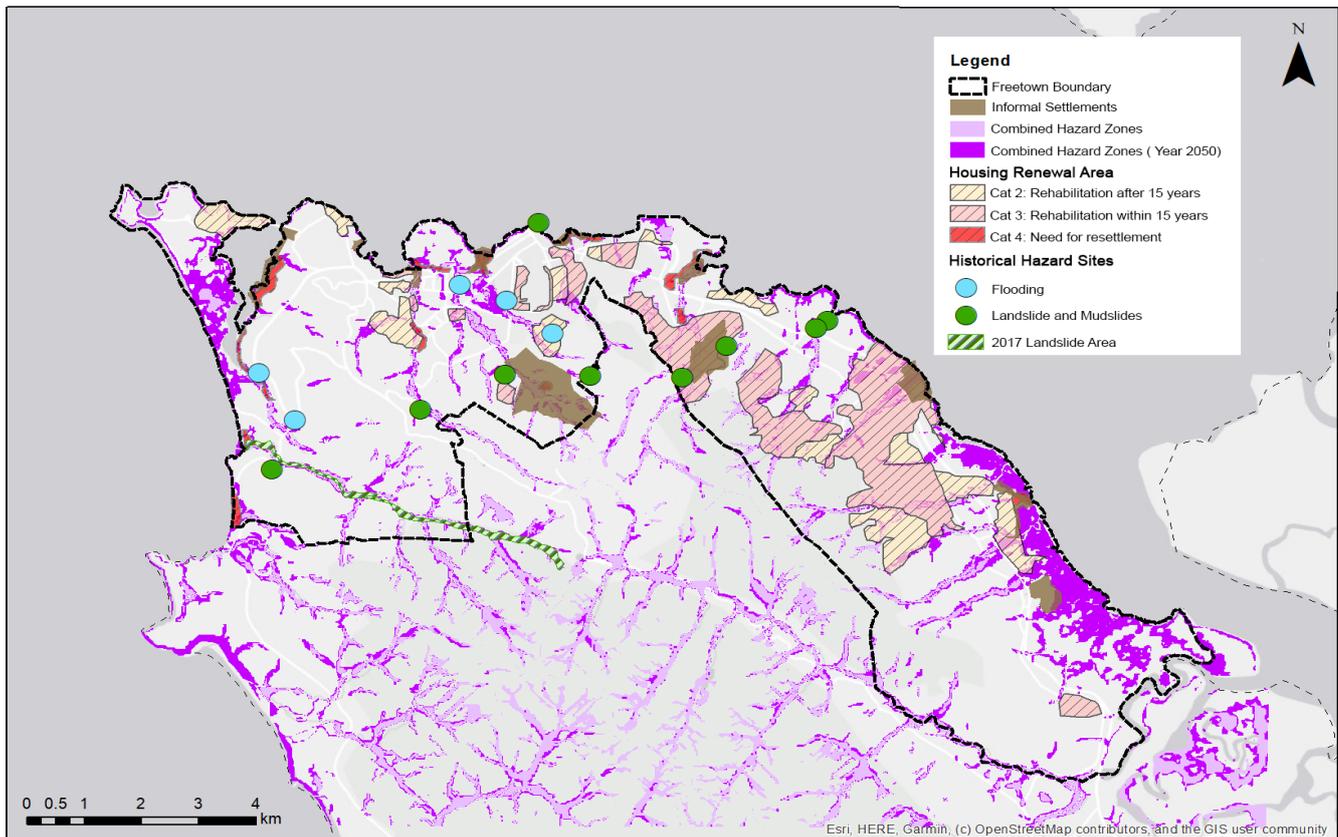


Figure 3: Housing and Hazard Map showing the location of historical floods and landslide in Freetown (as recorded until 2011) as well the area affected by the 2017 landslide (mapped using satellite imagery). The predicted combined hazard zones are defined by: spatial extent of a 100 year flood, landslide return period of less than 2000 years. The 2050 combined hazard zone accounts for climate change impacts for a year 2050 scenario.³² Housing renewal projects are indicated according to the plans described in the Freetown Structure Plan 2013-2028.³³

2.2 Overlapping Mandates and Regulations

Typically, in Sierra Leone, environmental laws are set by the government and define the rules for the use and the management of ecosystem services. Local ordinances then focus on the issuance of licenses for the management of specific natural resources.³⁴ This is the case for the sand mining and fishing industries in Freetown, for instance. In practice, however, the respective responsibilities of local and national agencies are unclear because their mandates often overlap. The lack of coordination between the different ministries and governmental agencies often results in the weak implementation and enforcement of regulations.^{35, 36}

For instance, sand mining permits are issued by the local government of Freetown, but the responsibility to protect coastal environments and to regulate the sand mining industry falls under the Ministry of Lands, country Planning and the Environment (MLCPE) and the Environmental Protection Agency (EPA). While the EPA has explicitly discouraged sand mining activities in coastal areas, Freetown's local government has distributed a number of permits to private actors.¹⁰

The EPA simply lacks the executive authority to implement strong regulations as well as the human and financial resources to monitor sand mining activities at local level.^{6, 28} In addition, the EPA often clashes with other ministries and agencies that have conflicting interests.³⁴ The cumulation of these factors makes compliance nearly impossible, which is why both formal and informal sand mining activities persist in Freetown.

Other sectors face similar challenges. Most of the legislation related to environmental issues is carried out by the MLCPE and the Ministry of Agriculture, Forestry and Food Security (MAFFS). However, their combined responsibilities have been subject to much criticism, particularly since the MLCPE has been accused of profiting from illegal sales of land in the Western Area forest reserve.³⁶ Deforestation is a major issue across the country: studies have showed that the natural rainforest cover has been reduced from over 70% some decades ago to about 4% at present.³⁷ In an effort to slow down deforestation in Sierra Leone and help combat climate change, the European Union has provided €4.2 million assistance to the Forestry Division of the MAFFS to help generate the conditions for “sound forest

governance” (cf. section on REDD+ in Table 2). Yet the regulatory frameworks remain outdated and poorly implemented.

The 1988 Forestry Act stipulates that no person can burn or cut down trees without the Chief Conservator's permission, yet critics have pointed out that these measures are loosely applied and favour the commercial use of forest land.^{35, 36} While the Forestry Act is supposed to restrict the use of ecosystem services and protect vulnerable communities whose livelihoods depend on these services, the international trade of timber has rapidly grown in Freetown and increased risk accumulation in the watershed areas.³⁴ Since 2013, however, the government has been working on a series of promising policies and strategies – including the Freetown Structure Plan and the Transform Freetown initiative (see Table 2) – that promote the sustainable use of natural resources and signal a potential shift in the way ecosystems will be governed and managed.

2.3 Reflections on Social and Environmental Justice

Studying urban environmental risks through the lens of ecosystem services

is useful to reveal the value of natural resources and the fragility of the ecosystems that produces them.⁴ However, as previously demonstrated, ecosystem services tend to benefit some stakeholders more than others. In addition, they are not always all equally involved in the decision-making process related to the management of ecosystem services. To avoid further marginalising the marginalised, ecosystem services management must therefore be coupled with notions of social and environmental justice.

Placing social and environmental justice at the core of our research framework provides a useful analytical perspective to assess (1) how and why urban risk traps in Freetown are produced, (2) where and with what socio-ecological consequences, and (3) to what extent better managing ecosystem services could promote transformative change.⁴⁰ By revealing ecological and social trade-offs, this approach ensures that these entrenched distributive inequities are structurally tackled and no longer remain invisible in policy and planning circles.²⁷

However, the essence of social and environmental justice is complex and perceived differently by different groups. It is indispensable to understand how different stakeholders frame justice in the context of ecosystem management, because policy interventions will only be successful if the underlying model of justice overlaps with local expectations.⁴¹ By including all stakeholders in the decision-making process – particularly those who do not usually have a voice in the design and implementation of interventions – policymakers have a real opportunity to achieve just and resilient outcomes.

This is only possible if all residents in Freetown – no matter whether they live in formal or informal housing – are officially

recognised as citizens and given the right to participate in such discussions.⁴² In tackling distributional injustices, procedural aspects must therefore also be examined.^{43, 44} In fact, studying urban risk traps through the lens of social and environmental justice reveals the multiple ways in which misrecognition and maldistribution actually co-produce each other and reinforce political asymmetries in the making and governance of ecosystem services.⁴⁰

3. Action Framework

Problems linked to the use of natural resources and the management of ecosystem services often involve a wide range of actors at different levels. Attempting to solve these problems thus requires more than simple technical solutions. The strategic pathways outlined in this section form guiding principles for long-term strategies that aim (1) to disrupt risk accumulation in the sectors that deal with ecosystem services in Freetown, and (2) to establish an inclusive and constructive dialogue between all the relevant stakeholders.

Some of these strategic recommendations are inspired from the Ecosystem Approach adopted by the Conference of the Parties to the Convention on Biological Diversity at its Fifth Meeting in 2000.⁴ This approach advocates for an “integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way” (UNEP, 2000: 103-104), and aims to strike a balance between resilient ecosystems and fair access to ecosystem services.

The suggested entry points indicate potential sites and industries in Freetown where these strategies could be first applied – either because they suffer from high degrees of exposure and vulnerability and should be regarded as priority areas, or

because they offer favourable conditions for the implementation of specific actions. Several case studies are explored to identify the potential of initiatives conducted in cities that share similar conditions to Freetown. Though their degrees of success vary, they each provide useful insights that contribute to refining the terms of appropriate measures for Freetown.

3.1 Strategic Pathways

Governance and Coordination

Improving ecosystem services management should start with improving governance mechanisms. Ensuring a clear distribution of responsibilities and strengthening coordination, both at inter-ministerial level and between national and regional authorities, is crucial to develop a comprehensive and coherent strategy.⁴ At present, the lack of coordination between the different government agencies – exacerbated by their overlapping mandates and conflicting interests – often results in the weak implementation and enforcement of regulations linked to ecosystem services management.³⁵

In Addis Ababa, similar challenges prevented the local authorities from meeting the objectives set in the 2002-2012 City Development Plan (Figure 4). Before issuing their new master plan, they managed to resolve some of the contentions between different ministries and successfully enhanced the implementation capacities of local government agencies. There are still absent voices in their decision-making process, though, and state institutions will remain fragile if they fail to coordinate their efforts with other actors on the ground. The case study of Dar es Salaam (Figure 5) sheds light on the value of horizontal coordination between local government agencies, NGOs, and local communities. Addressing governance issues in Freetown must begin with establishing a platform

<p>Transform Freetown 2019-2022</p>	<p>“Transform Freetown” is the most recent, and perhaps the most ambitious yet, initiative put in place by the government. It is structured around eleven priority sectors and includes specific targets and initiatives for environmental management, such as: raising environmental awareness in schools, empowering communities’ resilience against natural disasters, increasing vegetation coverage across Freetown by 50%, and strengthening environmental governance by facilitating the dialogue between stakeholders.^{38, 39}</p>
<p>Freetown Structure Plan 2013-2028</p>	<p>The Plan lays out the framework for long-term development strategies. It identifies, inter alia, key steps for the conservation of forests around Freetown. However, it completely dismisses the role of informal communities and seeks to re-settle them outside of the city centre. Twenty informal settlements are to be evicted because they are located in areas prone to flooding; yet the Plan projects to dedicate these same coastal areas to tourism.³³</p>
<p>Reducing Emissions from Deforestation and Forest Degradation (REDD+)</p>	<p>REDD+ was launched in Sierra Leone in 2012, but its impact is still uncertain.³⁵ The aim of the project is to generate the conditions for “sound forestry governance” and to reduce emissions from deforestation.³⁷ Similar programmes in neighbouring countries have yielded mixed results – partly because the communities that relied on ecosystem services had limited access to the funds, and because the local authorities lacked the on-the-ground organisational capacity to implement the strategies.³⁵</p>

Table 2: Strategies that are currently shaping the governance and the management of ecosystem services in Freetown.

where such where such coordination and dialogue can take place.

In addition, it is important to emphasise that stronger regulatory frameworks are not necessarily the (only) solution. Ecosystem processes are often non-linear and require adaptive management to deal with their complex and dynamic nature.⁴ Ecosystem services management needs some level of flexibility to respond to such uncertainties and to incorporate research feedback as well as elements of “learning-by-doing”.⁴⁵

Participation and Knowledge Co-Production

The management of ecosystem services should also consider a more decentralised approach that can lead to greater efficiency and equity for all. This would ensure that local communities’ needs, knowledge and practices are better taken into account. It will also promote greater responsibility and accountability of local communities in managing ecosystem services, since “the closer management is to the ecosystem, the greater the responsibility, ownership, accountability,

participation, and use of local knowledge” (UNEP, 2000: 105).

The success of the rehabilitation of the Sahel region in Burkina Faso (Figure 6) exemplifies this: local communities were involved throughout the project, and we recommend that Freetown adopts a similar approach to improve the management of its ecosystem services. It was not just a matter of participation in the decision-making process; they also endeavoured to integrate local knowledge and customary practices in the solutions that were proposed. Indigenous knowledge is indeed often compatible with existing livelihoods, and co-producing solutions for ecosystem services management in Freetown will ensure their success in the long term.

Recognition and Inclusion

Participation and knowledge co-production are crucial, but they are only possible if everyone is given the recognised right to raise their voice. There is much to gain from working together with local communities, whether or not they live in formal settlements. Therefore, the focus cannot solely be on governance and delineation of power: the notion that informality and “informal systems” are externalities that require fixing and formalisation needs to be challenged.

We thus propose to redefine what informality means in Freetown: we do not see it as the catalyst that drives environmental degradation and risk accumulation, but rather as the product of a system that has failed to adjust to the growing needs of its population. We do not seek to romanticise informality nor to make informal communities less accountable, yet the binary discourse that problematises their condition contributes to creating cycles of risk accumulation.²⁸ In addition, rather than seeking a top-down strategy, it is important to recognise the value of innovations and solutions that emerge from below.

3.2 Entry Points

Marine ecosystems

Illegal fishing is the biggest threat facing marine ecosystems in Freetown.¹¹ Tackling this problem will require better regulation, surveillance and reporting mechanisms. Empowering local fishermen could also help address the problem in places that that were previously unmonitored. In the South-West of Sierra Leone, the Environmental Justice Foundation, a British charity, has partnered with local fishing communities along the Sherbro River to

Figure 4. Environmental governance in Addis Ababa, Ethiopia

Addis Ababa’s 3.2 million inhabitants are putting increasing stress on local ecosystems. Land encroachment in the peri-urban wetlands has significantly increased the risks of flooding over the last decades.⁴⁶ Unclear responsibilities and the lack of cooperation at institutional level prevented the implementation of the 2002-2012 City Development Plan, which had identified 22,000 ha of green spaces to be protected.⁴⁹ In 2013, the government sought to address these governance failures and carried out a comprehensive reworking of their development programmes and policies.

The new Structure Plan (2013-2023) established a clearer division of tasks and resolved some of the contentions between the different ministries, while increasing the implementation capacities of local institutions.⁴⁹ However, local communities were once more excluded from the discussions and structural inequalities were maintained. Informality is still perceived as the cause of land degradation, and the rigid top-down approach precludes the possibility of co-producing solutions. The government’s attempt to reorganise informal settlements into formal condominiums faced a strong backlash and reinforced their marginalisation.⁵⁰

Figure 5. Mangrove management in Dar es Salaam, Tanzania

Like Freetown, Dar es Salaam experienced a rapid population growth coupled with hazardous urbanisation and land degradation.⁵¹ The high demand for construction wood and charcoal resulted in massive deforestation in and around the city. In 2011, it accounted for 75% of total deforestation in the country.⁵² The government implemented a mangrove protection scheme in 1928, but it failed to meet its objectives due to institutional failures and corruption.⁵³ For years, landowners and developers were granted exemptions to build new infrastructure in protected areas that once acted as buffer zones against natural hazards.^{54, 55}

To address the issue, Dar es Salaam’s local authorities partnered with local communities and recruited NGOs for consultative work.^{56, 57} Together, they organised workshops about the importance of ecosystem services and sustainable management practices. Though solar energy remains too expensive for many, local communities have decreased their dependence on charcoal and started actively protecting local mangroves in order to reduce deforestation.^{58, 59}

Figure 6. Land rehabilitation in the Sahel, Burkina Faso

Human activities have slowly but steadily led to a reduction of vegetation cover in the Sahel region. Land degradation has been coupled with biodiversity loss, dwindling water resources, impoverishment of local communities, and a subsequent increase in conflicts.⁶⁰ The international charity Plan Vivo Foundation and not-for-profit Reach Italia have partnered with the Ministry in charge of Animal Resources in Burkina Faso to reverse land degradation and foster sustainable land management in the region.⁶¹ The project intervention consists of restoring degraded pastures by replanting native tree and grass species in close collaboration with local rural communities. The first stage focused on the provinces of Oudalan, Soum and Séno. Stakeholders at all levels were consulted throughout the entire project and sustainable land-use management was promoted through the introduction of local land charters.⁶² From an institutional perspective, the Rural Land Tenure Law reinforced communities’ governance over land management and formally recognised the importance of customary rules and practices⁶¹, thus setting the foundation for procedural and distributional equality.

monitor the use of illegal trawlers. The Foundation is also teaching local fishermen how to report foreign vessels they encounter at sea by taking GPS-tagged photographs using smartphones.¹⁰ A similar strategy could be adopted for the fishermen of Freetown – starting with Kroo Bay, as it hosts a large fishing community. In addition, the management of natural resources calls for increased intersectoral communication and cooperation at a range of levels.^{4, 35} To better protect and manage its marine environments, Freetown could thus form partnerships with other cities along the coast of Sierra Leone and in neighbouring countries. The creation of these networks would allow to share information and experience, but also to conduct joint operations. The West Africa Task Force (under the supervision of the Fisheries Committee of the West Central Gulf of Guinea) and FISH-i Africa are good examples of international efforts to combat large-scale illegal fishing⁴⁶, and Freetown would greatly benefit from joining or forming similar alliances.

Coastal wetlands

The primary focus in coastal wetlands should be about restoring and protecting the mangroves. To this end, Freetown's local authorities should align penalties for private enterprises that use natural resources irresponsibly and incentives to promote sustainable management. Current livelihoods need to be balanced out with necessary measures to ensure that mangroves can regenerate over time. The case study of Dar es Salaam (Figure 5) is useful to illustrate the potential of teaching local communities about substitutes to charcoal in order to reduce deforestation.

However, restoring and protecting ecosystems is best achieved when responsibility is given to and shared with those that actually benefit from their services.^{29, 37} Therefore, we recommend exploring the option of handing over the governance of mangroves to local communities. This requires investigating how the land is currently allocated and the forest reserves managed. Mobilising local communities that depend on mangroves will help secure their rights to nature and ensure that they guard and manage these ecosystems sustainably.³⁷

Numerous initiatives in Latin America, Africa and Asia have demonstrated the benefits of involving local communities in the management of ecosystems, such as: reduced environmental impacts, a decline in illegal activities, improved food

security, poverty reduction, and the fact it provides a safety net for those whose primary economic activity rely on natural resources.³⁶ This strategy can be replicated in Freetown, particularly in the settlements in direct vicinity of mangrove forests like Cackle Bay and Kroo Bay.

Finally, based on the projects outlined in Freetown's 2013-2028 Structure Plan³⁴, we believe local communities could be better integrated in the coastal rehabilitation plans. At present, twenty informal settlements are to be evicted to make way for large-scale infrastructure projects in the Cackle Bay area. Evicting these communities would only accentuate some of the existing problems, whereas including them in the plans to transform the bay into an eco-touristic destination could yield mutually beneficial results.⁴⁷ Locals would be encouraged to protect the bay's biodiversity, and tourists would be eager to learn more about local customs while being forced to act responsibly.

Watershed forests

The remaining forests in the watersheds surrounding Freetown should also be protected and restored in partnership with local communities. This can be achieved through decentralisation and devolution of power. Several lessons can be drawn from the restoration project in the Sahel region in Burkina Faso (Figure 6) and the participatory mechanisms that were adopted: land charters were created at village-level by a group of local stakeholders representing the entire community. All residents – including those who traditionally are not allowed to speak in public – were consulted to design these charters. They included provisions regarding the conservation of shared resources and the sustainable use of ecosystem services. The fact they recognised the value of local practices led to strong community support for the project. We recommend a similar approach for Freetown's watershed forests.

While there might be significant costs involved at the start of a forest management scheme, it is important to remember that it will yield many indirect benefits in the long-term: air purification, carbon storage, restored wildlife habitats, fuel production, natural cooling, wind deflection, soil stabilisation, and so forth (cf. Figure 1). When working on these projects, it is thus important to look beyond the monetary value of nature.¹ It would be hard to attach a value to bird watching, for instance; yet a whole economy depends on it in Freetown, from the sale of

equipment to the local guides that specialise in this activity. A starting point for this strategy could be New England, an informal settlement located in an area categorised as a high-risk hazard zone, and where landslides have occurred in the past.^{16, 21}

Waste management

While having specific strategies for each type of ecosystem is helpful, Freetown also needs to tackle some urban risk traps at city-wide level. Local ecosystems are all interlinked and form one large, complex ensemble. Policy efforts should recognise these linkages and must not exclude any particular area of Freetown if they aim to efficiently maintain an overall balance of ecosystem regeneration. Should that happen, then the whole natural system is eventually disrupted, and some communities inevitably bear disproportionate social and environmental impacts.⁴²

This is particularly evident in the case of liquid waste flowing from the hill-side settlements to low-lying coastal areas, before it is dumped into the ocean and degrades both coastal and marine environments.²³ Freetown is in dire need of a better waste management scheme; there needs to be coordinated action across the different parts of the city to address this problem. This is of crucial importance to achieve good ecosystem services management, but also to guarantee safe water quality, sanitation and public health.^{24, 25} In addition, we recommend that the city makes the most of nature-based solutions, such as the filtering properties of local mangroves.¹⁵

Conclusion

Ecosystem services are central to the livelihoods of many communities in Freetown. However, they are increasingly threatened by the demographic growth of the city, hazardous urbanisation, industrial activities, governance gaps, institutional failures, and human-induced climate change.

This policy brief outlines strategic pathways that disrupt cycles of risk accumulation and promote environmental resilience through a sustainable and just ecosystem management model. Implementing these strategies will not only benefit the local environment and the people whose livelihoods rely on ecosystem services, but also contribute to achieving social and environmental justice in Freetown. A series of entry points are suggested to put these recommendations into practice.

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For further information, please contact:
Adriana Allen (a.allen@ucl.ac.uk) or
Braima Koroma (koromabm1@yahoo.com)