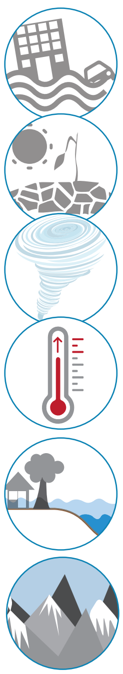
Photo: Coastal Landscape, South Africa. © GIZ / Andrea Bender

Opportunities in

spatial planning in land- and seascapes [1]

for integrating ecosystem-based approaches to climate change and disaster risk reduction



How is land and marine spatial planning affected by climate change and disaster risks?

Climate change as well as natural disasters pose wide-ranging challenges to the development targets of governments for national economies, societies and ecosystems. Both climate-related risks and those associated with biodiversity loss and ecosystem collapse are among the top global economic risks (WEF 2019). Extreme events such as floods, heat waves, droughts and cyclones but also slow onset events such as increasing temperatures, glacier retreat and sea level rise pose significant challenges for societies and their use of land-based and marine resources. These events manifest themselves at different levels, from local to land- and seascapes.

Risk varies spatially and requires context-specific approaches for planning. For example, the flood risk to a city might be increased by deforestation and soil erosion in the upper watershed, while storm damage within a coastal village might be exacerbated by degraded mangroves, coral reefs or seagrass beds. Other factors might affect the coastline, such as unsustainable groundwater extraction causing land subsidence; river canalization may cause a disturbance of sedimentation in rivers; built infrastructure along the coastline may disturb sediment settlement in front of the coastline. Therefore a holistic approach for spatial planning of land and seascapes – covering a multitude of actors, sectors and interests – is key for setting up effective climate change adaptation and risk reduction strategies.

[1] The development and authorship of the sectoral brief “Opportunities in spatial planning in land- and seascapes for integrating ecosystem-based approaches to climate change and disaster risk reduction” was led by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Why ecosystem-based approaches should be strengthened

Ecosystems underpin economies and societal well-being through the provision of ecosystem services (MEA 2005). There are several spatial relationships between areas within land- and seascapes where a service such as risk reduction is produced and where its benefits become apparent. For example, the conservation and sustainable management of forests of an upper watershed does not only provide local services such as water storage and erosion prevention, but landscape services such as water provision and flood risk reduction to downstream land use systems. To ensure sustainability in the long term, it is crucial to use ecosystems in a way that avoids degradation, considers current and future vulnerabilities and maintains resilience (FEBA, 2016).

Integrated management and restoration of ecosystems at land- and seascape level can greatly enhance the overall benefits that ecosystems provide to society. Concepts such as Ecosystem-based Adaptation (EbA) and Disaster Risk Reduction (Eco-DRR) support holistic and cross-sectoral thinking that takes the interactions and interdependency of people, economy and nature into account. Both are landscape approaches – a framework to integrate policy and practice for multiple land uses, within a given area – where decisions (policies, planning, and implementation) need to be based on spatial information. A landscape approach is an interdisciplinary, cross-sectoral and holistic approach to help overcome barriers by sectors and contribute to effective climate change adaptation by connecting all stakeholders involved, starting with the communities at risk in the affected landscape (Sayer, et al. 2013).

A systematic integration of ecosystem-based approaches into spatial planning holds various advantages that cover the following:

- **Multiple benefits:** Besides risk reduction, ecosystem-based approaches provide a multitude of benefits to society and economy, including provision of natural resources (food, fibres, and medicine), water regulation, climate change mitigation through carbon sequestration, recreation and provision of habitats for species.

- **Cost-effectiveness:** As natural risk buffers, natural and sustainably managed ecosystems are often less expensive to maintain and could be more effective than physical engineering structures. Depending on local conditions, condition of ecosystems and climate projections, hybrid green-grey infrastructure solutions that combine an ecological infrastructure (e.g. forests, wetlands) with a built infrastructure (e.g. dams, water retention ponds) may work best in terms of public health, social cohesion, urban biodiversity and mitigation, creating win-win solutions for the environment, society and economy (NWP, 2017).

- **Adaptive management:** Due to the fixed design and purpose of built physical “grey” infrastructure measures, they often cannot be modified afterwards; whereas ecosystem-based or hybrid approaches, combining both grey and green infrastructure can be adapted and managed more easily to fulfil their functions for society.

- **Social inclusion, participation and employment:** Especially rural poor and marginalized groups of societies directly depend on ecosystems and their services for sustaining their livelihoods. Ecosystem-based approaches help them to participate in ecosystem management and livelihood improvement since they require local ownership, knowledge and resources, including labour force. Participatory spatial planning will enable governments and local stakeholders to jointly identify priority areas for improving land tenure and access to key resources.

- **Using local knowledge:** Ecosystem-based approaches are often built on local, traditional or indigenous knowledge. They acknowledge and utilize this knowledge in combination with scientific knowledge in the context of using land based and marine resources.

Photo: Coastal Landscape, South Africa. © GIZ / Andrea Bender

Typical ecosystem-based approaches & technologies include the following:

Approach / technology examples (including weblinks of EbA/Eco-DRR examples from the PANORAMA Solutions platform)[2].	**Environmental benefit**	**Risk reduction benefit**	**Socio-economic benefit**
Include disaster and climate risks in integrated water resources management including reforestation of slopes in upper watersheds[3] – combination of IWRM action plan and reforestation through native tree species that stabilize soils and store water. Species should be resistant to current and future risks such as pests, extreme weather events, cyclones etc.	Erosion prevention, fertility maintenance, carbon sequestration, fresh water provision, climate regulation, habitat for species	Buffering of cyclones, land-slide prevention, flood prevention	Social protection, productivity maintenance, income generation, job creation
Transboundary river cooperation for improved water governance[4] – such as river basin approaches to have a better understanding of policy planning and transboundary cooperation issues.	Water provision and regulation, erosion prevention, climate regulation, habitat for species	Buffering of flash floods from upstream, sedimentation, surface water pollution control	Improved ownership, economic diversification, productivity increase, social protection
Renaturation of flood plains[5] – consists of measures to (re-)create natural retention areas for flood water e.g. by the restoration of old river arms, flood retention areas, restoration of river forests, etc.	Erosion prevention, water provision and regulation, habitats for species	Flood protection	Cost reduction (avoided damage, maintenance), recreation, income generation, job creation
Coastal habitat conservation / restoration[6] – such as mangroves, salt marshes, seagrass meadows or coral reefs aim to provide a natural buffer against coastal erosion and inundation.	Erosion prevention, carbon sequestration, habitat for species, water purification, nutrient cycling	Buffering of cyclones and storm surges, sea level rise	Economic diversification, productivity increase, social protection (of livelihoods), job creation, provision of raw material and food

(Source: GIZ, 2018)

[2] PANORAMA Solutions for a healthy planet platform (www.panorama.solutions)
[3] panorama.solutions/en/solution/applying-ecosystem-based-disaster-risk-reduction-eco-drr-integrated-water-resource
[4] panorama.solutions/en/solution/strengthening-multilevel-governance-eba-binational-sumpul-river-sub-basin-el-salvador
[5] panorama.solutions/en/solution/mayesbrook-river-restoration-project
[6] panorama.solutions/en/solution/building-nature-safe-prosperous-and-adaptive-coastlines-indonesia

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Existing opportunities & required action

Entry points as opportunities for strengthening ecosystem-based approaches for climate change adaptation and disaster risk reduction within spatial planning include the following:

Entry points	Examples
Policies	UN Agenda 2030 and Sustainable Development Goals (SDGs), UNFCCC Paris Agreement including Nationally Determined Contributions (NDC), UNCCD Land Degradation Neutrality Target Setting Programme, CBD Aichi Targets and Post 2020 Framework, UNISDR, Bonn Challenge on Forest Landscape Restoration.
Planning instruments	“Ridge-to-reef” or “source-to-sea” approaches, territorial planning and landscape approaches, long-term and medium-term land, coastal and marine development plans at national and subnational level, watershed management plans, land use plans, climate change strategies including National Adaptation Plans (NAPs), risk maps, land use maps and cadastral systems, land use conflict resolution mechanisms, participatory land use, coastal and marine spatial planning approaches (e.g. the concept of “Blue Planning in Practice” or the Bangladesh Delta Plan 2100).
Command and control instruments	Land use and zoning laws, standards and safeguards, management certification schemes, strategic environmental assessments, environmental impact analysis.
Economic and fiscal instruments	Public investment programmes, funds (e.g. Land Degradation Neutrality Fund, Green Climate Fund), taxes, fees, fiscal transfer mechanisms and subsidies as incentive systems for spatial planning.
Institutions	Inter-ministerial task forces and management committees, river basin committees, land use planning, forest user and water user associations etc.
Technology	High resolution spatial data and information (satellite based, drones, etc.) that is often openly available, geographical information systems (e.g. open source) and related planning and decision support tools (e.g. Marxan, InVEST, SeaSketch).

Further action will be needed in the following areas:

- Assess the current and potential challenges (and risks) for land use, coastal and marine spatial planning caused by climate change and natural disasters in addition to other man-made risks by using a combination of available geographical information systems and spatial climate and disaster risk information.

- Identify short-, medium- and long-term actions to address these risks including ecosystem-based, hybrid and engineering-based solutions as well as social options.

- Identify key actors from government, civil society and private sector to become allies in adapted spatial planning and establish suitable formats for ongoing exchange, negotiation and joint planning between these actors and sectors.

- Strengthen institutional coordination and multi-stakeholder approaches for spatial planning; increase the role of non-state actors and local ownership (e.g. civil society, research, private sector) for the governance of terrestrial and marine resources.

- Further align land cover and spatial use maps across different sectors such as agriculture, forestry, mining, urban planning, nature conservation, shipping, industrial and artisanal fisheries (i.e. national spatial data infrastructure).

- Review legal instruments related to spatial planning at regional, national and local level with regards to possible future integration of ecosystem-based approaches to climate change and disaster risk reduction.

Photo: Ecuador © GIZ / Nadia Manasfi

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