Global EbA Fund

Bhubaneswar Municipal Corporation BMC

National Institute of Urban Affairs

COMPENDIUM ON

ECOSYSTEM-BASED ADAPTATION PRACTICES

Acknowledgement

Title
Compendium on Ecosystem-based Adaptation Practices

About the document
This document comprises various ecosystem-based adaptation practices adopted worldwide for catering to address the issues of a changing climate.

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BACKGROUND

Climate change is one of the defining challenges of our time, manifesting as rising sea levels, erratic weather patterns, water scarcity, biodiversity loss, and increasing climate disasters. These impacts are particularly severe for developing countries like India, where socio-economic vulnerabilities and ecological fragility intersect. As traditional infrastructure and reactive measures fall short of meeting the scale of these risks, Ecosystem-based Adaptation (EbA) has emerged as a powerful alternative that is rooted in the resilience of nature. EbA uses biodiversity and ecosystem services as part of an overarching strategy to help people adapt to the adverse effects of climate change. It emphasises sustainable management, conservation, and restoration of ecosystems to buffer communities against climate risks while enhancing co-benefits like water security, food systems, livelihoods, and biodiversity. From restoring mangroves to constructing bioengineered wetlands and reviving urban drains, EbA provides low-regret, locally appropriate, and cost-effective adaptation measures that simultaneously improve ecological health and human well-being.

This Compendium on Ecosystem-based Adaptation Practices brings together a curated set of global and regional case studies showcasing the implementation and impact of EbA across diverse geographies, mountains, coasts, plains, deserts, and urban regions. The document has been developed as part of the "Proliferating Ecosystem-based Adaptation Practices in Indian Cities (EPIC)" project, supported by the Global EbA Fund, and implemented by the National Institute of Urban Affairs (NIUA).

By capturing a rich diversity of examples — from the oyster reef restoration in the Gulf of Mexico, to bioswale-driven stormwater management in Portland, and mangrove afforestation in coastal Bangladesh — the compendium serves multiple objectives:

- Highlighting tested EbA strategies that address site-specific climate risks;
- Demonstrating the co-benefits of ecosystem restoration, including livelihood generation, improved health, and biodiversity conservation;
- Drawing parallels and learnings for application in Indian cities and landscapes, especially through cross-referencing similar domestic examples; and
- Informing policy makers, urban planners, climate practitioners, and community leaders on actionable and scalable approaches to integrate EbA into development and climate resilience planning.

MOUNTAIN REGIONS

Major biodiversity hotspots still face acute risks from glacial melt, landslides, and erratic rainfall—necessitating nature-based resilience strategies tailored to fragile slopes and high-altitude ecosystems.

COASTAL REGIONS

Home to dense populations and critical ecosystems like mangroves and reefs, coastal regions are at the frontline of sea level rise, saline intrusion, and cyclonic risks—making them priority zones for integrated, ecosystem-based coastal defence.

PLAINS

Plains serve as agricultural and population heartlands but are increasingly exposed to floods, groundwater stress, and land degradation—calling for landscape-scale EbA interventions that restore ecological balance and secure livelihoods.

DESERT REGIONS

Desert ecosystems are defined by water scarcity, extreme heat, and fragile livelihoods, and require innovative, community-led ecosystem restoration approaches to combat desertification, and climate-induced resource stress.

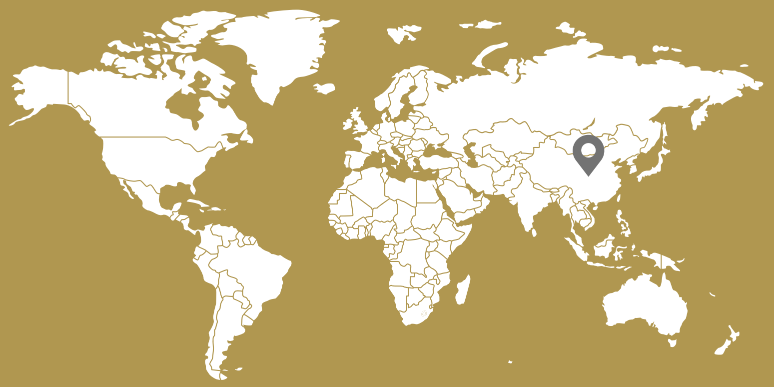
MOUNTAIN REGIONS

Leh City in India

Terraced fields on north China's Loess Plateau:
Waves of terraced fields near Changyuan Village, Linfen City, north China's Shanxi Province, are dyed green by the fresh crops. They are vital to control water and soil erosion on the Loess Plateau.

MITIGATION OF SOIL EROSION AND WATER SHORTAGE IN THE YANGOU WATERSHED, LOESS PLATEAU OF CHINA

LOCATION



GEOGRAPHY AND CLIMATE

- Typical continental monsoon climate.
- The Loess Plateau is around 640,000km², making it the world's largest loess region.
- Cliff-edged plains, ridges, hills and valleys are the topographical features of the region.

PROJECT IMPACT

2.5 million
people were lifted out of poverty through the introduction of sustainable farming practices

24%
increase in employment with a significant rise in opportunities for women to participate in the workforce.

Climate Impact

- The Loess Plateau is highly vulnerable due to steep slopes, fragile soils, and intense rainfall events. Soil erosion in the Yangou watershed reached up to 845.6 t/ha/year in extreme areas.
- Over-cultivation on steep slopes and deforestation have led to widespread land degradation. 88% of farmland was previously on sloped terrain, accelerating erosion and reducing land productivity.
- Existing sparse forestland, barren areas, and low-coverage grasslands provide minimal erosion control. Many high-risk erosion zones lack proper support practices like terracing or vegetation cover.

EbA Practice

- Policy Support: The 1999 "Grain-for-Green" programme aimed to combat deforestation, soil erosion, and over-cultivation.
- Land Use Adjustment: Sloped cropland was converted into terraces; dams and ponds were built for soil retention and drinking water.
- Water Conservation: Terracing, plastic mulch, deep furrows, and drought-tolerant crops improved water efficiency and resilience to low rainfall.
- Irrigation Techniques: Rainwater harvesting via ponds and tanks; "hole irrigation" improved sustainable water use and fertiliser efficiency.
- Livelihood Diversification: Alternatives like apple orchards, fish farming, manufacturing jobs, and small businesses offset the loss of farmland.

Major Stakeholders

- Government bodies
- Research institutions
- Local communities and farmers

Project Cost

Funding Sources:

- NSFC Grants
- World Bank Projects
- Strategic Science Plans of CAS

SDG GOALS ADDRESSED

Incomes grow from about US$70 per year per person to about US$200 through agricultural productivity enhancement and diversification.

More stable water flows, reduced downstream flood risk, and sustained dry-season agricultural use through construction of check-dams, terracing, and gully-filling.

Reforestation reversed desertification trends, rebalanced microclimates, and fostered ecosystem resiliency.

A woman harvests hickory nuts for crafting, a side benefit of the local tree planting efforts.

Key Learnings:

Himalayan foothills and semi-arid regions like **Rajasthan** and **Haryana** can adopt similar approaches to address the issues of soil erosion and water shortages.

Example from India

Sukhomajri Watershed, Haryana, is a notable example relevant to this case; it is India's earliest community-led watershed management project. Practices included check dams, contour bunding, reforestation, and water harvesting.

COASTAL REGIONS

Mangrove Plantation on Pari Island in Jakarta, Indonesia

OYSTER REEF RESTORATION IN THE GULF OF MEXICO

LOCATION

GEOGRAPHY AND CLIMATE

- Borders Texas, Louisiana, Mississippi, Alabama, Florida; features coastal wetlands, estuaries, bays, barrier islands, and marshes.
- It has a humid subtropical climate with 50–70 inches of rainfall and is vulnerable to storms, hurricanes, erosion, and sea level rise.

PROJECT IMPACT

~5,200 ha

of oyster reef has been restored across the U.S. Atlantic and Gulf coasts since the 1960s.

99%

of 6-year-old restored reefs met the minimum density/biomass targets; 83% met higher goals.

Ecosystem Services supported by Oyster Reefs:

- Improving/maintaining water quality through the filtration that takes place when oysters feeds. Oysters help reduce turbidity and harmful nutrient loads.
- Protecting adjacent shorelines - act as a natural barrier from waves for marsh edges and shorelines, reducing erosion.
- Providing forage, nursery, and refuge habitat for commercially, recreationally, and ecologically important species of fish, shrimp and crabs and other reef-associated estuarine species.

Climate Impact :

- Decline in oysters reefs by 50-85% in Gulf of Mexico (2011) due to the Deepwater Horizon Oil Spill in 2010 and also due to changes in freshwater flows to the Gulf's estuaries (from droughts, floods, and water use upstream), sedimentation, increasingly frequent and intense storms, low dissolved oxygen levels, oyster diseases, and heavy fishing pressure.
- Decline of oysters threatens livelihoods and the health of coastal ecosystems where they are a keystone species.
- Losing the economic and cultural value of the oyster industry and the important ecosystem services, like cleaner water, protection from storms and fish habitat provided by oysters and oyster reefs.

EbA Practice :

- Artificially constructed reefs using recycled oyster shells are designed to act as substrates upon which larval oysters can attach, grow, and mature into a fully functioning reef.
- Restoration practitioners partner with restaurants and oyster processors to obtain shells and return them to their original locations.

Major Stakeholders:

- Government bodies
- Non-profit & research institutions - (TNC)
- Local and coastal communities

Project Cost:

Total regional investment is estimated to be up to $200 - 250 million, potentially funded by the Deepwater Horizon NRDA.

SDG GOALS ADDRESSED

8 DECENT WORK AND ECONOMIC GROWTH – Supports local livelihoods through restoration jobs and oyster farming.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION – Promotes shell recycling and sustainable aquaculture practices.

13 CLIMATE ACTION – Enhances coastal resilience to storms and sea-level rise.

14 LIFE BELOW WATER – Restores marine habitats, boosts biodiversity, and supports sustainable fisheries.

17 PARTNERSHIPS FOR THE GOALS – Involves collaboration among governments, NGOs, scientists, and communities.

Key Learnings:

- Adoption of hybrid or nature-based coastal defenses like oyster, mussel, or mangrove-based reef barriers in estuarine/coastal belts (e.g., Sundarbans, Chilika, Kutch, Pichavaram).
- Integrate ecosystem restoration with inland water quality norms, especially in polluted coastal lagoons (e.g., Pulicat Lake, Ennore Creek).

Example from India:

“Oyster Reef Watch Programme (ORWaP)” launched by the Government of India for the restoration of oyster reefs in estuaries and bays to control coastal pollution around India.

URBAN FLOOD PARK, HUNTER'S POINT SOUTH PARK, NEW YORK

LOCATION

GEOGRAPHY AND CLIMATE

- Located in northeastern U.S. at the Hudson River's mouth, built on coastal lowlands and islands.
- It has a humid subtropical climate, characterised by hot summers, cold winters, and 45–50 inches of evenly distributed annual precipitation.

PROJECT IMPACT

30
acres of continuous waterfront park on a previously abandoned industrial area.

5,000
new affordable housing units introduced, mainly targeting the middle income families.

Climate Impact / Issue being Addressed:

- As a coastal city bordered by the East River on one edge, New York is vulnerable to changing tides, hurricanes, and rising sea levels.
- The park was developed on a post-industrial site that was once an industrial wasteland, consisting of wetlands and marshes.

EbA Practice :

- 30-acre waterfront park providing a barrier against coastal flooding and varied spaces for passive and active recreation.
- Wetlands and marshlands on the edge of the park and central greens serve as a natural form of storm absorption.
- Hidden channels to help stormwater drain away.
- Existing industrial concrete bulkheads were strategically replaced with wetlands and paths to create an infrastructurally "soft" edge.
- A pavilion and café with views across the river.
- An urban beach, rail garden, dog runs, play areas, cafe bar offer places of active recreation at the water's edge for the surrounding residential neighbourhood.
- Water management tools such as concrete benches divert storm flood water, the cafe's roof catches rain for reuse, and the grassy soccer field is conveniently lined with drains.
- Paving areas constructed with porous concrete.
- "Catch and release" approach, purposefully collecting water in certain areas and using a planned run-off system to drain it at a steady pace.

Major Stakeholders:

- City government
- Residents from surrounding neighbourhoods
- Communities affected from high tides and flooding

Project Cost:

Fully funded by the city government.

SDG GOALS ADDRESSED

13 CLIMATE ACTION

Design emphasizes resilience to climate change, including flood protection and sustainable stormwater management.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

The project involves innovative urban planning and sustainable infrastructure development.

11 SUSTAINABLE CITIES AND COMMUNITIES

Resilient urban development with high-quality housing, public spaces, and infrastructure that enhance livability.

Key Learnings:

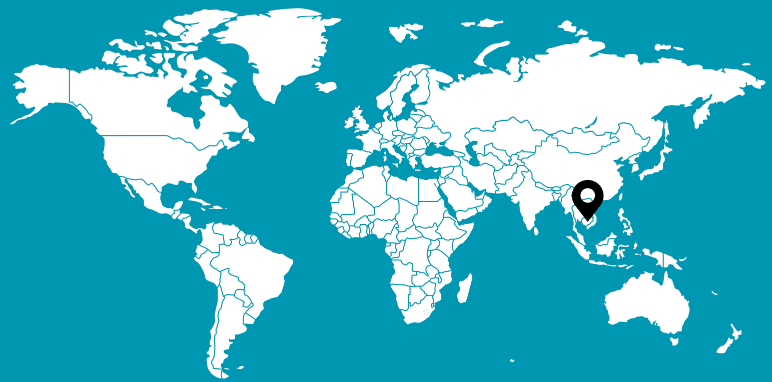
- Integrate marshy basins and absorbent green zones in waterfront master plans to buffer monsoonal and tidal impacts.
- Retrofit waterfronts or urban parks with layered interventions—rain gardens, swales, boardwalks—to reduce runoff and dilute flood peaks.
- In flood-prone zones intentionally design parks or open spaces that can flood temporarily.

Example from India:

Mula-Mutha Riverfront Development, Pune (Maharashtra) incorporates urban flood management, ecological restoration, and public access along a vulnerable river corridor—blending grey-green infrastructure.

ECOSYSTEM-BASED APPROACHES TO ADDRESS CLIMATE CHANGE CHALLENGES IN THE GREATER MEKONG SUBREGION (GMS)

LOCATION



GEOGRAPHY AND CLIMATE

- Greater Mekong Sub-region (GMS) crosses over six countries, including Thailand and Vietnam, and supports 75 million people.

PROJECT IMPACT

930
Hectares of valuable ecosystems restored.

1,000
Community members trained to plan and implement adaptation interventions.

54
Technical government staff trained on ecosystem- based adaptation practices and principles.

Climate Impact

- Frequent extreme weather events and shifting rainfall patterns are the major threats due to climate change in GMS.
- Mekong Delta and other coastal areas, are vulnerable to sea-level rise and storm surges.
- Climate-induced droughts are causing water shortages, reducing food security, and decreasing agricultural production in the region.
- Heavy flooding from extreme rainfall events inundates agricultural land and distributes sediment over farmers' fields, causing declines in rice production and reducing their income.
- Communities cope with income loss from climate shocks by over-harvesting forest products or clearing more forests for crops.

EbA Practice

- In Vietnam, along the coastline of Soc Trang Province in the Mekong Delta, mangrove rehabilitation and management demonstrated the cost effectiveness of a coastal protection system combining floodplains, mangrove forests, and appropriate dyke work, while generating additional benefits to communities.
- Rehabilitation of 930 hectares of forest and grasslands, and 200 hectares of riverbanks and community forests using multiuse climate-resilient tree species, protecting the communities against flooding and drought.
- Technical guidelines approved by the Ministry of Natural Resources and Environment for mainstreaming ecosystem-based approaches into national and provincial biodiversity conservation planning.

Major Stakeholders

- IUCN; Ministry of Natural Resources and Environment, Thailand; Ministry of Natural Resources and Environment, Vietnam

Project Cost

USD 7,000,000 from the Adaptation Fund.

SDG GOALS ADDRESSED

1 NO POVERTY — Supporting vulnerable communities with adaptive practices, reducing climate-induced income loss.

6 CLEAN WATER AND SANITATION — Enhancing groundwater recharge and water quality via ecosystem-based approaches.

13 CLIMATE ACTION — Addressing climate change impacts through ecosystem restoration and resilience-building.

14 LIFE BELOW WATER — Conserving coastal mangroves and marine ecosystems to reduce storm surges and sea-level rise.

15 LIFE ON LAND — Protecting, restoring, and promoting sustainable use of terrestrial ecosystems like forests and grasslands.

Key Learnings:

- Ecosystem-based approaches are considered cost effective due to the multiple environmental, economic, and social benefits they can provide for human well-being and economic development.
- Ecosystem-based approaches need to be mainstreamed into development and conservation policies.
- Indian river basin programmes should link ecosystem restoration to direct farmer benefits—like native-tree intercropping, flooded crop systems (e.g., flood-tolerant rice), and fisheries.
- Institutionalize EbA in State/City Climate Action Plans, Flood Mitigation Plans. Facilitate inter-state river delta collaborations—e.g., Mahanadi, Krishna–Godavari, coastal eastern belt.

COMMUNITY-BASED ADAPTATION TO CLIMATE CHANGE THROUGH COASTAL AFFORESTATION

LOCATION

GEOGRAPHY AND CLIMATE

- Low-lying delta plain of the Ganges–Brahmaputra–Meghna; highly vulnerable to cyclones, tidal surges, salinity intrusion, and erratic rainfall.

PROJECT IMPACT

9,650
Hectares of mangrove plantation established.

85,000
Community members trained to plan and implement adaptation interventions.

42%
of the individuals engaged in afforestation-related livelihoods—nursery development, plantation, protection, and maintenance—were women.

Climate Impact

- Communities in the coastal areas of Bangladesh are vulnerable to the increased frequency and severity of climate related events such as cyclones, tornadoes and floods. The vulnerability of coastal communities is exacerbated by high levels of poverty and a heavy reliance on natural resource-based livelihoods.
- From 1960 to 2000, mangrove areas in Bangladesh have been degraded and the spatial extent has decreased from 142,853 ha to 132,000 ha.

EbA Practice

- Planted nine new mangrove varieties across coastal zones to significantly increase tree density, enhance natural barriers, and strengthen coastlines.
- Established non-mangrove mound plantations on newly accreted lands to stabilise fragile soils, prevent erosion, and promote the development of diverse habitats.
- Developed dyke plantations using models such as Forest, Fish, and Fruit (FFF) in areas with moderate to high land accretion. These multi-use plantations offer ecological benefits like soil stabilisation and biodiversity, while also supporting livelihoods through integrated aquaculture and fruit harvesting.
- Created strip plantations along roadsides within project areas to enhance slope stability, reduce roadside erosion, and improve environmental aesthetics. These green corridors contribute to microclimate regulation, carbon sequestration, and community well-being.

Major Stakeholders

- Ministry of Forests and Environment, Government of Bangladesh
- Global Environment Facility (GEF)
- United Nations Development Programme
- Local communities (including landless and women, ~42% women participants) through Co-Management Committees

Project Cost

US$ 5.4 million in total, where GEF contributed US$ 3.3 million, UNDP contributed US$ 1.1 million and GOB contributed US$ 1 million.

SDG GOALS ADDRESSED

1 NO POVERTY — Strengthens livelihoods by involving communities in and reducing disaster vulnerability.

5 GENDER EQUALITY — Involves 42% coastal women in decision-making, advancing gender-inclusive climate action.

13 CLIMATE ACTION — Enhances resilience against climate-related disasters like cyclones and floods through EbA

14 LIFE BELOW WATER — Restores coastal and marine ecosystems (e.g., mangroves) that support biodiversity and fisheries.

15 LIFE ON LAND — Promotes afforestation and land restoration, stabilizes soil, and prevents degradation.

17 PARTNERSHIPS FOR THE GOALS — Involves collaboration among national government, UNDP, GEF, and local communitie

Key Learnings:

- To move beyond monoculture mangrove plantations and develop multi-functional coastal greenbelts that also support local food and income security.
- Integrate women-led SHGs and fisher cooperatives into EbA projects. Set mandatory gender inclusion benchmarks (e.g., 40%) and provide skills training in nursery management, mangrove restoration, and eco-livelihoods.
- Integrate mangroves with aquaculture and agroforestry like in the Forest–Fish–Fruit model.

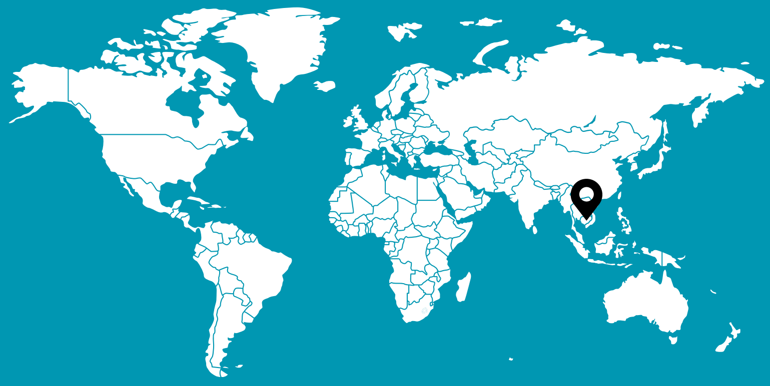
Example from India:

The Mangrove Restoration project in Odisha, under ICZMP, emphasizes community-led replantation in cyclone-affected Kendrapara and Bhadrak districts.

Construction of semi-permeable dams in Indonesia

BUILDING WITH NATURE IN INDONESIA

LOCATION



GEOGRAPHY AND CLIMATE

- Demak Regency, Northern Central Java, Indonesia—along ~9 km of eroded, subsiding coastline facing the Java Sea.
- A low-lying deltaic coastal plain experiencing severe coastal erosion (over 3 km of land lost), flooding, and land subsidence largely due to groundwater extraction and deforestation.

PROJECT IMPACT

20 km
of coastline restored.

3
times increase in farmers income from aquaculture.

>80%
of fishers report a catch increase.

119
hectares of Mangroves area restored.

Climate Impact

- Several parts of Indonesia suffered from severe erosion and flooding due to the removal of a protective belt of mangroves and their replacement by ponds for aquaculture.
- Other factors are subsidence due to excessive groundwater extraction, river engineering that deprives coastlines of riverine mud, and ill-judged hard infrastructure such as sea walls that disrupt the sediment and water flows that previously maintained shorelines.
- Climate change is raising sea levels and increasing the frequency and intensity of storm surges. As a result, more than 30 million people in Java alone are currently at risk of flooding and salt water invading their fields.

EbA Practice

- Permeable structures have been placed along more than 9 kilometres of the Demak coast together with the Indonesian government. The structures are made from local brushwood and bamboo attached to poles.
- Villagers donated abandoned and unproductive aquaculture ponds to be re-engineered to reconnect with the ocean, again creating conditions where mangroves can regrow. The work was carried out by village communities after training and capacity building.
- Shrimp farmers were trained to switch to a mangrove-friendly way of farming, which protected the coast and made their shrimp farms more productive. About 277 farmers saw their shrimp harvests triple.

Major Stakeholders

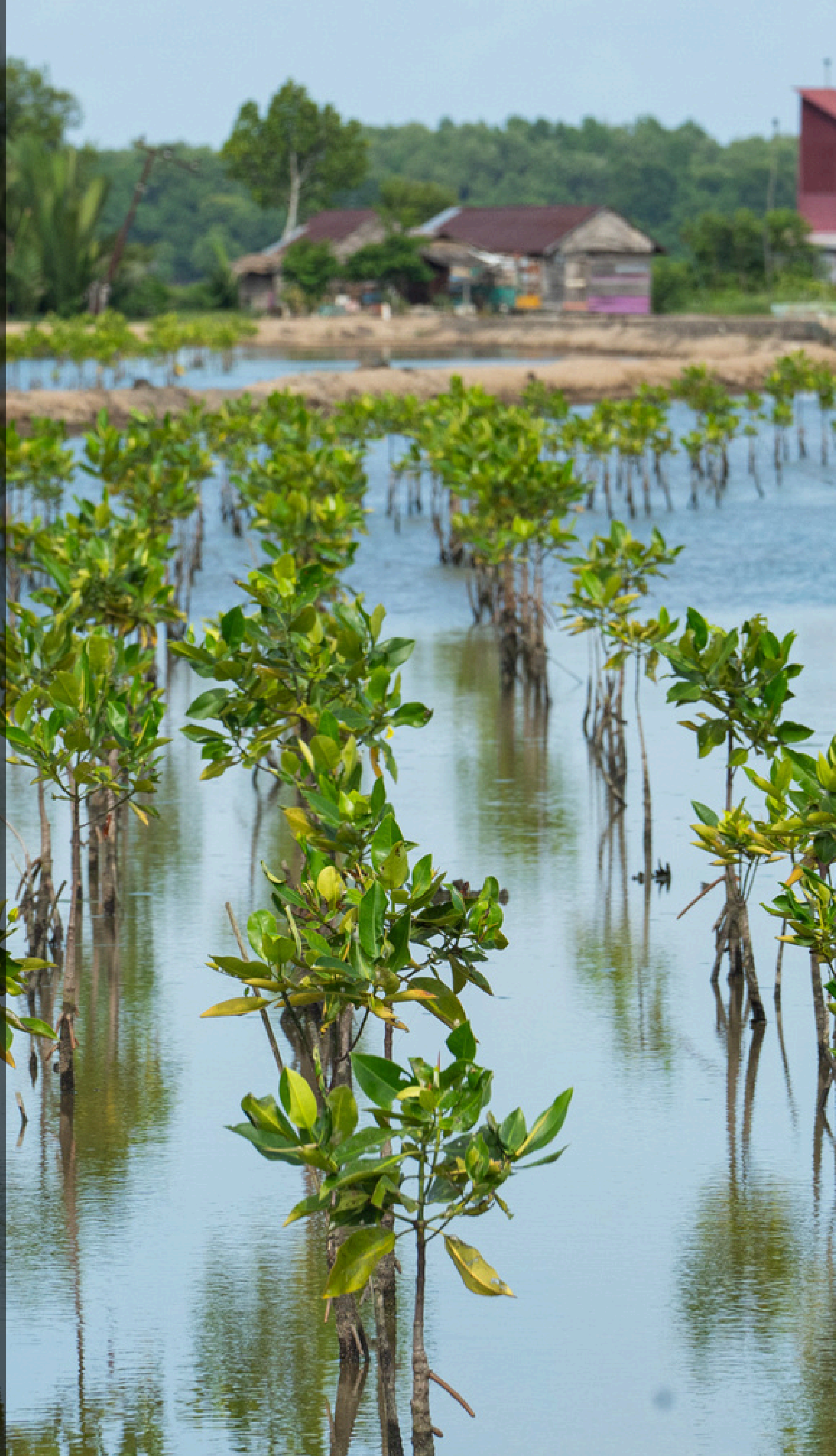
- Ministry of Marine Affairs & Fisheries, Ministry of Public Works
- Funders - Dutch Sustainable Water Fund, German BMU/IKI, Waterloo Foundation, Otter, Mangroves for the Future
- Local communities

Project Cost

10.5 million Euros in total distributed in different phases.

SDG GOALS ADDRESSED

- Increases income through sustainable aquaculture and improved livelihoods.
- Helps reduce salinity intrusion and protect freshwater systems near coastlines.
- Flood and erosion risk reduced via restored coastline.
- Restores coastal ecosystems like mangroves that support marine biodiversity.
- Promotes sustainable land use by regenerating mangroves and halting land degradation.
- Involves collaboration between communities, governments, and NGOs.



Key Learnings:

- Adoption of brushwood and bamboo permeable dams technique on India's muddy coastlines for coastal regeneration before vegetative interventions.
- Focus on habitat engineering (sediment balance) and allow species to reestablish themselves.

Example from India:

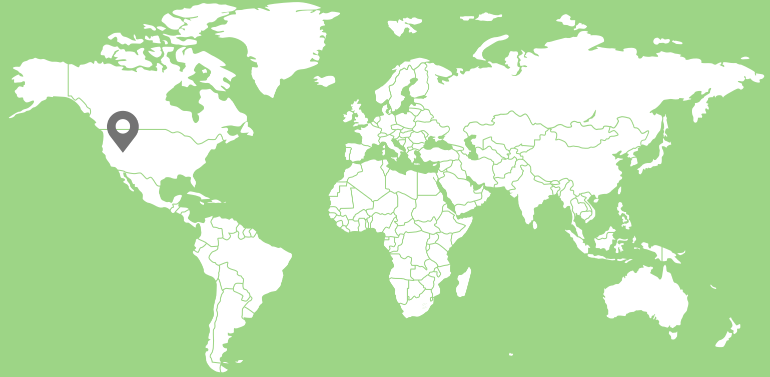
Pichavaram Mangrove Forests, Tamil Nadu is a similar example where the intervention protected local communities from the 2004 tsunami through natural wave attenuation.

PLAINS

Black Stork on Wetlands

MIXING MULTIPLE NBS FOR URBAN STORMWATER MANAGEMENT

LOCATION



GEOGRAPHY AND CLIMATE

- Portland, in the Pacific Northwest, sits where the Willamette and Columbia Rivers meet, surrounded by forests, mountains, and valleys.
- Its low basin makes it flood-prone during heavy rains. The climate is temperate oceanic.
- It gets about 36–43 inches of rain annually, mostly from November to March.

PROJECT IMPACT

94%
reduction in peak flow in the targeted areas achieved.

40%
reduction in cost compared to a traditional pipe upsize and replacement project.

90%
of suspended solids, organic pollutants and heavy metals filtered from water due to the Green Streets.

Climate Change Impact/Issue Addressed

- One-third of Portland, Oregon, has a combined sewer system that transports its stormwater runoff and sewage to treatment using a single pipe.
- The system struggled to handle the growing volumes of sewage and stormwater runoff from impervious surfaces, resulting in increased frequency of combined sewer overflows (CSOs) that directly affected water quality and community health.

EbA Practice

- Under the Green Streets program the city invested in over 2,000 bioswales, 600+ ecoroofs, and tens of thousands of street trees, significantly reducing combined-sewer overflows (CSOs) and alleviating pressure on stormwater pipes.
- Tanner Springs Park is centered around a bioengineered wetland that captures and filters stormwater from every roof and paved surface in the surrounding area, reducing flooding during extreme precipitation events.
- This high-performance constructed wetland of 1 acre boasts a great deal of biodiversity and offers a pleasant, accessible social hangout for the neighbourhood and delivers significant social benefits for the community.
- The park features a boardwalk, an art installation, and a recreational path running through its central area. Park programming emerged through a series of participatory charrettes with the community, which built a strong sense of pride and ownership among the participants.

Major Stakeholders

- Government Agencies
- NGOs
- Research Institutions
- Local Communities

Project Cost

Portland officials estimate $9 million in their total NBS investment portfolio has yielded a savings of $224 million in CSO costs related to repairs and maintenance.

SDG GOALS ADDRESSED

3 GOOD HEALTH AND WELL-BEING Improving water quality, reducing flood-related hazards, and creating healthier urban environments.

6 CLEAN WATER AND SANITATION Sustainable management of water resources through rainwater harvesting, water reuse and pollution reduction.

11 SUSTAINABLE CITIES AND COMMUNITIES Promoting resilient, green, and livable cities by implementing green infrastructure and flood management practices.

13 CLIMATE ACTION Addressing climate change impacts by reducing urban flood risks and managing stormwater effectively.

15 LIFE ON LAND Enhancing urban biodiversity and ecosystem health through green spaces and restoration projects.

Key Learnings:

- Convert existing drainage corridors into multi-functional green systems e.g. bioswales along canals or ecoroofs on municipal buildings to reduce sewage backups and CSOs.
- Engage Resident Welfare Associations, self-help groups, or school eco-clubs to adopt green infrastructure (bio-retention areas, storm ponds).

Example from India:

- Dhanbad’s Ward No. 35 – Community-Led Stormwater Recharge through Nature-Based Approaches. Community co-designed low-cost, nature-based interventions like permeable pavements, soak pits and recharge trenches, tree pits with overflow drains.

INTEGRATED WATER RESOURCES MANAGEMENT IN TANZANIA

LOCATION

GEOGRAPHY AND CLIMATE

- Tanzania has a diverse climate, ranging from tropical along the coast to temperate in the highlands, with distinct wet and dry seasons.
- Its geography includes savannahs, mountains (notably Mount Kilimanjaro), large lakes (like Lake Victoria and Lake Tanganyika), and vast plains, supporting rich biodiversity.

PROJECT IMPACT

180+

Community-Owned Water User Associations (COWSOs) were empowered.

168

women-group members, promoting inclusive governance.

Climate Impact

- In Tanzania, water demand is already exceeding supply.
- The ice cap of Mount Kilimanjaro has melted considerably and is projected to disappear completely by 2025. Basin Flows have been reduced from several hundred to less than 40 cubic metres per second.
- Water shortage is already leading to tensions between different water users – farmers, hydropower, fishers, and residents.
- Around 80% of the 3.4 million people who live in the basin depend on agricultural livelihoods.
- The Pangani Basin Water Board, which allocates water permits, has little data on which to base its decisions.

EbA Practice

- E-flow assessment to evaluate the ecological, social and economic impacts of alternate flow regimes to build an evidence base for water allocation decision options.
- Wetland restoration and reforestation in catchment headwaters (e.g., Mau complex) to stabilise flow, control erosion, and improve water quality
- Multi-stakeholder consultation and legal reviews to improve management planning and implement rational systems of water allocation.
- Establishing catchment forums for community participation in water management decisions, about climate change impacts and adaptation strategies.

Major Stakeholders

- Government of Tanzania - Basin Water Offices, Local Govt Authorities, Ministry of Water.
- International Donors and Agencies - UNDP/GEF, IUCN/WANI, WWF, EU, USAID (WARIDI)
- Local communities

Project Cost

Funded by GEF/UNDP and EU support to WANI.

SDG GOALS ADDRESSED

6 CLEAN WATER AND SANITATION

Focuses on sustainable water management, improving access, and addressing water scarcity.

13 CLIMATE ACTION

Incorporates climate adaptation strategies and resilience-building against climate change impacts.

15 LIFE ON LAND

Aims to conserve aquatic biodiversity and maintain ecosystem services.

17 PARTNERSHIPS FOR THE GOALS

Involves multiple stakeholders, donors, and community participation to enhance resource management.

Key Learnings:

- Strengthen and scale up Pani Samitis, VWSCs (Village Water and Sanitation Committees) and local groundwater user groups and embed them into district and state-level IWRM frameworks, with legal backing and capacity-building support.
- Strengthen customary knowledge systems in tribal belts (e.g. Northeast, Odisha) with state water boards.
- Recognise and integrate informal water practices (like tank desilting in Tamil Nadu, *kutcha* field channels in MP) into formal irrigation and WRM plans.

DESERT REGIONS

Water Well in Sahara Desert, Morocco, North Africa

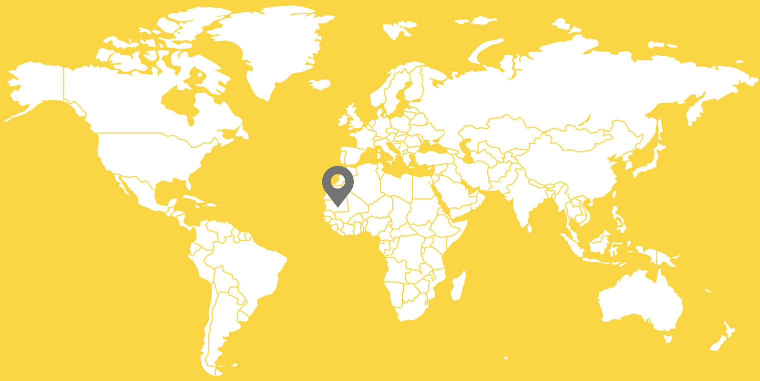
The plants are grown in nurseries and, once they have reached a certain size, they are planted during the winter period to take advantage of the rainy season. Trenches are dug in the ground to capture rainwater.

ECOSYSTEM BASED ADAPTATION IN MAURITANIA, WEST AFRICA

PROJECT

Development of an Improved and Innovative Management System for Sustainable Climate-Resilient Livelihoods in Mauritania.

LOCATION



GEOGRAPHY AND CLIMATE

- Arid Climate, high temperatures and irregular rainfall
- Three-quarters of land as desert or semi-desert
- Part of Sahelian Acacia Savanna Ecoregion

PROJECT IMPACT

18,000+
Individuals benefiting from access to ecosystem services and/or from new alternative livelihoods.

1490
Hectares of valuable ecosystems restored.

260+
Staff from government and NGOs with increased capacity for ecosystem-based adaptation.

Climate Change Impact / Issue being Addressed:

- The climate-induced changes include reduced precipitation, increased drought periods, and increased desertification.
- The climate impacts and the limited capacity for adaptation are worsened by Mauritania's rapid population growth, resulting in increased unemployment, competition for natural resources, widespread poverty, and food insecurity.

EbA Intervention:

- 450 hectares of multi-use green belts using indigenous, drought-resilient and soil-stabilising species.
- These greenbelts protect crops from wind erosion and desertification by holding together the soil and retaining moisture in the ground.
- Community-managed tree nurseries were built to supply the required trees.
- Training was provided to understand which trees to plant in Mauritania for desertification control.
- Training, technical support, and equipment for adopting climate-resilient livelihoods to over 300 community members.
- Over 100 climate-resilient income-generating activities were introduced by the project.
- Established and trained 6 new natural resource associations for the sustainable management of natural resources.

Major Stakeholders:

- Ministry of Environment (MEDD) and other Mauritania's government agencies.
- UNEP; GEF Council
- Local Community
- NGOs

Project Cost:

Implemented under NAP Project by UN Environment and funded by Green Climate Fund.

SDG GOALS ADDRESSED

6 CLEAN WATER AND SANITATION: Building 10 hectares of gabion walls and 98 hectares of stone contour lines for soil and water conservation in two watersheds.

15 LIFE ON LAND: Diversification of pastoral community livelihoods by providing training, technical support, and equipment to over 350 individuals.

13 CLIMATE ACTION: Restoring ecosystems across 1,490 hectares of watersheds, rangelands, sand dunes, and protected forests.

Key Learnings:

- Multi-use green belts enhance drought resilience and soil stability.
- Cover crops prevent wind erosion and retain soil moisture.
- Community tree nurseries support reforestation and biodiversity.
- Training and support enable communities to adopt climate-resilient livelihoods.

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