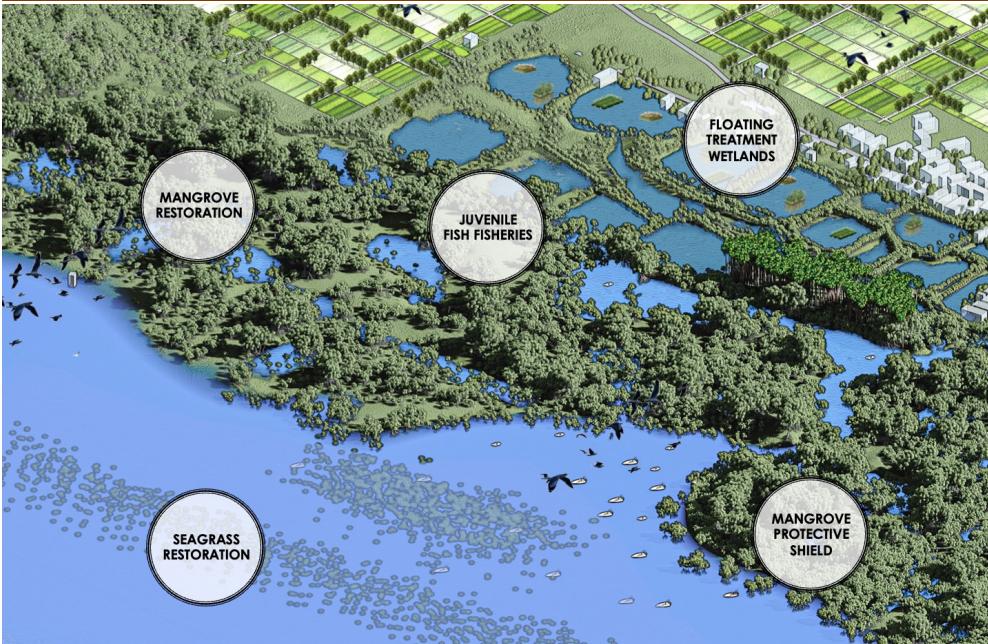


NbS-35: MANGROVE AS PROTECTIVE SHIELD FOR AQUACULTURE



LANDSCAPES SUPPORTED



EbA (ECOSYSTEM-BASED APPROACHES)

INTEGRATED COASTAL MANAGEMENT

REFORESTATION

COMMUNITY BASED MANAGEMENT

BIODIVERSITY CONSERVATION

SUSTAINABLE FISHERIES MANAGEMENT

HABITAT CONNECTIVITY

MAIN PROBLEMS ADDRESSED



SOIL EROSION



BIODIVERSITY LOSS



FLOOD CONTROL



SHRIMP POND



Dike (1m high)

FISH POND (17 m long)

Water treatment (oysters)

Minimum 30 to 50 meters long

The Coastal Mangrove Shield in synergy with Sustainable Fisheries acts as a natural barrier against tidal waves, coastal erosion, and storms, reducing the energy of incoming waves and stabilizing shorelines through their dense root systems. This NbS not only protects vulnerable coastal aquaculture sites, villages, and towns from severe weather impacts but also boosts biodiversity by providing habitat for fish and shellfish, which are crucial for local fisheries. Mangroves support sustainable fishing practices by offering nursery grounds and shelter for marine life, increasing fish stocks, and supporting the livelihoods of coastal communities.

ECOSYSTEM SERVICES AND ACTIONS

SUPPORTING

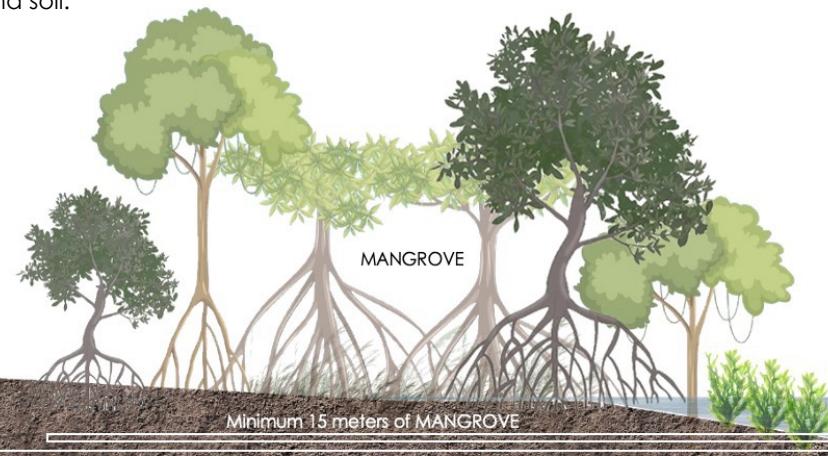
- Supports critical habitats for fish, crustaceans, and birds
- Nursery grounds for fisheries, protected by the mangrove

PROVISIONING

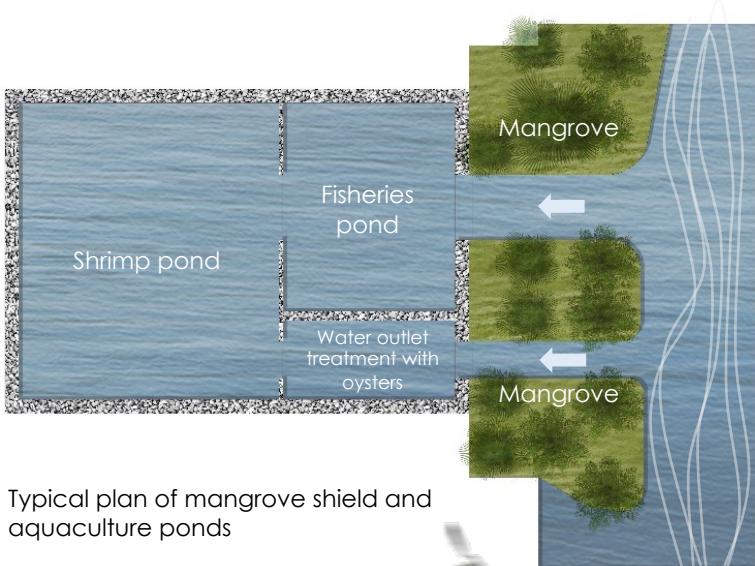
- Supplying wood, honey, and medicinal plants, balancing extraction with ecosystem health.

SOCIAL BENEFITS

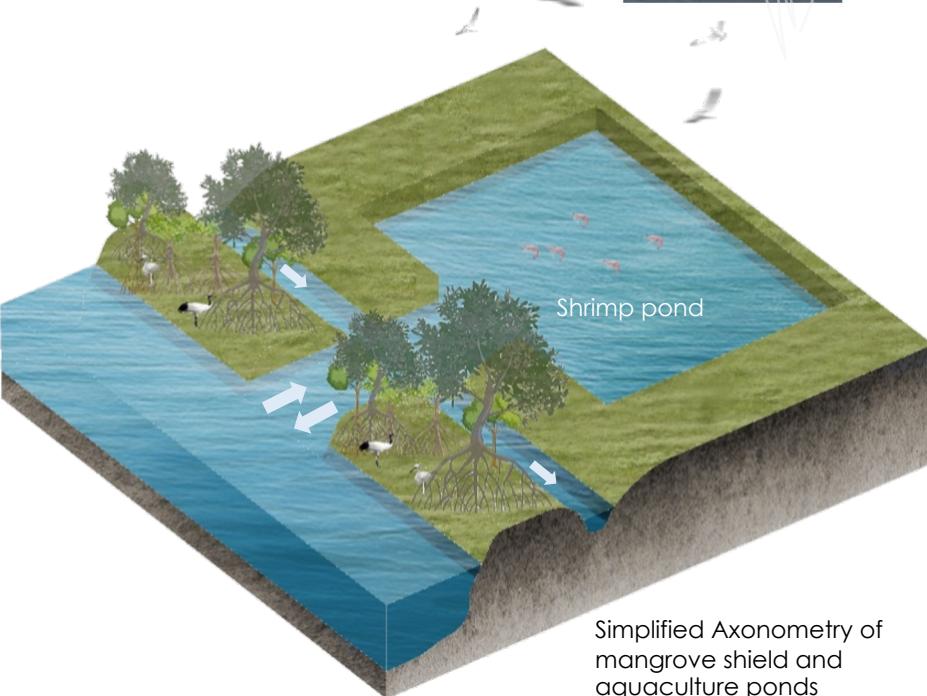
- Maintaining local economies and improve resilience for local communities.
- Mangroves lower disaster risk for nearby towns and villages, reducing infrastructure damage.



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Typical plan of mangrove shield and aquaculture ponds



Simplified Axonometry of mangrove shield and aquaculture ponds

PROJECT'S CHALLENGES & RISKS

- ❖ **Funding Gaps:** Long-term maintenance and monitoring often lack sustained funding.
- ❖ **Land Use Conflicts:** Due to potential competing interests (e.g., agriculture, aquaculture).
- ❖ **80% of Mangrove Restoration fail:** As the soil characteristics, density of plantations and rhythm of plantation will determine the success of the project.
- ❖ **Scaling up Coastal Fisheries:** Requires adequate land management and governance to avoid intensive coastal land pressure from the agricultural sector.

NbS co-BENEFITS AND THEIR INDICATORS

- **Biodiversity Conservation**
Species richness and abundance of key species (fish, crustaceans, birds).
- **Climate Resilience**
Reduction in shoreline erosion rates, frequency, and intensity of flooding in nearby communities.
- **Carbon Sequestration**
Carbon stock assessment in above-ground biomass and sediment (tCO₂/ha).
- **Water Quality Enhancement**
Levels of nitrates, phosphates, heavy metals, and sedimentation in water samples.
- **Livelihoods and Economic Benefits**
Increase in sustainable fishery yields, in income from ecotourism, local jobs.
- **Social Resilience and Community Engagement**
Number of community members involved in mangrove protection initiatives .

COST ANALYSIS

- **Direct Costs**
Restoration (0.40 USD/m²), infrastructure (fencing, access points), maintenance and monitoring.
- **Indirect Costs**
Opportunity costs if land is repurposed from other uses.
- **Time Horizon and Discount Rate**
10-30 years to capture full ecological and economic benefits, adjusted to account for long-term environmental and social benefits.
- **Direct Benefits**
Reduced storm damage costs, revenue from sustainable fisheries, carbon credit revenue.
- **Indirect Benefits**
Increased biodiversity, improved water quality, reduced health costs due to cleaner environment.
- **Risk Assessment**
Evaluation of factors such as climate change impacts on growth rates, potential for disease, and community engagement level.

REFERENCES:

Indonesia, Bogorame-Timbusloko Mangrove Shield, Demak.
Bedono Village Mangrove Regrowth.

IMPLEMENTATION OPPORTUNITIES:

Thailand, Western coastlines of Mekong Delta.
Vietnam, Ca Mau Peninsula.
Indonesia, Borneo, Java, Papua, Sumatra coastlines.