

# NbS-13: SMALL SAND DAMS



## LANDSCAPES SUPPORTED



## EbA (ECOSYSTEM-BASED APPROACHES)

INTEGRATED WATER RESOURCES MANAGEMENT

BIODIVERSITY CORRIDORS

SOIL AND WATER CONSERVATION

CLIMATE-SMART AGRICULTURE

RIPARIAN BUFFER RESTORATION

SUSTAINABLE LIVELIHOODS APPROACH

Small sand dams support the resilience of dry river landscapes by capturing and storing water within sandy riverbeds, offering a sustainable water source for local communities, agriculture, and ecosystems. Typically constructed from concrete or stone, these dams trap sand and sediment carried by rivers during seasonal floods, creating a natural reservoir that stores water while reducing evaporation and replenishing groundwater. This improves water availability during dry periods, strengthens food security, and ensures access to clean water for drinking and irrigation. In the watersheds of dry rivers in Western Timor, Indonesia, where water scarcity and flash floods often threaten livelihoods, sand dams can stabilize riverbanks, mitigate soil erosion, and reduce flood risks downstream. Additionally, they provide critical support for riparian reforestation and biodiversity conservation, promoting ecosystem health and sustainable agriculture. Given Western Timor's rugged terrain and prolonged dry seasons, sand dams offer a cost-effective, community-driven approach to improve water security, manage floods, and support regenerative farming, aligning with local needs and ecological conditions.

## ECOSYSTEM SERVICES AND ACTIONS

### SUPPORTING

- Groundwater Recharge:** Enhances aquifer replenishment by capturing and storing water in sand-filled reservoirs.

### REGULATING

- Flood Mitigation:** Reduces the impact of sudden floods by slowing water flow and storing it in riverbeds.

### PROVISIONING

- Clean Water Supply:** Provides a reliable source of water for drinking, irrigation, and livestock during dry seasons.

### SOCIAL BENEFITS

- Food Security:** Supports agricultural productivity by ensuring year-round water availability for crops and livestock.

## MAIN PROBLEMS ADDRESSED



SOIL EROSION

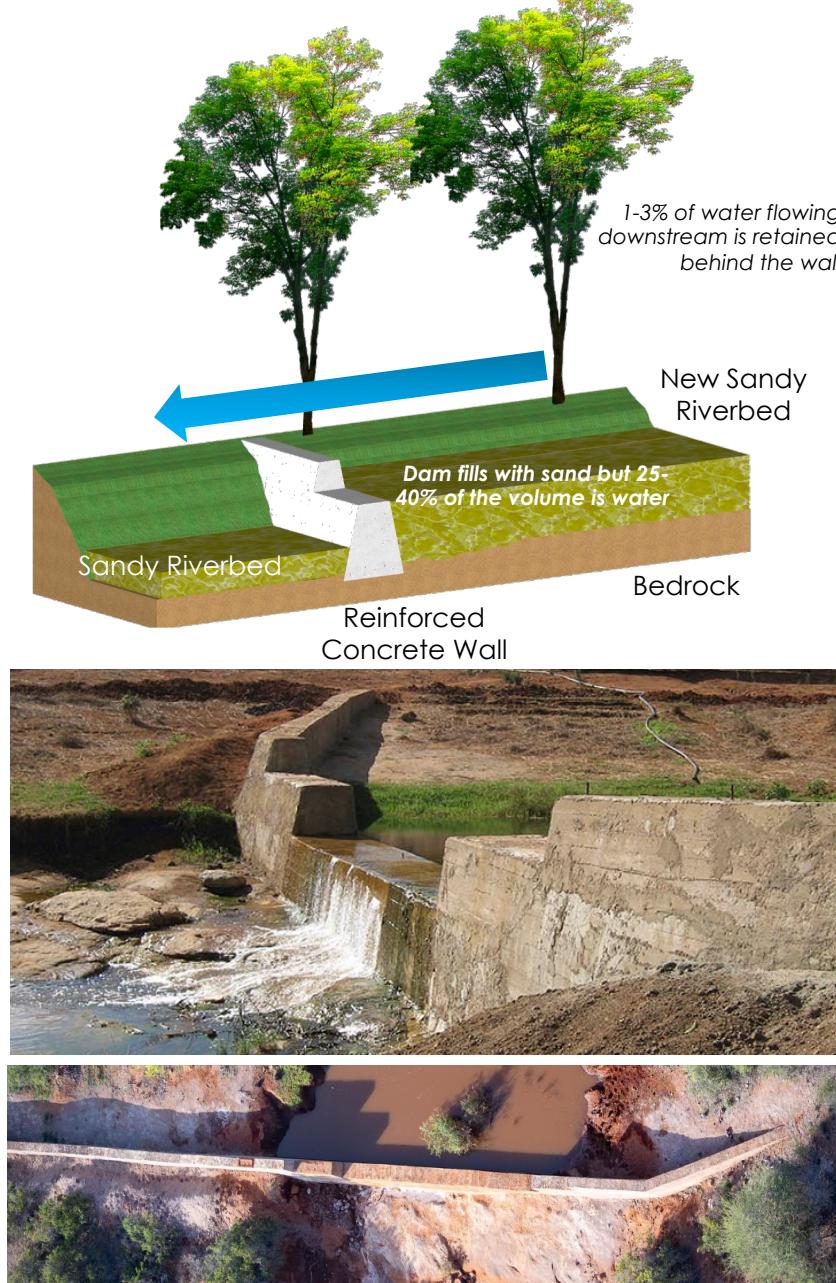


DISASTER RISK REDUCTION



FLOOD CONTROL

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## PROJECT'S CHALLENGES & RISKS

- ❖ **Site Suitability:** Identifying appropriate locations with adequate sand accumulation and stable bedrock can be challenging and resource-intensive.
- ❖ **Community Engagement:** Insufficient involvement of local communities in planning and maintenance may lead to lack of ownership and project sustainability.
- ❖ **Sediment Management:** Poorly designed sand dams risk excessive sediment deposition, reducing storage capacity and effectiveness over time.
- ❖ **Seasonal Water Flow Variability:** Highly irregular or minimal seasonal water flows, common in Western Timor, can limit the ability of sand dams to consistently recharge groundwater.

## NbS co-BENEFITS AND THEIR INDICATORS

- **Enhanced Groundwater Recharge**  
Small sand dams increase groundwater storage, with water table levels rising by up to 3–5 meters in adjacent areas.
- **Flood Mitigation**  
Sand dams regulate sudden water flows during floods, reducing downstream flood intensity by 20–40%.
- **Agricultural Productivity**  
Irrigation availability increases crop yields by 50–100% in regions dependent on dryland farming.
- **Improved Water Access**  
Communities gain year-round access to clean water, with up to 1,500 people benefiting from a single sand dam.
- **Biodiversity Support**  
Sand dams create microhabitats for aquatic and terrestrial species, with a 30–50% increase in vegetation cover near dams.
- **Climate Adaptation**  
Strengthened water storage buffers communities against droughts, reducing water scarcity risk by 30% in arid regions.

## COST ANALYSIS

- **Direct Costs**  
Construction of a small sand dam costs \$7k–15k, depending on local materials and labor availability.
- **Indirect Costs**  
Costs for community engagement, training, and maintenance range from \$1k–3k per dam annually.
- **Time Horizon**  
Lifespan of 30–50 years, with a discount rate of 5–7% typically applied for cost-benefit analysis.
- **Direct Benefits**  
Annual water savings for agriculture and domestic use can be valued at \$5k–10k per community.
- **Indirect Benefits**  
Enhanced crop productivity and reduced drought-related losses generate \$10k–25k in economic value annually.
- **Risk Assessment**  
Mitigating risks such as sediment overflow or structural failure typically requires an additional 10–15% of initial costs for monitoring and reinforcements.

## REFERENCES:

**Philippines**, community-based Bohol Sand Dam project.  
**Kenya**, Kitui and Machakos Sand Dam project.  
**India**, Saurashtra Sand Dams for Drylands in Gujarat.

## IMPLEMENTATION OPPORTUNITIES:

**Western Timor**, Noelmina and Benain Rivers.  
**Myanmar**, Central Dry Zone's Ayeyarwady River tributaries.