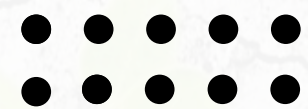


# BIO-DYKE

## From Indigenous Riverbank Protection to an Engineered Nature-Based Solution for Flood Risk Management



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# THE PROBLEM CONTEXT

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- Annually recurring floods
- Riverbank erosion/slumping
- Flood intrusion on the agricultural lands and communities
- Impacts on major livelihood crops and communal assets



Photo: Riverbank being washed away by flood in Tigra Community in Western Nepal (Source: Practical Action).

# INDIGENOUS PRACTICES

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- Earthen bunds with vegetation reinforcement (soil with straw)
- Natural slope stabilization
- Vegetation plantation (local and deep-rooted)



Photo: Vegetation-reinforced earth-based lining in irrigation canal in rural Nepal (Source: FMIST Nepal).

# BIO-DYKE

- Earth-based riverbank protection, using locally available bamboo, sandbag, soil, and local species vegetations
- Protects riverbank from slumping

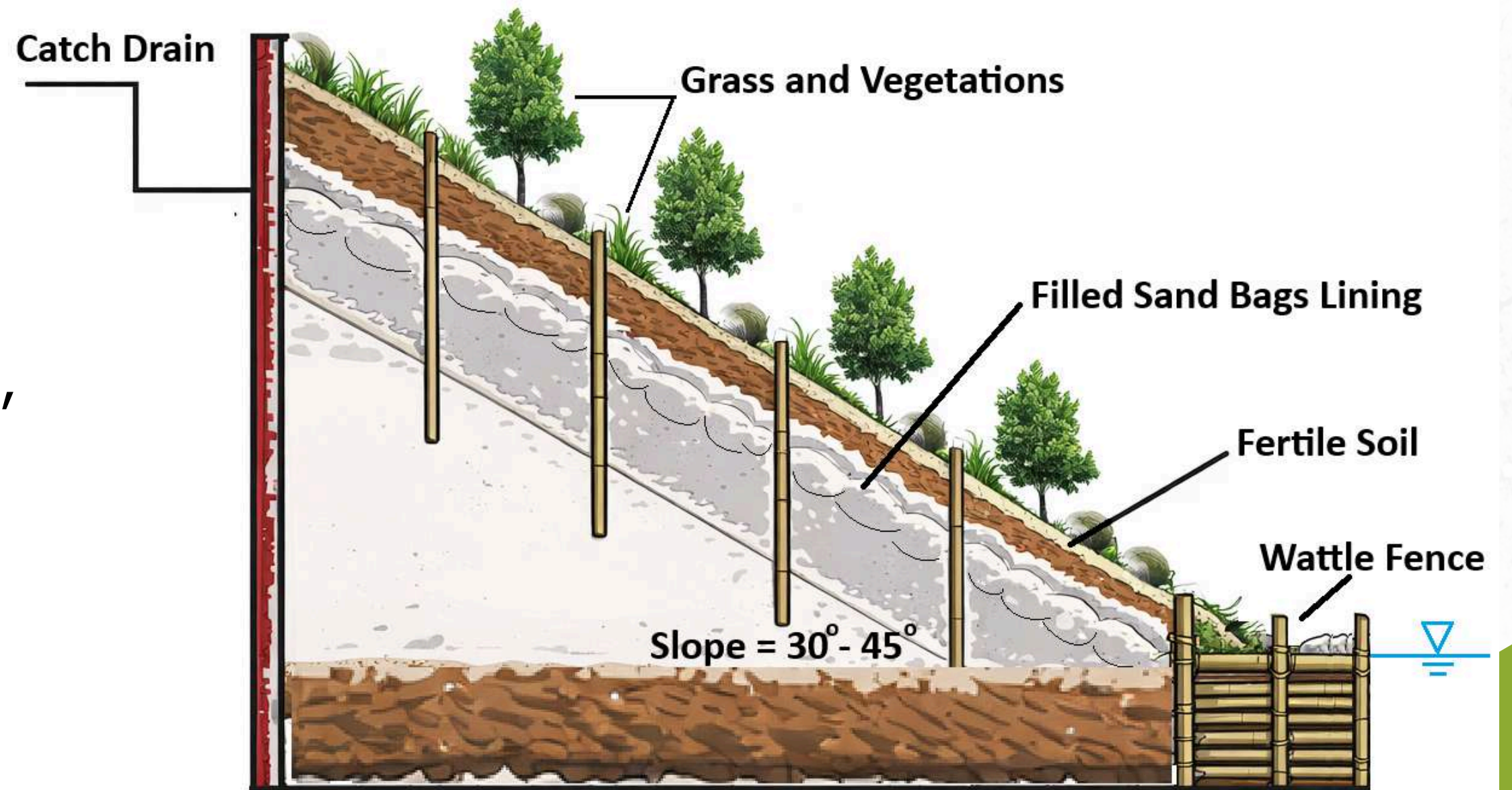


Image: Cross-section of a bio-dyke (recreated).

# BIO-DYKE

Bamboo and sandbags provide initial strength

Vegetation's root penetrate deep into the fertile soil to provide strength in the long run

Bamboo decay, and vegetation and soil form a natural-like slope

Vegetation provides long-term economic benefits to communities

### Structural Performance of Bio-Dyke Over Time

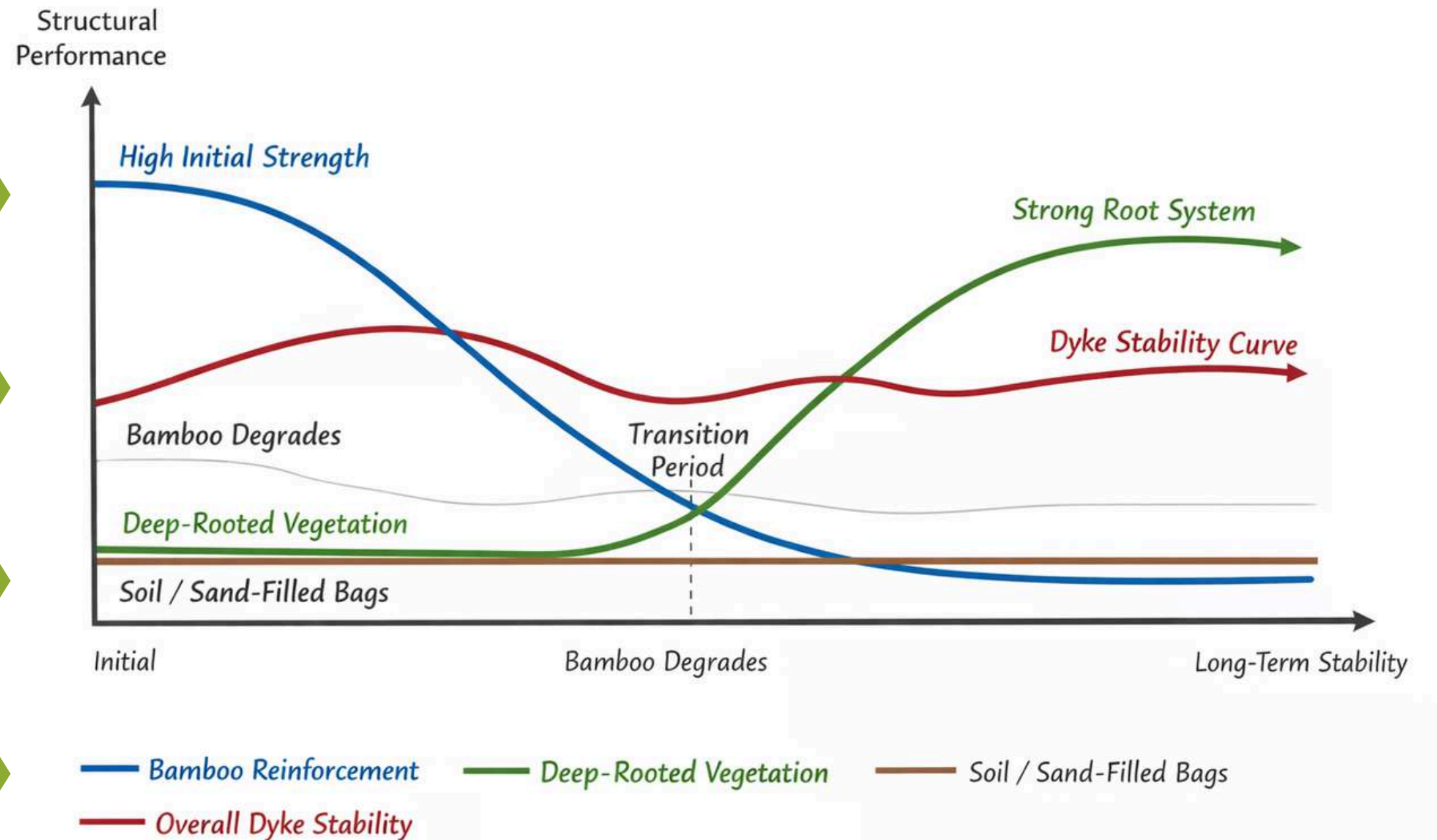


Image: Structural performance of Bio-Dyke over time (recreated).

# BIO-DYKE



Under construction in 2022



Status in 2023

Image: Bio-Dyke constructed in Pharela Community in Janaki Rural Municipality in Kailali, Nepal.

Image Source

<https://zcralliance.org/resources/item/improved-community-flood-resilience-nepal-impact-brief-2018-2024/>

# SOME PHOTOS



Image: Construction of a bio-dyke and a completed look without vegetation, Kanchanpur, Nepal

# KEY LEARNINGS

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- People are already living closely with the nature, however, demonstrating the effectiveness of the engineered nature-based solutions are key to community uptake.
- Solutions need to have a co-benefit to nature and people to increase community uptake.
- Community participation is key to sustainability (construction and maintenance).
- Nature-based solutions take time to work, but we can rely on them.
- They pose 'one for all solutions' to multiple hazards.

# USEFUL READINGS

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- <https://zcralliance.org/blogs/bio-dykes-a-nature-based-approach-to-reducing-flood-risk/>
- <https://zcralliance.org/resources/item/bio-dykes-working-with-nature-to-reduce-flood-losses/>
- <https://zcralliance.org/resources/item/bio-dyke-an-environment-friendly-solution-to-protect-river-banks/>

# Thank You

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