



# Mitigating Coastal Erosion & Coastal Inundation through COASTAL DEFENCES



## HARD ENGINEERING

man-made structures built along the coast to absorb wave energy and prevent coastal erosion and flooding.

### Defences

### Descriptions

### Disadvantages

#### Seawall



Duero, Bohol

Constructed using concrete, steel, and/or stone, seawalls are sited parallel to the coast to absorb wave energy.

Waves can breach the wall. Seawalls are also expensive to maintain. These structures deprive longshore currents from transporting sediments, resulting in coastal erosion.

#### Groynes



Vallehermoso, Negros Oriental

Wooden or cemented fence-like barriers built perpendicular to the shoreline. Groynes are built to accumulate sediments at their updrift side.

Causes erosion / sediment starvation at the downdrift side.

#### Gabions

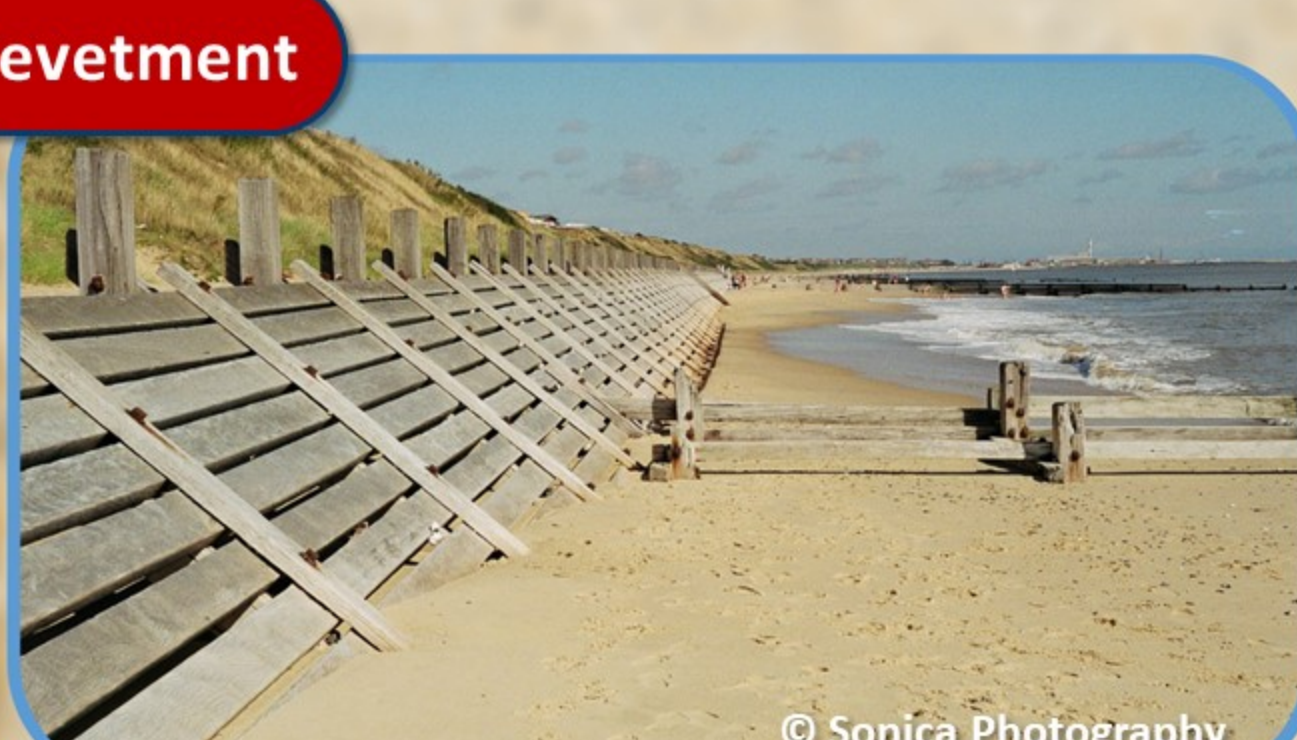


Jose Panganiban, Camarines Norte

Mound of gravels covered in metal mesh; usually built at cliff bases to reduce wave impact.

Prone to breaching and overtopping by waves.

#### Revetment



© Sonica Photography

Seaward dipping, wooden or cemented structures along the active beach that absorb wave energy and prevent cliff erosion.

Expensive to implement and can create strong wave backwash.

#### Tetrapods



Santa, Ilocos Sur

Piled up pre-fabricated tetrapods on a beach in front of a cliff or seawall that absorb wave energy and prevent coastal erosion.

Expensive to implement and maintain; can result to sediment starvation.

## SOFT ENGINEERING

modification of the natural longshore sediment transport utilizing less intrusive methods and activities.

### Defences

### Descriptions

### Disadvantages

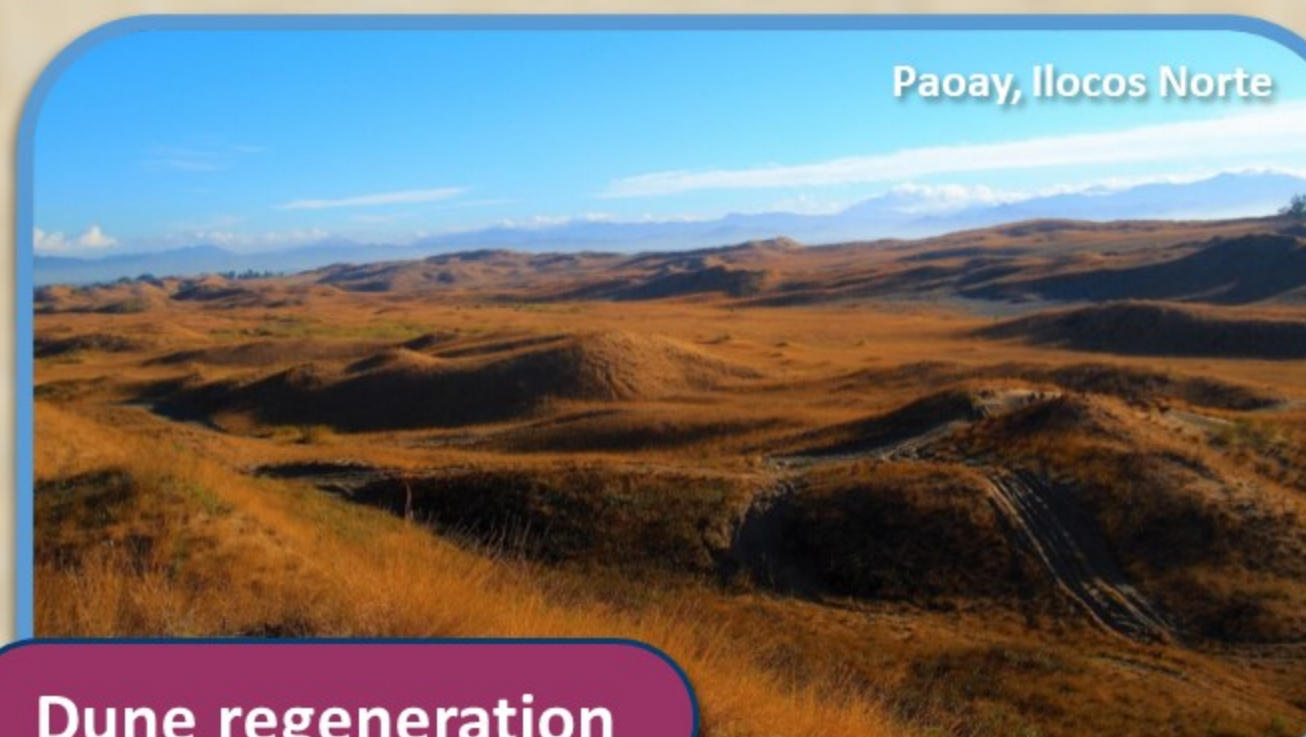


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EC-IFAS

#### Coastal dune afforestation

Introduction of new vegetation on coastal lands to stabilize the sediment volume of coastal dunes and to prevent coastal erosion.

Non-native species of plants could compete for nutrients needed by native plants. Selection of plant species that are drought resistant and have well developed root systems is limited.

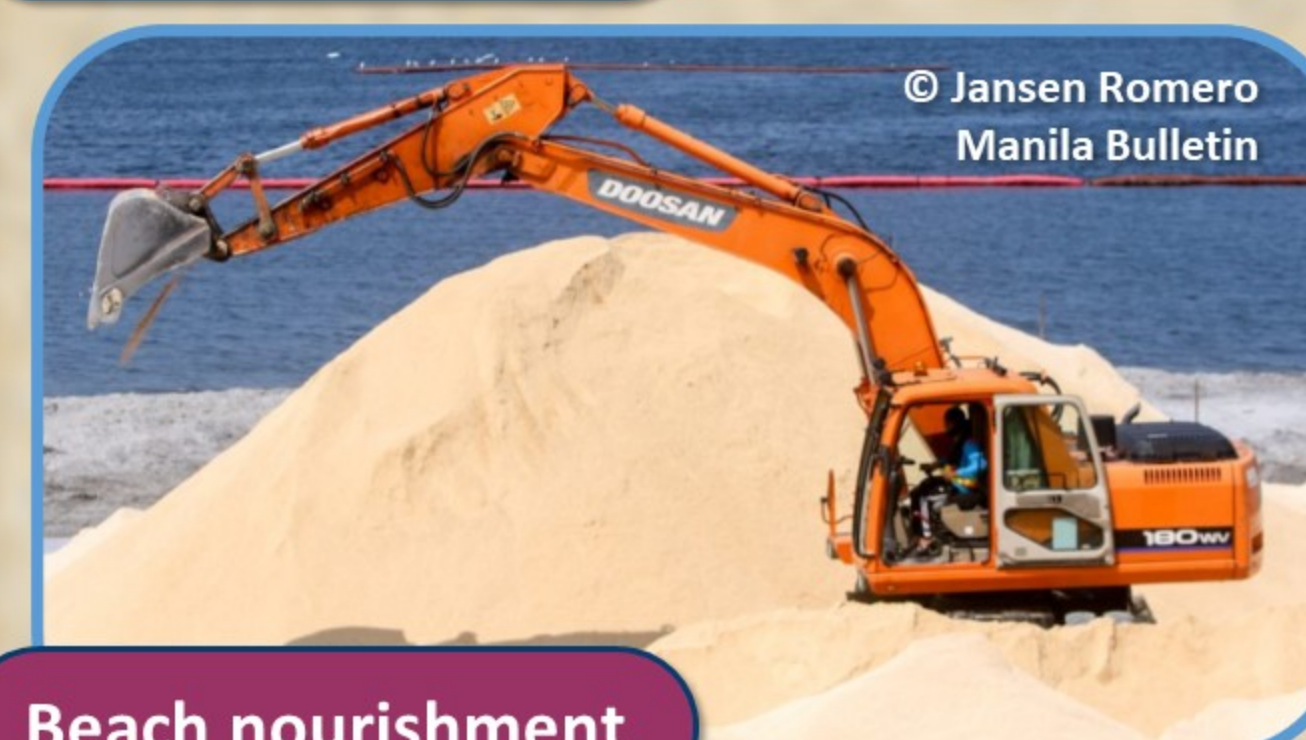


Paoay, Ilocos Norte

#### Dune regeneration

Areal densification and/or restoration of sand dunes and vegetation that act as natural barriers against wave energy.

Having dunes make access to the beach more difficult. Creating new dunes results in less land for human use.



© Jansen Romero  
Manila Bulletin

#### Beach nourishment

The beach is made wider using sand and shingles.

Costly as sand and shingle need to be sourced elsewhere; requires a lot of maintenance.

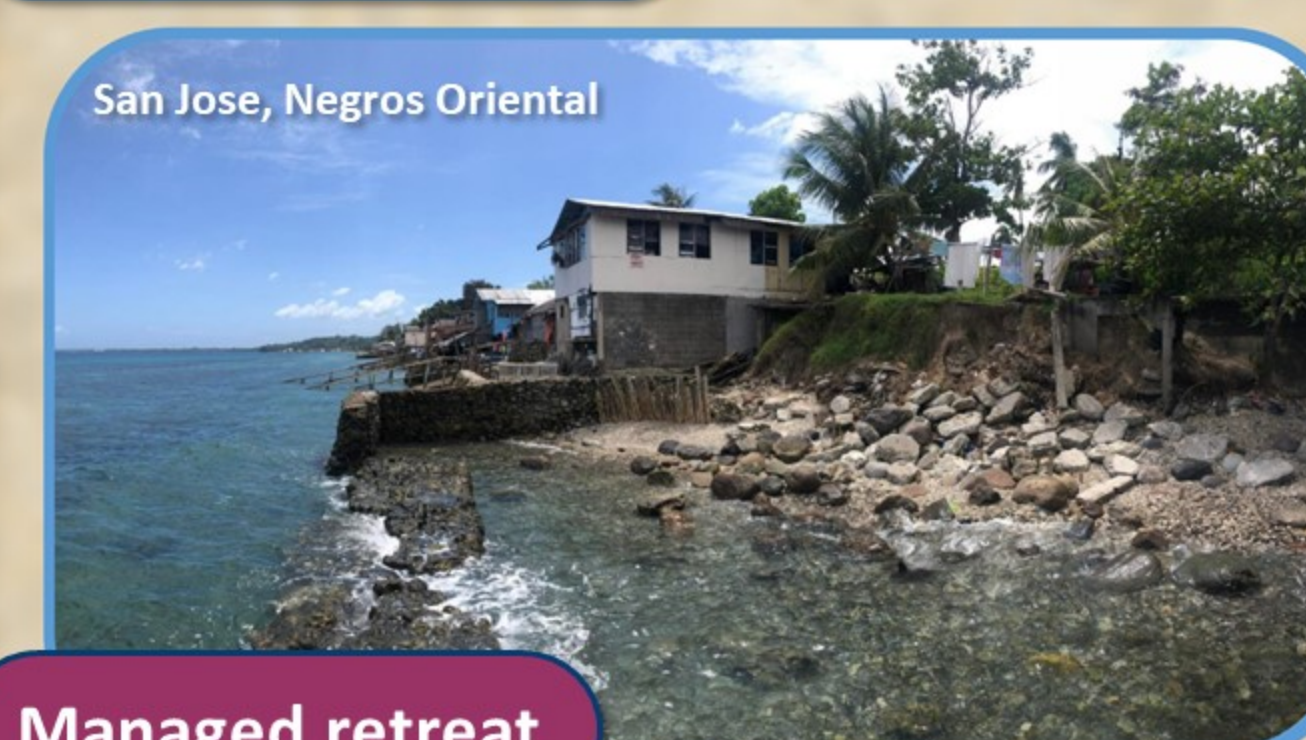


Dauin, Negros Oriental

#### Makeshift sandbags

Sand-filled sacks put up along the coastline to prevent coastal flooding.

Although less costly constructed, sandbags are easily damaged and are less effective wave energy absorbers.



San Jose, Negros Oriental

#### Managed retreat

Implementation and the subsequent natural adaptation of a recommended "No-Build-Zone" – the buffer zone distanced from the highest high tide shoreline.

Requires retreat and/or relocation of coastal populace from or away from the implemented "No-Build-Zone".

## ECOSYSTEM-BASED / HYBRID

integrates the use of biodiversity and ecosystem-based options into an overall strategy to adapt to the adverse impacts of climate change (i.e., coastal erosion, coastal inundation).

### Mangrove/Seagrasses preservation



Sinait, Ilocos Sur

Planting of mangroves (e.g., *Rhizophora mucronata*) and seagrasses along tide-dominated shores. Mangroves' complex root systems help dissipate wave energy and keep sediments in place preventing erosion. *Talisay* is also a mangrove species but are not as effective as *R. mucronata*.

### Coral reef restoration



Pamilacan Island, Bohol

Protecting existing coral reefs from anthropogenic activities (e.g., illegal fishing, harvesting for building materials) or creating artificial reefs. Coral reefs reduce wave energy and height and protect the coast against coastal erosion.

### Eco-type revetments



© Naylor, LA., et al., 2017

Provides a more beautiful landscape compared to the traditional seawalls; vegetation can also trap sediments for beach nourishment.



© EcoShape, 2022

Prefabricated concrete revetments that are designed to host and to support intertidal biodiversity and marine species.

