

SEA DYKE DESIGN For Kien Giang Province

BACKGROUND

Kien Giang Province has 205km of coastline with much of it covered by mangrove forests. Behind the mangrove belt sea dykes are constructed to stop the intrusion of sea water and protect communities and valuable agricultural land. This tacit coastal defense is threatened by global climate change, as predicted rises in sea levels take effect.

By 2009 mangroves had disappeared from 13% of the coast of the province. Strong sea currents are eroding exposed sea dykes and 11 kilometers of dyke have completely collapsed.



The Province and District authorities have repaired eroded sections of the dyke in the past but these efforts have often failed.

CURRENT DYKE CONSTRUCTION PRACTICES

Material for construction of sea dyke is generally excavated from an area within 10 m of the foot of the dyke. It is excavated from both the sea side of the dyke and from the inland side. The result of this practice is that a trench is created along the seaward toe of the dyke. The soil material used to create the dyke is thus a mix of organic material, gravel and clay.

AFFECT OF CURRENT PRACTICE ON FUTURE EROSION

Erosion will occur wherever there is a change or modification of the natural sea bed such as has occurred with the construction of dykes. The extraction of soil from the front of the dyke, combined with exposure to strong currents appears to be the cause of the erosion of the foreshore.

The trench constitutes a vulnerable area for erosion which can take place as outgoing waves cause turbulence within the trench. The turbulence gradually destroys the slopes and creates more erosion channels in the sediment of the foreshore thus destroying the mangrove trees.

Once this has happened, the erosion channels and mangrove destruction will expand rapidly as seawater turbulence enters adjacent areas through the trenches that exist behind the mangroves. This means that in the adjacent forested areas, part of the backflow will not pass through the mangroves but will follow the path of lowest friction and pass through the eroded areas.

The excavation of the trenches also damages the natural clay cover that protects the foreshore area. This could create a seepage flow that passes below the dyke causing internal erosion.

In order to demonstrate improved Sea Dyke construction and protection methods, the project has established the "Hon Dat Model Site" two km south of the mouth of the Hon Dat canal.



RECOMMENDED DYKE CONSTRUCTION

- Dykes should be constructed in accordance with national guidelines.
- Use dyke construction material from the landward side and not from the seaward side.
- The dyke must be constructed of homogeneous soil material.
- The foundation area of the dyke should be cleared and compacted before construction.
- Material should be placed in layers of 30 - 40 cm and compacted to approx. 20 cm.
- It is strongly recommended that a dyke maintenance program is developed.
- A proposed construction method is shown in Figure 1.

