

Coastal Hazard Mitigation: Reconstruction of Sand Dunes and Proper Setback Zoning

Tsung-Yi Lin

Department of Geography, National Taiwan Normal University

aeolin@ntnu.edu.tw

In response to coastal erosion, engineering structures, such as seawalls, groins, and detached breakwaters, are usually used in Taiwan to protect the shoreline and prevent the life and property losses that result from hazardous typhoon events. However, the inadequacies of protective measures in combating strong waves and storm surges have become apparent. Even worse, the concrete structures are continuously inflicting negative effects on beach preservation. Beaches in front of the seawall, on the downdrift side of a groin or a series of detached breakwater, are disappearing soon after the completion of the structure construction, which leads to the loss of the sandy beaches' functions as natural buffers.

Other than the beach, sand dunes are also acting as natural barriers between the sea and the land. Shore-parallel foredunes can be a solution to avoid the engineering structures' negative effects on ecological and aesthetic values of the coast. Unfortunately, most of the coastal dunes in Taiwan are under degradation caused by either natural or anthropogenic pressures. A study in I-lan shows that coastal sand dunes have been eroded to form scarps or have been overwashed to reduce the height in extreme wave events. Dunes have also been removed artificially for the construction of new roads or industrial parks, or they have been reclaimed as fish or duck breeding ponds. Providing reinforcements to or reconstructing those sand dunes by artificial planting or seeding might help sand accumulation and, thus, enhance their natural functions of coastal defense. Along with proper buffer or setback zoning, which limits the developments or investments in the hazard-prone area, dune reinforcement or reconstruction will be a huge step toward environmental sustainability and will also greatly reduce the loss of people's lives and properties in the future.

Keywords: coast, hazard mitigation, dune degradation, dune reconstruction, setback zone.