

Colonization of Non-Planted Mangrove Species in the “Rehabilitation of Aquaculture Ponds to Mangroves” Projects in China

Authors : Yanmei Xiong, Baowen Liao, Kun Xin, Zhongmao Jiang, Hao Guo, Yujun Chen, Mei Li

Abstract : Conversion of mangroves to aquaculture ponds represented as one major reason for mangrove loss in Asian countries in the 20th century. Recently the Chinese government has set a goal to increase 48,650 ha (more than the current mangrove area) of mangroves before the year of 2025 and “rehabilitation of aquaculture ponds to mangroves” projects are considered to be the major pathway to increase the mangrove area of China. It remains unclear whether natural colonization is feasible and what are the main influencing factors for mangrove restoration in these projects. In this study, a total of 17 rehabilitation sites in Dongzhai Bay, Hainan, China were surveyed for vegetation, soil and surface elevation five years after the rehabilitation project was initiated. Colonization of non-planted mangrove species was found at all sites and non-planted species dominated over planted species at 14 sites. Mangrove plants could only be found within the elevation range of -20 cm to 65 cm relative to the mean sea level. Soil carbon and nitrogen contents of the top 20 cm were generally low, ranging between 0.2%-1.4% and 0.03%-0.09%, respectively, and at each site, soil carbon and nitrogen were significantly lower at elevations with mangrove plants than lower elevations without mangrove plants. Seven sites located at the upper stream of river estuaries, where soil salinity was relatively lower, and nutrient was relatively higher, was dominated by non-planted *Sonneratia caseolaris*. Seven sites located at the down-stream of river estuaries or in the inner part of the bay, where soil salinity and nutrient were intermediate, were dominated by non-planted alien *Sonneratia apetala*. Another three sites located at the outer part of the bay, where soil salinity was higher and nutrient was lower, were dominated by planted species (*Rhizophora stylosa*, *Kandelia obovata*, *Aegiceras corniculatum* and *Bruguiera sexangula*) with non-planted *S. apetala* and *Avicennia marina* also found. The results suggest that natural colonization of mangroves is feasible in pond rehabilitation projects given the rehabilitation of tidal activities and appropriate elevations. Surface elevation is the major determinate for the success of mangrove rehabilitation, and soil salinity and nutrients are important in shaping vegetation structure. The colonization and dominance of alien species (*Sonneratia apetala* in this case) in some rehabilitation sites poses invasion risks and thus cautions should be taken when introducing alien mangrove species.

Keywords : coastal wetlands, ecological restoration, mangroves, natural colonization, shrimp pond rehabilitation, wetland restoration

Conference Title : ICAWREE 2020 : International Conference on Advances in Wetland Restoration and Ecological Engineering

Conference Location : Bangkok, Thailand

Conference Dates : February 03-04, 2020