

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. After one year old plantation, *R. apiculata* had the highest percent survival rate at 66.67 while *B. gymnorhiza* had the median percent survival rate at 41.33. *C. tagal* had the lowest percent survival rate at nil after ten months period. Soil parameters in this shrimp pond favored for *R. apiculata* more than the other two species. Not only the soil parameters but the standing water due to the high water level also affected the survival rate of the mangrove seedlings. However, the percentage of survival rate of both *R. apiculata* and *B. gymnorhiza* were higher than *C. tagal* because they could produce some leaves.

2. As for *R. apiculata*, they also had the highest height growth at 45.73 centimeters. *B. gymnorhiza* had the median height growth and *C. tagal* had the lowest height growth at 44.87 and 11.22 centimeters respectively. The factors that supported the high height growth of both *R. apiculata* and *B. gymnorhiza* were the size of the propagules, the photosynthetic production from the leaves, and the suitable concentrations of soil parameters.

3. The soil properties in this shrimp pond prior to the plantation were different from the natural mangrove soil except for the percentage of moisture content and the sodium

concentration. The percentage of moisture content and the sodium concentration were in the range of 54.77-56.21 percent and 9398.06-9996.12 ppm. respectively. The concentrations of ammonia, nitrite and nitrate were 1.677-1.869, 0.004-0.005, and 0.039-0.056 ppm. respectively. All of these inorganic nitrogen were also lower than the concentrations in the natural mangrove. Besides these, the potassium (710.72-837.44 ppm.) and magnesium concentrations (1337.05-1742.22 ppm.) were also lower than the concentrations in the natural mangrove. The soil pH, phosphate and calcium concentrations with the range between 7.4-7.5, 1.539-2.539 ppm., and 6813.60-8216.40 ppm. respectively. These concentrations were higher than the ranges occurred in the natural mangrove. This shrimp pond soil was not at all a wasteland; therefore, the rehabilitation of mangrove seedlings would be successful. After one year old plantation, only the inorganic nitrogen group were still lower than the concentrations in the natural mangrove.

4. The suitable mangrove seedlings that could survive and thrive on this abandoned shrimp pond were *R. apiculata* and *B. gymnorhiza*. While *C. tagal* could grow but the survival rate was low. Besides soil parameters, The factors that should be considered was the standing water due to high water level. The standing water with the dike obstruction affected the survival of seedlings. In order to increase the survival rate and height growth of these mangrove seedlings, the limit of the standing water level approximately to 10-20 centimeters or dike removal should be carried out.

Recommendations

1. The enhancement of the survival and height growth of the mangrove seedlings planted on the abandoned shrimp pond could be carried out by allowing the normal flooding tide in the area by the removal of the dike. Another choice is to limit the water level in the shrimp pond to the maximum 10-20 centimeters. Cost and operation feasibility of either method chosen should be considered.

2. The other commercial mangrove species that grow very fast such as *Avicennia* spp. should be selected for rehabilitation. However, the *Avicennia* spp. should be planted in the nursery prior to plantation. The *Avicennia* seeds always floated so the seeds with rooted would easily establish themselves on the abandoned shrimp soil. Moreover, *Avicennia* spp. grew well on the sandy sand.

3. The introduction of multispecies plantation in the rehabilitation of the abandoned shrimp pond should be carried out such as *Bruguiera* spp. . Each species with its functions in the ecosystem will support each other.