

## IRPC's Mangrove Development Research Synopsis

IRPC Company is the giant industrial corporate in Rayong Province. Several CSR programs have been conducted by the company to show the responsibility to the Rayong communities and the coastal environment. IRPC Company and the local communities have determined to develop the IRPC's mangrove development since 2007 in area 300 rai (118 acre) that planted about 277,200 for development the knowledge on mangrove ecosystem learning center. The assessment on mangrove productivity and social mechanism are important roles to build IRPC's mangrove plantation, Rayong Province to be one of the mangrove ecosystem learning centers

IRPC's mangrove plantation, in the vicinity of Klong Gonpruk, was mangrove reforestation area on the degraded forest. This small mangrove forest appeared in narrow fringes. Mangrove zonation was not evidenced due to different ages of mangrove plantation. The remaining forest in the vicinity to IRPC industrial estate was with tall trees of *Rhizophora apiculata* and *Avicennia alba*. The study revealed that the IRPC's mangrove plantation was in the developing forest condition. Dominant mangrove species found in the area were *A. alba*, *R. apiculata* and *R. mucronata*. Other common species found in the mangrove plantation usually associated with landward forests such as *Higiscus tiliaceus*, *Thespesia populnes*, *Derris trifoliata* and *Clerodendrum inerme*. In February 2014, enrichment planting in the IRPC's mangrove forest was carried out 14 rai (5.5 acre). *Rhizophora apiculata* and *R. mucronata* were planted within the old forest fringes with 2x2 meters spacing. The low survival rate of 70% was observed. The freshwater discharge to prevent urban flooding caused the low survival rate. It impacted the fluctuating in salinity and high water level retention which were detrimental to mangrove saplings growth.

IRPC's mangrove plantation served as the natural classroom indicating the impacts from human activities. Threatening factors affecting mangrove productivity in IRPC's mangrove forest were urbanization and expansion of eco-tourism in the Rayong River Estuary. Flooding and freshwater discharge controls also the major threat causing the changes in circulation, water mass exchange, salinity as well as sediment characteristics. IRPC's mangrove plantation was the only mangrove forest in Rayong City Municipality that retained the direct contact with the sea through tidal cycles. However, from the physical oceanographic study revealed limited flows and circulation between the IRPC's mangrove forest and the Rayong River Estuary. This greatly affected the productivity of fishery

resources. Water circulation and exchange of water masses were not in accordance to the tidal cycles that indicated human activities in flooding control has impacted to the mangrove plantation. Low water exchange between the mangrove forest and coastal area enhanced the accumulation of pollutants and organic enriched sediments. Small wave heights were detected during the Southwest Monsoon. Water circulation in the Rayong River Estuary was wind-driven toward the southeast direction. This corresponded to the water circulation in the eastern coastline in the Gulf of Thailand.

The evaluation of the ecological revealed that IRPC's mangrove forests served as the natural filter for coastal pollution. The coastal water in IRPC's mangrove plantation and Rayong River Estuary were in good condition meted the standard of coastal waters defined by the Pollution Control Department. Variations in salinity changes were evidenced in line to the flood controls. Nutrient concentrations were good quality coastal waters but high nitrate concentrations. Sediment characteristics in the IRPC's mangrove forest ranged from sandy loam to dandy clay loam. Changed in sediment characteristics occurred in certain study sites in the drought. Organic matters in the sediment were in the range of extremely low to moderately high levels. High organic content observed during in the drought more than the rainy as similar as the plant biomass in the sediment.

This study also revealed that IRPC's mangrove plantation served as life supporting system and the coastal welfare. High phytoplankton productivity in the forest as evaluated from the phytoplankton biomass in term of chlorophyll A. Phytoplankton diversity of 80 genera were recorded. *Thalassionema* and *Thalassiosira* were the dominant. The phytoplankton diversity was similar as previous study. Zooplankton diversity was also in the same range as previously recorded. But the density greatly declined. Zooplankton productivity in the IRPC's mangrove forest and Rayong River were in the range of moderate to high productivity. High diversity during the drought was detected of 28 groups in 10 phyla. The diversity during the rainy was detected only 22 groups in 7 phyla. Copepods were the dominant zooplankters. Nematodes, foraminiferans and harpacticoid copepods were the dominant meiofauna in the forest. High density of meiofauna were recorded. The macrofaunal diversity in the forest indicated moderate productivity. Polychaetes and molluscs were the dominant groups indicating the disturbances in benthic communities. Low fish diversity and abundance were macrofaunal observed. Reduced fish and macrofauna diversity and abundance were evidenced as same as previous studies. However the complexity of the food webs indicated the sustaining coastal productivity.