Mangrove productivity estimation using modelling approach and tree parameters assessment

ABSTRACT

This study used productivity models and above ground biomass to investigate productivity in different sites of MMFR. Ninety Rhizophora apiculata leaf samples were collected from different compartments (18, 31, 71, 74, 42 and 55) based on tree age and management. For biomass calculation, tree height and diameter were measured in plot of 10m x 10m in compartment 18, 31, 71, 74 and 67. The age of the trees were as follows: compartment 18 and 31 with 15-year-old, compartment 71 and 74 with 25-year-old and compartment 67 with 30-year-old mangrove trees. Compartment 42 and 55 are classified as virgin jungle reserve (VJR). Compartment 67 was not taken as a sample site due to technical reason and compartments in VJR were not considered for biomass estimation. Sixteen variables; stable isotopes ($\delta13C$, $\delta15N$), macronutrients (C, N, P), cations (Ca, Mg, Na, K) and trace elements (Cd, Cu, Fe, Mn, Pb, Zn) were analyzed. Productivity models and calculated biomass for investigated compartments showed similar trends. In 15-year age group; compartment 18 showed higher productivity than in 31. For the 25-year age group; compartment 74 had higher productivity than 71. No prominent increase was observed in biomass between 15-year old and 30-year old trees. Furthermore, with moderate N and $\delta15N$ loading input, compartments showed more productivity. The results conclude that MMFR is a sustainably managed mangrove forest and its productivity could be monitored using nutrient productivity models.

Keyword: MMFR; Nutrients; Rhizophora apiculata; Productivity models; Biomass