

Secondary Succession Patterns of Mangrove Forest in the Degraded and Abandoned Paddy Farming Areas in Rufiji Delta, Tanzania

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The aim of this study was to assess ecological dynamics in terms of species composition, structure, biomass and edaphic factors of regenerating compared to old growth mangrove forest areas. Forty-five plots of 11.6 m radius were established and distributed equally in three strata (i) early stage fallow (ii) intermediate fallow (iii) old growth forest. A post hoc multiple comparison of mean indicated a significantly lower ($p < 0.05$) stem density (112 ± 127 stems ha^{-1}) for intermediate and (78 ± 100 stems ha^{-1}) for early stage fallows compared to old growth forest (418 ± 159 stems ha^{-1}). A similar pattern was reflected in the basal area and biomass. Abandoned paddy farms had lower species diversity compared to old growth areas. *Avicennia marina* demonstrated its pioneer effect with the highest Importance Value Indices (IVI) in abandoned sites. A general trend on soil properties sampled up to 100 cm depth, mean Total Nitrogen (TN) and Soil Organic Matter (SOC) were 0.13 ± 0.06 % and 5.70 ± 1.70 % respectively in the early succession stages, indicating the soil properties improved with the advancement of succession. But, mean soil pH, Phosphorus (P) and Potassium (K) were 4.33 ± 1.51 , 9.04 ± 6.53 $mgKg^{-1}$ and 2.06 ± 0.97 % respectively in the intermediate fallow, being lower for those in fallows of early stage and old forest. However, only pH and K were only significant ($p < 0.05$). This indicates that the regenerating trees in the forest deplete soil nutrient. These findings demonstrate that fallow periods of up to 10 years would still not support full recovery of lost mangrove forest from conversion to agriculture