Influence of REDD+ pilot project on mangrove forest condition in Zanzibar, Tanzania

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Zanzibar was involved in piloting REDD+ project in mangrove forests through community forest management between 2010 and 2014 to address climate change impacts and to provide incentives to local communities against deforestation. Since then there was lack of information linking influence of REDD+ pilot project on mangrove forest condition in Zanzibar. Therefore, this study was designed to assess the influence of REDD+ pilot project on mangrove forest condition in Zanzibar Tanzania to provide viable information to gage performance of the project in addressing the global REDD+ policy, Tanzania REDD+ strategy and Zanzibar Forest Policy for improving forest condition through carbon credit.

Kitogani and Muyuni B villages were randomly selected for detailed study because these villages were among the villages involved in piloting REDD+ project in Zanzibar. Systematic sampling design was used to establish sample plots in mangrove forest in the study villages. Circular nested plots with radii of 2 m, 5 m, 10 m and 15 m were adopted and in each plot assessment involved identification and counting of all trees <5 cm diameter at breast height (dbh) as regenerants. Diameter at breast height was taken for trees ranging from 5 cm to above 20 cm. Species names were recorded along with the number of stems counted in each plot. Data were analyzed by using Microsoft Excel computer program and analysis involved computation of stocking parameters.

There were 5847 and 374 number of stems per hectare in mangrove forests of Kitogani and Muyuni B villages respectively. The observed difference on the number of stems per hectare for the two studied mangrove forests was contributed by the size of the forests. Mangrove forest in Kitogani village is bigger than that of Muyuni B village. Stem distribution in the studied forests showed normal reversed ‘J’ shape trend, which is common for natural forest with active regeneration and recruitment. There were no trees above 20 cm dbh in mangrove forest in Muyuni B village indicating that mangrove forest in this village was facing high level of human disturbance as compared to those in Kitogani village. Focus group discussions revealed that in both villages, there was high level of illegal harvesting of mangroves for poles, firewood and charcoal making for household income before implementation of REDD+ project.

The results on basal area distribution showed that mangrove forest in Kitogani village had higher mean basal area per hectare (17.5 m^2/ha) than that of Muyuni B village (0.4 m^2/ha). The observed difference could be contributed by low number of stems per ha for the Muyuni B mangrove forest when compared to that of Kitogani village. Generally speaking, mean basal area recorded in the studied mangrove forests was high (17.9 m^2/ha) meaning that implementation of REDD+ project had helped to improve the forest condition particularly growth of young stems that had led to regeneration. The general pattern of normal ‘J’ shaped trend for natural forests of mixed age species was not followed for both villages. This could be explained that small diameter trees constituted more to mean basal area per hectare. Focus
group discussions revealed that there was high level of mangrove forest disturbances before implementation of REDD+ project. The main reason given for that was poor law enforcement regarding access to mangrove forest resources under the state tenure regime. The legitimacy did not involve local communities in the management of forest resources hence the forest behaved open. Other reason given was that the mangrove forests are close to local communities’ residents where larger diameter trees were highly demanded for poles, firewood and charcoal making for household income. Interestingly both forest showed high regeneration potential of the *Ceriops tagal* this could be due to high coppicing capacity and resistant to a range of ecological condition including dry and wet environment. In conclusion, the study established that REDD+ project has positively influenced stocking parameters in the two studied mangrove forests. There should be effective monitoring mechanisms in order to measure the impact of the project to the forest condition.