Cover and cover change analysis of mangrove forests in the trans-boundary areas of Kenya and Tanzania

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Mangroves are among the most threatened ecosystem on earth. Some of these forests transverse national boundaries complicating their management due to differences in governance structures between countries. In order to improve the management of trans-boundary mangroves and associated biodiversity, regular monitoring of status and conditions of these forests is essential. Remotely sensed data and GIS were used to determine forest cover and analyze changes in forest condition over a 30 year's period; from 1986 to 2016. Image classification was conducted in ENVI 5.3 and ArcGIS10.2.2 using supervised maximum likelihood algorithm. This was complemented by a detailed ground-truthing where degradation hotspots were detected and mapped. The trans-boundary mangrove of Kenya and Tanzania occupy an area of approximately 6,140ha and 5,110ha respectively giving a total of 11,250ha with an overall density of 3083 stems/ha. These forests are dominated by Rhizophora mucronata, Avicennia marina and Ceriops tagal that occupy 2960ha, 2752ha & 2394ha respectively which is more than 80% of the forest formation. The trans-boundary mangroves are in different levels of degradation. A 25% decline in mangrove cover was recorded over the last three decades, translating to a loss of 245.4ha/annum. An average of 1055 stumps/ha was obtained for Funzi, Mwache, Sii Island, Mwazaro and Bondo. Harvesting of mangroves for building poles and energy has contributed to major loss of mangroves in the region. Mangroves areas near human settlements in Tanga and Moa in Tanzania and Vanga, Funzi and Gazi in Kenya, suffered a higher degradation level