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Applications of GIS and Remote Sensing for Mangrove Management in Uttara Kannada, Karnataka State

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The estuaries including mangrove habitats of most of the Indian west coast are much smaller compared to such along the east coast, with the overwhelming presence of Sundarbans and Orissa mangroves. The west coast estuaries, despite their high productivity and biodiversity, faced neglect regarding mangrove conservation and development programmes, probably on account their smallness. These estuarine regions, densely populated due to high productivity, are prone to rising human pressures causing greater mangrove fragmentation and losses. The lack of spatial quantitative maps on mangroves for the west coast has often crippled restoration programmes. In the Uttara Kannada district of Karnataka State, mangrove planting works in the small estuaries attempted during the recent years have raised high hopes of better ecology and higher biological production. Yet the local forest departments, which manage most mangrove areas, are to be equipped with spatial, quantified data on mangroves and potential area for mangrove planting. Using open source GIS software (QGIS) and remote sensing software (GRASS) and IRS imageries mangrove areas and potential areas available for planting in four river estuaries and some minor creeks in the Honavar Forest Division of Uttara Kannadawere mapped. Mangrove species associated with different salinity regimes are appropriately recommended for planting in suitable areas. Whereas *Rhizophora apiculata* and *Avicennia marina* are exclusive to high salinity (>15 ppt.) areas, *R. mucronata, Sonneratia alba* and *Excoecaria agallocha* are good for high to medium salinities (5-10 ppt) and *S. caseolaris*is, a fairly large mangrove tree thrives in low salinity conditions (<5 ppt). The RS data using 2010 IRS p6 L4 MX 5M having resolution of 5 m, was useful in finding out distribution of only tree mangroves and not juveniles and shrubby forms, which need more higher resolution. The study of this nature, using GIS and remote sensing are handy tools for scientific planning and management of mangroves even at a micro-level. These tools are helpful in finding out alienation of potential mangrove areas for shrimp farming or other alternative uses. For instance in the Aghanashini estuary 2973 ha of intertidal areas have been diverted for shrimp farming, rice cultivation and salt production. The applicability of such modern techniques to micro-level mapping of mangroves, for depicting potential mangrove areas, assessing threats to mangroves through diversion of mangrove areas etc., for the relatively smaller west coast estuaries and creeks, is expected to pave way for increase in area under mangroves and improve the efficiency of mangrove management even at the village level.

Keywords: Coastal ecosystems, Mangroves, Estuaries