Aerial Imagery for Monitoring Land Use in East African Wetland Ecosystems

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Abstract

Anthropogenic pressure and environmental change processes are key drivers of the recent intensification in the agricultural use of East African wetlands. Land shortage and degradation of upland areas as well as climate change effects turn wetland ecosystems into focal points of production by commercial and traditional users, entailing rapid wetland use changes and, in some instances, severe wetland degradation. An ecosystem inventory by mapping land cover and monitoring land use changes with remote sensing improves our understanding of change processes in wetlands and will contribute to the provision of decision support for sustainable use of wetland ecosystems. However, the spatial resolution of satellite systems is often too coarse to derive land use information at the plot level. In particular, small wetlands often exhibit abrupt transitions into different types of land use and landscape elements. Hence, monitoring of small wetlands requires spatially high-resolution remote sensing data, accounting for the prevailing small-scale diversity in land use. High-resolution aerial imagery, which is not available for most parts of East Africa, may provide information of wetland use/change at the required plot-level scale. Therefore, image acquisition campaigns over Kenyan and Tanzanian wetlands were realized with a common Nikon D-200 in September 2008 and February 2009, respectively. A comprehensive geo-referenced image data set that displays land use units at the plot level was obtained, used to discriminate various land cover types. Land cover/-land use maps can be derived that reveal land use trends fundamental for providing decision support for a sustainable wetland use.

Keywords
Agriculture
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