



Forest change and the Nile Basin: implications for scale based water management

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Abstract

Forest-water interactions defy simple generalizations, elsewhere as well as in the Nile Basin of East Africa. Among others, scale is one of the causes behind complexities of forest-water interaction. The region has been hit by recurrent climate extremes, as well as rapid land use changes of forests (both afforestation and deforestation). Different studies addressing the issues of forest cover change and its impact on hydrology in general for the Nile Basin and in particular for the Ethiopian Highlands are reviewed and summarized for this presentation. Farm level (plot scale), small-scale, meso-scale and regional scale watersheds are included in this study. At farm level and small-scale watersheds, forest cover change impacts are vivid. However, impacts are inconsistent across watersheds – both afforestation and deforestation could worsen or augment water availability. As the scale becomes larger (100 – 1000s km²), impacts of forest change obscure. On the other hand, at regional scale, forests are crucial for regulation of regional atmospheric moisture, which in turn falls as orographic rain within the high rainfall areas of the upper Nile basin. For example, the well-being of West and Central Africa rainforests has substantial contribution to feed the Sahel and Ethiopian Highlands with rainfall. The vivid relationship between forest and hydrology at smaller scales infers the need for stronger land management policies which should be tailored with adaptive forest management to the best of water security. On the regional scale, states, regional and international agents need to focus further on institutionalizing regional, cross-boundary cooperation on land management for the sake of mitigating impacts of extreme climate conditions. These joint local and regional scale land management actions are needed for sustainable water provisioning, required for food production, human consumption, hydropower generation and industrial development, which is entirely based on water management of the Nile Basin.