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Forest hydrology in the Blue Nile Basin: based on observational analysis and community perception.

The influence of tropical forests on hydrological regimes has been a concern for both science and society. The relationship of forest cover change and hydrological regime was investigated in the Blue Nile Basin of Ethiopia, which is a sub-basin of the Nile Basin, based of 45 years (1960-2004) of gauged-river data using observational data analysis and community perception in 12 macro-scale watersheds (> 100 km2 in area). Changes in Hydrology and forest cover were analyzed through statistical methods, modeling, remote sensing, and complemented by community perception. Finally, the changes were summarized. The statistical and modeling change detection analysis revealed few significant changes in the hydrological regime; however those changes that were detected varied among the watersheds. Despite the relatively stable hydrological regimes, there was dramatic forest cover change (from 90% cover to 45% in the 45 years period) in the watershed from the southern part of the Basin. There was also a higher relative increase of eucalyptus plantation in one of the watersheds from the northern part of the Basin. The community perception complemented the observational forest hydrology study as: “In general, forest change and hydrological regime are related, but the relationship is not simple and direct because of intermediary factors like rainfall variability, different types of forest influences at different places with in watersheds, population growth, cattle grazing… “. Some Literatures from the Blue Nile Basin shows relationships between forests and low flow hydrology in the spatial dimension; however, there is no evidence to support this in the temporal dimension at the scale of river basins. Land use change may not be the dominant factor for changes in the hydrological regime of a 100 km2 basin over the course of decades. In addition, there could be factors contributing to masking forest influences. The possible contributing factors (based on both observational analysis and community perception) are watershed size (scale), uncertainty in observational measurements and rainfall variability. New research studies need to be designed to address these factors; starting from hillslope and farm level studies integrated with community participation, on different forest types.