



Forest and watershed storage: the pursuit of aquifer

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It is well documented that forest cover plays a key role in influencing the dry season hydrology in the tropics. Also known is the availability of water resources during dry seasons, being particularly critical for agriculture and human livelihood. We assessed how much watershed storage as a function of the dry season recession flow is changing in dependence of forest cover changes in a 30 years period (1983 – 2014). Three watersheds from Ethiopian Highlands were used given the dynamic and ongoing history of forest cover changes: one watershed (Sokoru) turned from predominantly seasonal cultivation to woodlot plantation, the second watershed (Woshi-Dimbira) undergoes non-significant changes in forest cover except for a few tea plantations in place of deforested natural forests, and the third watershed (Upper-Didesa) lost 100% of its natural forest in the time of 30 years and is now dominantly covered by small holder agriculture and villages. A recession flow analysis was employed using a linear reservoir model. The linearity assumption bases on linear characteristics of flow in the absence of rain (dry season). In its original state at the beginning of the period analysed, the more forested watersheds, the second and the third ones, showed higher storage capacities as compared to the first one, which is more of agricultural use. However, along the time scale, the watershed Upper-Didesa with highest rate of natural forest loss showed an increasing trend of storage. Slight increments of storage are also seen for the Sokoru watershed, where woodlot plantations have increased. These latter two watersheds are known for their deep soils. We are able to show that forest cover changes do not necessarily impact storage capacity at the watershed scale as far as the soils and aquifers are intact. Meanwhile, deforestation has a subsequent impact on soil degradation in many parts of Ethiopian highlands sooner or later; which entails reduction of storage could be imminent once the deep soil starts degrading.