



Response of Groundwater table to Eucalyptus Plantations in a Tropical Monsoon Climate, Lake Tana Basin, Ethiopia

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Given the increasing demand for water resources and the need for better management of regional water resources, it is essential to quantify the groundwater use by phreatophytes in tropical monsoon climates. Phreatophytes, like eucalyptus plantations are reported to be a groundwater sink and it could significantly affect the regional groundwater resources. In our study, the consumptive groundwater use of a closed eucalyptus plantation was calculated based on the diurnal water table fluctuations observed in monitoring wells for two dry monsoon phases in the Fogera plain, northwest of Ethiopia. Automated recorders were installed to monitor the hourly groundwater table fluctuations. The groundwater table fluctuates from maximum at early in the morning to minimum in the evening daily and generally declined linearly during the dry phase averaging 3.1 cm/day during the two year period under the eucalyptus plantations. The hourly eucalypts transpiration rate over the daylight hours follows the daily solar irradiance curve for clear sky days. It is minimal during the night and reaches maximum of 1.65mm/hour at mid-day. The evapotranspiration from the groundwater by eucalyptus plantations during the dry phases was estimated at about 2300mm from October 1 to 31 May, in 2015 compared to about 900mm without eucalyptus trees. The average daily evapotranspiration was 9.6mm. This is almost twice of the reference evapotranspiration in the area and 2.5 times the actual rate under fallow agricultural fields. Thus, water resources planning and management in the region needs to consider the effect of eucalyptus plantations on the availability of groundwater resources in the highlands of Ethiopia.

Key words: Eucalyptus, Evapotranspiration, Groundwater, Ethiopia, Lake Tana