

## Water balance evaluation of beresa catchment with emphasis to groundwater recharge, upper Blue Nile Basin, Ethiopia, Eastern Africa

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This paper describes application of soil moisture water balance model and the physically based FAO Penman Montheith reference evapotranspiration estimation model in the evaluation of the water balance components (with particular reference to groundwater recharge) of Beresa catchment that found in South Eastern headwater of Upper Blue Nile. The total area covered in this study is 1112km<sup>2</sup>. In typical mountainous catchments such as the Beresa in which surface water resources are scarce, groundwater is the primary resource for both domestic and agricultural water use. As availability of hydrogeological data is limited for groundwater balance analysis, important data like annual and monthly groundwater recharges were estimated after (Thornthwaite-Mather, 1955, 1957) methods. The hydrological study was conducted between 2012 and 2013. In this study, hydrological and hydrometrological data were analyzed and a soil moisture accounting method was used so as to account for the groundwater potential of the area. Evaluation of the annual water balance and conceptualization of stream flow shows that the average rechargeable rainfall (over a period of 31 years) in the study area is approximately 10.72%. On average 66.89% of the total rainfall in the area is lost as actual evapotranspiration and 22.39% contributed to direct runoff. The monthly water budget of the catchment indicates that the groundwater recharge is lumped from August to September. February is the month in which maximum moisture deficit is observed. July and April are the months that have neither moisture surplus nor soil moisture deficit. The months January, February, March, May, June, October, November and December are experiencing soil moisture deficit.

### Biography

Tibebe Belete Tigabu is a lecturer in University of Gondar at the department of Water Resources & Environmental Engineering, Gondar, Ethiopia. He has got his B.Sc. in Hydrology & Water Resources Management in 2008, B.Sc. in Geology in 2004 at Arba Minch University and Addis Ababa University, Ethiopia respectively. He also participated an international training in Technology for Integrated Water Management, Belgium and Global Warming & Sustainable Water Management, Germany. Mr. Tibebe has extensive experience in water related practical works, like investigation, design and supervision of water schemes. He has been involved in different leadership works. He was the Coordinator for Rural Water Supply, Sanitation and Hygiene program Assisted by World Bank and Team leader of Water Resources Development office in Simada Area, Ethiopia from September 2005 to October 2006.

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