

UNDERSTANDING WATER LEVEL FLUCTUATIONS IN (SEMI)CLOSED MARGINAL GRABENS UNDER A FAST GROWING IRRIGATION DEVELOPMENT OF NORTH ETHIOPIA

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Water resources safeguard livelihoods of pastoralists and farmers at the western margin of the Rift Valley in north Ethiopia. However, poor knowledge of water resources and their availability hampers good governance in the closed basins. Therefore, this study investigated the condition of water resources in the marginal grabens. We monitored and analyzed the water level of observational wells (n= 46) springs (n=80), river baseflow (n=14) and endorheic lakes (n=3); from 2015 to 2017. The study shows that the western escarpment stretching from Aba'ala to Kobo basins are the main recharge areas to the marginal graben bottoms well beyond the eastern horsts. Western mountains showed a higher concentration of springs and river flows (95%). Moreover, the baseflow at the outlet of the Kobo sub-graben (573 km²) and Aba'ala graben (553 km²) are 185x10⁶ m³ and 18332 m³ respectively. Unlike the outlet of Aba'ala, baseflow at the Mehoni-Alamata and Kobo basins flows through out the year. This indicates that the volume of baseflow is greater at the outlets of basalt grabens than the limestone grabens. Groundwater, springs, streams/ rivers and closed lakes also showed rapid fluctuations in water level as a response to human abstractions and high evapotranspiration in dry seasons. To conclude, surface and subsurface water resources in the marginal grabens showed variability both in time and space, and this could severely challenge the future livelihoods of the marginal graben communities. Thus, integrated catchment management is required to support the present fast growing irrigation agricultural development in the marginal grabens of north Ethiopia.

Keywords: springs, baseflow, diver, hydrograph, escarpment, Ethiopia

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