Challenges to sustainable management of urban groundwater in Nairobi County, Kenya

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This paper presents the challenges in managing groundwater resources in Nairobi County, Kenya, a rapidly growing urban centre. The Water Resource Management Authority (WRMA) estimates water demand for Nairobi is 650 000 m3/day compared to production of 482,940 m3/day. This difference between production and demand has been widening over time due to population growth, inadequacy of the carrying capacity of the distribution network, and climate shocks. Groundwater continues to be exploited to fill the gap. We mapped licensed boreholes developing spatial discrimination maps and assess changes in borehole locations and drilling depths. Further we interviewed staff of regulatory agency (i.e. WRMA) on compliance and challenges they face. 2,632 boreholes were mapped and analysed to elucidate statistically significant borehole density and water abstraction ‘hotspots’. Proximity analyses also showed a 6% increase in the number of boreholes that lie within 100 m from each other from 2011 to 2013 whereas analyses on drilling depths indicated that an average increase of 170 m from 1930 to 2013. This substantial increase in drilling depth is attributed to both pollution of the upper aquifer and perceived competition for groundwater. This study also reveals policy and practice shortcomings that contribute to the poor management of groundwater in Nairobi. Lack of a publicly available groundwater database for decision making; unclear legal framework; low capacity of the regulator; access to groundwater that permits unlicensed (and thus unrecorded) groundwater use. The county’s population increase drives other exigent contributing factors such as poor enforcement of supportive regulations, increased water demand, and intermittent piped supply. A low level of compliance to, and awareness of, regulatory processes among residents and borehole owners was also noted. Based on these findings, we propose a series of recommendations to improve groundwater management in Nairobi County. Under a new 5-year project, AfriWatSan, we are extending our analyses of urban groundwater to Kisumu County.Kenya, where we will explore growth in groundwater use and its relation to current management policies.