

Effects of Urbanization on Water Table Increase in Wadi Aday— Muscat Water Assessment Area - Oman

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ABSTRACT

Oman is located in the south-eastern part of the Arabian Peninsula with a total land area of 309.832 km², 75% of it occupied by desert. Muscat, the capital is the largest city. It has undergone a rapid economic, population and water demand growth during the last 35 years. The total population reached about 631.031 people (census, 2003), ranking as the second populated area of the Sultanate and representing 27% of the total population. The fast urbanization growth has great effects on the hydrogeological characteristics of the shallow alluvium aquifer represented by rising the water levels in some monitoring wells and the contamination of part of the aquifer. This paper investigates the impact of urbanization on groundwater quantity and quality of the alluvium aquifer in Muscat Water Assessment Area (MWAA), particularly in wadi Aday and wadi Lansab catchments. The study tackles also the groundwater rise in some parts of the alluvium aquifer, despite the low rainfall and recharge during the last 7 years prevail over Muscat assessment Area. The available data were analyzed and reported. It includes seven rainfall stations. A potentiometric water level map is initiated and compared for the periods 1996 and 2005 based on twenty five monitoring wells. Besides a total of twenty four samples were collected, in 2004 and 12 samples were collected in 2005 to check the water quality. The results are presented to reflect the effect of urbanization on the shallow groundwater aquifer. In addition, water balance for the area is computed to reflect the areas of water surplus or water shortage. The results showed that there is a general rise in water table reaching more than 7 meters during the last ten years, despite the arid conditions that prevailed during that period. Also data reflects aquifer contamination due to the lack of sewage collection and sanitation system to face the accelerated urbanization rate. In general we can say that unplanned urbanization could affect the hydrogeology, quality and quantity of the shallow unconfined aquifer.