

The Effects of Land Use Change and Urbanization on Groundwater Resources in Langat River Basin, Selangor, Malaysia

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Problem Statement: Langat River Basin in Selangor state is an emerging mega urban region in Malaysia. Transformation from an industrial agricultural basin to an urbanised area in the recent decades has deteriorated the quality of groundwater resources in the region. If sustainably managed and conserved, groundwater resources can be utilized as an alternative water source for increasing drinking and development needs. **Objective:** The paper aims to determine the impact of progressive basin oriented urbanization and land use pattern on its groundwater resources. **Methodology:** Satellite images of the years 1974, 1981, 1988, 1991, 1996 and 2001 obtained from Department of Agriculture, Malaysia; 2005 obtained from Remote Sensing Agency Malaysia (RSAM); and 2014 obtained from U.S. Geological Survey website, and topographical map of year 2014 obtained from the Department of Survey and Mapping (JUPEM) Malaysia are used to analyze the land use change patterns. The satellite images are then processed and analyzed using GIS, mainly for four types of land uses: forest; developed area; agriculture; and water bodies. Further, secondary data collected from Minerals and Geoscience Department (JMG) and Selangor Water Authority (LUAS) on quality parameters, abstraction, and usage pattern are utilized to assess the groundwater quality. The variation in land use change pattern and groundwater quality is studied over the period of 1974-2015. **Results:** The results showed drastic increase in developed area over the years while other land use types have declined. Additionally, population is growing at a rapid rate. While Malaysia is yet to sustainably utilize the groundwater potential to mitigate its water shortage, groundwater is being exploited by industries. Groundwater usage in the basin has been fluctuating over years 2005-2010, hitting the highest in 2011 (16,176,124 m³), and then again fluctuating but at a two-fold or three-fold amount compared to usage prior to 2011. Nonetheless, groundwater usage over years is within the safe yield. Both Iron (Fe) and Manganese (Mn) are widely found, however within the limited standards. Secondary data to analyze presence of heavy metals and organic compounds are lacking. **Conclusion:** Although data showed that groundwater abstraction and groundwater quality are within the recommended standards, there is a need for conservation and sustainable utilization and management of groundwater resources in Malaysia. More studies on surface-groundwater interactions, heavy metal and organic compound contamination, salt water intrusion, groundwater level decline and land subsidence are required.