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A Plan of Smart Management for Groundwater Resources

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Abstract : Groundwater resources play a vital role in regional water supply because over 1/3 of total demand is satisfied by groundwater resources. Because over-pumpage might cause environmental impact such as land subsidence, a sustainable management of groundwater resource is required. In this study, a blueprint of smart management for groundwater resource is proposed and planned. The framework of the smart management can be divided into two major parts, hardware and software parts. First, an internet of groundwater (IoG) which is inspired by the internet of thing (IoT) is proposed to observe the migration of groundwater usage and the associated response, groundwater levels. Second, algorithms based on data mining and signal analysis are proposed to achieve the goal of providing highly efficient management of groundwater. The entire blueprint is a 4-year plan and this year is the first year. We have finished the installation of 50 flow meters and 17 observation wells. An underground hydrological model is proposed to determine the associated drawdown caused by the measured pumpages. Besides, an alternative to the flow meter is also proposed to decrease the installation cost of IoG. An accelerometer and 3G remote transmission are proposed to detect the on and off of groundwater pumpage.

Keywords : groundwater management, internet of groundwater, underground hydrological model, alternative of flow meter
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