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GROUNDWATER MONITORING NETWORK IN THAILAND

Thayarat Srikamma, Wasana Sarththaporn*

The excessive groundwater extraction can deteriorate groundwater quantity and quality in Thailand such as groundwater level decrease continuously in central area, land subsidence in metropolitan areas, saline water intrusion in Northeastern and Southern Thailand. In addition, contamination in groundwater can be problematic as a result of human activities such as improper waste management, industrial activities, mining and chemical uses in agriculture. Department of Groundwater Resources (DGR) has been monitoring the changes in groundwater level and quality from to control the impacts of groundwater abstraction and contamination, and monitoring aquifer response and quality trends provide key inputs for Sustainable Development Goals 6 (clean water and sanitation: implement integrated water resources management at all levels).

Currently, there are 1,944 groundwater monitoring wells which monitor groundwater levels and quality. The groundwater monitoring networks are divided into 2 patterns. First, the monitoring networks for observing groundwater levels and groundwater quality in large scale covering 27 groundwater basins. In the study, these networks should add 4,558 monitoring wells by 6 criteria, (1) number of monitoring wells in the present, (2) land use (industrial, agriculture, tourist attraction, and service business), (3) number of groundwater development and groundwater consumption of each area, (4) risk of groundwater contamination (saltwater intrusion, occurs naturally (iron, arsenic, manganese), and industrial waste), (5) risk of earthquake or geohazard affected groundwater resources, and (6) transboundary aquifer of ASEAN Community. Second, the monitoring networks are designed for the risk areas of contamination or losing the water balance such as landfills, industrial waste disposal areas, mining areas, and the areas with high demand of groundwater use.

Nowadays, groundwater levels measurement can be categorized by necessary areas into 3 methods. First of all, 93 observation wells in the specific areas, groundwater levels continue to drop steadily, saltwater intrusion, and land subsidence, are measured by online automatic recorders. That provides continuous data and deliver the data as automatic real-time to database system of Thailand Groundwater Monitoring System (TGMS). Second of all, 332 observation wells in areas of declining trend of groundwater levels and risk of groundwater contamination, are measured by recorders and retrieving stored data from recorder with a laptop. Eventually, 1,519 observation wells in areas of groundwater levels and groundwater quality slightly changed, are measured by using electric tape and data is collected twice a year.

The groundwater levels and groundwater quality are stored in the TGMS and disseminate information for groundwater levels and groundwater quality to the public and governmental agencies through the website www.tgms.dgr.go.th. Groundwater monitoring data can be implemented in drilling permit. The annual report of groundwater monitoring has been applied for creating regulations by groundwater committee. TGMS is an important data to increase the performance of groundwater measures in terms of groundwater conservation. The focus areas include: 1) contaminated areas, e.g., municipal and industrial waste; 2) saltwater intrusion areas, e.g., Northeastern Thailand and coastal areas; 3) the areas with highly use of groundwater, e.g., Central Thailand and big cities or industrial estates.

Keywords: monitoring wells, groundwater level, groundwater quality