

Sustainable Development and Management of Groundwater Resources in the Central Part of Nakhon Phanom Province, Northeast Thailand

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According to the extreme drought crisis in the dry season is increased in every year. Droughts is a serious issue particularly Photak and Nasai subdistrict area, located in the central part of Nakhon Phanom Province, Northeast Thailand, where surface water is mainly used for water supplies and agricultural purposes. In the dry period (approximately November to May), extreme water shortage and poor water quality are become to two major problems in this area. Thus, groundwater has become undoubtedly an excellent as water supply. Both of Subdistrict Administrative Organization (Photak and Nasai subdistrict) attempted to solve the problem by trucking water to each village water supply systems and to limit timing water use. However, it does not sustainable management. Consequently, the overall situation calls for urgent development and management of existing groundwater resources for sustainable. This study aims to efficient development and management of groundwater resources for water supply to meet a need of local people, to raise the awareness among stakeholders, to highlight the groundwater quality issues, and to formulate approaches for sustainable management of groundwater resources.

The methods of this study are as follows; (I) Data collection (such as geological data, hydrological data and existing groundwater well data) (II) Field investigation in order to determine for siting wells and boreholes and to assess the groundwater potential by geophysics survey. After analysis, 10 boreholes drilled (depth range between 40 to 60 meter) were selected from the 150 points of vertical electrical resistivity sounding (VES) survey data and groundwater contained to weathered shale aquifer. Unfortunately, the chance to find groundwater resources in Nasai subdistrict area is very rare due to area underlain by salinity aquifer which related to the characteristic of individual hydrogeology. (III) Design water supply system to serve two subdistricts. As the result from pumping test was carried out on 10 of groundwater wells, each of groundwater well has a sufficiently high yield (Each 10-15 cubic meter per hour) and total yield is calculated approximately 1,680 cubic meter per day which enough for large scale water supply system. Water quality from the groundwater wells was suitable for usage within the World Health Organization (WHO) recommended limits for drinking water. The massive water supply system is consisted of three main components: 1,000 cubic meter ground storage tank, 300 cubic meter elevated storage tank and reverse osmosis water filtration system building. The system was constructed in Photak village and distributed to 11 villages over Photak and Nasai subdistrict by 17,850-meter pipeline system.

From scarcity to security through sustainability. Nowadays, the population in Photak and Nasai subdistrict have been able to thoroughly and sufficiently usage groundwater from this system. As the result from the efficient groundwater development contributes to improve livelihood and well-being for local people. Hence the linkage development and management of Groundwater Resources is very important that are forms a large component of attaining the sustainable development goals.

Keywords; Groundwater development, Groundwater security, Sustainability