

# **Groundwater exploration and potential mapping for groundwater management in repeated drought areas of Nong Fai Basin, Lao Khwan District, Kanchanaburi Province, Thailand.**

Nannatee Thongpanja; Kanittha Pimmun; Jirapat Phetheet; Bundarik Borisuth  
Department of Groundwater Resources, Chatuchak, Bangkok 10900 Thailand

**Corresponding Author(s):** nannatee.dgr@gmail.com

The area in Kanchanaburi Province includes the districts of Lao Khwan, Bo Phloi, Nong Prue, Huai Krachao, and Phanom Thuan, as well as parts of Suphan Buri Province, including Dan Chang and Nong Ya Sai districts. This region is characterized as a rain shadow area. The topography consists of foothill plains and slopes surrounded by high mountains, resulting in annual rainfall of less than 1,000 millimeters. Climate change is intensifying these challenges by increasing the frequency and severity of droughts. Consequently, the region is more vulnerable to climate-related impacts, demanding urgent adaptation and mitigation measures from the involved authorities.

To solve water scarcity in this area, the Department of Groundwater Resources explored and discovered high-potential groundwater sites in the sediment aquifer of Nong Fai Subdistrict, Lao Khwan District, naming it the 'Nong Fai Basin'. As groundwater becomes a dependable resource for the local people, further studies and groundwater potential mapping are needed to delineate the exact boundaries and potential of groundwater in this area.

To create the groundwater potential map, this project began with an analysis of geological and hydrogeological data. Additionally, 613 one-dimensional (VES) resistivity measurements and 55 two-dimensional (2D) resistivity profiles were collected, covering the entire area. Furthermore, 47 wells were drilled: 16 exploratory wells and 31 development wells. Groundwater pumping tests were conducted on 20 wells, yielding approximately 15-50 cubic meters per hour. The groundwater quality in the study area is good, with total dissolved solids (TDS) less than 500 milligrams per liter.

Subsequently, utilizing geological data, vertical resistivity surveys, 2D resistivity profiles, and rock cuttings helped indicate the basin's boundaries, shape, and thickness. The basin is a colluvium sediment deposit formed by subsidence along fault lines. It is narrow and elongated in a north-south direction, covering Nong Pling, Thung Krabam, and Nong Fai subdistricts in Lao Khwan District, Kanchanaburi Province. It is approximately 7 kilometers wide and 22 kilometers long, covering an area of about 124.15 square kilometers and surrounded by metamorphic and igneous rocks. The sediment thickness varies, with the thickest layer around 300 meters from the surface. As a result of the study and the pumping test data, it is estimated that the basin holds 550 million cubic meters of water.

In summary, creating a groundwater potential map is beneficial and sustainable as a resource for groundwater management and conservation plans for the local population, local government organizations, and government agencies. Although much data is needed, it ensures that people can clearly understand and use the groundwater map to its best benefit.

**Keywords:** groundwater potential mapping; resistivity survey