

THE EXPANDED OF BRACKISH - SALINE GROUNDWATER IN COASTAL AREAS AND SONGKHLA LAKE, SONGKHLA PROVINCE

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Fresh groundwater in Songkhla Province is mostly extracted from aquifers with the depth less than 50 meters. Brackish and saline groundwater is used for aquaculture along the coast of the Gulf of Thailand and around Songkhla Lake. Since 2012, Groundwater in aquifers with the depth of more than 100 meters is increasingly developed. The inventories groundwater information of Department of Groundwater Resources in 2006 shows that more than 79 percent of unauthorized wells were drilled and used. The type of groundwater use permission does not match the actual usage which will affect the process of evaluating groundwater usage in the area.

The study of groundwater quality changes in Songkhla Province focuses on the unconsolidated aquifer with depth less than 50 meters. During 2012 – 2020, in the southern region of Songkhla Lake, it was found that the brackish - saline groundwater distribution area has expanded from 11.61 square kilometers to approximately 13.77 square kilometers. However, the groundwater level measured during 2017 - 2020 is in the range of 10 - 20 meters, which mostly unchanged, except in Ban Mai Subdistrict, Wat Son Subdistrict, Ranot District and Pha Tong Subdistrict, Hat Yai District which the groundwater level has decreased by an average of 1.1 - 2.0 meters per year. Chloride content was used as an indicator of saltwater migration. The assumption of brackish-saline groundwater migrates in the freshwater aquifer is related to lateral intrusion from the ocean. Overexploitation of groundwater in this area caused groundwater level decline. Thus, saltwater from the sea and lagoon can invade into the fresh aquifer due to pressure differences. In addition, brackish-water flow in a well with an open borehole then upward leakage between aquifers. Consequently, people living in the coastal area need to install deeper pumping wells which cost more expense or move to the area where fresh groundwater is available.

Therefore, the Department of Groundwater Resources has issued an announcement about guidelines for the development and conservation of groundwater in the coastal and surrounding areas of Songkhla Lake in order to protect the quality of the groundwater, maintain a good quality, and reach a certain the standard of drinking water. It is forbidden to drill and consume groundwater within the aquifer containing brackish-saline water. Any drilling and construction of wells must comply with the Ministry of Natural Resources and Environment announcement and the Groundwater Act 1977, which require the standard operation of groundwater well drilling and construction. The cooperation from people to register and request for a permission to drill and use of groundwater is required to control the amount of groundwater use and not to exceed the safe amount of groundwater. Furthermore, changes in groundwater level and its quality needs to be continuously monitored from observation wells in the area.

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