

Development of an integrated numerical model of seawater intrusion mitigation and groundwater resource management

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The Pingtung Plain is one of the areas with extremely plentiful groundwater resources in Taiwan. Due to that the application of the water resource is restricted by significant variation of precipitation between wet and dry seasons, groundwater must be used as a recharge source to implement the insufficient surface water resource during dry seasons. In recent years, the coastal aquaculture rises, and the over withdrawn of groundwater by private well results in fast drop of groundwater level. Then it causes imbalance of groundwater supply and leads to serious seawater intrusion in the coastal areas. The purpose of this study is to develop an integrated numerical model of groundwater resources and seawater intrusion. Soil and Water Assessment Tool (SWAT), MODFLOW and MT3D models were applied to analyze the variation of the groundwater levels and salinity concentration to investigate the correlation of parameters, which are used to the model applications in order to disposal saltwater intrusion. The data of groundwater levels, pumping capacity and hydrogeological data to were collected to build an integrated numerical model. Firstly, we will collect the information of layered aquifer and the data of hydrological parameters to build the groundwater numerical model at Pingtung Plain, and identify the amount of the groundwater which flow into the sea. In order to deal with the future climate change conditions or extreme weather conditions, we will consider the recharge with groundwater model to improve the seawater intrusion problem. The integrated numerical model which describes that seawater intrusion to deep confined aquifers and shallow unsaturated aquifers. Secondly, we will use the above model to investigate the weights influenced by different factors to the amount area of seawater intrusion, and predict the salinity concentration distribution of evaluation at coastal area of Pingtung Plain. Finally, we will simulate groundwater recharge/ injection at the coastal areas in Pingtung Plain by above model to investigate the analysis of salinity concentration in deep aquifers and the improvement of salinity concentration in shallow aquifers.