

Development of a complex groundwater model to assess the relation among groundwater resource exploitation, seawater intrusion and land subsidence

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The land subsidence, which is usually irreversible, in Taiwan Pintung Plain occurred due to groundwater overexploitation. Many of the land subsidence areas in Taiwan are located in coastal area. It could not only result in homeland loss, but also vulnerability to flooding because the function of drainage system and sea wall are weakened for the lowered ground surface. Groundwater salinization and seawater intrusion could happen more easily as well.

This research focuses on grasping the trend of environmental change due to the damage and impact from inappropriate development of aquaculture in the last decades. The main task is developing the artificial neural networks (ANNs) and complex numerical model for conjunctive use of surface and groundwater which is composed of a few modules such as land use, land subsidence, contamination transportation and etc. An approach based on self-organizing map (SOM) is proposed to delineate groundwater recharge zones. Several topics will be studied such as coupling of surface water and groundwater modeling, assessing the benefit of improving groundwater resources by recharge, identifying the improper usage of groundwater resources, and investigating the effect of over-pumping on land subsidence in different depth. In addition, a complete plan for managing both the flooding and water resources will be instituted by scheming non-engineering adaptation strategies for homeland planning, ex. controlling pumping behavior in area vulnerable to land subsidence and increasing groundwater recharge.