

Land subsidence prevention and adaptation strategies in Taiwan

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The groundwater resource is abundant in Taiwan and it is making a critical issue to exploit groundwater resource properly. Since 1960s, the concentrated over-drafting of groundwater for economic development and domestic water supply has led the land subsidence in Taipei region and the south-western area of Taiwan. The affected area of land subsidence has exceeded 2,491 km². Historic max. accumulated record of subsidence reached 3.53m in Pingtung County and max. subsidence rate was over 20 cm/year in Changhua county. Land subsidence area may reduce flood prevention capacity and increase the possibility of flooding, causing the loss of land utilization values. In recent years, the safety of high-speed rail at Changhua-Yunlin section has been widely discussed. The prevention strategies include increasing surface water supply, decreasing groundwater pumping, promoting groundwater recharge and enhancing wells management, planning the land utilization and improving the inundation area. Because of strict restrictions on the amount of groundwater pumping and surface water sources supply, the subsidence in Taipei region has stopped since 1978. From 1995, the

government integrated the central departments resources and local governments powers to execute several special projects. According to the monitoring data, land subsidence has been slowed down consistently year by year. In 2018, the significant land subsidence area has decreased from 1,529 km² in 2001 to 419 km² and the maximum annual subsidence rate has dropped to 6.7 cm. The main subsidence areas are concentrated in the inland areas of Changhua-Yunlin, and the coastal subsidence situation has slowed down, annual subsidence rate has dropped to about 3 cm. Studies show that the subsidence rate is significant correlated with rainfall.

Under the influence of climate change, the rainfall patterns in Taiwan have changed dramatically in recent years. The probability of extreme rainfall bearing short-duration intense rainfall and the frequency of wet-dry periods increase, which increases the risk of drought and flood disasters, and the use of water resources is highly challenging. Because of the characteristics of excellent water quality, low price and easy to obtain, groundwater is a life-saving water for drought resistance. It will lead to new challenges in land subsidence prevention.