農業地下水使用行為分析-雲林縣虎尾地區為例

Analysis of agricultural groundwater use behavior -a case study in Yunlin, Taiwan

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摘　要

地下水為農業灌溉水資源重要一部分，但在過去由於地下水的過度抽取造成雲林地區地層下陷、海水倒灌、土質惡化等生態問題。近年來更因為地層下陷導致高鐵安全性的問題。然而在台灣由於經濟與政治因素，缺乏對地下水抽水直接觀測紀錄，也因此對於農業地下水使用行為了解有限。

為了瞭解地下水抽水的模式，進而有效管理地下水資源，本研究蒐集雲林虎尾地區 2016 年 1 月至 2017 年 7 月 87 口農業抽水井的抽水時間序列。透過非間督式學習對該時間序列進行分類並與其他特徵交互比對，建構出農業抽水型態的關鍵影響因素，包含降雨量、作物類型、耕作期及與主灌溉渠道之距離。藉由資料上客觀地了解農業地下水用水行為與需求，以達有效管理農業地下水資源及永續利用之目標。

關鍵詞：地下水，抽水，非監督式學習

Abstract

Groundwater is an important part of agricultural irrigation water resources, but in the past, over-extraction of groundwater has caused environmental problems such as land subsidence, backflow of seawater, and deterioration of soil quality in the Yunlin area. In recent years, land subsidence has led to problems with the safety of high-speed rail. However, in Taiwan, due to economic and political factors, there is a lack of direct observation records of groundwater pumping, and therefore limited understanding of agricultural groundwater use behavior.

To understand the groundwater pumping patterns and further manage groundwater resources effectively, this study collected pumping time series of 87 agricultural pumping wells in Huwei, Yunlin, from January 2016 to July 2017. The time series were classified through unsupervised learning and cross-referenced with other characteristics to construct key influences on agricultural pumping patterns, including rainfall, crop type, cultivation period, and distance between wells and main irrigation canals. By objectively understanding the agricultural groundwater use behavior and demand, we can achieve the goal of effective

management and sustainable use of agricultural groundwater resources.