透過情境工作坊促進地下水管理共識與行動方案發展—以雲林地區地下水管理為例

Using Scenario Workshops to Facilitate Consensus-Building and Action Planning for Groundwater Management: A Case Study of Groundwater Management in Yunlin, Taiwan

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摘　要

臺灣西部平原地區長期面臨地層下陷問題，過去因養殖漁業發展而主要發生於沿海地區，近幾十年來則以內陸地區較為嚴重，其中以雲林地區最為大眾所關注。雖然政府多年來推動多項管理政策與防治計畫，但在農業地下水使用管理與農民用水與耕作行為改變成效仍然有限。本研究嘗試透過一系列情境導向的參與式工作坊，與不同層級權益關係人，包含中央政府機關、地方政府相關局處、農民、NGO 組織與學界，共同探索可接受且具行動潛力的地下水管理策略與行動。

本研究設計五種情境對應不同專業觀點，如農業工程師、水資源工程師、法律專家等，引導參與者進行情境討論與排序。討論結果顯示，農業改革(如鼓勵種植節水作物、改善農業供應鏈)與水資源工程方案(如強化人工地下水補注涵養與灌溉系統現代化)為多數權益關係人最接受的情境。而災害風險管理應對地層下陷或將農地轉為非農用途的情境則較不被接受。參與者也一共提出 140 項潛在管理行動並進行排序，其中提升灌溉與水資源管理效率、促進農業轉型以及合理控管地下水使用等為較具共識的管理方向。

本研究希望透過由下而上的參與式方法建立跨部門、跨層級權益關係人相互理解與共識，並揭露不同權益關係人對於管理措施的接受度與優先性。雖然此參與式管理模式尚未被正式納入台灣地下水管理決策架構，但本研究之成果可促進多元權益關係人之間的對話與學習，為未來永續地下水管理政策形成的重要基礎。

關鍵詞：權益關係人參與，地下水管理，地層下陷，情境工作坊

Abstract

Taiwan's western plains have long been affected by land subsidence. While subsidence was initially concentrated in coastal areas due to the development of aquaculture, it has become increasingly severe in inland regions over recent decades—particularly in Yunlin County, which has drawn significant public attention. Despite years of government-led policies and prevention programs, the effectiveness of managing agricultural groundwater use and altering farmers' irrigation and cropping behaviors remains limited. This study explores the use of a series of scenario-based participatory workshops to engage multi-level stakeholders—including central government agencies, local government departments, farmers, NGOs, and academic institutions—in the co-identification of acceptable and actionable groundwater management strategies.

Five hypothetical scenarios were developed, each reflecting a distinct professional perspective, such as those of agricultural engineers, water resource engineers, and legal experts. These scenarios were used to guide stakeholder discussions and priority rankings. The results indicate that agricultural reform (e.g., promoting water-saving crops and improving agricultural supply chains) and water resource engineering strategies (e.g., enhancing artificial groundwater recharge and modernizing irrigation systems) were the most widely accepted among stakeholders. In contrast, scenarios focused on disaster risk adaptation or converting farmland to non-agricultural uses were generally less favored. Participants collectively proposed 140 potential management actions and prioritized them, with broad consensus emerging around actions that improve irrigation and water resource management efficiency, promote agricultural transformation, and ensure appropriate regulation of groundwater use.

This study aims to use a bottom-up participatory approach to foster mutual understanding and consensus among stakeholders across sectors and levels. It also highlights the varying degrees of acceptance and perceived priority of management measures among stakeholder groups. Although this participatory model has not yet been formally integrated into Taiwan's groundwater governance framework, the outcomes of this study demonstrate its potential to stimulate dialogue and mutual learning, laying a vital foundation for the development of sustainable groundwater policies in the future.

Keywords: Stakeholder involvement, Groundwater management, Land subsidence, Scenario workshop