

灌溉水質污染事件之案件類型分析與緊急應變 制度建構研究

Analysis of Irrigation Water Pollution Incident Types and the Development of an Emergency Response Framework

財團法人農業工程研究中心

助理研究員

蕭方歌

Fang-Ko Hsiao

副研究員

張慧嫻

Hui-Hsien Chang

農業部農田水利署

正工程司

廖珮妤

Pei-Yu Liao

總工程司

洪銘德

Min-Der Hung

摘要

有鑑於灌溉水質污染事件通報頻率逐年上升，農業部農田水利署(下簡稱農水署)近年推動灌溉污染事件緊急應變制度建構與通報處理標準化。本研究協助研擬《灌溉水質污染事件緊急應變參考作業指引(草案)》，分析污染案件類型、建構應變層級定義、作業處理流程與通報機制等，以提升現場應變與通報紀錄之一致性與時效性。

依據民國 110 年至 112 年緊急污染通報紀錄分析，約 87% 的污染案件類型為油污、死魚與垃圾，其餘來源包含民生污水、建築廢水或畜牧廢水等。進一步比對污染應變層級統計，案件以第一級應變(低急迫性且低敏感性、低急迫性但高敏感性)為大宗，顯示近年發生案件多來自民眾陳情或基層通報，內容多屬可辨識物或易排除污染源，相關管理或應變量能或可聚焦於第二級(高急迫性但低敏感性)或第三級(高急迫性且高敏感性)案件，以有效或快速地減緩對於灌溉水質之影響程度。

另針對常見油污污染，本研究亦協助農水署彙整《油污緊急應變處理應用參考手冊》，包含污染物特徵辨識、處理技術(圍堵、吸附、抽除)、器材應用與使用流程。有鑑於灌溉水質緊急污染事件大多零星且分散，為提升灌溉水質污染事件之即時應變能力，本研究建議可仿效環保單位建置開口契約制度，針對污染現場所需之緊急處置設備、吸附材、攔油索及人力支援等，預先簽訂服務或供應契約，確保污染事件發生時可迅速動員、立即應變，降低污染事件對於灌溉水質之影響。

本研究整體成果有助於建立灌溉污染事件之標準化應變作業流程，提升處理效率與

資訊完整性，並提供未來教育訓練與制度化推動之基礎依據。

關鍵詞：灌溉水質、緊急污染應變、油污、開口契約

Abstract

Due to the increasing number of reported irrigation water pollution incidents in recent years, the Irrigation Agency of the Ministry of Agriculture has promoted the development of an emergency response system and standardized reporting procedures. This study assisted in drafting the Emergency Response Guideline for Irrigation Water Pollution Incidents (Draft), focusing on pollution type classification, response level definitions, operating procedures, and reporting mechanisms to improve consistency and timeliness in field responses.

Based on emergency pollution reports from 2021 to 2023, about 87% of cases involved oil spills, fish deaths, or garbage, with the rest linked to sources such as domestic sewage, construction wastewater, or livestock waste. Most incidents were classified as Level 1 responses (low urgency with low or high sensitivity), suggesting they were often reported by the public or local units and involved identifiable or easily handled pollution sources. Future efforts may be better directed toward Level 2 and Level 3 cases, which involve higher urgency and may have greater impacts on irrigation water quality.

This study also helped compile the Oil Pollution Emergency Response Reference Manual, which includes pollutant identification, treatment techniques (e.g., containment, adsorption, removal), equipment use, and illustrated workflows. Since most irrigation pollution cases are scattered and require quick action, the study recommends establishing open contracts for emergency supplies and services to ensure fast mobilization and reduce water quality damage.

These results support the standardization of emergency response procedures, enhance response efficiency and data quality, and serve as a basis for future training and system development.

Keywords: Irrigation water quality, emergency pollution response, oil pollution, open contract