氣候變遷下海平面上升對臺灣雲嘉南沿海地區農作物的影響

Impact Assessment of the SSP2-4.5 Sea-level Rise Scenario on Agricultural Crops: A Case Study of Yunlin-Chiayi-Tainan Coastal Region

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摘　要

本研究針對臺灣雲林、嘉義及臺南沿海地區，分析海平面上升對農作物的影響。根據政府間氣候變遷專門委員會(IPCC)第六次評估報告(AR6)中的中度共享社會經濟路徑(SSP2-4.5)排放情境推估的海平面上升量值，進行雲嘉南海岸溢淹模擬，並將模擬結果套疊內政部國土測繪中心 2022 年土地使用分類後，評估在 2040 年、2050 年、2060 年、2070 年、2080 年、2090 年及 2100 年，SSP2-4.5 情境下的海平面上升對雲嘉南地區土地利用的影響。結果顯示，由於該地區以農業用地為主，海平面上升將導致大面積農田被淹沒。其中，雲林地區從 2040 年至 2100 年，因海平面上升遭淹沒農作面積將從 0.35%增至 2.56%，嘉義地區為 0.11%增至 4.41%，而臺南地區則為 0.07%增至 1.6%。海平面上升伴隨的影響包括土壤鹽化、淡水資源污染、農田淹沒及極端氣候事件增多，這些因素將嚴重威脅雲嘉南地區的農業生產。研究結果顯示，氣候變遷下的海平面上升對雲嘉南地區的農業發展構成重大挑戰，需要引起重視並制定相應的應對措施。

關鍵字：SSP2-4.5、海平面上升、海岸溢淹、農業用地

Abstract

This study investigates the impact of sea level rise on agricultural land in the coastal regions of Yunlin, Chiayi, and Tainan in Taiwan. Utilizing sea level rise projections from the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC) under the Shared Socioeconomic Pathway (SSP) 2-4.5 emission scenario, we conducted inundation simulations for the Yunlin-Chiayi-Tainan coastal area. These simulation results were integrated with the 2022 land use classification provided by the National Land Surveying and Mapping Center to evaluate the effects of sea level rise on land use for the years 2040, 2050, 2060, 2070, 2080, 2090, and 2100. The findings reveal that, due to the predominance of

agricultural land in the region, sea level rise will result in significant inundation of farmland. Specifically, the area of farmland inundated in Yunlin is projected to increase from 0.35% to 2.56% between 2040 and 2100, in Chiayi from 0.11% to 4.41%, and in Tainan from 0.07% to 1.6%. The concomitant impacts of sea level rise include soil salinization, contamination of freshwater resources, farmland inundation, and an escalation in extreme weather events. These factors pose substantial threats to agricultural productivity in the Yunlin-Chiayi-Tainan region. The study underscores that sea level rise, driven by climate change, represents a formidable challenge to agricultural development in the region, necessitating urgent attention and the formulation of targeted adaptation strategies.

Keywords: SSP2-4.5, sea-level rise, coastal inundation, Agricultural Land