探討氣候變遷下都市土地空間之減洪方案
－以將軍溪流域為例

A Study on Flood Mitigation Strategies Based on Changes in Urban Land Use in Response to Climate Change－Case Study of Jiangiyum River Basin

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摘　要

受到氣候變遷的影響，近年來臺灣洪災事件頻傳，短延時強降雨加上海平面逐漸上升對臺灣帶來淹水風險及土地利用之威脅，加上都市發展快速，大面積的土地開發造成原本土地的透水保水能力降低，進而導致地表逕流與入滲型態的改變，造成總逕流及洪峰流量增加，為了減輕氣候變遷造成傳統工程手段的負擔及延長工程使用期限，因此以流域或都市整體之減洪治水方式已成為最佳輔助手段，透過土地使用管制、減災策略等非工程措施進行滯洪及減洪，以此提升都市防洪能力與調適韌性。

由「臺南市國土計畫」中提及目前都市政策應以「國土計畫法」第 10 條規定，訂定臺南市氣候變遷調適計畫，其中提到將軍溪的流域為排水規劃強化區，屬於淹水敏感區域易受到海潮影響使內水排除不易，且近年都市發展快速防洪排水問題更加突顯，強化都市減災與調適能力，並確保民眾生命財產安全，是目前重要的課題。

本研究藉由 TCCIP 公布之未來暴雨改變率並以兩種氣候變遷條件(RCP4.5、RCP8.5)的重現期距 5 年及 10 年作為降雨條件，推算在氣候變遷下不同重現期的未來暴雨量 (2036 年~2065 年)，並參考逕流分擔技術手冊中逕流暫存措施作為減洪手段，以都市發展現況選擇尚可開闢之公共設施用地，利用開放空間降挖蓄水，以結合空間規劃與逕流分擔之減洪策略，亦透過在地滯洪觀念以農業使用地降挖蓄洪，於颱洪期間作為「微型滯洪池」以不改變地目及用途下，在需要時轉變為臨時的滯洪功能，以發揮減淹效益降低其他地區淹水風險。

根據 HEC-RAS 二維水理模式模擬結果，以公共設施用地的逕流暫存措施在氣候變遷情境下 RCP4.5 重現期 5 年的降雨條件下，對本研究區域仍有減洪的效果，而以經農地往市區方向的地表逕流作為農田挖蓄減洪措施之布設位置，會有更佳的減洪效果。

關鍵詞：HEC-RAS，逕流分擔，氣候變遷，都市計畫

Abstract

In recent years, there have been the occurrence of frequent floods in Taiwan due to climate change. Storms with short time duration and heavy rainfall intensity, as well as sea-level rising have led to the risk of flood disaster and the pressure of land use in Taiwan. Furthermore, both rapid urban development and the large-area development cause the reduction of land permeable ability of water that not only result in changes in surface runoff and infiltration but also increase total runoff and peak discharge. Because the limitation of the traditional structural measures and the effort to extend the use life of hydraulic infrastructures, flood mitigation measures based on the whole river-basin perspective may have been the best method to cope with climate changes. Moreover, flood detention and reduction can be conducted by land use control, disaster mitigation strategy, and other non-structural measures to enhance urban flood management and adaptation ability.

In the current study, a two-dimensional hydraulic modeling (HEC-RAS), developed by US Army Corps of Engineers, Hydrologic Engineering Center, is used to simulate the runoff in catchments. After calibration with the observed rainfall data, several urban planning districts of Jiangiym river basin are selected to seek the effective solutions for flood mitigation and detention basin location, and then evaluate their effectiveness using resilient strategy flood mitigation and adaptation. The results show that the most effective approach for flood mitigation in the current study is the measure of digging 50 centimeters from agricultural lands.

Keywords: HEC-RAS, climate change, runoff allocation, resilient strategy for flood mitigation and adaptation