氣候變遷下以成長管理觀點研擬城鄉發展區空間規劃減洪調適韌性策略之研究

The Study on Resilient Strategies ff Flood Mitigation and Adaptation for Urban-Rural Development Areas under Climate Change

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摘要

本研究選定橫跨數個都市計畫區之鹽水溪流域，佈置其符合都市分區之演算格網。考量流域綜合治理之逕流分擔，透過鹽水溪流域各子集水區逕流分擔量，計算各都市計畫區之逕流分擔量。運用成長管理觀念(包括成長總量、區位、優先順序等)結合減洪調適韌性策略，評估易淹水範圍加以限制或降低開發強度，並應用水理模式模擬集水區內的逕流現象，分析可有效減洪之地區及可有效滯洪之區位，以減災布局引導發展出具災害韌性的空間規劃減洪策略。

演算於都市計畫施行前後之逕流體積增幅，在 275mm/24hr 與 350mm/24hr 降雨情境下，各都市計畫施行前後逕流體積平均增幅分別為 3%與 2.4%，以臺南市安平港歷史風貌園區特定區計畫施行前後逕流體積增幅 0.2%為最小，善化都市計施行前後逕流體積增幅 15.8%、13%為最大。佈設逕流設施於高速公路永康交流道附近特定區計畫，對鄰近且位於下游之永康六甲頂都市計畫亦有逕流減少之影響。在重現期 10 年（275mm/24hr）降雨情境之逕流模擬下，逕流體積可有比大豪雨（350mm/24hr）降雨情境較佳之減少百分比；臺南科學工業園區特定區計畫因有較高速公路永康交流道附近特定區計畫 2 倍以上之逕流分擔措施總體積，故其逕流體積亦有較大之減少百分比。整體來說，逕流分擔措施在此兩區具有降低逕流百分比 19.32%至 39.75%之成效。

臺南科學工業園區特定區計畫與高速公路永康交流道附近特定區計畫，於氣候變遷降雨情境下，新訂擴大都市計畫施行前後之逕流增加體積分別為 0.68 萬立方公尺、19 立方公尺，增加百分比分別為 0.1%、0.002%。永康新化擴大都市計畫因土地使用分區類型為工業、住宅、農業，與原土地使用分區類型相近，CN 值變化不大，逕流體積增量不多。都市計畫施行後上游地區實施逕流暫存措施前後之逕流減少體積分別為 8.9 萬立方公尺、0.66 萬立方公尺，減少百分比分別為 1.28%、0.67%。整體來說，在氣候變遷及新訂擴大都市計畫施行之影響下，逕流暫存措施在此兩區仍具有降低逕流百分比

0.67%至 1.28%之成效。因此，新訂擴大都市計畫施行後可考慮利用非都市計畫區之農業用地，降挖 0.5 公尺，提供補償等相關配套措施進行減洪。

關鍵詞：氣候變遷、成長管理、逕流分擔、減洪調適韌性策略

Abstract

This study selected the Yanshui River basin, which spans several urban planning divisions, as the study area. This study was conducted from the viewpoint of growth management and used resilient strategies for flood mitigation and adaptation to evaluate flood-prone areas and limit or reduce the intensity of development of those areas. The hydraulic model was used to simulate the runoff in catchments and analyze effective flood mitigation areas and detention locations. Resilient strategies with spatial planning are then developed while putting into consideration current drainage systems, linking green infrastructures, and the utilization of non-urban land.

For heavy rain events and 10-year return period rainfall, the runoff volume increased by an average of 2.4% and 3% after the enforcement of urban planning, respectively. Anping Harbor historic special district planning had the smallest increase in terms of runoff volume percentage, and Shanhua urban planning had the largest increase. Setting up runoff allocation facilities in the special district planning project near Yongkang Interchange location also reduces the runoff amounts in the Lioujiading (Yongkang) urban planning area downstream of the Yanshui River. Flood mitigation effects were better for 10-year return period rainfall than for heavy rain situations. As the size of runoff allocation facilities in The Tainan Science Park Special District planning area are about two times the size of those in the planning project near Yongkang Interchange, the reduction percentage for runoff volume was also higher. Setting up runoff allocation facilities had the effects of lowering runoff percentage by 19.32% to 39.75%.

Because of the impacts of the enforcement of new or expanded urban planning and the impacts of climate change, runoff volume for the Tainan Science Park Special District planning area and the special district planning project near Yongkang Interchange area increased by 6800 cubic meters and 19 cubic meters, respectively. The CN values of the Expanded Yongkang and Sinhua urban plannings area did not vary greatly from original values due to the types of land use remaining much the same, and runoff increases remained small as a result. Runoff temporary storage can be reduced by 0.67% to 1.28% for the Tainan Science Park Special District planning and the special district planning project near Yongkang Interchange areas when under the effects of climate change and the enforcement of new or expanded urban planning. After the enforcement of new or expanded urban planning, non-urban planning for detention in agricultural use land or compensation measures can be put under consideration.

Keywords：climate change, growth management, runoff allocation, resilient strategy for flood mitigation and adaptation.