

因應氣候變遷遙連結應用於新興治水策略之研究(1/2)

The application of telecoupling in emerging water management strategy under climate change

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摘要

隨著全球化發展，社會、經濟與自然環境間具有交互影響之關係，而全球暖化下的氣候變遷情勢，跨域水資源管理、環境污染等議題也從而顯現。

本計畫目的為利用遙連結之分析方法，結合氣候模式、全球經濟模式及土地利用變遷模式，模擬不同情境下之土地利用空間分布及降雨特性，探討淹水的可能情況，再透過分散式治水架構建立風險管理的概念，評估氣候變遷所造成的影響，以因應國土規劃之新興治水策略。

桃園地區為示範區域，首先利用局部氣候數值模式，分析未來氣候變遷與不同土地利用情境下，區域發展對於降水程度之影響，結果顯示休耕降水及當地水文氣候所造成的效應，比單純只有土地使用的改變還要大。此外，桃園地區都市建成環境面積在 1991 年至 2006 年間成長 30%，因而使得植被及水體面積減少，而在 2006 年至 2016 年間，三種土地利用的變化幅度相對而言已趨於穩定，對於未來土地利用模擬，設定三種限制發展情境進行討論，其中限制情境二將桃園機場範圍、國土保育地區第一類，以及農業發展地區第一類劃定為限制開發地區，結果顯示限制情境二使國土保育地區及農業發展地區之建地不至於增加太多，且讓農業發展地區之農地變化幅度減少，同時亦能讓國土保育地區之林地有增加的空間。最後，當考量上游及下游皆分擔部分洪水時，管制區的劃設以先分析淹水熱點較直接以逐時淹水來得集中，說明先進行熱點分析之重要性。

關鍵詞：水利工程、氣候變遷、遙連結、治水策略

Abstract

Due to the globalization, the relationship between society, economy and natural environment has an interactive influence, and with global warming, it is obvious that some issues such as cross-discipline water resources management or environmental pollution combat climate change.

The project aims to combine the telecoupling approach with climate model, global economic model and land-use change model to simulate different scenarios of spatial distribution and rainfall characteristics, which turns to discuss the possibility of flooding. Further, the concept of risk management is established through a decentralized adjustment framework to evaluate the impact of climate change, and responds in emerging water management strategies of national spatial planning.

The research area is Taoyuan City. At first, using Weather Research Forecast (WRF) is to analyze the impact of regional development on precipitation patterns under climate changes and different land use scenarios in the future. The results show that land retirement has a greater impact on precipitation and local hydrological climate than only land-use changes. Moreover, in Taoyuan City, the urban built environment area had grown by 30% from 1991 to 2006, thus causing the reduction of the vegetation and water area, while between 2006 and 2016, three types of land use had changed stably. As for future land use simulation, it divided into three restricted scenario, and among them, Restricted Scenario 2, which designated Taoyuan International Airport, the first category of land conservation areas and the first category of agricultural development areas as restricted areas, made the construction of the land conservation areas and agricultural development areas not increase too quickly, and also allowed for an increase in the area of forest land in the land conservation area. At last, when both upstream and downstream shared part of the run-off, the control areas designated for flooding hotspots are relatively more concentrated than those for directly time-by-time flooding areas, indicating the importance of conducting hotspots analysis.

Keywords : Hydraulic engineering, climate change, telecoupling, water management strategy