

108 年淹水損失推估模式精進及暴露量更新

Enhancement of the Flood Disaster Loss Assessment Model and Updating of Exposure Database in 2019

主管單位：經濟部水利署水利規劃試驗所

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摘要

台灣因特殊的地理位置經常遭受颱風暴雨的侵襲而導致水災，淹水損失亦隨著社會經濟發展的密度增加而益形嚴重，淹水風險管理成為相當重要的工作，而淹水損害評估是淹水風險管理及相關決策之基礎。利用淹水災害損失曲線配合淹水深度資料推估淹水災害損失是目前國內外最常用的災損估算方法，但是淹水災害損失與建築式樣、用途與內容物等關係密切且具地域性，國外的淹水災害損失曲線並不一定適用國內。本所於民國 102~103 年完成桃園、宜蘭、台中與高雄地區四縣市之淹水損失問卷調查，並建立淹水損失模式。然而國內之淹水災害並非僅侷限於此四縣市，倘若就全省其他縣市逐一調查，勢必得花上大量之人力、物力與時間成本，故民國 104~105 年計畫主要應用四縣市調查結果，研討如何建置其餘縣市之住宅、工商業類別之淹水損失推估模式，以使整體之排水規劃更趨於完善。此外並收集彙整相關社經圖層，建構淹水災害損失評估模組，並完成淹水災害損失評估系統，以簡化災損人工估算之複雜程序，提升排水規劃於淹水損失估算之效率及便利性。106~107 年度精進淹水災害損失模式，建立考量生長期與淹沒時間建立農業災害損失推估模式與畜牧業損失模式之建置，並訂定網格標準及評估模式系統功能擴充(包含新建模式於系統功能之更新與擴充、支援多元資料匯入、即時災害調查淹水範圍圖介接)，提供未來辦理排水規劃及水利防災應用。

為使淹水損失模式精進與暴露量更新，本(108)年度辦理漁業淹水損失推估模式精進、農業區暴露量資料更新、全省淹水潛勢災損圖資建立、建立權限管理及流通服務以及教育訓練，本計畫可提升都市防災韌性並提供未來排水規劃應用。

為比較本系統推估成果，本計畫以嘉義縣 107 年 0823 暴雨為案

例，推估暴露量與損失，再與官方災害統計資料進行比較。損失推估結果 0823 暴雨嘉義縣住宅損失約 5 億 2,500 萬元，工商損失約 19 億 2,400 萬元，農業損失約 3 億元，公共設施損失約 1 億 7,900 萬元，總損失為 29 億 2,700 萬元。漁業淹水損失推估結果政府相關報告所公告之損失相比較結果發現，本系統所估算之結果與政府公告之數值相近。藉由本系統相較傳統透過災害調查估計損失的方式，可更快速進行災害損失粗估，作為防洪決策之參考。

關鍵字：淹水損失調查、淹水損失分析、淹水深度損失曲線、淹水評估系統、漁業淹水損失

Abstract

Due to unique geographic location, Taiwan is frequently suffering from floods caused by typhoons and heavy rainfall. As the density of economic development is increasing, flood damage is becoming more severe. Flood risk management therefore is a very important task for the government. Flood damage assessment is the basis of flood risk management and relevant policy decision making. The Water Resources Planning Institute (Water Resources Agency, Ministry of Economic Affairs) has completed flood loss surveys of four metropolitan areas (Taoyuan, Yilan, Taichung and Kaohsiung) and established the flood depth-damage curves in 2013 to 2014. However, the areas suffering from floods in Taiwan are not only restricted to the four areas being investigated. In case a complete field investigation is planned to be conducted over Taiwan, it is expected to consume tremendous of manpower, materials and time costs. Following the results obtained for the four areas, the project in 2015 and 2016 then proposed to explore an approach for the established flood depth-damage curves being adjusted for practicing in other areas of residential and industrial-commercial sectors with a more appropriate planning of integrated flood mitigation. Furthermore, relevant social and economic GIS layers are collected to build up loss assessment modules for floods as well as to complete the construction of the flood disaster loss assessment system. The construction is to simplify complicated artificial assessment procedure for flood disaster loss, and to increase efficiency and convenience for flood drainage planning. To further expand the functions for the flood disaster loss assessment system, it is implemented in 2017 and 2018 to refine the model. It is to establish the agricultural disaster loss assessment model with consideration of the growth period and submerged time, and animal husbandry losses. It is also to set up grid standard for the GIS exposure layers and to expand the loss assessment system

functions (including updating and expansion of the system functions of the new model, supporting multiple data importation, and intervening real-time field investigation flooding maps). These are to provide for drainage planning and flood disaster prevention applications in the future.

In order to make the flood disaster loss assessment model refined and the exposure updated, it was in 2019 to conduct the improvement of the fishery flood loss assessment model, the update of the agricultural area exposure data, the establishment of the flooding potential disaster maps in Taiwan, and the establishment of system hierarchy management, circulation services and system user training. This project is expected to enhance urban resilience in disaster prevention and provide planning for future drainage applications.

In order to compare the results of the system, the project used the 0823 rainstorm in 2018 in Chiayi County as a study case to assess the exposure and flood disaster loss, and then compare with the official disaster statistics. The results of the loss assessment are as follows: the 0823 rainstorm in Chiayi County caused residential loss of about NT\$525 million, industrial and commercial losses about NT\$1924 million, agricultural losses of NT\$300million, and public facilities loss of NT\$179million. The total loss was NT\$2927 million. Comparing the results of the fishery flood loss assessment with the loss results announced in the relevant government reports, this project found that the assessment results of the system are similar to those by the government. Compared with the traditional way of assessing flood disaster losses through field investigation, the system can make a rough estimate of disaster losses more quickly, which can be used as a reference for decision making in flood prevention.

Keywords: Flood loss field survey, Flood loss analysis, Flood depth-damage curves, The flood disaster loss assessment system, Fishery flood disaster loss