不同空間尺度氣象資料對灌溉用水量計算差異之探討

Study on Spatial Scale of Field Meteorological Data for Irrigation Water Consumption

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摘　要

本研究以新竹縣新埔鎮一處約 4,884m^2 農地為研究案例，該農地種植作物為水稻，分別採用氣象局以及透過田間所布設的氣象站，收集溫度、濕度、風速、日照、降雨量等不同大小空間尺度之氣象條件，利用聯合國糧農組織(FAO)所發展之 CROPWAT 模式計算作物需水量，再配合滲漏量及有效雨量推估田間耗水量。首先利用田間氣象站所蒐集之氣象條件進行演算 107 年至 109 年度，一期作田間耗水量分別約為 2,515mm、1,624mm、2,260mm；二期作田間耗水量分別約為 2,365mm、2,467mm、2,476mm。經比對演算結果後，各項氣象條件中，由於降雨量較受地形地勢影響，因此對於不同空間尺度之氣象條件，降雨量相對於其他氣象條件對作物需水量影響相對較大。

關鍵詞：農業水資源，有效雨量，作物需水量

Abstract

A farmland with 4,884m^2 of area in Xinpu Towns, Hsinchu County was applied as a case study in this study. The farmland is planted with rice. The meteorological conditions with different spatial size, such as temperature, humidity, wind speed, sunshine, rainfall, were respectively collected by the Meteorological Bureau and the weather station in the farmland. The crop water requirements were calculated using the CROPWAT model developed by the Food and Agriculture Organization of the United Nations (FAO). Combined with leakage and effective rainfall, the field water consumption could be estimated. Applying the

meteorological conditions from the field weather station to calculate from 2018 to 2020, the field water consumption of the first period is about 2,515mm, 1,624mm, 2,260mm; the second period is about 2,365mm, 2,467mm, 2,476 mm. After comparing the calculation results, the rainfall is more affected by the terrain and topography among the various meteorological conditions. Therefore, the rainfall has a relatively greater impact on the water demand than other meteorological conditions for different spatial scale.

Keywords: agricultural water resources, effective rainfall, crop water requirement