**行為者模式於水資源管理之應用**

**Application of Agent Based Model for Water Resources Management**

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**摘 要**

近年來隨著產業型態的改變，用水需求日益增加，水資源之有效管理也越來越重要，由於現今水資源管理研究大多採用水庫管理觀點，以最小缺水量與最少缺水事件做為評估方式，缺乏以其他觀點進行供水方式的評估，本研究則將加入不同用水戶同時探討多觀點方式，了解不同供水機制與行為對供水系統之影響。本研究採用行為者模式（Agent Based Model）模擬大台南地區供水系統，將行為者分為政府、水庫及用水戶三類，同時對於現今供水系統增加環境流量用水考量。設計不同供水政策、行為者個性、周遭影響方式、個性影響需水比例增減係數、環境流量係數等五項因子作為控制因子，並透過水庫管理、政策滿意比及環境缺水率三種不同面相對供水系統進行評估。由於行為者模式對於行為者與環境互動之動態過程有良好描述能力的特點，可提供未來大台南地區供水系統之水資源管理決策者在設計供水政策或是決策評估時作為參考。

**關鍵字**：行為者模式、水資源管理系統、環境流量、供水政策

**Abstract**

The water demand is continuing to increase rapidly in recent year with Taiwan industrial types changing. Effective water resources management is more and more important. Nowadays the water resources management research mostly uses perspective of “reservoir management”, in the way of evaluating the least water deficit and less water shortage events. However this study tries to use multi-perspective in the water resources management by consider different water users to understand the influence of water supply mechanism and water user behavior to water supply system simultaneously This study aims to simulate Tainan Area water supply system using an agent based model. In our model, agents are divided into government, reservoirs and water users. The environmental flow is also considered in the water supply system. Five control factors, water supply policy, agent’s character, neighborhood effect, coefficient of agent demand attitude, environment flow ratio, are considered to set thirteen scenarios for the analysis. To evaluate the performance of different scenarios, supply and risk indicators, satisfaction ratio, and environmental flow deficit ration, are used for comparison. The results show that agent based model can effectively simulate the dynamic interactions between agents and the environment. Our model can provide the Tainan City water resources managers to evaluate different management policy and decisions when consider environmental flows in the future.

**Keywords**: Agent based model, Water resource management, Environment flow, Water supply policy