

## Strengthening Carrying Capacity of a Water Supply System under Climate Change with the Drought Early Warning System

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The carrying capacity of a water supply system is the maximal probable water supply amount under an acceptable risk which is related to the systematic combination of hydrology conditions, climatic conditions, and water infrastructures, for instance, reservoirs, weirs, and water treatment plants. Due to long-term imbalance of water supply and demand during the drought seasons, the carrying capacity of a water supply system may be affected gradually with more extreme climate events resulting from the climate change. To evaluate the carrying capacity of the water supply system under climate change, three major steps to build adaptation capacity under climate change are adopted, including problem identification and goal setting, current risk assessment, and future risk assessment. The carrying capacities for current climate condition and future climate condition were estimated respectively. The early warning system was taken as the effective measure to strengthen the carrying capacity for the uncertain changing climate. The water supply system of Chuoshui River basin in Taiwan is used as the case study. The system dynamics modeling software, Vensim, was used to build the water resources allocation model for Chuoshui River basin. To apply the seasonal climate forecasts released from Taiwan Central Weather Bureau (CWB) on modeling, a weather generator is adopted to generate daily weather data for the input of the hydrological component of GWLF model, to project inflows with the lead time of three months. Consequently, the water shortages with and without a drought early warning system were estimated to evaluate the effectiveness of a drought early warning system under climate change.

Keywords: Climate change, Carrying capacity, Risk Assessment, Seasonal Climate Forecasts, Drought Early Warning System