



Impact of climate change to carrying capacity of water supply system in Taiwan

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The carrying capacity of water supply in the water resources system is neither just the quantity of the river discharge nor the summation of storage of the reservoirs. To estimate it reasonably, it must be considered with both demand side and supply side which includes the systematic combination of hydrology, climate, reservoirs, weirs, water treatment plants... etc. To analyze and approach the carrying capacity of water supply system, this study used system dynamics model to establish the water resources system in Gaoping river basin which is located in southern area of Taiwan. The impact of climatic change to water supply system was estimated with the output of 5 GCMS running with SRES scenarios and integrated with several models such as weather generation, HBV hydrological process model and system dynamics model – VENSIM. The drought index, deficit percent day (%-day), was adopted to analyze the risk of water shortage of the water resources system in Gaoping river basin under present condition and climatic change condition. The water supply system in Gaoping river basin is under two threats in the future. One is the expanded water demand, and another is climatic change. Climatic change would cause more stream flow in wet season and less stream flow in dry season. Most results from the simulation of different scenarios indicated that the carrying capacity will decrease down and the water shortage will rise up under expanding water demand and changing stream flow caused by climatic change.