Water Resources Management under Climate Change Impacts: Inter-Regional Water Resources Input Output Table Approach

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This paper proposes the use of Inter-Regional Water Resources Input Output (IRWRIO) table as a tool to meet the challenge of evaluating and balancing water demand to commit economic activities against water supply under impacts of climate change. This hybrid approach, which combines input output table analysis and water resources management, overcomes the shortcoming of traditional engineering management methods, such as water balance analysis, which do not resolve the challenge with linkage of each industry and area at the same time. The IRWRIO table is enumerated by combining (1) inter-regional input output tables in regional scale and downscaling to river basin scale; (2) predicted water demand from future economic targets of each region; (3) forecasted water supply under climate change impacts; (4) water demand and supply analysis under conditions of economic and climate change in the future; and (5) decision making system using options of water demand and supply measures. The calculated results are compared between daily water demand calculated by input output table and water supply under climate change impacts to show water shortage in this river basin. The application methodology is illustrated through the case of Yoshino river basin in Shikoku region of Japan. The water demand is evaluated under four different main water-user groups: 1) agriculture; 2) manufacturing; 3) service; and 4) household sector. The paper indicates that "inter-regional water resources input output table" provides a tool that allows decision makers to accurately manage water resources with consideration not only of future development targets, but also of impacts of climate change in water supply. Policy makers can make rational policy decisions by balancing the water demand to support regional economic values and future water supply under climate change impacts.