A State-of-the Art Global Water Resources Assessment and its Future Extension for Sustainability Studies

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The sufficiency of global water resources has been assessed by calculating the ratio between water withdrawal and water availability throughout the world. The calculated ratio is usually called as “water stress.” However, such conventional water stress assessment is not sufficient for measuring the sustainability of world water resources. Measurement of sustainability does not necessarily depend on water stress; rather, it should depend on the services and impacts achieved. For carrying out such a global water resources assessment for sustainability, a numerical model that represents temporally varying natural and anthropogenic water cycles along with the representation of the role of “green” water and “virtual” water is useful. A prototype of such a model and preliminary results of the calculation of the model will be introduced in the presentation. In addition to the model, data on water availability and withdrawal are indispensable. Data on the availability of water stocks and the withdrawal from water stocks are also indispensable for sustainability analysis. However, these data such as ground water depletion are still sparse and uncertain. Even with successful model calculation, criteria for evaluating sustainability remain an unsolved issue, partly because we should consider the ethical aspects like as how much is the basic need of human beings. Finally, the linkages of water with other resources and energy will be introduced in the above context.