

## Introduction to global climate change impact assessment

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In this presentation, a typical methodology used in modern climate change impact assessments is introduced. Some latest research activities to tackle key problems are discussed as well. This presentation mainly focuses on water resources sector at global scale, but the contents can be broadly applicable to other sectors and scales.

Climate change impact assessment requires scenarios on future climatic and socio-economic conditions and a model which quantitatively describes how the system of interest responses to those changes. In this presentation the latest scenarios namely CMIP5, RCP, and SSP are introduced. Then, a global water resources model H08 is explained which delineates the water cycle and water use of the globe.

Climate change impact assessment typically takes three steps. First, a model of interest is prepared and a simulation is conducted using the present climatic and socio-economic conditions. Second, some simulations are conducted using various future scenarios. Third, the differences in outputs between the future and present are examined since these are considered the impact due to climatic and socio-economic change. In this presentation, the geographical spread of water stressed regions and the number of affected population are discussed under 10 different future scenarios.

A number of challenges remain unsolved on climate change impact assessments. Two international research activities are highlighted to address some of the challenges. The first item is quantification of uncertainties in assessments caused by models. Although the models used in climate change impact assessment basically reproduce the present conditions well, none of them is perfect and outputs include errors. An ongoing international research project termed ISI-MIP is introduced which conducts climate change impact assessment by using a set of common scenarios and multiple models. ISI-MIP analyzes the variations in results and reasons. The second item is implementation of adaptation options. Although humans are expected to take adaptation measures when the impacts of climate become intolerable, adaptation is seldom implemented in earlier simulations. Some pioneering works including adaptation are reviewed and future research directions are discussed.

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