The value of seasonal forecasting and crop mix adaptation to climate variability for agriculture under climate change

H. S. Choi (1,2), U. Schneider (2), E. Schmid (3), and H. Held (2)

(1) IMPRS-ESM (International Max Planck Research School on Earth System Modeling), Germany, (hyung.choi@zmaw.de), (2) Research Unit Sustainability and Global Change, University of Hamburg, Germany, (uwe.schneider@zmaw.de, hermann.held@zmaw.de), (3) Institute for Sustainable Economic Development, University of Natural Resources and Applied Life Sciences, Austria , (Erwin.schmid@boku.ac.at)

Changes to climate variability and frequency of extreme weather events are expected to impose damages to the agricultural sector. Seasonal forecasting and long range prediction skills have received attention as an option to adapt to climate change because seasonal climate and yield predictions could improve farmers' management decisions.

The value of seasonal forecasting skill is assessed with a crop mix adaptation option in Spain where drought conditions are prevalent. Yield impacts of climate are simulated for six crops (wheat, barely, cotton, potato, corn and rice) with the EPIC (Environmental Policy Integrated Climate) model. Daily weather data over the period 1961 to 1990 are used and are generated by the regional climate model REMO as reference period for climate projection. Climate information and its consequent yield variability information are given to the stochastic agricultural sector model to calculate the value of climate information in the agricultural market.

Expected consumers' market surplus and producers' revenue is compared with and without employing climate forecast information. We find that seasonal forecasting benefits not only consumers but also producers if the latter adopt a strategic crop mix. This mix differs from historical crop mixes by having higher shares of crops which fare relatively well under climate change. The corresponding value of information is highly sensitive to farmers' crop mix choices.