Nation-wide assessment of climate change impacts on crops in the Philippines and Peru as part of multi-disciplinary modelling framework

Mariko Fujisawa (1) and Hideki Kanamaru (2)

(1) FAO (Food and Agriculture Organization of the U.N.) (mariko.fujisawa@fao.org), (2) FAO (Food and Agriculture Organization of the U.N.) (hideki.kanamaru@fao.org)

Agriculture is vulnerable to environmental changes, and climate change has been recognized as one of the most devastating factors. In many developing countries, however, few studies have focused on nation-wide assessment of crop yield and crop suitability in the future, and hence there is a large pressure on science to provide policy makers with solid predictions for major crops in the countries in support of climate risk management policies and programmes.

FAO has developed the tool MOSAICC (Modelling System for Agricultural Impacts of Climate Change) where statistical climate downscaling is combined with crop yield projections under climate change scenarios. Three steps are required to get the results: 1. The historical meteorological data such as temperature and precipitation for about 30 years were collected, and future climates were statistically downscaled to the local scale, 2. The historical crop yield data were collected and regression functions were made to estimate the yield by using observed climatic data and water balance during the growing period for each crop, and 3. The yield changes in the future were estimated by using the future climate data, produced by the first step, as an input to the yield regression functions. The yield was first simulated at sub-national scale and aggregated to national scale, which is intended to provide national policies with adaptation options. The methodology considers future changes in characteristics of extreme weather events as the climate projections are on daily scale while crop simulations are on 10-daily scale. Yields were simulated with two greenhouse gas concentration pathways (RCPs) for three GCMs per crop to account for uncertainties in projections. The crop assessment constitutes a larger multi-disciplinary assessment of climate change impacts on agriculture and vulnerability of livelihoods in terms of food security (e.g. water resources, agriculture market, household-level food security from socio-economic perspective). In our presentation we will show the cases of Peru and the Philippines, and discuss the implications for agriculture policies and risk management.