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Agriculture and Climate Change - Adapting Crops to Increased Uncertainty (AGRI 2015)

## Adopting higher-yielding varieties to ensure Chinese food security under climate change in 2050

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### Abstract

Challenges of ensuring food security under climate change require urgent and substantial increase in the focus of research, innovation, transformation of knowledge, and rapid adoption of available technologies. Here we simulate the effects of the adoption of higher-yielding varieties of rice, wheat and maize crops into the food production systems on China's food security index (FSI, or relative food surplus per capita) in 2050, using the CERES crop models, climate change and a range of socio-economic and agronomic scenarios which were developed following two contrasting development pathways in line with the IPCC A2 and B2 emission scenarios, respectively. The obtained results predict a slightly positive effect of climate change on the FSI, but the magnitude of this positive effect cannot compensate the negative effects of population growth, urbanization rate and the rising affluence on the future trends of the FSI. The outcomes of the adoption of higher-yielding varieties show that a systematic adoption of higher-yielding varieties can raise the average FSI values by a margin of 16 and 27 units under the A2 and B2 scenarios, respectively, during the 2030-2050 period, compared to the average predicted FSI values of -2 and 8 percentage points under A2 and B2 during the same period. This suggests that systematic adoption of higher-yield varieties is an effective measure for Chinese agriculture not only to ensure food security but also to build adaptive capacity to climate change in 2050.

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**Keywords:** Adaptation; Adaptive capacity; Agricultural crops; Food security index; Food self-sufficiency; Scenario building;

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