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Climate Change Affects Crop Production and Its Adaptation

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Abstract: Based on relevant domestic research, the paper gives an overview of the observed facts of climate change impacting on agro-climatic resources and crop planting structure, the detected trends in frequency and intensity of agro-meteorological disasters, and the potential impacts and adaptation strategies for the future of climate change on crop production. It shows that: (1) Light and temperature productivity have an increasing trend on China's mainland (except southwest). They tend to increase to a greater degree in the north of China than the south of China. Climate change has different roles on potential productivity among different crops or in different regions of China. (2) Higher temperature increases the heat resource for crop growth, enhances the multiple cropping index, pushes the agro-climatic zone northward and westward, and increases the proportion of thermophilic crops' sown areas. The dry warming trend in northern China and southern flood disasters have also resulted in the change of the cropping system to some extent. (3) The meteorological disasters expand agricultural disaster areas which have led to increasing agricultural economic losses year by year in China in the recent 50 years. They increase the risk of crop production with the frequency and intensity of extreme weather events. (4) They would have pros and cons of the future climate change impact on China's crop production. Warming will lead to the northern boundary of multi-cropping northward, and induce the change of crop varieties and cropping layout. Weather disasters will be more and more frequent in future, which would increase the instability of crop production. (5) Based on the existing scientific knowledge, strategies for crop plant adaptation to climate change are proposed, optimizing our farming system, crop planting structure adjustment, strengthening the crop plant infrastructure, as well as cultivating new stress-resistant crop varieties.

Key words: climate change, global warming, agricultural meteorological disasters, extreme weather events, adaptation

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