



Review

Proposing an interdisciplinary and cross-scale framework for global change and food security researches

Qiangyi Yu^{a,b}, Wenbin Wu^{a,b}, Peng Yang^{a,b}, Zhengguo Li^{a,b}, Wei Xiong^c, Huajun Tang^{a,b,*}^a Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences, Beijing 100081, China^b Key Laboratory of Agri-informatics, Ministry of Agriculture, Beijing 100081, China^c Institute of Environment and Sustainable Development in Agriculture, Chinese Academy of Agricultural Sciences, Beijing 100081, China

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ABSTRACT

Food security is greatly affected by the consequences of global change, especially its impact on agriculture. Currently, global change and food system interaction is a hot issue across the scientific community. Scientists have tried to explain this interaction from different perspectives, and the issues related to this interaction can be classified as (1) crop yield and productivity in response to global change; (2) crop distribution and allocation in relation with global change; (3) general impacts on food security. However, most of the existing studies lack consistency and continuity. As food systems exist at the intersection of the coupled human and natural system, the interdisciplinary context of global change and food security requires an integrated and collaborative framework for better describing their importance and complexity. To do so, we decompose global change/food security studies into different levels in accordance with the previous mentioned issues, field, regional, and global, and categorize them into the life sciences, earth and environmental sciences, and social and sustainability sciences, respectively (yet not necessarily one to one correspondence). At the field level, long-term observations and controlled experiments in situ are important for exploring the mechanism of how global change will affect crop growth, and for considering possible adaptation methods that may maximize crop productivity. At the regional level, priority should be given to monitoring and simulating crop production (animal production and fishery are not included here) within large areas (a region or a continent). At the global level, food security studies should be based on scenario assessments to prioritize human adaptations under the changed environment, using integrated socioeconomic–biogeophysical measures.

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* Corresponding author at: Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences, Beijing 100081, China.

E-mail address: hjtang@mail.caas.net.cn (H. Tang).