

4th World Conference on

CLIMATE CHANGE

October 19-21, 2017 | Rome, Italy

Potential effect of drought on winter wheat yield using CERES-Wheat model under RCP 8.5 Scenario over the Huang-Huai-Hai Plain

Qin Liu and Hui Ju

Chinese Academy of Agricultural Sciences, China

Statement of the Problem: Droughts and water shortage are generally accepted to be one of the most critical problems faced by worldwide agriculture, and it is so especially in China where agricultural production and prosperity are largely dependent on the timely, adequate and proper distribution of rainfall. The analysis of potential effect of climatic drought on grain yield is becoming very critical in light of population growth, food security and increasing pressure on water resources. However, there is limited understanding of the spatio-temporal variation in potential evapotranspiration (ET₀) and climatic drought and its effect on grain yield of winter wheat in Huang-Huai-Hai Plain (3H Plain) in which there is an over-exploitation of groundwater region.

Methodology & Theoretical Orientation: we used Penman-Monteith formula, SPEI-PM method, DSSAT-CERES-Wheat model and RCP 8.5 data to explore the characteristics in ET₀, climatic drought and yield reduction rate for winter wheat in response to climate change over the 3H Plain.

Findings: Our work demonstrated the investigation that an increase of ET₀ was predicted leading to subsequent drought rise in frequency, duration, severity and intensity under the RCP 8.5 scenario. Annual future ET₀ is most sensitive to RH changes and accordingly RS is responsible for the predicted increment of the annual ET₀. Analysis of yield reduction rate by drought in different growing period shows that wheat yield decline most in drought of jointing stage, followed by grain filling stage. Irrigation in the jointing stage (60mm) could retrieve yield by 16.3% (short-term) 18.6% (medium-term) and 16.6% (long-term).

Conclusion & Significance: In our work, major agronomic consequences have been drawn regarding the reform of the common agricultural policy in Huang-Huai-Hai Plain, China. Researchers are encouraged to further investigations into how to implement these practices with emphasis of improving the sustainability of these agroecosystems.

Biography

Qin Liu obtained his PhD in 2017 from University of Liege at Belgium. He worked as a Research Scientist at Institute of Environment and Sustainable Development in Agriculture, Chinese Academy of Agricultural Sciences, China. Qin Liu has his expertise in evaluation and passion in climate change and agricultural water resource management based on spatial analysis and crop modelling. He has published more than 30 papers in referred journals and had served as an Editor of Chinese Journal of Agrometeorology.

liuqin02@caas.cn

Notes: