

파키스탄 기후변화에 따른 밀생산량 모의  
Simulation of Wheat Yield under Changing Climate in Pakistan

미르자 주네이드 아흐메드\*, 최경숙\*\*  
Mirza Junaid Ahmad, Kyung-Sook Choi

요 지

Sustainable wheat production is of paramount importance for attaining/maintaining the food self-sufficiency status of the rapidly growing nation of Pakistan. However, the average wheat yield per unit area has been dwindling in recent years and the climate-induced variations in rainfall patterns and temperature regimes, during the wheat growth period, are believed to be the reason behind this decline. Crop growth simulation models are powerful tools capable of playing pivotal role in evaluating the climate change impacts on crop yield or productivity. This study was aimed to predict the plausible variations in the wheat yield for future climatic trends so that possible mitigation strategies could be explored. For this purpose, Aquacrop model v. 4.0 was employed to simulate the wheat yield under present and future climatology of the largest agricultural province of Punjab in Pakistan. The data related to crop phenology, management and yield were collected from the experimental plots to calibrate and validate the model. The future climate projections were statistically downscaled from five general circulation models (GCMs) and compared with the base line climate from 1980 to 2010. The model was fed with the projected climate to simulate the wheat yield based on the RCP (representative concentration pathways) 4.5 and 8.5. Under the worst, most likely future scenario of temperature rise and rainfall reduction, the crop yield decreased and water footprint, especially blue, increased, owing to the elevated irrigation demands due to accelerated evapotranspiration rates. The modeling results provided in this study are expected to provide a basic framework for devising policy responses to minimize the climate change impacts on wheat production in the area.

**Keywords:** Aquacrop, Climate change, Wheat yield, Pakistan

\* 정회원 · 경북대학교 농업생명과학대학 농업토목공학 박사과정 · E-mail : [agri.junaid1205@gmail.com](mailto:agri.junaid1205@gmail.com)

\*\* 정회원 · 경북대학교 농업토목공학과 교수 · E-mail : [ks.choi@knu.ac.kr](mailto:ks.choi@knu.ac.kr)