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Estimation of Potential Changes in Cereals Production Under Climate Change Scenarios

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This paper introduces the improved crop-yield model based on Global-Agro Ecological Zones model by FAO and IIASA, the improved global-agricultural model that can evaluate crop yields in Global by taking into account the effect of global warming under climate change scenarios. In addition, we apply a GIS-Based TOPModel in 11 major international river basins, to obtain discharge and irrigation water requirements. The impacts of climate change on crops yield have been estimated using the above model. The changes in crop yields between 1990-2000 and 2099 have been calculated using CRU TS 2.1 Climate Database and GCM outputs for AR4 with SRES A1B Scenarios. As a result of simulation, we obtained high representation of the proposed model in comparison with the current production yields for each crop. For future estimation in Canada, a country currently classified as inadequate for high agricultural production due to its cold weather, yields and harvest area for all crops increase. On global scale, these cold zones become appropriate zones for agricultural production, whereas temperate zones currently adequate for agricultural production become inadequate.

Keywords: agricultural production, irrigation, global model, GCM, A1B