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Climate impacts on palm oil yields in the Nigerian Niger Delta

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Abstract

Palm oil production has increased in recent decades and is estimated to increase further. The optimal role of palm oil production, however, is controversial because of resource conflicts with alternative land uses. Local conditions and climate change affect resource competition and the desirability of palm oil production.

Based on this, crop yield simulations using different climate model output under different climate scenarios could be important tool in addressing the problem of uncertainty quantification among different climate model outputs. Previous studies on this region have focused mostly on single experimental fields, not considering variations in Agro-Ecological Zones, climatic conditions, varieties and management practices and, in most cases not extending to various IPCC climate scenarios and were mostly based on single climate model output. Furthermore, the uncertainty quantification of the climate- impact model has rarely been investigated on this region. To this end we use the biophysical simulation model APSIM (Agricultural Production Systems Simulator) to simulate the regional climate impact on oil palm yield over the Nigerian Niger Delta. We also examine whether the use of crop yield model output ensemble reduces the uncertainty rather than the use of climate model output ensemble. The results could serve as a baseline for policy makers in this region in understanding the interaction between potentials of energy crop production of the region as well as its food security and other negative feedbacks that could be associated with bioenergy from oil palm.

Keywords: Climate Change, Climate impacts, Land use and Crop yields.