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Model Comparison for Simulating Upland Rice Production in Small-holder Farming Systems in Benin

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Abstract

Many issues are currently raised up concerning the uncertainty and validity of crop models to be used for the evaluation of adaptation strategies to climate change. The test of the performance of the field scale crop model under different agro-ecological conditions is a prerequisite for the evaluation of the impact of management strategies and climate change on the crop yield and production at larger spatial scales. The aim of this study is to determine an appropriate model in the presence of controlled technique data, given the range of data available in rainfed agriculture. Attention will be given to two methods that will be tested: EPIC (Erosion Productivity Impact Calculator / Environmental Policy Integrated Climate) and Oryza2000. Specifically, this study has to describe the potential of two models to simulate growth and yield performance of rice crops under several conditions of management in the context of West African small holder farms. The focus will be put on the new rice varieties for Africa named NERICA (NEw RIce for AfriCA) which are low-input rice germplasm developed for resource-limited and smallholder production systems. Their introduction is a driving force of the rice intensification cropping systems on both upland and lowland conditions in Africa. Then, some on-farm trials in different environmental zones in the Republic of Benin have been selected: (1) costal zone, (2) Guinean Savannah and (3) Sudanian zone, showing high soil heterogeneity and the use of different crop cultivars. In order to evaluate the performance of the two crop models, the collection of agronomical, climate and soil data will be done. Then some management scenarios will be defined and simulated in cooperation with the involved stakeholder of rice production in Benin Republic.

Keywords: Crop model, modelling, onfarm simulation, rice