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FIRST MAIZE AQUACROP MODELING FOR ADAPTATION TO CLIMATE CHANGE FOR ANDEAN AND ARID ZONES PRODUCTION

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ABSTRACT

The Adaptation to climate change in agriculture is a priority for water conservation because is a key factor for crop production and food security. Only 20% percent of crop production areas has water sources, most of crop land suffer water deficit, and the projection for the next 50% years is critical. Due to water scarcity, there is a need to research in adaptation of crops in order to avoid crop failure due to the new climatic conditions and assure food production. The climate change laboratory at INIA-Peru (Instituto Nacional de Innovación Agraria) began the modelling of the principal maize varieties in the coast and the Andean highlands of Peru using the Acuacrop modelling which is predictive model of yield under different climatic conditions from FAO. The application of this model is very important in Peru due to our microclimate conditions, and the resulting information can be used to avoid crop failure of small farmers under future water scarcity conditions. We modelled maize accounting the climate and crop data from two crop campaigns in INIA, the former in arid zone in La Molina Station (Lima) and the second highland Andean zone in Santa Ana Station (Huancayo). In the first zone we modelled the culture of maize under well-watered conditions, and in the Andean zones we testes both well-watered and water deficit condition. In the first case we realized that the high temperature effect accelerated the crop development; and in the Andean station we found that the high precipitation retarded the crop cycle and enhanced the weed development. Both factors of temperature and high precipitations affect significantly the crop cycle and vary the grain yield. So this grain production may strongly affect the farmer income. Also the reformulation of how many crop seasons must develop each year and the variation in yield production may affect that food availability in local markers.

Keywords: Maize, adaptation, climate change yield, model

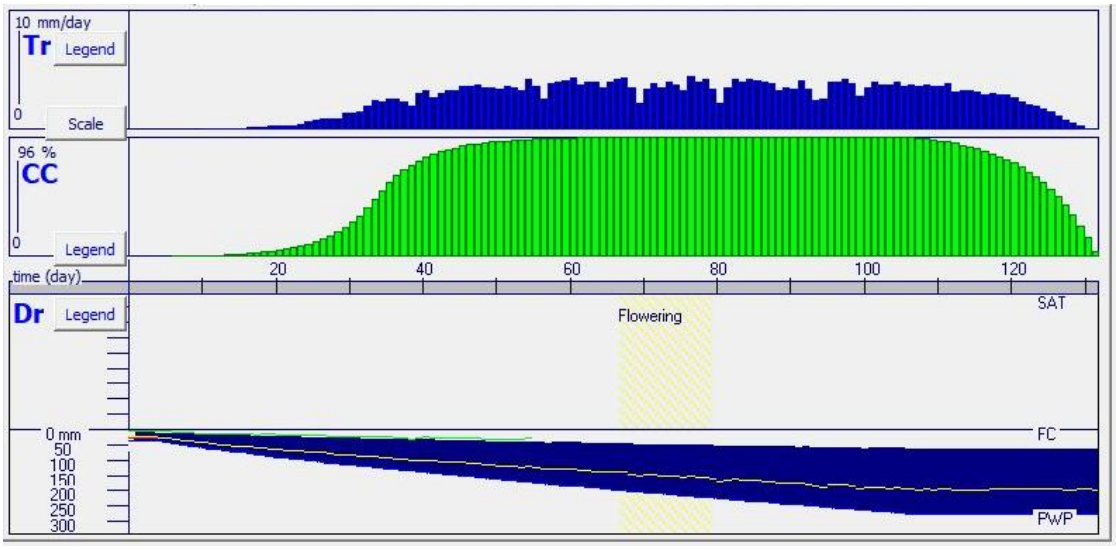

Figure 1. Peruvian Maize AquaCrop Modelling in arid zones under well watering conditions at La Molina INIA station. The production model shows the acceleration of the crop cycle for a crop production of 14,16 tons/Ha and the variation of Transpiration (Tr), Canopy cover (CC) and Water in root zone (Dr).