UNIVERSITY OF THE PHILIPPINES

Master of Science in Meteorology

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Weather as driver of planting window for rainfed corn in Ifugao

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ABSTRACT

Weather influences corn production activities such as planting date, fertilizer application date and harvesting date. For a rainfed corn production, determining the planting date is the most crucial and difficult part for a farmer because of varying and uncertain weather in growing the crop especially during dry cropping season. Weather variability causes the shift of the optimum planting date every year, thus, the difficulty of farmers to find the optimum planting date that may produce higher yields. The study was conducted to examine the weather condition of the dry cropping season in order to optimize the yellow corn production in eastern Ifugao. The aim of the study is threefold: (1) to characterize the weather of the dry cropping season at different planting dates; (2) to determine the optimum planting window of rainfed corn; and, (3) to validate the derived optimum planting window of rainfed corn.

Weather conditions were analyzed using the climatology (1998-2016) of eastern Ifugao derived from the open access website of NASA and NOAA due to absence of ground weather observation in the area. Optimum planting window of rainfed corn was established by simulating the yields at different planting dates during the dry cropping season with the aid of a calibrated crop model (DSSAT-CERES-Maize) using the climatology (i.e., rainfall, minimum and maximum temperature, solar radiation) of the area as input. The established optimum planting window was validated with the observed yields during 2017 dry cropping season.

Results showed that temperature and solar radiation reduction in eastern Ifugao were less significant contributor in corn production, whereas, rainfall availability during the dry cropping season was the major factor influencing the yield of the crop. Rainfall for early planting dates (September to October) were available throughout the

growing period of corn providing sufficient soil moisture for growth and development. However, for late planting dates (November to January), soil moisture were sufficient during the early growing stages of corn but limited during the flowering and grain filling stages leading to reduced yield. The derived optimum planting window for rainfed corn opens on September 1 (earliest possible start of dry cropping season) because of the favorable weather condition and closes on November 7. However, in the span of 1998 to 2016, several El Niño–Southern Oscillation (ENSO) events have occurred (five El Niño, eight Neutral and six La Niña) that may affect the derived planting window using the 1998 to 2016 weather data, thus, it is also important to determine the optimum planting window for the different ENSO phases. At different ENSO phases, the closing dates were October 14, October 25 and November 25 for El Niño, Neutral and La Niña, respectively. Rainfall at different ENSO events dictated the closing date of the optimum planting window wherein limited rainfall during El Niño and abundance of rainfall during La Niña event resulted to shorter duration of planting window in El Niño and longer duration of optimum planting window for La Niña year, respectively.

The field experimentation showed that the yield from planting within the optimum planting window were significantly higher by 49% than planting beyond the optimum planting window while actual yields of farmers who planted within the optimum planting window were significantly higher by 39% than farmers' yield planted beyond the optimum planting window. With this information, farmers will have a better way to decide the time of planting.