

Effects of Temperature, Rainfall and Relative Humidity on the Yield and Quality of Rice in Two Areas in Davao City, Southern Philippines

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Abstract

Climate inconsistency can be a major threat to food manufacturing and sustainability of environmental resources. Changing pattern, for instance, of weather parameters such as temperature, rainfall, and relative humidity can affect rice yield and quality. In this study, we utilized data from automated weather stations (AWS) installed in Tamugan, Calinan, and in Marilog, Davao City, to assess the effect of weather parameters on the yield and quality of rain-fed rice. Time series data taken from 1987 to 2013 from the Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA) weather stations were also used to predict the yield of rice crop in Davao City using Cobb Douglas production function having rainfed rice yield as dependent variable and weather parameters as independent variables. Results showed that a positive change in temperature and relative humidity favorably affected rice yield. As the temperature increased by 1.70 °C, rice yield also increased by 0.27%; and as relative humidity increased by 5%, rice yield also increased by 0.78%, although change in rainfall did not seem to affect rice yield. Studies on the effect of the three weather parameters on the physico-chemical properties of rice revealed that temperature directly affected the physical properties of rice such as length, width, thickness, and thousand grain weight. There was also noticeable effect on the gelatinization temperature but not the amylose content of rice. With sufficient rainfall, increased temperature can yield rice variety with better physical properties and gelatinization temperature. The results implied that close monitoring of weather parameters is crucial to sustainable rice production.