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Master of Science in Meteorology

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Influence of Selected Hydrometeorological Variables to Agricultural Drought

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ABSTRACT

INFLUENCE OF SELECTED HYDROMETEOROLOGICAL VARIABLES TO AGRICULTURAL DROUGHT

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Drought is defined as a persistent and abnormal deficiency in moisture affecting vegetation health condition, animal welfare, water supply, and eventually, human well-being. One type of drought is the agricultural drought which is the deficit of water available for plants that would lead to wilting of crops and drying of soils. Understanding the causes of agricultural drought is essential for a better impact mitigation of drought. In this study, the influence of selected hydrometeorological variables such as rainfall, evapotranspiration, and potential evapotranspiration to agricultural drought was established. Specifically, it aimed to understand the response of agricultural drought to those mentioned hydrometeorological variables during the different seasons and the phases of the El Niño/Southern Oscillation (ENSO) at different climate types; and comparison between the responses on irrigated and rainfed areas.

From 2002-2016, agricultural areas experienced 30-60 months of drought events and mostly occurred during El Niño and during dry season. Furthermore, the influence of meteorological drought to agricultural drought varies with location, where higher influence was observed in the western Mindanao. Agricultural drought is also associated with rainfall deficiency, reduced evapotranspiration rate, and increased potential evapotranspiration. The

agricultural drought is more sensitive to those hydrometeorological variables during the dry season and during the El Niño events. Rainfall deficit and high potential evapotranspiration has delayed response to the occurrence of agricultural drought while evapotranspiration has no lag effect. Higher influence and a longer lag effect of rainfall deficit on agricultural drought was found in Climate Type 1 especially during the dry season while in Climate Type 3 and 4 during El Niño. Moreover, higher influence of evapotranspiration and potential evapotranspiration was found in Climate Type 1 and 3 especially during the dry season. A higher effect of rainfall and potential evapotranspiration was found in rainfed areas compared to irrigated areas while higher influence of evapotranspiration was found in irrigated areas. Lastly, previous monthly rainfall deficit could have led to agricultural drought; as the latter is linked to low evapotranspiration.