Drought Analysis and Forecast Using Landsat-8 Sattelite Imagery, Standardized Precipitation Index and Time Series

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Abstract— A drought is a phenomenon of shortages in water supply in an area for a long time. Drought usually occurs in areas that has little rain for a long time or in areas with low precipitation. Drought have negative impacts on many sectors such as agriculture, plantations, water resources and environment. This paper describes the results of a research that aims to analyze data to get the level of drought during four yearly periods, and predict the likelihood of drought to occur in the future. The level of drought was analyzed using the Inverse Distance Weighted (IDW) method and the Standardized Precipitation Index (SPI). Least square time series was utilized to forecast the level of drought in the near future. Data consists of drought data collected from electronic news, rainfall data from BMKG, and anual Landsat-8 satellite imagery. All data are for Western Southeast Mallucas in the range of 2015-2018. Analysis using IDW and SPI methods produce similar interpretation for year 2015, i.e. mild dryness, and fro year 2018, i.e. no drought. However, the two methods show discrepancy in analysis of data for 2016 and 2017. The use of least square time series to forecast drought in 2019 gives SPI value of 0.03 which intepretes as normal weather (no drought) that is consistent with the result of field observation.

Keywords — Drought, inverse distance weighted, standard precipitation index, least square, time series