

Evaluation of Agricultural Drought Impact in the Crop Productivity of East Gojjam Zone

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Abstract : The most catastrophic condition for agricultural production is a drought event, which is also one of the most hydro-metrological-related hazards. According to the combined susceptibility of plants to meteorological and hydrological conditions, agricultural drought is defined as the magnitude, severity, and duration of a drought that affects crop production. The accurate and timely assessment of agricultural drought can lead to the development of risk management strategies, appropriate proactive mechanisms for the protection of farmers, and the improvement of food security. The evaluation of agricultural drought in the East Gojjam zone was the primary subject of this study. To identify the agricultural drought, soil moisture anomalies, soil moisture deficit indices, and Normalized Difference Vegetation Indices (NDVI) are used. The measured wilting point, field capacity, and soil moisture were utilized to validate the soil water deficit indices computed from the satellite data. The soil moisture and soil water deficit indices in 2013 in all woredas were minimum; this makes vegetation stress also in all woredas. The soil moisture content decreased in 2013/2014/2019, and 2021 in Dejen, 2014, and 2019 in Awobel Woreda. The max/ min values of NDVI in 2013 are minimum; it dominantly shows vegetation stress and an observed agricultural drought that happened in all woredas. The validation process of satellite and in-situ soil moisture and soil water deficit indices shows a good agreement with a value of $R^2=0.87$ and 0.56 , respectively. The study area becomes drought detected region, so government officials, policymakers, and environmentalists pay attention to the protection of drought effects.

Keywords : NDVI, agricultural drought, SWDI, soil moisture

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