

Project title: Determination of the Temporal and Spatial Variation of Soil Moisture and Drought Analysis in Susurluk- Kocadere Sub-Basin

Research Area	Soil Water Resources and Environment
Research Program	Agriculture-Climate Change Interaction
Executive Institute	International Agricultural Research and Training Center
Supporting Institute/s	General Directorate of Agricultural Research and Policy
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Project Summary: Moisture content of soil; plays an important role in climate change, agriculture, evaporation, transpiration like processes and help prediction and modeling of large-scale ecological values such as flood forecasting, surface runoff and groundwater. It is an important hydrological variable that converts soil moisture to, precipitation, flow, subsurface storage, which are closely related to flood, and drought events. However, determination of soil moisture at basin level by in situ measurements is a difficult and costly process to follow. Therefore, different types of models are widely used in drought monitoring and similar applications to determine soil moisture.

This project carried out in Kocadere Basin ($11,366 \text{ km}^2$) within Large River Basin of Susurluk and located in Bigadiç (district of Balıkesir province) between 2015 – 2017 water years; spatial and temporal variation of soil moisture at basin level was investigated also moisture distribution maps were created. Additionally, in this project tried out to determine the use of a parametric model for monitoring soil moisture of basins, whether the moisture values to be obtained are a good indicator of drought and whether characterizes the basin's hydrological status. Within the scope of the project, meteorological and hydrological data were measured for 3 water years, while monthly soil moisture measurements were conducted for 2 water years. Within the context of the aim, the measured moisture values were evaluated and the monthly change in the basin level of all the moisture taken from 35 points of 3 different depths was mapped. When the obtained maps were evaluated, higher moisture differences were observed between the months in the south-southeast part of the basin, while no similar situation was observed in the north-northwest part, and it was found that the soil moisture values were lower in this part of the basin in both years. The measured data were used both to perform drought analysis of the basin and to test the predicted success of a calibrated and verified model for soil moisture prediction. The coefficient of determination showing the relationship between the measured and modeled soil moisture values was found 0,82 and thus the success of the simulation was demonstrated. In addition, Palmer Drought Severity Index values were calculated for the research area and according to the results, it was determined that the driest month was March of 2001 with the index value of -5,65.

Key words: Kocadere watershed, Soil moisture, Drought analysis, "abcd" model, PDSI