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Monitoring and forecasting water deficit and surplus in agriculture in Poland using standardized precipitation index SPI

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Since 2012 Institute of Technology and Life Sciences (Poland) have developed the system which provides current and forecasted information on the status and impact of water shortages and surpluses in selected, representative agricultural ecosystems in 13 rural regions of Poland. Most of these selected regions have unfavorable hydro-meteorological conditions for agricultural. This activity is carried out using a nationwide system of automatic meteorological stations.

The standardized precipitation index SPI is used for monitoring and forecasting precipitation deficits and surpluses. The SPI is calculated for each month at the 3-, 6-, 12-, 24- and 48-month time scale. The shorter time scale index describes drought events affecting agriculture (soil moisture depleting, crop yield reduction), while the longer ones are more suitable for water resources hazard (reservoirs storage, stream flows, groundwater levels). The 3 and 6-month value of SPI is used for a short-term or seasonal drought identification, a 12-month SPI – for medium drought identification, a 24 and 48-month SPI - for a long-term drought identification.

Other agro-meteorological factors (air temperature, wind speed, vapor pressure, sunshine duration or radiation, evapotranspiration) as well as soil and plant factors allow the calculation of other indicators important for agriculture: soil moisture - soil moisture index SMI, a deficit of water for crops - agricultural drought index CDI, the potential reduction of crop yield.

Weather forecasts, necessary to develop predictions of water shortages or surpluses in the next 10 and 20 days, come from the meteorological service of MeteoGroup Poland. The present results of monitoring and forecasts of all indices in the form of maps and tables are shown on-line at the site: www.agrometeo.itep.edu.pl.