Leszek ŁABĘDZKI, Bogdan BĄK

IMPACT OF METEOROLOGICAL DROUGHT
ON CROP WATER DEFICIT AND CROP YIELD REDUCTION
IN POLISH AGRICULTURE

Abstract

The study presents the quantification of the effect of meteorological drought on crop water deficit and crop yield reduction in different agro-climatic regions of Poland. The regression equations describing the relationship between the standardized precipitation index SPI (meteorological drought) and the crop drought index CDI (evapotranspiration reduction) were used in a first step. Then the FAO equation describing the relationship between CDI and yield reduction was used. Crop water deficit measured by CDI is spatially differentiated and depends on the intensity of meteorological drought and soil water availability. The greatest evapotranspiration reduction is found for late potato growing in the central-west Poland (30–60%). The smallest reduction of evapotranspiration was stated for winter rape (12–16%) in the same region on soils with small water retention and no reduction can be on soils with large water retention. A good correlation between estimated and observed yield reduction was found. Potential yield reduction of late potato can reach more than 50% in central Poland. Least yield reduction is for winter wheat and winter rape. The main advantage of the method used in the study is the combination of meteorological drought, soil water retention capacity, evapotranspiration, soil water balance and crop yield, and so help provide more accurate assessments.

Key words: crop drought index CDI, crop water deficit, drought, soil water balance, standardized precipitation index SPI, yield reduction