

The Economic Impact of Climate Change on Sunflower Seeds Yield in Constanta County, Dobrogea Region, Romania*

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Abstract

The paper analyzed the impact of climate change on sunflower production performance in Constanta County, Romania using data from National Institute of Statistics and from Valu lui Traian Meteorological Station. Fixed basis indices and graphics reflected the dynamics of cultivated area, seeds production, yield, and precipitations, while correlations, regression and R^2 were used to show the link existing between precipitations and yield. In the period 2016-2020, low precipitations, high air temperatures, a long and severe drought influenced the performance of sunflower crop. The cultivated area declined by 6% from 76,854 ha in 2016 to 72,265 ha in 2020. In the period January-August of the years 2017, 2019 and 2020, the amount of precipitations was below the average 1961-2010 climatologic normal accounting for 273.7 mm. The lowest precipitations level was 133 mm in 2020 and the only favorable year was 2018 (569 mm). In consequence, in 2020, seeds production accounted for 83,089 tons, the lowest level, being by 28% smaller than in 2016 and by 72% smaller than the highest level of 296,518 tons in 2018. Seeds yield registered the lowest performance of 1,115 kg/ha in the year 2020, being by 25.77% smaller than in 2016 and by 70% lower than 3,715 kg, the peak achieved in 2018. The yield variation caused by precipitations was attested by the correlation coefficient, $r = 0.795$ and $R^2 = 0.6333$. The regression equation $Y = 4.7465x + 906.5177$, where Y is seeds yield and x precipitations, showed that an increase by one unit in precipitations could grow average seeds production by 4.7465 kg per ha. Under these conditions, farmers have to continue to adapt production technologies in order to diminish the negative impact on production, income, and profitability of their business.

Keywords: climate change, precipitations, sunflower yield, correlation, regression, Constanta County, Romania