

Effects of Irrigation on Crop Production in Different Agrometeorological Conditions in Serbia and Montenegro

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The lowlands in Serbia and Montenegro in which agricultural production is concentrated have a moderately continental climate with warm summers, cold and dry winters. The precipitation are unevenly distributed in space and time, and frequent droughts. Drought occurs regularly and over large areas, especially in the agricultural regions. These regions have changeable, unstable and unforeseeable rainfall, and very often dry periods during June, July and August. These dry periods are long or short, and they are also characterized by high air temperatures, hot and dry winds, increased plant water requirements, and soil moisture levels below the wilting point. All these phenomena affect plant growth and development and considerably reduce yields on most crops. Depending on the time when they occur and their duration, droughts have affect plant growth and development and considerable reduce yields of most crop species. In some years and some regions of the country, drought reaches catastrophic proportions for agricultural production.

The analysis agrometeorological conditions and drought has been made on the basis of precipitation data collected in Novi Sad, which represents the northern part, and Zaječar, which represents the eastern part of the country. Precipitation sums by hydrological years (October – September) vary largely, from 322 to 867 mm. The variations during growing season is important for water provision to plants. The average precipitation sum for the Vojvodina Province (Novi Sad), for the hydrological years in an 82- year period (1923-2003) is 605 mm, 341 mm in the vegetation period and 264 mm in the winter period. In the eastern part (Zaječar), the annual average for the 43 hydrological years (1962/1962-2003/2004) is 592 mm (from 416 to 704 mm) and the average for growing season is 326 mm (from 170 to 478mm).

Rainfall analysis for July and August for the period of 80 years (1924-2003) in the Vojvodina Province shows that 67 years or 83% and 69 years or 86% of the years had the monthly precipitation under 100 mm in July and August, respectively. There were 62,5% of extremely dry years with less than 50 mm respect to July and 50% with respect to August. Rainfall analysis for July and August for the period of 42 years (1962-2003) in eastern Serbia (Zaječar) shows that 38 years (90%) and 40 years

(95%) had the monthly precipitation under 100 mm in July and August, respectively. There were 55% extremely dry years (less than 50 mm) with respect to July and 81% with respect to August.

Drought impact on the yields of several field crops was analyzed in trials with and without irrigation established at the experiment field of Institute of Field and Vegetable Crops in Novi Sad on the loamy chernozem soil. Annual yield difference between irrigated and non-irrigated plots depended on crop grown and precipitation amount and distribution. Compared with irrigation crop production, drought impact on rain-fed farming was expressed in a wide range, from few percents to 100% or more. In extremely dry years, the yields in non-irrigated plots are 2-3 times less than those in irrigated plots.