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Impacts of Climate Change on Agricultural Technology Management in the Transylvanian Plain, Romania

Teodor Rusu, Paula Ioana Moraru, Ileana Bogdan, Adrian Ioan Pop, and Horea Cacovean

University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Agriculture, Agrotechnics, Cluj Napoca, Romania (rusuteodor23@yahoo.com, 0040264593792)

The impact of climate changes varies considerably in Europe, with different degrees of vulnerability. Romania is situated in an area with the lowest capacity to adapt to existing climate change and those that will occur, and the Transylvanian Plain (TP) is one of the most affected areas. In these conditions, the climate monitoring and implementation of measures to adapt to these changes are essential for sustainable development of agricultural technologies. The TP name comes from the Latin "silva" which means forest, namely an area covered with forests approximately 55-60% in the early nineteenth century, but today reached an average of 6.8% in the TP area. In time, the rugged terrain, deforestation, erosive slopes, and irrational agro technical practices for crop production altogether brought about the degradation of large areas of agricultural land, reducing its productivity.
The degree of soil degradation in TP and climate change in recent years, have radically modified climatic conditions for cultural crops. Monitoring of temperature and water supply in TP aims to evaluate these two resources for agricultural production.
The TP is a geographical region located in north-central Romania and it is bordered by large rivers to the north and south: the Somes and the Mures rivers. The altitude of the TP ranges from 231 to 662 m. TP, with an area of approx. 395,616 ha, includes areas of three counties (Cluj - CJ, Mures -MS, Bistrita-Nasaud - BN), has a predominantly agricultural character, and is characterized by hilly climate with oceanic influences, 9-100C average annual temperatures and 500-700 mm/year average annual precipitations.
Monitoring the thermal and water supplies from TP was performed with twenty HOBO micro stations which determine the temperature (to a height of 1 m) and rainfalls same as temperature (at 10, 30, 50 cm depth in soil) and soil moisture (at 10 cm depth).
Average precipitation recorded during 2009-2011, is 498.97 mm, which is beneath the multiannual average of the area. The year 2009 indicated an average of 503.84 mm in TP, considered in the lower limit of the area, followed by the year 2010 with an annual average of 607.84 mm, the year with the closest values to normal area precipitation values. The year 2011 is extremely dry, with an average of 376.56 mm. This situation is reflected in rainfall humidity values, recorded at a depth of 10 cm in the soil, where the area average is about 0.249%.
The inner hydrological network contains rivers with low flow inside a semi-permanent or intermittent flow supply. River flow is not related to the surface water supply, being tributary to rainfalls which have an uneven character. Since the supply is pluviometrical, floods are recorded from March to April due to snow melting and in May to July after torrential rains.
Quantity and quality of groundwater in Transylvanian Plain represent problems that have conditioned economic and social development of rural habitats and determined the anthropic development and maintenance of the natural lakes. Groundwaters have a particular importance within the region revealing the possibility of development of settlements and location of others settlements and supporting an efficient agriculture.
Reduced volume of groundwater induces a temporary or intermittent character to the majority of surface waters during summer and early autumn. The amount of real evapotranspiration adds up to these, which from April to October, is 550 - 600 mm, half of these being registered in the summer months. Hydrographical local organization exclusively, lack of alternative water sources and unproductive correlation between S-SV exhibition of the flanks with increased slopes, all these are images of a region tributary to the critical term.
Average air temperature during 2009-2011 is 10.750C, in the soil at 10 cm depth being 11.150C, respectively 11.280C at depth of 50 cm.
Low amounts of precipitation, especially their poor distribution during crop vegetation, are aggravated by the deficit of hydrological resources for TP.
The average air temperature is above multiannual average of the area, which significantly influenced the optimum time of sowing and amount of biologically active degrees of temperature during the vegetation period.