

SERBIA - DROUGHT

- **Use of climate and weather information, forecasts, monitoring and early warning to mitigate the effects of drought**

In accordance with its tasks, Republic Hydrometeorological Service (RHMS) developed a system of monitoring and early warning that represents a basic component of national plan for protection and mitigation of effects of this natural disaster that endangers the whole region of southeast Europe. National network of principal meteorological stations with hourly meteorological observations and operative collection of hourly meteorological reports makes the basis of this system. On the basis of systematic monitoring and forecasting of weather, climate and agroclimatic conditions, the beginning, intensity and distribution of drought is timely defined as well as its potential influences on various economic and regional sectors.

For this purpose RHMS has developed and operatively used the following agroclimatic indices: Standardized precipitation index (SPI), Calculated values of moisture storage in the soil up to the depth of one meter; Palmer's Z index and Palmer's drought index (PDSI); Precipitation quantity expressed in the percentage of long-term average for month, season and vegetation period.

Index value calculation is operatively carried out every day on the basis of hourly observations in national network of principal meteorological stations (30 stations on the territory of the Republic of Serbia that send collected coded SYNOP meteorological reports every hour). Calculation results of these and other agroclimatic indices are issued in regular and outstanding agrometeorological bulletins that are available together with other meteorological information and forecasts (short-range, medium-range, monthly, seasonal) and operative warnings via Internet and other communication means to farmers and manufacturing companies and Ministries for Agriculture, Water Management, Forestry, natural disasters protection, scientific institutions and other users.

- **Application of risk-mapping, remote-sensing, agro-meteorological modeling, integrated multidisciplinary crop-forecasting techniques, and computerized food supply-demand analysis.**

For the purpose of risk assessment of the occurrence of meteorological drought, criteria are defined on the basis of which the survey has been carried out of historical data on drought on the territory of the Republic of Serbia in the period 1961-2003.

Preliminary drought analysis on the bases of SPI indicated relatively high concentration of drought years in Serbia during the last two decades of the previous century. The year 2003 should be added to that series since it stands out as per its exceptionally intensive drought during spring months and great shortcomings in winter crop yield. This analysis shows that on annual level the drought in 2000 had the characteristics of extreme drought both according to drought intensity and endangered territory of the Republic. According to the territory covered by drought the years 1990 and also 1993 can join this year only having less intensity.

The new Law on the Protection from Natural Disasters whose adoption is expected soon, also plans for the adoption of national plans for the protection from all elementary disasters and catastrophes facing our country including drought too. Drought risk maps will be an integral part of these plans.

In relation to agro-meteorological modeling RHMS experimentally uses CROPSYST with data for six chosen locations in the most important agricultural areas. This model makes possible the research of climate variability influence on corn yield with simultaneous validation of obtained results by comparison with available biological data (data on recorded yield, occurrence time of certain phonological phases, etc).

Since the ratification of UN Convention to combat desertification and mitigation of adverse drought effects (UNCCD) the strengthening of the capacities of competent government bodies, including RHMS, is necessary for the purpose carrying out of the obligations stemming from this Convention. In this context and with international financial support, the following is planned:

- Further upgrading of the drought monitoring system and early warning as well as the system of dissemination of meteorological, agrometeorological and agroclimatic analyses, forecasts and warnings
- adoption and application of national protection program against drought within the UNCCD implantation program and national legislation on the protection against natural disasters;
- adoption and application of multidisciplinary program of investigation of drought causes and effects, desertification, climate changes; transfer of knowledge and technologies; and
- strengthening of capacities of competent institutions for carrying out of relevant tasks related to drought, desertification and climate as well as education and raising of public awareness.