Drought – National Drought Mitigation Center

Drought Network News (1994-2001)

University of Nebraska - Lincoln *Year* 1994

Persistent Drought in 1993 Affects Bulgarian Agriculture

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The drought of 1992 persisted through the winter of 1993 (see *Drought Network News*, Vol. 5, No. 2 [June 1993]:12-15). Figure 1 shows the monthly values of national rainfall in 1993 and their normal averages. National rainfall was 28% and 63%, respectively, of the mean during January and February 1993. During March, rainfall was about normal, but drought conditions persisted because of the rainfall deficit from the summer of 1992. Water supplies increased until 20 April 1993, but after this date, drought conditions returned. At the end of April, the soil moisture in the 0-20 cm layer was 10-25 mm, which is insufficient for normal emergence and growth of spring crops. The development of winter crops was also delayed. In some areas of the country, the available soil moisture in the top 1 mm was only 60-71% of the available capacity in April.

In May, rainfall was nearly normal and agrometeorological conditions were favorable across the country. However, national precipitation was 51% of the mean in June. Available soil moisture during June in the top 1 m was 37-70%, which was insufficient for normal growth of spring crops, fruit trees, and vegetables. The root zone of crops was very dry. In addition, the last ten days of June were characterized by abnormally high air temperatures. The drought conditions persisted and worsened in July; monthly precipitation was 27% of the mean during this month (Figure 1). The upper layer (0-20 cm)

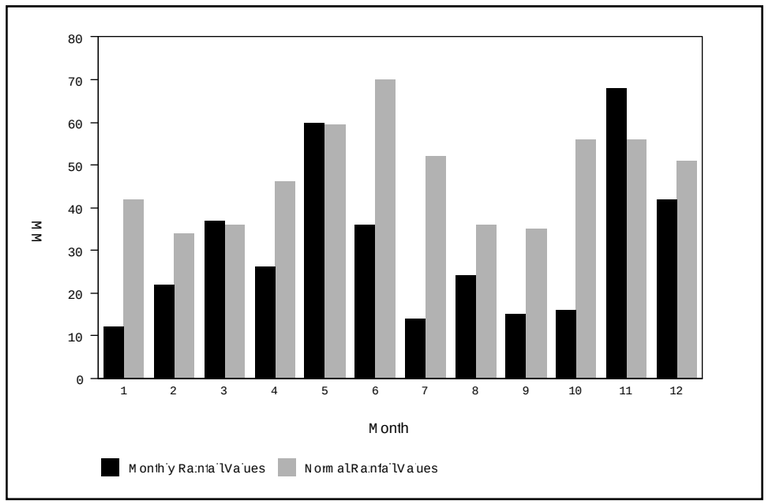

Figure 1. Monthly rainfall values in 1993 and their normal averages. Value for December is estimated.

Crops	Mean Yield 1989–92 [kg/ha]	Mean Yield 1993 [kg/ha]	Sowed Areas, 1993 [ha. 10^3]	Decrease in Yield [t. 10^3]	Decrease in Total Production [t. 10^3]	Loss [USD, 10^6]
Wheat	4050	2870	1266	1494	747	72.3
Barley	3800	2650	361	415	207	16.7
Corn	3700	2270	370	529	958	102.2
Sunflower	1580	940	403	258	116	14.6
Sugar Beets	21170	11000	10	104	42	0.6
Cotton	960	740	7	16	6	18
Tobacco	1240	1130	32	35	12	21.7
Fruits						9.7
Wine Grapes	4600	3500	105	116	29	2.8
Dessert Grapes	5200	4520	12	8	2	0.3
Total						258.9

Table 1. Crop losses caused by drought in Bulgaria, 1993.

contained little or no soil moisture, and available soil moisture in the top 1 m was 35-50% of the available capacity. Crop growth was poor; winter crops were harvested, but the corn crop did not begin tassel initiation, and corn dried or remained undersized. Sunflower anthesis extended too long without insemination. Root crops like sugar beets had slow biomass formation, bean crops dried without pod formation, and grapefruit remained small. The drought expanded in August, with continuous rainfall deficits and high air temperatures, which slowed the growth of most crops. Below-normal precipitation during this month led to untimely maturity of spring crops and lower yields. Much of the corn for grain production was used for silage. Available soil moisture in the top 1 m was 30-45% of the available capacity. Most of the soil moisture was depleted from the surface soil layer (0-20 cm). Drought conditions persisted during September and October, with national rainfall 43% and 29%, respectively, of the mean. Available soil moisture in the top 1 m was 40-60% of the available capacity during these two months, which was insufficient for normal germination and emergence of the sowed winter crops in October.

The summer drought of 1993 adversely affected Bulgaria's agricultural sector. Crop losses caused by drought in Bulgaria are presented in Table 1 (National Statistical Institute, Sofia). Fortunately, November rainfall was above normal—120% of the mean—and forecasts for precipitation in December 1993 were relatively favorable.

This article appeared in the February 1994 issue of ***Drought Network News****.*