

DROUGHT MONITORING ACTIVITIES: CASE STUDIES

Extract from WMO publication, 'Drought Monitoring and Early Warning: concepts, progress and future challenges', (WMO-No. 1006).

<http://www.wamis.org/agm/pubs/brochures/WMO1006e.pdf>

PORTUGAL

The Palmer Drought Severity Index is used to characterize drought in Portugal. This index has been adapted and calibrated to the specific climatic conditions of mainland Portugal. The PDSI performs a parameterized computation of

estimated soil moisture content with its climatological mean.

Evolving drought patterns are presented in monthly PDSI maps that show the spatial distribution of drought in Portugal. These maps are used to monitor spatial and temporal

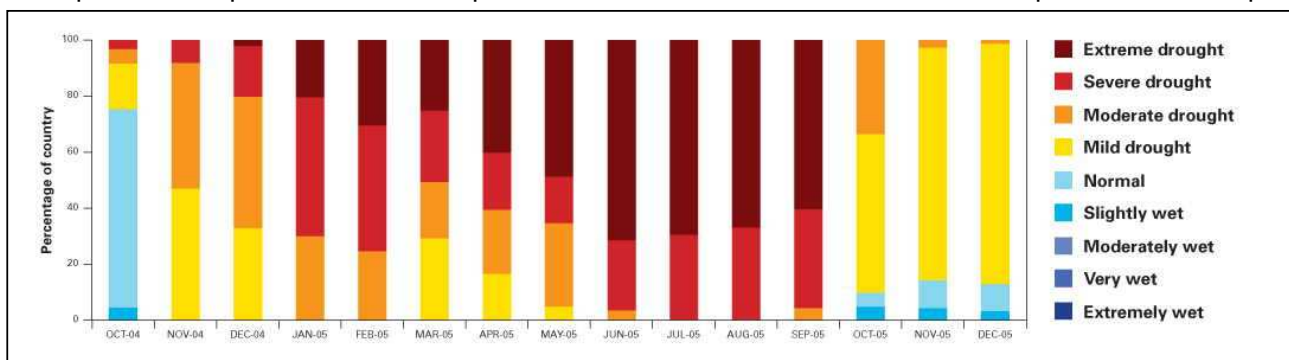


Figure 16. percentage of Portugal affected by drought, October 2004 to December 2005. Source: institution de Meteorologia, Portugal)

Palmer Drought Severity Index (PDSI)	Area affected by drought in 2004–2005 (per cent)														
	2004			2005											
	31 Oct	30 Nov	31 Dec	31 Jan	28 Feb	31 March	30 April	31 May	30 June	31 July	31 Aug	30 Sept	31 Oct	30 Nov	31 Dec
Moderately wet	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slightly wet	47	0	0	0	0	0	0	0	0	0	0	0	6	5	5
Normal	22	1	0	0	0	0	0	0	0	0	0	0	6	12	11
Mild drought	20	47	30	0	0	26	15	4	0	0	0	0	52	81	83
Moderate drought	5	47	48	25	23	22	22	28	3	0	0	3	36	2	1
Severe drought	1	5	20	53	44	28	20	20	33	27	29	36	0	0	0
Extreme drought	0	0	2	22	33	24	43	48	64	73	71	61	0	0	0

Table 1. ercentage of mainland Portugal affected by drought in 2004 and 2005. (Source: Instituto de Meteorologia, .Portugal)

the soil water balance and compares the variations in drought across mainland Portugal,

which is helpful in delineating potential disaster areas for agriculture and other sectors, allowing for improved on-farm decisions to reduce impacts.

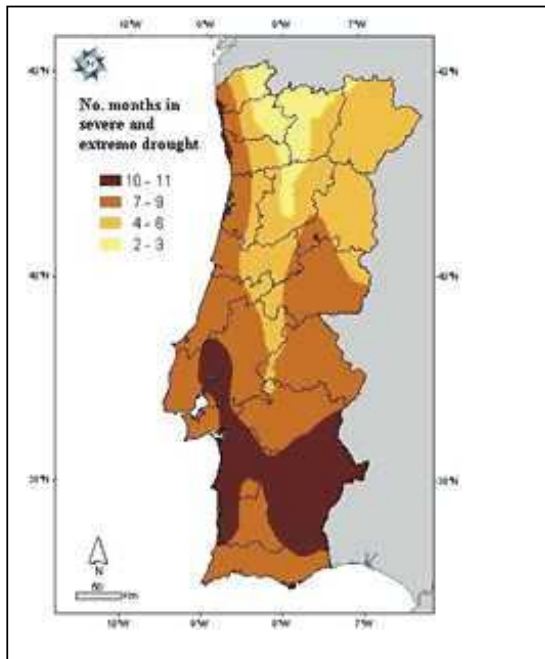


Figure 17. Spatial representation of consecutive months in severe and extreme drought situations in Portugal, October 2004 to September 2005. Source: Instituto de Meteorologia, Portugal)

The 2004–2005 hydrological year began with favourable amounts of precipitation in October, except in the southern region, where it was dry to normal. The months that followed were dry to extremely dry, resulting in the development of a very intense drought. Figure 16 and Table 1 show the monthly PDSI variations expressed as percentages of area affected in mainland Portugal. In addition, they

Period	Affected population	
	With supplemented water	With cuts/reduction in supply
1 st half April	14 175	213
1 st half May	8 395	2635
1 st half June	26 500	26 781
2 nd half June	23 440	25 217
1 st half July	26 004	26 350
2 nd half July	54 831	53 312
1 st half August	48 500	60 061
2 nd half August	94 372	100 500
1 st half September	73 097	66 127
2 nd half September	69 588	39 429
2 nd half October	48 883	30 083
2 nd half November	11 921	13 354
2 nd half December	10 238	13 445
Maximum	94 372	100 500

Table 2. Number of people affected directly or indirectly by drought in Portugal, 2005. Source: Instituto de Meteorologia, Portugal)

March because of the occurrence of precipitation in the country's northern and inner regions. During June, July and August, the drought situation worsened. These months normally contribute, on average, only 6 per cent of the annual precipitation. Precipitation received during the first 15 days of September lessened the severity of drought in the northern and central regions.

Figure 17 shows the number of consecutive months in severe and extreme drought through

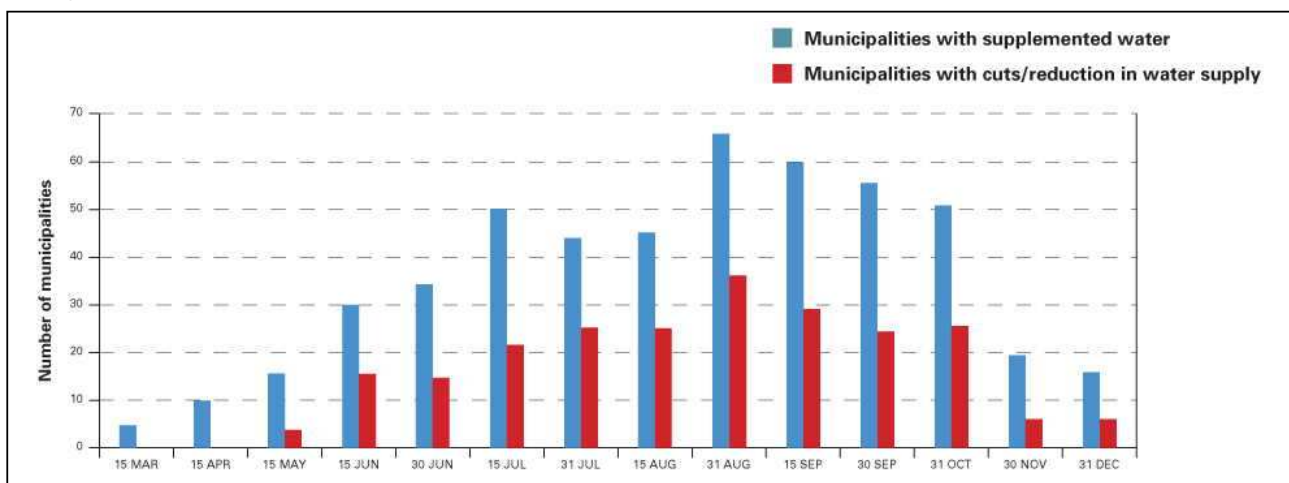


Figure 18. Number of municipalities with supplemented water (blue) or cuts/reduction in household supply (red). Source: Instituto de Meteorologia, Portugal)

reveal a deterioration of drought conditions during the winter months, with some attenuation in

the end of September 2005.

The impacts of the drought on agriculture, energy and urban water supply were significant. Figure 18 illustrates these impacts on the urban water supply. The number of people affected by drought from April to December 2005, as shown in Table 2, is also a good indicator of the widespread impacts associated with this drought event.