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The Climatic Impact of La Niña-related Droughts in Entre Rios (Argentina)

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The Climatic Impact of La Niña-related Droughts in Entre Rios (Argentina)

The National Institute of Tecnología Agropecuaria (INTA) at Paraná, Entre Rios (Argentina), has a farming experimental station (E.E.A.) located at 31.5°S and 60.31°W, 110m above sea level. A meteorological observatory has existed at the site since 1934.

The region has a temperate humid climate and receives an average annual rainfall total of 1,000 mm. Distribution is monsoonal, with October–April rains accounting for 73% of the annual total.

Since August 1998, the area has been affected by La Niña, and experts expected the conditions of the cold episode to persist into 2000. The La Niña event in the humid Pampean region of Argentina is associated with negative anomalies of winter temperatures and below-normal precipitation in the June–December period (Magrin, 1998). From August 1 to November 30, 1999 (122 days), the area recorded its lowest precipitation since 1934 (Figure 1; Table 1).

| Month | Decade | Precipitation (mm) | Percent of Normal |
|-----------|--------|--------------------|-------------------|
| August | 1 | 0.7 | 7 |
| | 2 | 0.0 | 0 |
| | 3 | 8.0 | 56 |
| September | 1 | 1.3 | 10 |
| | 2 | 0.0 | 0 |
| | 3 | 20.5 | 104 |
| October | 1 | 1.6 | 6 |
| | 2 | 7.6 | 24 |
| | 3 | 15.2 | 36 |
| November | 1 | 25.9 | 69 |
| | 2 | 0.9 | 3 |
| | 3 | 2.8 | 7 |
| Total | | 84.5 | 29 |

Table 1. Ten-day precipitation totals for August–November 1999 and percent of normal, E.E.A. Paraná.

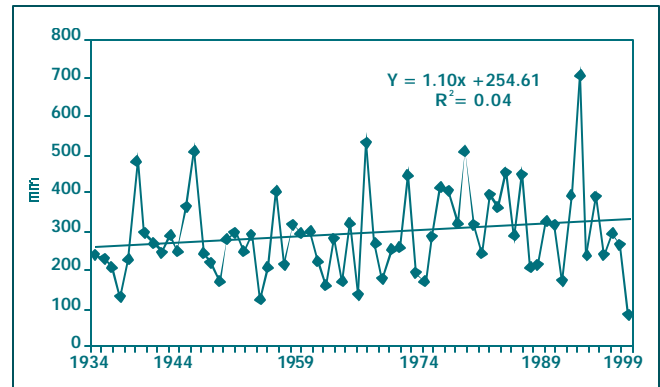


Figure 1. Cumulative rainfall, August–November 1934–99, for E.E.A. Paraná.

In this region, given the great variability of rain, it is essential to use an index to appreciate the degree of normality or abnormality of precipitation. A precipitation index (Xavier and Xavier, 1987) was used to allow comparison of precipitation data for 1934–99 to normal precipitation. The Precipitation Index (PI) allows rain to be classified in humidity or drought degrees according to scales from 0 to 1. Figure 2 shows that for 10 of the 66 years of this period, the PI of August to November was “very dry.” The 10 years were 1937, 1949, 1954, 1962, 1966, 1969, 1974, 1991, and 1999.

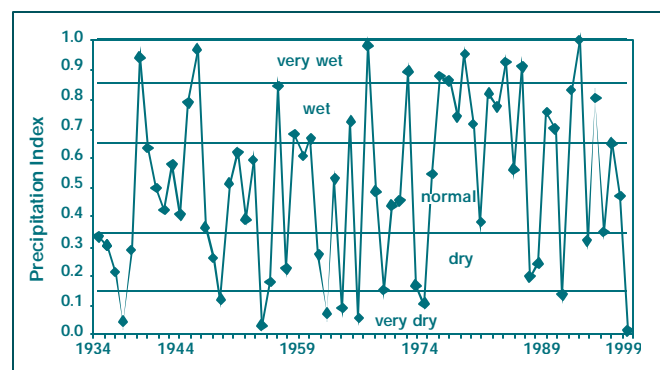


Figure 2. Cumulative precipitation index, August–November 1934–99, for E.E.A. Paraná.

| Index | No. of Events | Percent of Total |
|--------------|----------------------|-------------------------|
| Very dry | 5 | 31 |
| Dry | 4 | 25 |
| Normal | 5 | 31 |
| Wet | 0 | 0 |
| Very wet | 2 | 13 |
| Totals | 16 | |

Table 2. Classification of August–November precipitation.

The values of the PI for 1999 indicate severely dry conditions. From 1934 to 1999, sixteen La Niña events were registered; the classification of precipitation for August–November of those years is shown in Table 2. “Very dry” and “dry” events account for 56% of these years, confirming the assertions of Magrin (1998).

The current serious situation has affected and continues to affect the culture of winter crops such as wheat and linen and the seeding and development of summer crops (sunflowers, corn, and soybeans) and pasture. Because of this situation, the Provincial Government declared a state of farming

emergency and/or disaster from November 1, 1999, to February 28, 2000, noting that 50% of farm production had been affected by the intense drought and frosts.

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