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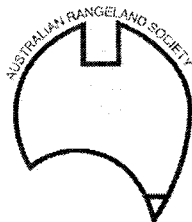
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VARIABILITY OF CLIMATE IN RANGELAND ENVIRONMENTS

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INTRODUCTION

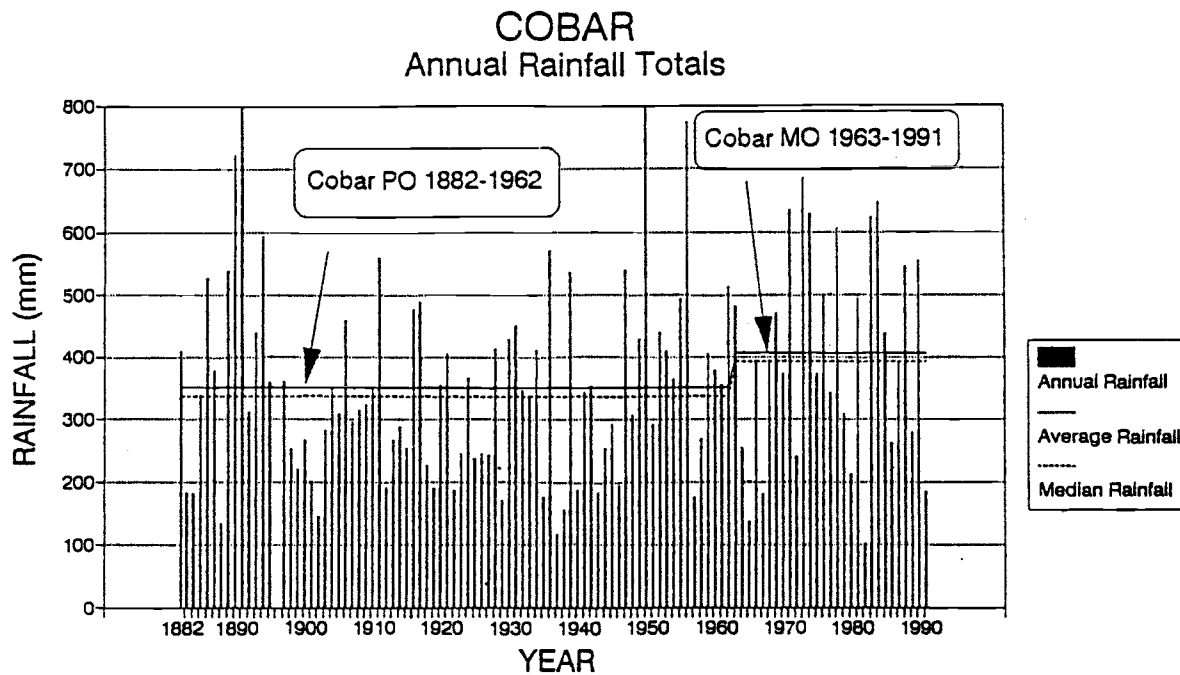
Recent emphasis in the community and the press has been on human-induced long term climate change. Much effort has therefore been expended in determining existing evidence of climate change. However, any observed climate trends need to be treated with great caution as they may well reflect changes due to natural climate variability rather than man-made climate change. Moreover, climate variability will have a much greater effect on the year to year operation and planning of rangeland agriculture. The variability of climate is a critical feature of rangeland and arid areas. This poster presentation aims to show some of the ways that variability data can be used to give useful climate information for planning purposes.

Rainfall Variability

A simple way to assess rainfall variability is through a visual assessment of the annual rainfall plots. Figure 1 shows the annual rainfall totals for Cobar for all years of available data. The data used is combined data for Cobar Post Office and Cobar Meteorological Office, since the Post Office ceased as an observing site in 1962. Variability is clearly illustrated. The lowest two recorded rainfalls were 101mm in 1982 and 116mm in 1937; the highest totals were 800mm in 1891 and 798mm in 1949. (1896 data is missing).

Simple inspection also reveals "wetter" and "drier" periods. For example, although 1963-1991 at Cobar MO shows higher average (407mm) and median rainfall (391mm) than Cobar PO for the 1882 to 1962 period, (351 and 347mm respectively), Cobar PO would have had an average rainfall of 422mm and a median of 415 for the 1882 to 1895 period.

Figure 1.

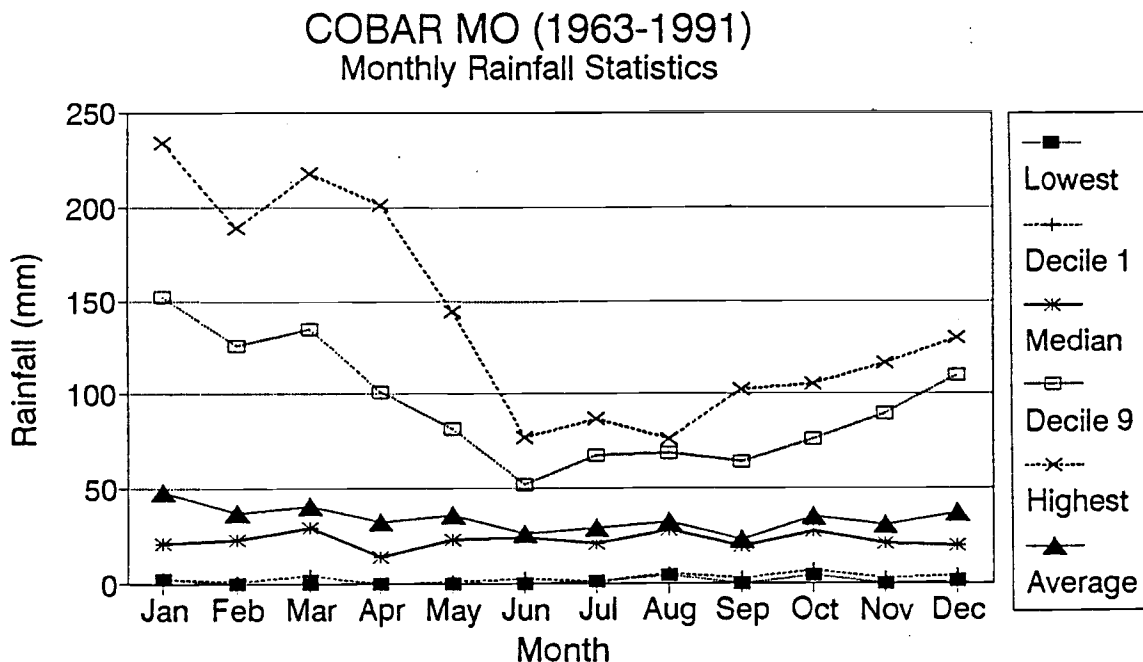


Restrictions of "Average" Statistics

Statistics which give an indication of the mean or "normal" values, such as the average or median are only useful when there are small variations about these values. When there are large fluctuations, as may be expected in the climate of rangeland areas, it becomes necessary to consult measures of this spread. The standard deviation is a useful measure of spread for normally distributed variables. However, rainfall is not distributed normally. Averages tend to be influenced by a few years of extremely high rainfall. The best indication of rainfall variability is gained through looking at rainfall deciles. These can be used graphically to give some very useful information.

For example Fig. 2 shows that Cobar, although it has little seasonal variation in its average or median rainfall, has considerable seasonal variation in the monthly variability, with the winter rainfall being the least variable.

Figure 2.



Rainfall Deciles are available for Bureau of Meteorology rainfall stations and are calculated for standard periods ranging from one to twelve months. This means it is possible to obtain decile information for any desired growing period - for example five months starting May - in order to obtain an estimate of the likelihood of occurrence of a desired rainfall. Complete decile information for one location is available on four photocopied pages for \$2 from your regional Meteorological Office. Alternatively, it can be provided on fiche or computer disk if the information is required for a large number of locations. District rainfall deciles are also available.

Variability Index: This is calculated from the 9th, 5th and 1st decile (or 90th, 50th and 10th percentile). It may be calculated by subtracting the first decile from the ninth decile and dividing the result by the fifth decile. A plot of this index for an annual Australia wide basis is shown in Figure 3. It is a useful index for comparisons between locations.

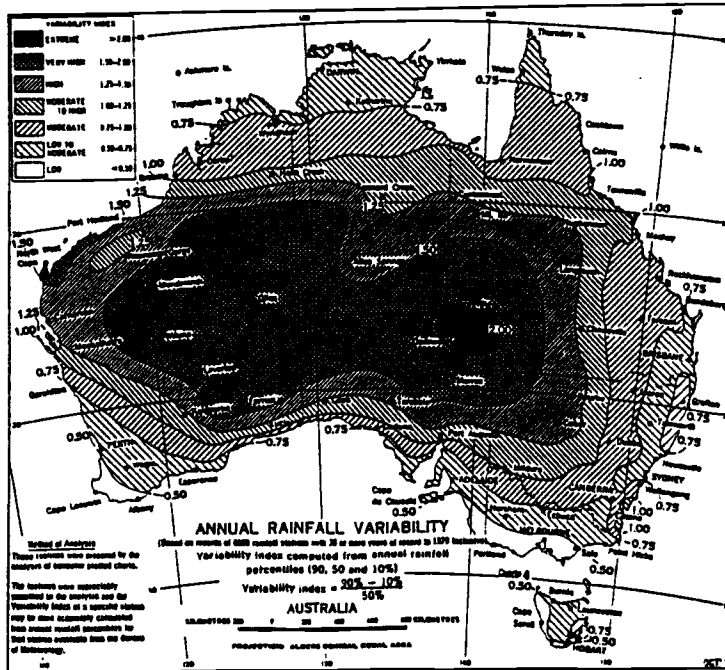


Figure 3

REFERENCES

Bureau of Meteorology, "Climate of Australia" Aust Govt Publishing Service, 1989.

Lee D.M and Gaffney D.O., "District Rainfall Deciles - Australia", Bureau of Meteorology, AGPS, 1986.