RANKING PERFORMANCE OF SEASONAL RAINFALL IN WINDHOEK AREA SINCE RECORDS BEGAN IN ABOUT 1892

(Sepiso Mwangala, February 1999)

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Abstract

Rainfall climatology has two major extremes, namely droughts and floods. While other climatic extremes such as those of temperature are also significant, it is the rainfall extremes that by far impact most adversely on society. Droughts often cause crop failures with the resultant mass famines and population displacements. On the other end of the scale, floods also destroy crops, cause population displacements and other forms of social dislocations, including loss of life and property. For these and other reasons, studies of rainfall characteristics, including extremes are always of great interest in climatology.

The rainfall analysis in this paper uses the simple empirical methodology of rainfall deciles and is particularly concerned with quantification of the likelihood of a dry (or drought) year in the Windhoek area, both conditionally and unconditionally. Monthly and Annual Rainfall Percentile tables for Namibia have routinely been constructed in the course of building up the National Meteorological data bank. By definition, the kth percentile value is that value whose position in the ascending ordered series is at position number k(n+1)/100. If the position number is not a whole number, an appropriate interpolation is made. The upper limits for deciles 1,2,3,…,10 are the 10th, 20th, 30th …, record highest value which can be easily read from the Percentile Table.

It is evident that rainfall in Windhoek like elsewhere in Namibia is highly variable from year to year. Even during the peak rainy season months of December to March, the variability (standard deviation expressed as a percentage of the mean) remains quite high at over 65%. The results show that the unconditional probability of drought in any given year is about 30% while that of a wet year is slightly higher at about 40%. Runs of dry and wet years are not suggestively strong. The conditional probability of having a dry year given that the preceding year was also dry is about 34% which is roughly the same as that of having a wet year given that the preceding year was also wet (33%). On the other hand, the conditional probability of having a wet year given that the preceding year was dry is about 53% which is markedly higher than that of having a dry year given that the preceding year was wet (29%).

With 5 clear drought years each, the current decade (1991-2000) and the preceding decade (1981-1990) have exhibited the highest frequencies of drought in the Windhoek area. The seventies, besides the drought of 1972/73, were clearly the wettest decade with seven of the years registering well above normal rainfall.

Although the analysis is based on ‘whole season’ rainfall series which do not explicitly tell the whole story on intra-seasonal distribution, the results are sufficiently useful on their own. Indeed a season ranked at 1 or 2 on a performance scale of 1 to 10 is more likely to be a very poor performer than not.