

REGIONALISATION OF KARNATAKA ON THE BASIS OF RAINFALL: A PRELIMINARY STUDY

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ABSTRACT: Monthly rainfall data of 140 taluk raingauge stations in Karnataka was collected for the period 1900 - 1978. The rainfall totals of each raingauge station for all the four south west monsoon months which coincide with the main cropping season in the state were calculated. The percentage deviation of the seasonal rainfall of each year from its averages were calculated. On the basis of these deviations, the seasonal rainfall totals were classified into four categories ie. i)heavy ii)marginally excess iii)marginally deficit and iv)deficit. The boundaries of different rainfall regions were defined by comparing each seasonal total of a station with that of Mercara (a high rainfall station located on the western ghats of Karnataka), Bijapur (a low rainfall station located in the arid zone of the State) and Tumkur (a low rainfall station located in southern parts of Karnataka). Based on the above comparison, Karnataka State was divided into three rainfall regions namely wet zone, Northern dry zone and southern dry zone.

INTRODUCTION

Identification and delimitation of areas which have similar seasonal rainfall occurrences as well as fluctuations help to evaluate the agricultural potential of an area and to evolve suitable agricultural technology for the ultimate purpose of increasing agricultural production. Also, such studies are useful for planned plant introduction. Consequently, of late, increasing use of climatic data is being made in agricultural research.

In order to identify the homoclimates, a number of climatic classifications have been proposed (Koeppen—1936, Thornthwaite—1948, Papadakis—1966, Fitzpatrick and Nix—1970, McBoyle—1971, Dyer—1975, Russel and Moore—1976). The pattern analysis was adopted by Edwards and Johnson (1978) for their studies on the agricultural Climatology

of the upper Murrumbidgee River Valley, New South Wales. Subsequently, Edwards (1979) using the same technique studied the rainfall in New South Wales. The principal component analysis was used by Gadgil and Joshi (1980) for classifying the 145 rainfall stations in the Indian Region. Similar analysis was done for fiftythree rainfall stations of the Indian Peninsula by Gadgil and Iyyanagar (1980).

In the present study, the seasonal rainfall totals are compared by employing the method adopted by Gregory (1954) for broadly identifying the different rainfall regions. However, for a more rigorous classification, we have to consider the amplitude of the seasonal rainfall and distribution pattern. Also we have to adopt either the cluster analysis (Gadgil and Iyyanagar - 1980) or pattern analysis (Russel - 1978).

METHODOLOGY

Monthly rainfall data of 140 taluk raingauge stations in Karnataka was collected for the period 1900 - 1978. The rainfall totals of each raingauge station for all the four south-west monsoon months which coincide with the main cropping season in the state were calculated. The percentage deviations of the seasonal rainfall of each year from its average were also calculated on the basis of which the seasonal rainfall totals are classified into four categories—i.e., (i) heavy, (ii) marginally excess, (iii) marginally deficit and (iv) deficit. Seasonal rainfall is considered to be 'heavy' if it exceeds the average by 25 per cent, 'deficit' if it is short by 25 per cent or more of the average, 'marginally excess' if it exceeds by 11 to 25 per cent of the average and 'marginally deficit' if it is less than 11 to 25 per cent of the average. The boundaries of different rainfall regions are defined by adopting the following procedure for each station to indicate years of excess rainfall (black squares), marginally excess (squares with diagonal shading), marginally deficit (blank squares), deficit (empty

circles). Years during which the seasonal rainfall deviation is less than or equal to 10 per cent of the average are left blank in the diagram. In order to facilitate easy comparison and grouping of raingauge stations, all those marginally deficit years (blank squares) and marginally excess years (diagonally shaded squares) are considered as transitional. Then the seasonal rainfall of each year of each raingauge station under consideration is compared with that of the corresponding rainfall of Mercara. Mercara is selected for comparison because it is situated on the crest of the Western Ghats exposing itself well to the southwest monsoon current. Also, it is located in the heavy rainfall area of the State. If during any one year the southwest monsoon rainfall of Mercara is heavy and the seasonal rainfall of the corresponding year of a particular place is marginally excess (transitional), then the record for that year is taken as almost similar for the stations. Similarly, if Mercara records the average rainfall and the station under comparison records marginally deficit (transitional), then the record for

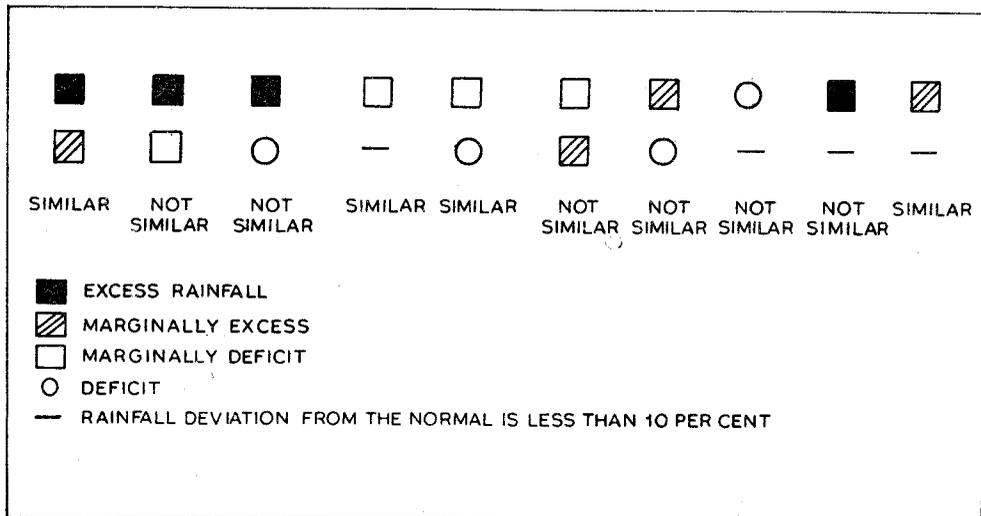


Fig. 1: Scheme for comparing different rainfall categories.

that year is taken as similar for both the places. On the other hand, when transitional values occur at a place without the occurrence of

heavy or deficit values at Mercara, the rainfall is considered as not similar for that year.

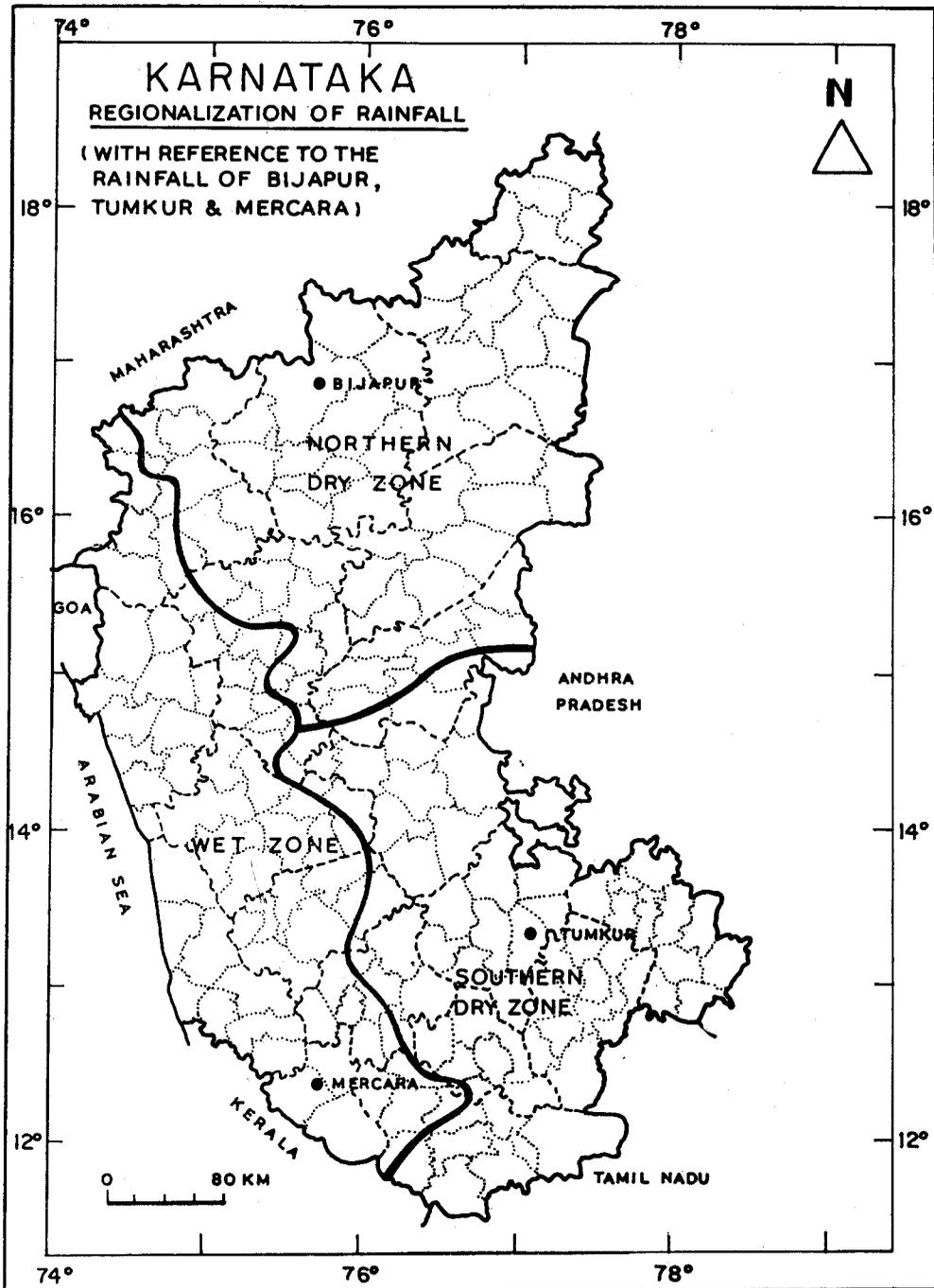


Fig. 2

The above criteria which was adopted for comparison is shown diagrammatically in Fig.1. After comparison, if a place is found to receive in 50 per cent or more of the years during which the seasonal rainfall is similar to that of Mercara, then both the places are considered to belong to the same rainfall region. Adopting this procedure, the southwest monsoon rainfall recorded at about 140 taluk stations was compared with that of Mercara and grouped into one region called 'wet zone'. Places which do not fall within this region are compared with the seasonal rainfall of Bijapur which is a contrasting station since it is located in the arid zone of Karnataka and is frequently visited by droughts. Obviously, for this reason it is selected for comparison; and those places whose seasonal rainfall has similarity in their occurrence with that of Bijapur are grouped into a zone, known as 'Northern Dry Zone'. Places which do not fall within these two regions are again compared with the seasonal rainfall of Tumkur which lies on the borders of the arid and semi-arid zones of the south Maidan area of Karnataka, and these places constitute the 'Southern Dry Zone'. The bounda-

ries of the wet, northern and southern dry zones are shown in Fig. 2.

DISCUSSION

The rainfall zones which are shown in the map are almost identical with the geographical regions. The boundary of the wet zone covers North Kanara, South Kanara, Shimoga and Mysore Districts, and Western Parts of Belgaum, Dharwar and Chickmagalur districts. The dry zone is mainly confined to the Maidan area of the State. The low rainfall of this region is due to the rainshadow effect of the Western Ghats and is often visited by droughts of varying duration and intensity. Based on the occurrence of seasonal rainfall, the dry zone is further sub divided into two viz., the northern dry zone and the southern dry zone. The northern dry zone compares Bidar, Gulbarga, Bijapur, Raichur, Bellary districts and the eastern taluks of Belgaum and Dharwar districts. The southern dry zone consists of Chitradurga, Tumkur, Bangalore; Kolar, Mandya districts and the eastern taluks of Hassan and Mysore districts.

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