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Short Communication

Comparison between two methods of estimating crop growing periods

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In arid and semi-arid regions availability of water with regard to quantity and timing is the most important factor controlling crop production. Availability of water to crops depends apart from rainfall on factors such as potential evapotranspiration and water holding capacity of the soil. Cocheme and Franquin (1967) devised a simple procedure for evaluating water availability periods in semi-arid areas in Africa. Bastos (1986) has used this procedure for an agroclimatic study of Paraiba state. Recently the method is used for evaluating crop growing season in semi-arid areas in northeast Brazil. Temperature and rainfall data at stations in paraiba state is used in this study.

Twenty five years of rainfall and temperature data of 4 stations (Sao Goncalo, C. Grande, Catole do Rocha and Umbuzeiro) of Paraiba state, Brazil were used to determine the crop growing periods using Cocheme and Franquin (1967) and Robertson (1989) approaches. According to Cocheme and Franquin method, the periods are classified as humid, moist and intermediate by comparing rainfall and potential evapotranspiration. Robertson (1989) approach is based on soil moisture storage and its probability. Crop growth periods on decadal (10 days) basis are considered as good period if there are atleast five wet days (days with soil moisture more than 50% of field capacity). In the present study daily soil moisture storage was computed following Thornthwaite and Mather (1957) water budget procedure. Ten days mean (decadal) were calculated. A first order Markov chain model was applied to the daily soil moisture data and probabilities of occurrence of at least five wet days (days with soil moisture content more than 50% of the field capacity) in each decade of the year were computed. Soil moisture averages and probabilities were used to evalute crop growing season at the stations.

The results revealed that as per Cocheme and Franquin approach at Sao Goncalo station, the humid period extended from 31st January to 30th April during which time rainfall was more than PE. The moist period starts on 8th January and lasted till 20th May. Accordingly the pre and post humid intermediate periods lie between 8th January and 31st January and 30th April and 20th May respectively.

As per Robertson (1989) approach the crop growing period analysis at Sao Goncalo revealed that the seedbed moisture content was more than half the water holding capacity for the decades 4 to 19. The probability of five wet days succeeding a wet day was the highest for the second decade of February and for this decade there was about 90% probability of at least one wet day. For FC150 mean soil moisture content was more than 75 mm during the decades 3 to

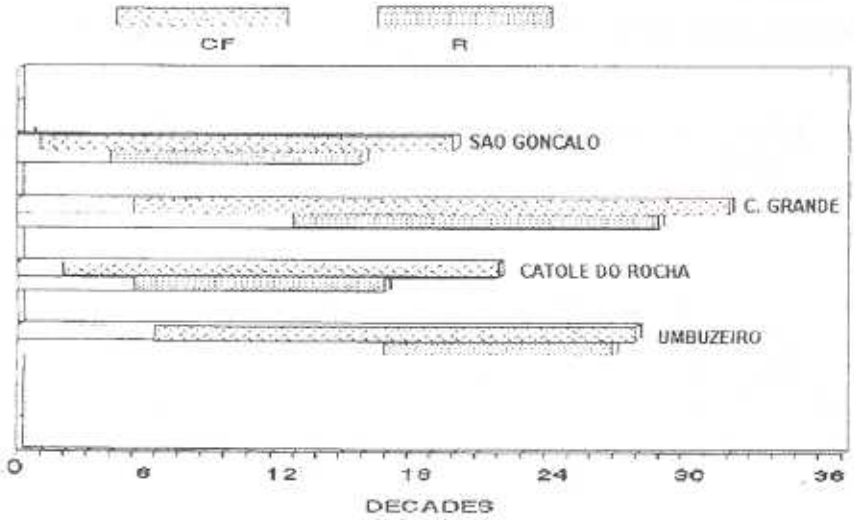

Fig. 1 : Growing periods according to Cocheme and Franquin (CF) and Robertson (R) methods.

16. The probability of at least five wet days in a decade P(5W) was more than 70% during the period 5-15 decades. These features suggested that at Sao Goncalo the crop growing season was 10th February to 31st May and it was between 8th January and 5th July according to Cocheme and Franquin procedure. Similer results were obtained at all the stations (Fig. 1) this revealed that Cocheme and Franquin method estimated growing period much longer than that estimated by Robertson method at all the four stations studied.

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