

## MARKOV CHAIN MODEL FOR PLANNING AGRICULTURAL OPERATIONS IN RUBBER : A CASE STUDY

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Markov chain model was fitted to thirty years' daily rainfall data of the Rubber Research Institute of India for the period 1965-1994. The model provides information on pattern of occurrence of wet and dry spells. The expected length of wet or dry spells can be used to plan agricultural operations during various phases of the crop growth. The analysis of occurrence of rainfall by Markov chain Model totalling 10, 20, 30, 40 and 50 mm at weekly intervals is presented. The dependable rainfall at 75 and 90 per cent probability levels worked out using incomplete gamma probability estimates are also presented.

**Key words :** Climatic model, Hazeu, Markov chain model, Rainfall probability, Rubber.

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### INTRODUCTION

Rubber (*Hevea brasiliensis*) is grown mainly as a rainfed crop and as such scheduling many of the agricultural operations revolves around the chances of receiving sufficient amount of rainfall. A comprehensive idea regarding the probability of rainfall, therefore, is essential because agronomic management of the crop has economic implications if weather sensitive operations are not carried out on time (Virmani *et al.*, 1982).

Rainfall distribution is basically a sequence of dry and wet spells during the rainy season. If these spells are well characterised a fair idea of the length of growing season can be determined which gives an indication of the crop cultivars suitable for the area. A stochastic model, particularly a Markov chain model, has

been observed to be suitable for such an estimation and can be used to the pattern of occurrence of dry/wet spells. The expected length of wet and dry spells can be determined for the various phases of growth and development of rubber plants. Such information can be successfully used for planning agricultural operations.

A Markov chain model which gives the basic probable representation for the rainy spells and their distribution, makes it possible to derive pattern of rainfall occurrence (Biswas and Khambete 1978). Use of initial and conditional rainfall probabilities for obtaining agronomically relevant information can also be extracted (Virmani *et al.*, 1982). Subramaniam and Rao (1986) computed the onset and end of rainy season and sequence of dry and wet spells by Markov chain models. Sarkar and Subramaniam (1995) applied a first order Markov chain