

Title: Effects of Climate Change on Rubber Plantations in Sri Lanka

Research Institute: Rubber Research Institute of Sri Lanka

Period of contract: 01st June to 30th November 2001

Scientific background and scope/objectives of the study:

This study was focused on finding any changes in the rainfall; temporal and seasonal together with other important meteorological factors, in major rubber growing areas. Special focus was made on finding the risks of dry spells, onset and cease of rains in a rainy season and to relate them with management practices in rubber plantations to suggest a crop calendar with possible improvements.

Experimental method:

Daily data on rainfall in 15 stations covering the rubber growing areas of Sri Lanka were collected from the Meteorological Department. The time frame covered was 1941 to 2000. Data on other meteorological factors were also collected from 6 AGROMET stations

The statistical methods involved in analyses were;

- Descriptive analyses consisting of; computation of average, minimum, maximum, coefficient of variation (CV%) and quartiles for yearly and monthly data
- Time series techniques to identify any trends, seasonal effects or cycles for yearly and monthly data,
- Probability analyses *viz.* incidence of a wet week, a wet week after a wet week (W/W) for weekly rainfall totals; 20 mm, 30 mm, 40 mm and 50 mm,
- Regression analysis to identify the significance of the trend in yearly and monthly data, and

- Identification of start and end dates for the 2 major rainy seasons.

Results obtained:

Long term annual rainfall values showed significant declining trends in Peradeniya, Aranayake, Matara, Nalanda, Ambanpitiya, Galle, Avissawella Matale and Okkampitiya. Random fluctuations were observed in Agalawatta, Badulla, Kalutara, Ratnapura, Kurunegala and Hanwella with no significant trends. Analysis of annual rainfall under different scenarios suggested that during the period 1981 to 2000, majority of the locations indicated negative deviations indicating decreased rainfall during this period. Significant declining trends were observed in March for Avissawella, Agalawatta, Ratnapura, Galle, Ambanpitiya, Aranayake and Matale. Declining behaviour in Rainfall was observed for December in Ambanpitiya, Aranayake, Peradeniya, Nalanda and Kurunegala. No significant trends were identified in Hanwella, Kalutara and Badulla for any of the months. Although, significant declining trends were observed, the magnitude was small.

At Avissawella after 1994, a late start and an early end was observed for the 1st rain spell. In the Ambanpitiya area, the start of the first rain spell was found to be fairly late during the last 4 years. Moreover, the length of the first spell seemed to be narrowing towards the year 2000. Any marked shift was not identified in other locations.

Conclusions:

Any marked variations were not observed for rainfall in rubber growing areas. However, it is important to note any departures from the normal

trend as these will be useful to find out adaptation measures with respect to the productivity of a certain crop.

Based on probabilities associated with wet weeks and dry spells, this study identified suitable periods for different farming operations; namely, clearing, holing, planting, fertilizer application, disease control and other operations such as; rain guarding in rubber plantations located in different agro-ecological regions in Sri Lanka.