B-129: Effect of precipitation deficit on tea production in Sri Lanka

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Tea being a plantation crop, the bush productivity of tea is greatly affected by the weather conditions, mainly rainfall. Drought is a serious environmental problem faced by the tea industry in Sri Lanka, as it inflicts irreparable losses in the form of loss of yield and death of bushes. For example, the decline in the national tea production in 1992 dry spell was about 19% compared to the previous year which deprived the country of about Rs 3 billion foreign exchange. In this study the relationships between the rainfall deficits and yield losses in different tea growing regions in Sri Lanka are presented.

The monthly rainfall data for the period 1976 to 1995 were collected from 7 Agro-meteorological stations: TRI Talawakelle, Bandarawela and Seetha Eliya representing the high grown region; TRI Hantana and Gannoruwa representing the mid grown region; and TRI Rattnapura and TRI Kottawa representing the low grown region. As the minimum monthly rainfall requirement to achieve the potential yield is around 100 mm, the present study was concentrated on those months with less than 100 mm rainfall during the 20 year period. The monthly rainfall deficit was calculated by obtaining the difference between the rainfall received and the minimum rainfall requirement of 100 mm. The loss of yield for those months having less than 100 mm rainfall was also calculated as a percentage of the monthly average yield over the yield of the balance period. The regression was done to establish the relationship between monthly rainfall deficit and percentage yield loss.

Significant positive correlation was seen in each of the 3 tea growing regions in Sri Lanka with $R^2 = 61.6\%$ ($p < 0.001$), $R^2 = 28.4\%$ ($p < 0.05$) and $R^2 = 40.1\%$ ($p < 0.01$) in low, mid and high grown tea areas, respectively. There is a linear yield decrease with increase in rainfall deficit (for Rf<100 mm). The losses in yield are 38.6%, 29.5% and 30.9% for low grown, mid grown and high grown tea areas, respectively.

Results indicate that the yield loss of tea during a dry month can be as high as 30-40%. The highest correlation obtained in low grown tea area indicates that the yield of low grown tea is greatly affected by dry spells compared to the mid- and high grown teas. The results of this study also emphasize the necessity to

adopt proper drought mitigation practices in tea lands particularly in the low grown tea areas to maintain productivity.