# Rainfall Probability analysis for Pelwatte Sugar Cane Plantation

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## Abstract

The production of sugar cane under rainfed condition is affected by the rainfall, being a chief limiting climatic factor at Pelwatte, Sri Lanka. This uncertain rainfall, in its length, quantity and distribution creates a moisture deficit at different stages of the sugar cane crop and ultimately results in a considerable loss in the cane yield. This can be overcome by selecting appropriate planting and harvesting dates to ensure the utility of every drop of incident rainfall that falls on land to its maximum. A study was undertaken to statistically analyze the available rainfall data of Pelwatte Sugar cane plantation using 1:1 rainfall confidence limits showed that seasonal cycles as most pertinent, break of seasons and torrential rains. The values of these confidence limits were used for selecting suitable planting and harvesting dates. A reliable choice of planting dates could be the early part of October for the *Maha* planted crop and early part of April for *Yala* planted crops. Harvesting of *Maha* crop could be done during the period of $24^{th}$ to $27^{th}$ week and then $31^{st}$ to $33^{rd}$ week of a year. The period in between $27^{th}$ week to $31^{st}$ week should be avoided in order to circumvent problems of experiencing unusual rains. Similarly *Yala* harvesting can be done during $5^{th}$ week to $9^{th}$ week of a year. A two parameter gamma probability model was fitted to the annual pattern of the catchment with a mean amount of 2.3 mm rainfall per rainy day and 0.5914 of shape factor. The observed and predicted results using the model showed a significant correlation ($r^2$ = 98.93). This correlation explains that the probability of occurrence of daily rainfall can be reliably modeled by using two parameter gamma probability density function. The modeling approach has considerable potential for comparing sites and classifying rainfall regimes, and a vital component of agricultural research and development.

**Key words**: Rainfall, Gamma distribution, Confidence limits, Sugar cane

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