A PRELIMINARY STUDY OF THE SPATIAL VARIATION OF RAINFALL AND ITS EFFECT ON WATER MANAGEMENT IN THE DRY ZONE

by

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ABSTRACT

Incorporating effective rainfall in irrigation water is an important task in water management. Understanding the climatic conditions is necessary to plan a raingauge network. The occurrence of thunderstorms is a main feature in the inter-monsoonal periods. These convective storms are often highly localized and usually tend to be less than 8 km in width. Thus a fairly dense network of raingauges is necessary to get an accurate representation of the rainfall during these periods. However, when the rainfall is widespread, the maintenance of such a dense raingauge network is not essential.

Paddy production in Sri Lanka is more influenced by rainfall in the Maha (October to February) season than in the Yala (May to August), as there is hardly any rain in the Yala season in most of the paddy growing areas. For the Maha crop, land preparation usually starts in October. About 28 percent of the annual rainfall occurs in October and November (second inter-monsoonal period) and is mostly of the convective type. With a proper understanding of the areal rainfall distribution during this period, conserving irrigation water is possible.

The use of isohyetal patterns, correlation coefficient vs. distance diagrams and correlation linkage diagrams could be used to assess an optimum spacing between the raingauges.

Using a triangular storm model, it can be shown that negative correlation values between pairs of raingauges, are due to smaller storm cells. Further, it can be shown when the storm width is approximately three times the width of the gauged area then no negative correlation can occur between the raingauges.

A square grid of raingauges at about 2 km intervals is necessary during the period of the convective storms while a 14 km grid is required for the widespread monsoonal storm period.

This study indicates an area where more research work is required for better water management and it is possible to achieve this within the normal level of management and would also yield considerable economic benefits.

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List of Symbols and Abbreviations

r	-	correlation coefficient
$\mathcal{E}$	-	summation
X,Y	-	precipitation observation series
N	-	number of observations
ρ (D)	-	inter-station correlation function
D	-	distance between raingauges
B	-	storm cell diameter
G_i	-	measuring gauge i
$g_i(t)$	-	rainfall amount produced by storm t
S_c	-	storm centre
h_a	-	rainfall amount produced at point 'a' of the storm
M_{in}	-	minimum value
Y_i	-	gauge axis
Z_i	-	area axis

TABLE OF CONTENTS