# ASSESSMENT OF RAINFALL EROSIVITY WITH REGARDS TO FLOOD OCCURRENCE

By

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#### ABSTRACT

In Malaysia, major flood events usually occur during the Northeast and Southeast Monsoon due to continuous heavy rainfall. It is known that the rainfall has a strong correlation with flood occurrences. However, there is no study has been done to correlate the rainfall erosivity and flood occurrences. Therefore in this research the correlation between rainfall erosivity and flood occurrences will be established. Thus, the idea of this research is to get the erosive properties of rainfall; which are the amount, duration, intensity, energy and the erosivity of the rainfall. In this present study, five rivers, which are Klang, Muda, Pahang, Setiu, and Segamat River were Historical rainfall data for three years (1997-1999) were recorded based selected. on the worst cases of historical flood occurrence among the five rivers. The rainfall data during the flood occurrence were obtained from the Department of Irrigation and Drainage. The method adopted in analysing the rainfall erosivity (RE) and rainfall energy is based on the R factor of the Universal Soil Loss Equation. It is expected that the higher rainfall intensity will lead to the higher rainfall erosivity and major flood occurrence. From the results, it has been found that the maximum of 30 minutes rainfall amount affected some result of the rainfall erosivity. A statistical analysis shows that there is a non-linear relationship between rainfall erosivity and rainfall intensity. Transformation of data was employed and positive linear relationship was established between the log erosivity and log intensity and a new equation was obtained linking rainfall erosivity and intensity which is Log RE = 1.172Log RI + 1.118. This equation, within limits can be used as an indicator to predict future flood occurrence with regards to its intensity and erosivity of rainfall for these five rivers.

# CHAPTER ONE INTRODUCTION

#### 1.1 Background of Study

Peninsular Malaysia receives rainfall from the northeast and southwest monsoon as well as conventional rain. Generally the northeast monsoon brings rain to the east coast and the southwest monsoon brings rain to the west coast. The distribution of rain reflects the relationship between seasonal winds and relief whereby Peninsular Rivers are subject to flooding caused by several winds and those on the east are due to the torrential nature of the rain during northeast monsoon.

The largest floods on record occurred in 1926 followed by recurrence of severe floods in 1931, 1947, 1954, 1957, 1967, 1971 and 1992. As much as 9% of the lands areas in Malaysia amounting to 29,000 sq. km are flood prone. The National Water Resource Study in 1982 conducted by Department of Irrigation and Drainage has estimated average annual flood damage at RM 100 Million (Department of Irrigation and Drainage, 2000). Large floods had damaged properties, public utilities, cultivation, and loss of lives and caused hindrance to social and economic activities.

In 1998, the phenomenon of 'La Nina' occurred around the world, which is the continuation of 'El Nino' impact that occurred the year before. The word 'La Nina' which originated from Spain, means a young girl according to the years of a baby girl birth. 'La Nina' occurred when there is a low temperature of the sea at the Peru's coastal area, which is located at the centre and '/<sub>4</sub> part of North East Pacific Ocean. As there was consequently, conspicuous drought occurred in South America, heavy rain in Indonesia and East of Australia. Research indicated that both phenomena of 'La Nina' and 'El Nino' would be recommend between 2 to 7 years. But, the effects of La Nina and El Nino to Malaysia are not very