CHAPTER 1

INTRODUCTION

1.1 Background of Study

The climate in Malaysia is known as tropical climate which is warm and wet throughout the years, as it is located at the centre of the equator. The average annual rainfall in Malaysia is more than 2500 mm with monthly variations for selected cities and towns (MSMA, 2000). With high annual rainfall rate and exposed to monsoon, Malaysia not only having high risk towards flood occurrence, but also environmental and financial problems as the after effect of the unfortunate event if proper management is not be taken in advance. In addition to the global climate change, the risk will significantly increase, so do the effect to the country.

The Klang Valley river basin is located to the west coast of Malaysian Peninsular and engulfs the federal territory of Kuala Lumpur and some parts of the state of Selangor. The Klang river, with 120 km length, originates from the Main Range (at an altitude of about 1330 m) and about 25 km to the north of Kuala Lumpur. This river finally pours into the sea at the Strait of Malacca. This river also flows through a region with a dense population. Eleven tributaries comprise the water of Klang River. Some of these tributaries are Ampang, Bunus, Damansara, Gombak, and Batu. Klang River's upper basin is a fairly mountainous with a steep slope.

Analysis of rainfall data strongly depends on its distribution pattern. Distribution of daily rainfall in Klang Valley in Selangor was selected because many flash flood events were occurred. It has long been a topic of interest in the fields of meteorology in establishing a probability distribution that provides a good fit to daily rainfall. Several studied in Malaysia and abroad on rainfall analysis and best fit

probability distribution function such as Normal, Log-normal, Gumbel, Weibull and Pearson Type distribution can be identified using statistical data that we collected.

Weather data are important in our daily life. The data collected such as rainfall and temperature can be used to serve as a precautionary measure to against natural calamity or disaster such as flood and drought. Besides that, it is important for others to plan the works. For example, in the construction industry, the weather data is important for a project manager to plan their schedule so that the project will complete on time. The weather data collected for a long period are used to predict the climate change in future trends. The weather data collected for the past decade can be used to analysis in order to identify the pattern of climate change.

According to Malaysia Meteorological Department (MetMalaysia, 2015) the rainfall distribution pattern in Malaysia can be determined by the seasonal wind flow patterns and local topographic features. Peninsular Malaysia was divided into 5 (five) rainfall regions with distinctive patterns of rainfall, namely North West Malaya, West Malaya, Port Dickson-Muar Coast, South West Malaya and East Malaya (Dale, 1959).

The climate of Peninsular Malaysia is described by three seasons, namely Southwest monsoon (SWM), Northeast monsoon (NEM) and Inter-monsoon. Usually, the wind over Pahang is generally light and variable, however, some uniform periodic changes in the wind flow patterns. This is because Pahang is mainly governed by the regime of northeast monsoon. During the northeast monsoon, the exposed areas on the eastern part of the Peninsula receive heavy rainfall. On the other hand, the areas which are sheltered by the mountain ranges (Titiwangsa Range) are more or less free from its influence (Jamaludin et al., 2010). Pahang River has received high total rainfall during northeast monsoon period with almost 40 per cent of total rainfall annually (JMM, 2010). The northeast monsoon has the greatest impact in characterizing rainfall patterns for Pahang. On the other hand, Malaysia also experienced numerous drought occurrences with the most significance one in the 1997/98 El Nino, which had an extensive impact on the environment and social activities across the whole nation (Jamaludin et al., 2010). Some regions of Malaysia were threatened by means of extensive wild forest fire on account of prolonged dry weather condition.

1.2 Problem Statement

In Malaysia, we faced a lot of flash flood event. Flash floods most often occur when the rains rapidly on saturated soil or dry soil. Soil moisture is considered to be the most important soil factor for rapid runoff and flash flooding, especially in humid areas with deep soils. If soil is saturated it will not permit additional rainfall to infiltrate, and all rainfall becomes runoff regardless of other environmental conditions. On the other hand, many flash floods occur in areas with sub-saturated soils. Dry soil has a specific rate at which it can absorb rainfall, called the infiltration capacity. If the rainfall rate exceeds the infiltration capacity, runoff will occur. This process, called infiltration excess overland flow, leads to rapid and efficient production of surface runoff even during dry conditions.

Klang River basin is the most developed region in Malaysia, especially, in the city of Kuala Lumpur. However, runoffs have become a serious problem in this region during the past decade. The floods occurred in early 21st century showed that the infrastructure, especially the channels, which were constructed in this region were not enough to cater for the flood flows. Figure 1.1 shows a flash flood occurs in major highways were inundated with floodwater and temporarily causing traffic congestions in Taman Sentosa, Klang.

The phenomenon of flooding becomes a problem and is of great concern when places important to humans are affected, or in other words, the hazard is the risk encountered in occupying a place subject to flash floods. The flash flood hazard comprises many aspects including structural and erosional damage, loss of life and property, contamination of food, water and other materials; disruption of socio-economic activity including transport and communications, and in some cases the spoiling of agricultural land. There have been various responses by the people affected by flash floods and the various authorities in the form of structural and non-structural adjustments and flood plain management, aimed at either minimizing or putting end to flood damage and flood loss. However, despite increasing flood control measures, the problems continue to increase as the areas subject to flooding expand. In Figure 1.2 it shows that a heavy downpour on Tuesday morning caused massive traffic delays along major roads in the road heading to the Subang Airport.