CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter briefly explains the background of the study, problem statement, the objective and scope of the study, expected outcome and the significance of this study.

1.2 Background

Water is essential for life. It plays an important role in supporting all human activities so that human beings need water. Its significance to the rapidly increasing number of the human population, especially in developing areas, is crucial. Planning of water resources in a catchment is an initial step to provide a platform and improvement of water resources continuing to meet the desires of water in the future. Poor management of water resources caused water availability fails to be fulfilled to the maximal level, especially during the dry season, or it may lead to the occurrence of the flood in that area. Therefore, a comprehensive approach for water resources requires management plans, especially in the management of catchment.

Catchment is the natural unit of land which water from direct precipitation, rainfall, and other storage collects in a channel and flows downhill to a common outlet at which the water enters another water body such as a stream, river, wetland, lake, or the ocean (Dilip G. Durbude & Sharma, 2001). In the context of any water resources development project, the information concerning the quantity of available water is very crucial. The characteristics of the river basin define the quantity of runoff from it. These characteristics include land use, soil type, and morphometric parameters.
By using available technologies, the characteristics of the catchment can be identified. Current research in past few years on catchment hydrology as well as practical management of water resources is based on catchment delineation for estimating runoff from rainfall and evaporation data. In earlier times, catchment delineation was mainly directed by the technique of hand delineation. Nowadays, there is an easier way to delineate catchment, which by computer modeling using GIS technique. The GIS has been widely used for catchment delineation and classifying river network. The delineation of watershed using GIS mainly based on Digital elevation model (DEM) data. Computer modeling provides many advantages compared to manual techniques. Development Geographical Information System (GIS) and Digital Elevation Models (DEM) enable to examine the phenomenon the natural surface of the earth through spatial modelling (Indharto, 2004). According to Cheng (2016), because of the capability of the GIS to handle a large amount of spatial and attribute data, it has become a critical tool in hydrological modeling. The derivation and aggregation of hydrologic parameters from different sources can be assisted by some of the GIS features.
1.3 Problem Statement

Malaysia experiences many major flood events in the past few years due to prolong rainfall occurrence. The flood occurrence has caused many negative impacts to the society such as properties loss and affecting the water quality. Due to the flood problem, the Malaysian government has spent a lot of money in the flood mitigation work to reduce the impact of the flood on the society. Flood occurrence is usually caused by the runoff of rainwater which occurs because of the rain volume exceeding the storage capacity in the natural and artificial storage. The process of rainfall-runoff will be influenced by terrain, geology, soil, area, slope, and plant-types (Chang, 2009).

Kuantan River basin has been subjected to the flood since past decades due to its tropical climatic condition. After three decades of a catastrophic flood in 1971, the year 2001/02 experienced havoc flood with the magnitude of 3.9 brought by continuous heavy rainfall during the northeast monsoon, which hit most of the part of Peninsular Malaysia. Pahang was inundated beneath water after nearby rivers overflowed affected 18,000 people and 22,940 square kilometers (EKA, 2002). Besides, right after 10 years, another worst flood circumstance in years 2011/12 has paralyzed Kuantan. Sudden flood due to nonstop massive rainfall affected almost 6,000 flood victims reportedly; several roads were seriously flooded, and hundreds of vehicles stuck in subsequent of the poor drainage system that cannot cater heavy rain (Kuala Lumpur Post, 2012). The unexpected massive flood, a moment ago in 2013 occurred due to prolonged heavy rainfall and land-use change really conveyed serious risk to society. Kuantan was rigorously distressed. Around 14,044 people evacuated and major damages occurred in terms of electricity, road's structure, structures, and belongings hence government suffered from the substantial financial cost for repairing flood damages (Jamaludin et al., 2013).