CHAPTER 3

METHODOLOGY

3.1 SITE DESCRIPTION

The area of study to determine the rainfall and runoff relationship using Hydrological Modelling System (HEC-HMS) is at Sg. Lemoi, Sg. Bertam and also Sg. Telum. These three rivers are located at CAMERON HIGHLAND which have an area of $712\text{km}^2$. The estimated terrain elevation above sea level of Sg. Lemoi is 164m. Rainfall and stream flow stations are at the selected places at these three rivers and the analysis will be done based on the data collected from these stations.
3.2 FLOW CHART OF METHODOLOGY

This flow chart shows the methodology used in this research as shown in Figure 3.1.

![Flowchart of the study](image)

Figure 3.1: Flowchart of the study
3.3 DATA COLLECTION

The data needed in doing this study will be the rainfall data and also the stream flow data at the study area. The data needed was taken from Jabatan Pengairan dan Saliran (JPS) from the year 1999 until 2014. For the rainfall data, in order to have the rainfall data and calibrate the model, suitable rainfall stations have been identified at the study area. The stations have the numbers which are 4414037, 4414038, and 4514032. As for the stream flow data, there is stream flow gauging station at Sg, Jelai in Kuala Medang that have a number of 4218416.

3.4 HEC-HMS

The Hydrological Modelling System is a software used to stimulate a rainfall and runoff model of the proposed area using the available rainfall runoff data and also the streamflow data. Hydrograph will be produced from the analysis of the model created. The methods to be used in the analysis of basin will be Transform Method (Clark Unit Hydrograph) and also SCS Unit Hydrograph method. Not only that, in the basin analysis, SCS Curve Number method also be used. Whereas for the river routing, Lag method will be used for the analysis. For the basin analysis, there will be two methods to be used because there will be a comparison between the results obtained between the two methods and the best method will be proposed.

Clark Unit Hydrograph

Clark Unit Hydrograph is one of the synthetic unit hydrograph and it is based on linear reservoir model. The parameters involved are the time of concentration which is the time of flow from the farthest point on the watershed to the outlet, storage time which is the storage constant with the linear reservoir model. The process of the Clark Unit hydrograph are as follow: