E1 – 17

Mathematical models for rainfall-runoff relationships

The determination of relationship between the rainfall over a catchment area and the resulting runoff is a fundamental problem for the hydrologists. Rainfall-Runoff relationships can be used to understand the catchment yields.

Long term records of runoff are needed for planning, designing and operation of reservoirs, river basin projects, irrigation, hydropower generation, flood control *etc.* Usually, there are plenty of rainfall records, but more elaborate and expensive runoff records are often limited and rarely available for a specific river under investigation in Sri Lanka as well as in the other countries. Therefore, estimation of the runoff from the observed rainfall is one of the primary challenges faced by hydrologists all over the world.

Here, we study the problems of finding Rainfall-Runoff Relationships and fitting suitable mathematical models of estimating runoff using available rainfall data. Rainfall-runoff relationships were studied for the following catchment areas:

Hanwella catchment in Kelani Ganga

Kataragama catchment in Menik Ganga

Tawalama catchment in Gin Ganga

Using monthly data, significant relationships were found for Hanwella catchment in Kelani Ganga and Tawalama catchment in Gin Ganga. Relationships were established using the regression analysis technique. An adequate relationship could not be found for Kataragama catchment in Menik Ganga. This is due to the fact that the rainfall-runoff relationship is weaker in the dry zone.