

Thesis title:

Use of Satellite-based Data and Real-time Rainfall data to improve Flood Predictions in the Lower Kelani River Basin

Abstract:

The downstream of the Kelani river with relatively flat terrain is extremely important as a region with high population density and semi/highly built-up areas including Colombo suburbs. However, this part of the basin is highly flood-prone and frequently affected due to the significant amount of rainfall received annually and its inherent drainage issues. Therefore, simulation of rainfall-runoff-inundation processes using hydrological modeling plays a vital role to develop an early warning flood system and mapping flood hazards. The traditional distributed models are unsuitable for modeling flash flood conditions in semi/highly urbanized catchments due to higher run time, no link to accommodate actual/real-time data, inaccuracies, and uncertainties as a result of not updating state variable data in real-time. The distributed hydraulic model with the capability of simulating rainfall-runoff inundation processes such as MIKE-SHE, LISFFLOOD, and Rainfall-Runoff-Inundation model are considered to be informative and effective models. Among these models, the RRI model has ability to simulate both rainfall-runoff and inundation simultaneously. A new distributed hydraulic model, Water and Energy Budget based Rainfall-Runoff-Inundation (WEB-RRI) model has recently been introduced by coupling SiB2 and RRI models to determine processes of water and energy budget, flood forecasting, and long term flood simulation.