

# Decision Making on Flood Risk in Small Ungauged Urban Basins

**N. K. Gunasekara**

Centre for Disaster Management Research –  
KDU and Faculty of Engineering,  
General Sir John Kotelawala Defence  
University (KDU), Sri Lanka  
[nilupul.gunasekara@kdu.ac.lk](mailto:nilupul.gunasekara@kdu.ac.lk)  
[dir.cdmr@kdu.ac.lk](mailto:dir.cdmr@kdu.ac.lk)

**H. G. D. S. Ashvini**

Centre for Disaster Management Research –  
KDU, General Sir John Kotelawala Defence  
University, Sri Lanka  
[sanduniashvini97@gmail.com](mailto:sanduniashvini97@gmail.com)

**W. C. D. K. Fernando**

Department of Civil Engineering, Faculty of  
Engineering,  
General Sir John Kotelawala Defence  
University, Sri Lanka  
[kumari@kdu.ac.lk](mailto:kumari@kdu.ac.lk)

## Keywords

Small ungauged urban watershed, flood modelling, different data sources, decision making on DRR.

## INTRODUCTION

Mainstreaming disaster risk reduction (DRR) is a must for the foreign and treasury funded projects in Sri Lanka (DMC, 2005). However, for the privately owned organizations and establishments this is currently not mandatory, although they are advised to do so. Nevertheless, the majority of the development work in urban and suburban areas take place because of myriad of development activities in the private and semi-governmental organizations. However, some organizations acknowledge the importance and the benefits of it in the future. This work highlights the effort to mainstreaming flood DRR into development of General Sir John Kotelawala Defence University (KDU), Ratmalana, Sri Lanka. The university is located in the Kandawala area very close to the Ratmalana Airport, just 500 m away from the Weras River.

The area has been a water retention area for the South-Western monsoonal rains it receives. Later on, the area became an industrial zone and an urban center, along with an airport which is now being operated as an international airport. This low-lying area frequently undergoes flooding with retention period of less than a 24 hours. Rainfalls received in consecutive days in the monsoon season can be a major issue creating longer retention durations.

The importance of the establishments in the study area considering the infrastructure that will be affected, and the number of users per working day makes KDU a high-risk establishment. Considering the ongoing infrastructure development activities, it is imperative that proper and adequate flood retention and drainage be provided inside KDU, Ratmalana premises. However, like many other small watersheds, the Kandawala watershed is also ungauged. Unavailability of measured flow data is therefore, a major hurdle for the flood DRR studies. This work-in-progress (WiPe) highlights the efforts taken to decision making on flood DRR and mainstreaming it into development, despite the data unavailability, which is a very common situation in the developing world.

## **METHODOLOGY**

The unavailability of measured flood hydrographs is a major hurdle in small urban basins, where the flood DRR is of high importance. Even though synthetic hydrograph methods are often used in the ungauged basins, the uncertainty of the method is very high.

Here, synthetic hydrographs were developed coupled with measurements taken on flood depths in photographs along with measured cross sections and levelling survey data on the site. Multiple data sources had to be utilized in parallel to make informed assumptions regarding the input hydrographs of the calibration and validation events in the HEC (HMS and RAS) model.

## **RESULTS AND DISCUSSION**

The existing flood drainage infrastructure was proven to be inadequate to accommodate and carry the increased runoff generated by increased runoff coefficient due to the increased paved areas and the loss of storage due to the filling of existing low lying areas. Even though the new drainage development project proposes expanded ponding area along the drainage channel itself controlled by flood gates, improper gate operation and low maintenance will result in adverse flooding effects as well. Therefore, by designing the proposed drainage to a return period of 10 years and by proposing and adopting gate operation rules and a suitable channel maintenance schedule, this issue is expected to be overcome.

## **CONCLUSION**

For small, ungauged, urban basins, it is essential to mainstream flood DRR into development considering the importance of the infrastructure and activities involved with those, as the flood disasters will do more damage than in sub-urban or rural settings.

However, the lack of data is a universal issue to small ungauged basins. Comparison to the rural catchments, urban catchments tend to have secondary data such as photographs, surveys done as well. Wise use of these secondary data can enhance the quality of the assumptions made regarding the flood assessments or modelling.

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