

A REVISIT TO THE STRUCTURAL FLOOD MITIGATION MEASURES IN SRI LANKA USING REMOTE SENSING AND GIS

J.S.M. Fowze^a, M.K. Hazarika^{b}, S.M. Premasiri^c and B.C.P. Bogahawatta^d*

^a *Geoinformatics Center, AIT, P.O. Klong Luang, Pathumthani 12120, Thailand*

Email: jsmfowze@gmail.com

^b *Geoinformatics Center, AIT, P.O. Klong Luang, Pathumthani 12120, Thailand*

Tel: +66-2-524-6184; Email: manzul@ait.asia

^c *Irrigation Department, Colombo, Sri Lanka ; Email: sellakkody@yahoo.com*

^d *Survey Department, Colombo, Sri Lanka ; Email: chanakabcp@yahoo.com*

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ABSTRACT: Flooding is the most frequent natural hazard in Sri Lanka and the occurrence of extreme flood events are increasing in the recent past. This warrants a review of exiting structural measures for flood mitigation. In this context, a study was carried out in the lower Gin basin where a structural mitigation measure in the form of flood bunds is already in place. The construction of the bunds which add up to a total length of about 24 km was completed in 1982 and in 2003 the system was overtopped at a location due to a major flood caused by a extreme rainfall event.

To study the system, a DEM of the study basin was created utilizing the 1:10,000 scale contour lines and spot heights derived from aerial photographs. Existing flood bunds were, then, incorporated to the DEM by means of customized tools in ArcGIS 9.3 environment. Such tools provide flexibility to allow the user to modify the height of the flood bunds as would be necessary for scenario modeling with options to select the bunds of interest.

The one dimensional steady flow module of the Hydrologic Engineering Center's River Analysis System (HEC-RAS) was, subsequently, utilized for establishing the flood routing model. A land use map of the study area was derived from remote sensing data for necessary hydraulic characterization. The 2003 flood event was chosen for model calibration as detail river discharge records were available. Having successfully calibrated the model with acceptable correspondence between model results and field records, flood routing maps of lower Gin area corresponding to 10, 20 and 50 year return period events were produced by carrying out frequency analysis. ALOS/PALSAR derived remote sensing data was also utilized successfully to make a situation analysis of the flooding event of year 2008.