

## **Comparative Analysis of Spatial Extents and Implications of Year 2011, 2014 and 2015 Floods in Dar es Salaam.**

This study aimed to compare spatial flood extent of 2011, 2014 and 2015 floods in Dar es Salaam city through mainly exploiting GIS and remote sensing in mappings. Data were collected through questionnaires, field observation and Google Earth and Land sat images captured by MODIS on 28th December, 2011, 13th April, 2014 and 20th May, 2015 during the peak of the flood, and the comparison image was captured 17th August, 2010 before the flood. The study identified areas with flood extent, in 2011 were from 42 wards, in 2014 were from 28 wards and in 2015 were from 23 wards.

The spatial flood extent in 2011 was wider and the most peak flood intensity. This 2011 flood covered a large land area and implicated more population residing in Dar es Salaam city compared to 2014, 2015 floods. The study also revealed that most of flood extent was in areas closer to waterways. This therefore led to the selection of 12 wards that are closer to Msimbazi River and subjected them to more detailed flood mappings analysis whereby flood extent in 2011 was 6.1km<sup>2</sup>, in 2014 was 4.4km<sup>2</sup> and in 2015 was 3.7km<sup>2</sup> which are 28%, 20% and 17% of the total area respectively. Further, the estimated residing population in 2011 floods was 7865 people, in 2014 was 5735 people and in 2015 was 3604 people, whereby Jangwani area was the most affected followed by Magomeni and Hananasif ward areas.

Furthermore 2011 floods had more loss of lives, damage and loss of property than 2015 and 2014 flood though 2015 floods had more infrastructure damage and loss of property than 2015 and 2014 flood though 2015 floods had more infrastructure damage and loss. Finally it was revealed that the land covered low hazard level was 11.1 km<sup>2</sup>, land covered by moderate hazard level was 6.9km<sup>2</sup> and land with high hazard level was 3.8km<sup>2</sup>. In vulnerability, the land covered low vulnerability level was 15.7km<sup>2</sup> and land covered by high vulnerability level 6.1km<sup>2</sup>. In risk, the land covered low risk level was 12.7km<sup>2</sup>, land covered by moderate risk level was 4.9km<sup>2</sup> and land with high risk level was 4.2km<sup>2</sup>.

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