

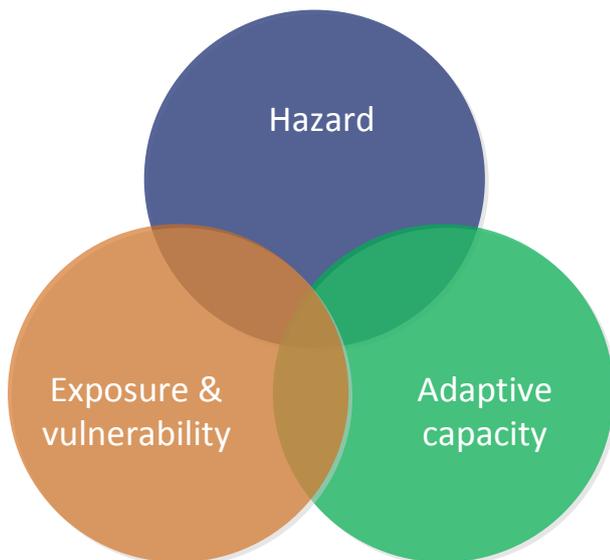
Integrated Flood Management Kampala

Flash flooding in Kampala

Flash floods are a serious and recurring problem in Kampala. Though these floods do not generally have a very long duration –normally from several hours to at most 2 days – they do cause major disruption to the lives of Kampala's citizens and they entail high economic and social costs. Generally, the relatively poorer members of Kampala's citizens experience more of the burdens of flooding as many of them live in the relatively low-lying valleys and wetlands.

Flood risk involves an understanding of 3 main components: the hazard itself, the level of exposure and the vulnerability of the different elements at risk (people, businesses, buildings, infrastructures etc.) and the adaptive capacity of the affected societal groups.

Flash floods arise through a mix of factors: periods of intensive rainfall during the wet seasons, the landscape of the city which features many hills that drain into numerous relatively flat valleys and wetland areas, the densely developed hills and valleys, the high rates of rainwater run-off, inadequate drainage networks and water management, the spread of unplanned development, inadequate solid waste management etc. A proper understanding of how these elements interact and contribute to flooding is an essential first step towards Integrated Flood Management (IFM).



The IFM Kampala Project

UN-HABITAT's Cities and Climate Change Initiative (CCCI) selected Kampala to be one of its target cities and is the sponsor for the IFM Kampala project. Broadly the project envisages a series of studies on flood risk in Kampala and the development of a set of proposed strategies and actions that local stakeholders could undertake to reduce flood risk. These should better prepare the city for the future and in particular for the effects of climate change which will likely aggravate the flood risks in Kampala.

The project's objectives are:

1. to carry out a city-wide assessment of flood risk based upon the principles of integrated flood management;
2. to undertake a more detailed flood risk assessment

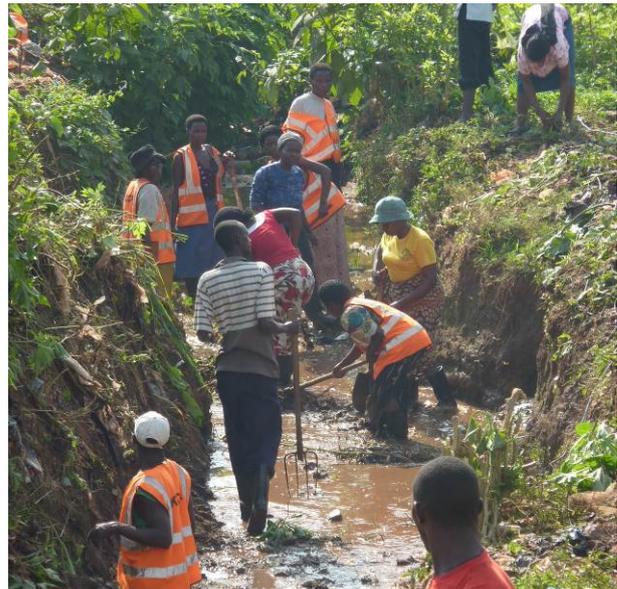
in a neighborhood with high levels of hazard, exposure and vulnerability;

3. to develop a strategy in the form of proposals for policy, bylaws and action plans for improved and integrated flood management.

What has been done?

The project commenced in March 2012 and is now in its final stages. The project team was formed by a consortium of international and local partners under the leadership of the University of Twente's Faculty of Geoinformation Science and Earth Observation (ITC). Other partners were Makerere University and Hydroc Consultants of Germany.

From the outset it was realized that the IFM approach is more than a technical solution to flood risk. It supplements technical analyses and assessments of flood risk at city-wide and neighbourhood levels with a multi-level, stakeholder approach in which governance issues play prominent roles. The governance component is essential for success: stakeholders are not only affected by floods, but their actions also contribute in many ways to their own risks as well as those of others. A successful strategy to reduce flood risk must therefore raise overall awareness of the role of stakeholders and attempt to change their behavior so as to reduce flood risk. Regular contact with local NGOs and community groups were established from the outset.

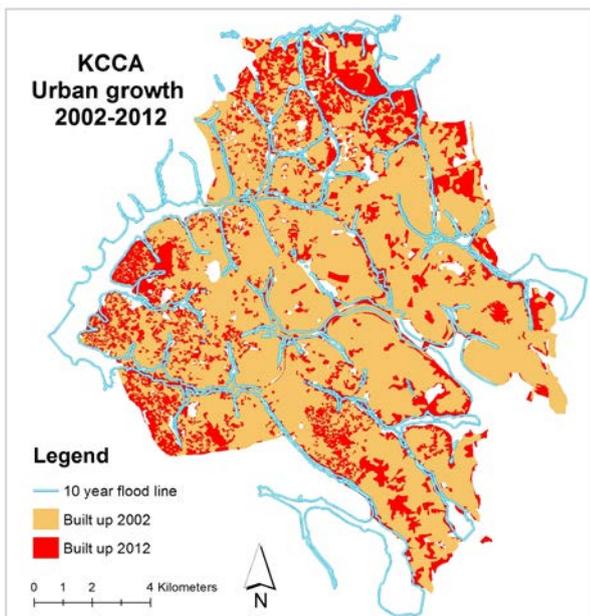


Regular and proper maintenance of drains is an essential part for flood management (Photo: Sliuzas, March, 2012)

Flood risk analysis and modeling was carried out at two spatial scales using spatial information from the GIS Unit of Kampala Capital City Authority (KCCA). For example data was available from the Greater Kampala Development Plan and from the 2002 Kampala Drainage Master Plan. The city wide analysis provides a general assessment of changes in urban development since 2002 and the likely impact of this on flood risk. As the loss of open space and the increase in impervious surfaces is a major driver of flooding in Kampala it is important to accurately quantify urban growth (Map 1).



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Map 1 showing urban growth between 2002 and 2012 within the KCCA boundary and 1 in 10 year flood lines from the 2002 Drainage Master Plan.

Additional data has been collected to allow for more accurate assessments to be carried out. This includes some rainfall intensity data via an digital weather station installed at Makerere University and a simple rain gauge installed at Outspan Primary School in Bwaise. In stakeholder fora results will be critically discussed and options for strategies, policies and action plans will be formulated and reviewed.

A detailed flood risk assessment has been made with a dynamic modeling tool (LISEM) for the upper Lubigi catchment area with specific attention for the situation in Bwaise, one of Kampala's best known flooding hotspots (Map 2). The analysis has included several scenarios of possible future situations to provide stakeholders and decision makers with more insight into how various drainage adaptations and stakeholder actions will affect flood risk in the catchment area and in Bwaise.

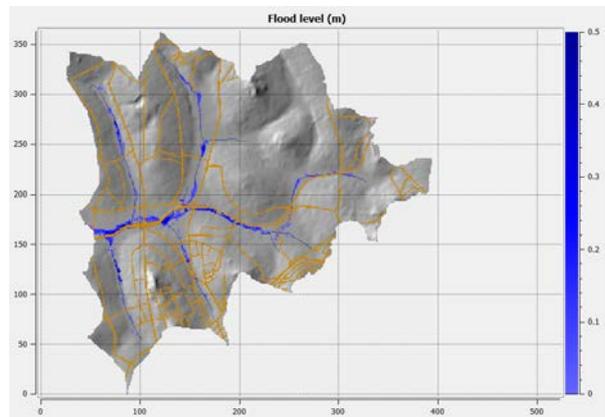
Some key findings of these assessments are:

- Unregulated urban development is a major driver of increased surface water runoff volumes and speeds and therefore of flooding



Flood waters damage properties and increase morbidity and mortality rates through drowning and water borne diseases (Photo: Sliuzas, 2012).

- The lack of well designed, integrated drainage system compounds the flooding problems
- The capacity of those drains that do exist to deal with surface water runoff is compromised by inadequate solid waste collection and sedimentation of drains.



Map 2 showing flood levels in the Lubigi catchment area for a 1 in 2 year rain storm event (Source: Jetten, ITC)

What can be done to alleviate flooding?

The final activities of the project are directed at identifying and gaining stakeholder commitment to adopt and implement a range of possible IFM strategies and actions. At two recent stakeholder workshops the process of identifying and prioritizing possible IFM options has commenced. The workshops' discussions have already highlighted improved solid waste management and drain cleaning as priority issues which can be addressed in the short term. These are issues in which community members and KCCA staff need to coordinate their actions in a concerted effort to establish a regular waste removal and cleaning operations.

Many other measures area also needed, some of which will require structural changes to be made in legislation and the enforcement processes of urban development. Adopting the principles of Sustainable Urban Drainage Systems (SuDS) in all future developments can also help to substantially reduce flood risk in Kampala. Together these measures can enable the transition of Kampala to a city with greater flood resilience. They will also enable Kampala to increase economic prosperity and the quality of life of its residents.



Open areas and wetlands are crucial for IFM as they provide for water retention and infiltration entailed in SuDS principles. (Photo: Sliuzas, 2012).

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