INFOCUS
Enabling Policy Environment: Exposure Analysis and Modelling

SUBJECT

Ghana's capital Accra is a significant business hub and has a high natural vulnerability to flooding. A combination of unplanned spatial developments, high percentage of paved areas, lack of proper solid waste management, and lack of maintenance for the drainage system result in frequent flooding during (but sometimes even outside) the rainy season. It is expected that climate change further aggravates this.

Metropolitan, Municipal and District Assemblies (MMDAs) in the Greater Accra Metropolitan Area (GAMA) face significant challenges to finance reconstruction work after floods. The negative impact and damage caused by flooding in cities demand a robust Integrated Disaster Risk Management (IDRM) approach which also considers sustainable risk transfer measures. Therefore, a risk transfer solution, such as insurance, as part of an IDRM could help speed up reconstruction through the swift disbursement of claim pay-outs after an event.

To this end, the Public-Private Partnership between Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and Allianz Reinsurance implemented the project "Developing Risk Management Approaches for Climate Risk". Within an integrated flood risk management approach, the project focused on preparing the grounds to insure public assets against flood.

This makes an exposure analysis and modelling critical to help describe current and future flood risk for a particular city and its assets. The exposure analysis and modelling identify and describe the exposure of public assets at risk in terms of concentration or intensity, duration, and frequency of floods events. It, therefore, highlights the magnitude (intensity), spatial (location), and temporal (time) patterns of exposed public assets through an economic and social lens. This provides robust data on risks sufficient to design insurance products for cities in urban areas.

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On behalf of
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CHALLENGES

Generally, the main challenges faced included:

- **Insufficient data to assess the exposure of specific assets.**

Each piloting assembly had data gaps in their public asset register for instance the spatial features, flood history, and many others. This makes it difficult for experts to conduct such a complex analysis.

- **Limited knowledge of conducting exposure modelling.**

There is less knowledge about the tools that could be applied to determine the flood exposure of an asset within a particular jurisdiction. Cities have limited knowledge on how to develop flood models and vulnerability curves for public infrastructure.

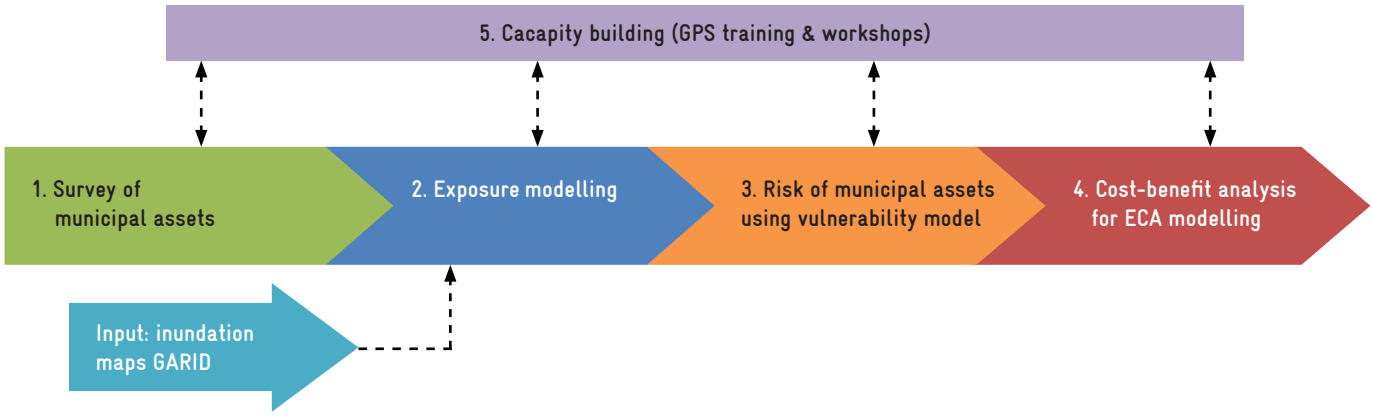
SOLUTIONS

A thorough exposure analysis was conducted for public assets to explore the potential for flood risk insurance.

A survey of public assets for all piloting assemblies was conducted which helped with the digitalization and update of public asset registers. The survey results served as an input for the exposure modelling that was stored in a GIS database. Another input for the exposure modelling was the inundation maps by the World Bank project GARID which uncover flooding patterns for rainfall events with different return periods in Greater Accra now and in the future. Thus, the current and future (2050) exposure of the public assets to floods were modelled. The exposure of the assets was also modelled assuming that a pilot investment plan aiming to reduce flooding in Accra would be implemented.

Moreover, a vulnerability model was developed with the help of international literature and the experiences during the 2015 flood to assess the risk of the public assets in the flood zone.

To overcome the challenge of limited knowledge among the city authorities, the entire process was supported by capacity building that included for example GPS trainings and further workshops for relevant stakeholders.



LESSONS LEARNED

1. **Exposure analysis and modelling proved to produce data fitting insurers' demands and provide valuable insights to cities authorities.**

   Exposure analysis provides relevant data for insurance companies to enable them to develop new products for the insurance market. Within this project, Allianz Re was able to design a flood cover insurance product to be later implemented for public assets in three assemblies in GAMA. All the analyses generated during the exposure analysis and modelling were deemed relevant and accurate which facilitated the insurance product developments.

2. **Most public assets are not in the ownership of MMDAs.**

   City officials can however only purchase insurance products for assets that are owned by them. It is always relevant for experts to know which assets are owned by an assembly to avoid conflicting issues in the future.

3. **Inaccurate information on the value of assets affects premiums for insurance products.**

   Premiums for insurance products are based on the cost of insured buildings and inventory of assets. Thus, for an insurance company to determine a premium for insuring a particular asset, the value of the asset is one of the most important aspects. City officials must have the capacity to determine and provide the value of different assets as well as its inventory.

OUTCOMES

- **Public asset registers for some cities were digitized, standardized, and updated.**
- **With, among others, the input of the exposure analysis, an indemnity insurance product was designed by Allianz Re to be later implemented for three cities in GAMA.**

Activity name
Enabling Policy Environment: Exposure Analysis and Modelling

Focus area
Greater Accra Metropolitan Area (GAMA), Ghana

Local partners
GA East, GA West, AMA, GMet, and NADMO

Target group
Public assets under the control of assemblies in GAMA

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Developing risk management approaches for climate and health risks

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For more information please refer to the factsheet "Developing Risk Management Approaches for Climate Risks in Ghana".

DISCLAIMER
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