

Household adaptations to flooding in the suburbs of Dakar, Senegal: the case of Yeumbeul North

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What is the issue?

Recurrent flooding affects the suburbs of Dakar, with 44% of the population in Pikine (where Yeumbeul North is located) suffering damage during the rainy season. A total of 30,000 homes and 130 schools were affected by flooding in the Dakar region in 2009.

Many stakeholders are taking action to address this problem, including the State, communities, non-governmental organizations, associations, and households. For instance, a 10-year, US\$1.5 billion flood management program (2012–2022) was recently implemented by the State, focusing on infrastructure, development, and housing relocation.

Unlike previous research that focused on the causes and aggravating factors associated with flooding, an IDRC-funded research project led by the *Institut Africain de Gestion Urbaine* (IAGU), titled *Flooding in Dakar suburbs: towards adaptation by improving buildings, infrastructure and local governance*, focused on identifying and testing household and community level adaptation options. It also helped to bring effective options to scale.

What did we do?

Participatory action research was used to understand which adaptation options are currently being used in the suburbs of Dakar. This involved interviewing 800 households in 20 of the 24 flooded neighbourhoods in Yeumbeul North, the study area, between 2012 and 2014. Data collection was done in close collaboration

Key messages

- Of the 80 neighbourhoods within the Yeumbeul North suburb of Dakar, 25 are affected by seasonal flooding, with 61% of the damage directly affecting dwellings. To address this, a number of adaptation strategies are being developed at the household level.
- Homes belonging to people that recently moved to Yeumbeul North are less affected, since flood risk was taken into account at the time of construction.
- Over 80% of households believe that flood-prone neighbourhoods can be redeveloped to reduce risk, and 68% intend to stay and repair their homes. Only 19% claimed that they want to move.
- The research has identified sustainable household-level adaptation actions (e.g. raising buildings and adding PVC septic tanks), as well as negative actions (e.g. backfilling of streets).
- The borough of Yeumbeul North should reorganize its support services to better assist households in implementing effective adaptation actions.

with the community via surveys, focus groups, and sharing of observations on neighbourhood and household flooding impacts. Additional data was collected from relevant State agencies and ministries, including the *Agence nationale de l'aviation civile et de la météorologie*, the *Agence nationale de la statistique et de la démographie*,

and the *Direction des travaux géographiques et cartographiques*. Local consultations brought together authorities, associations, researchers, the public, and State representatives. Pilot projects supporting household and community adaptation measures were also implemented.

What did we learn?

Contrary to widespread belief, the people living in Yeumbeul North are well aware of flooding risks. One third of the families currently living there moved into the flood-prone neighbourhoods following the severe floods of 2005 and 2009. Most of the households that did not experience flooding had taking into account flood protection measures during the construction of their homes, by raising the ground level. Over 80% of households say that flood-prone neighbourhoods can be redeveloped and 68% intend to stay and repair their homes, due to proximity of employment, social ties with neighbours, and the limited availability of housing at the proposed relocation sites. Only 19% intend to move.

As a result of the pilot initiatives, the project improved not only the quality of dwellings affected by flooding, but also the economic resilience of households. These pilot projects included:

- Engaging youth associations to clean drainage areas in six neighbourhoods (Darou



Dakar's suburbs are regularly affected by flooding; up to 44% of the population of Pikine (nearly 500,000 people) suffer damage during the rainy season

Salam Diamalaye, Darou Salam 6, Arafat, Aynoumady 5, Darou Salam 5A and Darou Salam 4D);

- Small renovations for 27 homes to improve their ability to withstand flooding;
- Construction of a 250m secondary drainage channel serving the neighbourhoods of Nemah and Al Pulaar 2; and
- Improving economic resources for 170 women in the neighbourhoods of Darou Rahmane 3 and Ouest 3A, and supporting a group of dyers through microcredit.

Stories of change

Research has shown that renting rooms is a widespread strategy for supplementing household income in Yeumbeul North. However, flooding

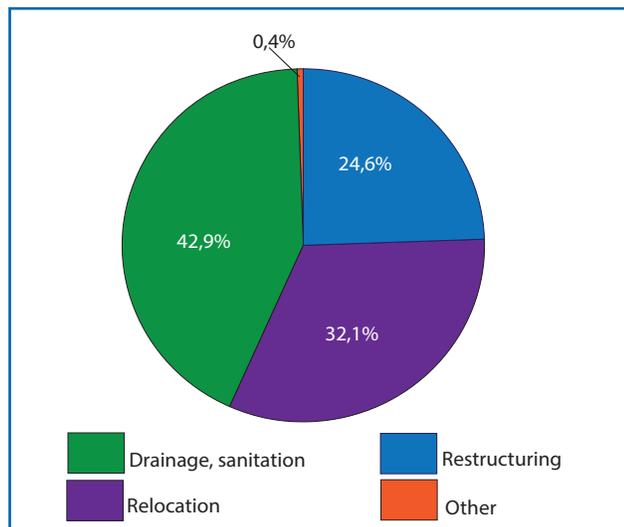


Figure 1: Solutions recommended by households for addressing flooding



An attempt to limit flood waters from entering a home in the Dakar suburb of Yeumbeul North



A secondary drainage system was constructed in the neighbourhood of Al Pulaar in Yeumbeul North, which has helped to reduce flooding

can pose an obstacle to this strategy. The pilot initiative that supported small home renovations to reduce flood-risk was much appreciated by households.

“I lost half of my tenants because of the state of the septic system, and I wasn’t been able to save any money to pay for repairs. The credit allowed me to repair the septic system. My house no longer has a foul odour like it did before.”

A beneficiary of the pilot initiative

The borough is the first resort for households that are affected by flooding. However, due to scant technical resources, it is not in a position to provide optimal assistance to households that have suffered flood damage. This research project has strengthened the borough’s ability to intervene and provide support. As a result of this research, the borough is now equipped with a detailed land use map, a development plan for Lac Warouwaye, and a local adaptation plan for addressing flood-risk.

“As a result of current pilot initiatives and possible solutions identified through the project, living conditions in Yeumbeul North will be improved. The land use plan that came out of the project will make neighbourhood restructuring, land regularization, and addressing flood-risk possible. In the wake of this project, sanitation initiatives such as the construction of collective septic systems, household waste sorting, and repurposing will be implemented.”

Mayor of Yeumbeul North District during a local consultation on June 2, 2014

What are the policy implications?

Based on the outcomes of this research, the following actions are recommended:

- The district of Yeumbeul North should implement new knowledge gained in urban planning and housing. Funds should be allocated for the construction of secondary drainage systems and improvements in infrastructure for affected neighbourhoods. The district should also advise households located in flood-prone areas about effective construction and home improvement techniques, access to property-ownership, and land status in relation to decentralized State services (e.g. urban planning, land registration, etc.).
- To improve the overall resilience and adaptation of dwellings located in Yeumbeul North and other suburbs, microfinance institutions (including the *Partenariat pour la Mobilisation de l’Épargne et du Crédit au Sénégal*, or PAMECAS) should grant credit to women and women’s groups living in flood-prone areas and provide financing for minor home renovations.
- The ministry that oversees the 10-year flood management program (2012–2022) should implement a component for assisting people living in flood-prone areas with household adaptation measures. The ministry responsible for urban planning, housing, and quality of life should work collaboratively with boroughs on matters of neighbourhood restructuring, in particular through the *Fondation Droit à la Ville*.



Pumping of water in the in the neighbourhood of Yatassaye

What next?

Neighbourhood redevelopment is needed to adapt to flood risk. Further research is needed to study processes, methods, and actions relating to the development and upgrading of infrastructure in flood-prone neighbourhoods to improve overall resilience of households in the face of flooding.

Covering the costs of different adaptation options is an obstacle for many families living in Yeumbeul North, given that two thirds of households have irregular incomes. Further research into the financing aspects of adaptation at the household-level (e.g. debt capacity, credit rate, repayment methods, etc.) is needed.

The borough of Yeumbeul North has recently received jurisdiction over local urban planning and housing. The borough's management skills, abilities, and available resources should be assessed, to understand how it can best advise households on adaptation measures, and oversee the development of secondary drainage systems and related infrastructure. In addition, revisions to the municipal floodwater adaptation plan should be reviewed.



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An example of a household-level adaptation strategy to flooding includes raising the septic pit

Need more information?

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