

Investing in Drainage or Managing Waste? Different Costs, Same Results

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Similar to the Tanzanian water access issues discussed in the previous case study, focusing solely on deploying new infrastructure curtails the potential impact and efficiency of resources. Complementing the roll out of such projects with a contextual analysis of social dynamics—and subsequently sharing the decision-making and management power among stakeholders—could prove to be a powerful and cost-effective climate adaptation strategy.

Common Perceptions

Uncoordinated, rapid urbanization and worsening climate change have made flooding an increasingly recurrent phenomenon (Fernandez et al. 2018). A common response to mitigating the associated damage has been to roll out massive infrastructure projects in the urban centers of developing countries. Traditionally, development agencies have focused on the engineering aspects of such projects. However, little consideration has been given to the broader context in which they occur, such as the surrounding institutional and community dynamics.

Questions We Should Be Asking

In recent decades, stormwater flooding has become one of the most serious natural hazards—affecting hundreds of thousands of people and causing hundreds of millions of dollars' worth of damage to infrastructure, public equipment, and households' livelihoods (Fernandez et al. 2018). This is due to rapid and unplanned urbanization, increased rainfall following periods of intense drought, rising groundwater, and inadequate

drainage infrastructure (Fernandez et al. 2018). These risk factors disproportionately affect the most vulnerable population groups, who often settle informally in high-risk areas located on the outskirts of large urban centers (Fernandez et al. 2018).

This is the case in Senegal, where the cities of Pikine and Guediawaye were established on a dried-up river basin next to the capital and, as a result, suffer enormously during rainy seasons. Emergency solutions were implemented to facilitate the drainage and storage of stormwater through the construction and rehabilitation of retention basins. There was, however, little engagement of local populations in the planning and construction of these basins, and, consequently, little sense of ownership of these resources by their host communities. In addition, the absence of public waste management services led to the disposal of waste in the stormwater installations, clogging the drains and rendering them ineffective.

The maintenance of infrastructure investments requires not only ongoing government, operational, and financial support, but also individual and collective behavior conducive to the sustainable functioning of these resources. Without the latter, returns on new water infrastructure run the risk of falling flat per the tragedy of the commons: individual users will tend to overutilize a public resource in the absence of adequate collective action. In the case of Pikine and Guediawaye, what was intended as a community good ended up being a source of insecurity and health hazards. The question is: how can we incentivize the active engagement of target

beneficiaries and maximize the returns on infrastructure investments?

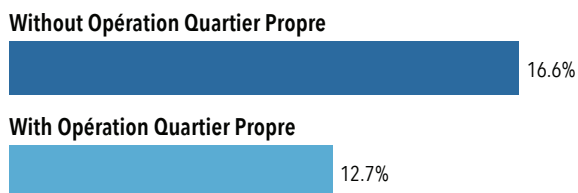
Challenging Perceptions

In a bid to reduce the risk of flooding in the peri-urban areas of Dakar, the government of Senegal launched the World Bank–assisted Stormwater Management and Climate Change Adaptation Project (Projet de Gestion Environnemental et d'Adaptation au Changement Climatique, also known as PROGEP). Originally conceived as an infrastructure project, PROGEP added a community-focused initiative following recommendations from DIME. The project had three major components:

- Strengthening institutional and management capacity for stormwater drainage and urban planning;
- Developing primary drainage infrastructure (approximately 73 percent of project investment); and
- Engaging the community in urban flood-risk reduction and management.

The third component included a wide variety of community-based interventions, such as the construction of amenities (for example, walking paths and sport installations) aiming to add value to areas surrounding the drainage infrastructure. One such intervention was Opération Quartier Propre (OQP), which sought to mobilize established community-based organizations (CBOs) for the maintenance of public spaces. Partner CBOs were provided with cleaning materials and offered non-monetary rewards, conditional on maintaining a certain level of cleanliness in their neighborhood. OQP's overarching goal was to reduce the incidence of flooding by leveraging granular local knowledge and mobilization capacity by giving CBOs a direct stake in the state of their neighborhood.

■ ■ Figure 1.6 The Effect of Opération Quartier Propre on the Absolute Risk of Being a Flood Victim



Note: Opération Quartier Propre decreased the relative risk of being a flood victim by 23 percent.

DIME evaluated the impact of OQP through a randomized controlled trial and surveys of 2,400 households (including 28,010 persons) and 160 CBOs in Pikine and Guédiawaye. The results showed the intervention was effective: just one year after OQP began, households in treated areas reported being significantly less affected by flooding (see figure 1.6). OQP also positively impacted residents' overall quality of life, with respondents reporting a better perception of their neighborhood's cleanliness and improved flood-related health outcomes.

Policy Implications

The OQP impact evaluation was designed to test whether this specific intervention, over and above all other actions by PROGEP, could increase community engagement in the general upkeep of public areas and improve residents' quality of life. This was a light-touch, cost-effective, bottom-up intervention: OQP engaged existing community-based organizations and empowered them to use their local knowledge and networks to work toward improved community cleanliness, while providing minimal guidance and only basic materials. These findings support the argument that aspirational incentives can positively impact the returns and maintenance of public infrastructure projects through increased community engagement.

We found that the positive effects on local waste management, cleanliness of public spaces, and quality of life were particularly pronounced in areas with underdeveloped infrastructure. This suggests that in addition to complementing large infrastructural investments, an OQP-type intervention could be implemented as a low-cost, high-impact interim solution. The results of this impact evaluation provide evidence that the tragedy of the commons can be mitigated by setting up aspirational incentives that facilitate collective action.

More broadly, the OQP impact evaluation provides lessons for other initiatives aimed at engaging communities in the upkeep or provision of public goods:

- The intervention relied almost wholly on local knowledge and gave participating CBOs full autonomy in determining the types of activities to be implemented.
- CBO rewards were based primarily on an external assessment of neighborhood cleanliness, as opposed to the actual activities conducted. This is an example of a results- or outcome-based intervention at the local level.
- The study highlights how a light-touch intervention can shift social norms, which is critical in achieving sustainable returns on community investment in the context of climate change adaptation.



This case study is based on an impact evaluation conducted within DIME's Infrastructure and Climate Change research program. See: Newman, Carol, Tara Mitchell, Marcus Holmlund, and Chloë Fernandez.* 2019. "Group Incentives for the Public Good: A Field Experiment on Improving the Urban Environment." Policy Research Working Paper 9087, World Bank, Washington, DC. See also: Fernandez, Chloë,* Marcus Holmlund,* Tara Mitchell, and Carol Newman. 2018. Operation Clean Neighborhood: Working with Communities for Flood Risk Mitigation in Senegal. Impact Evaluation Final Report.*

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ACKNOWLEDGMENTS

PROGEP was co-funded by the government of Senegal, the World Bank, and the Nordic Development Fund (NDF). The work presented in this report is the result of a multiyear collaboration between Senegal's Municipal Development Agency, the World Bank, and Trinity College Dublin.

**Development Impact Evaluation (DIME), World Bank.*