

# “Flood resilience in Slums: Community-Responsive Adaptation in Kibera, Nairobi”

- Rapid urbanisation and climate change are combining to dramatically increase exposure to flood-risk among the poorest.
- Top-down adaptation measures need to respond to and incorporate local knowledge and adaptations that can themselves integrate with municipal systems.
- A model of “Community-Responsive Adaptation” has the potential to integrate top-down policy with local adaptation measures and knowledge.
- In partnership with slum residents and local government we will co-design, build and evaluate three integrated “Community-Responsive Adaptation” projects in Kibera, Nairobi’s largest informal settlement.
- We will provide the first systematic evidence on the delivery, costs and impact of “Community-Responsive Adaptation” that integrates community and city-level efforts to reduce local flood risk.

## 1. Rapid Urbanisation and Climate Change

In cities in the developing world, rapid urbanisation and climate change are combining to dramatically increase exposure to flood risk among the poorest and most vulnerable (Jha et al, 2012). This is because informal settlements consistently form in high flood-risk areas alongside rivers and other natural drainage paths (Parikh et al, 2012) and because inadequate drainage prevents rainwater from running off during storm events. In turn, climate change is increasing the frequency of extreme rainfall events (IPCC, 2014). Flooding occurs several times a year in many informal settlements, interrupting economic activity, contaminating water supply, leading to disease outbreaks, destroying the limited assets of poor households and often displacing residents (Douglas et al, 2008).

## 2. Bridging Bottom to Top - “Community-Responsive Adaptation.”

Top-down efforts to reduce flood risk in informal settlements have had limited success. Efforts to relocate residents have caused conflict and insecurity, while large-scale physical flood protection measures are expensive and inflexible. At the other extreme, low-income residents can independently or collectively take some measures to reduce their exposure to risk, but many of the vulnerabilities they face cannot be addressed by local action alone (Satterthwaite et al., 2007). Many observers have therefore posited the need for top-down adaptation measures to respond to and incorporate local adaptation measures; and for local adaptation measures in turn to be informed by and connected to wider municipal systems (e.g. Satterthwaite et al., 2007, Ranger and Garbett-Shiels, 2011). We call this approach, which integrates top-down policy with local adaptation measures, “Community-Responsive Adaptation.”

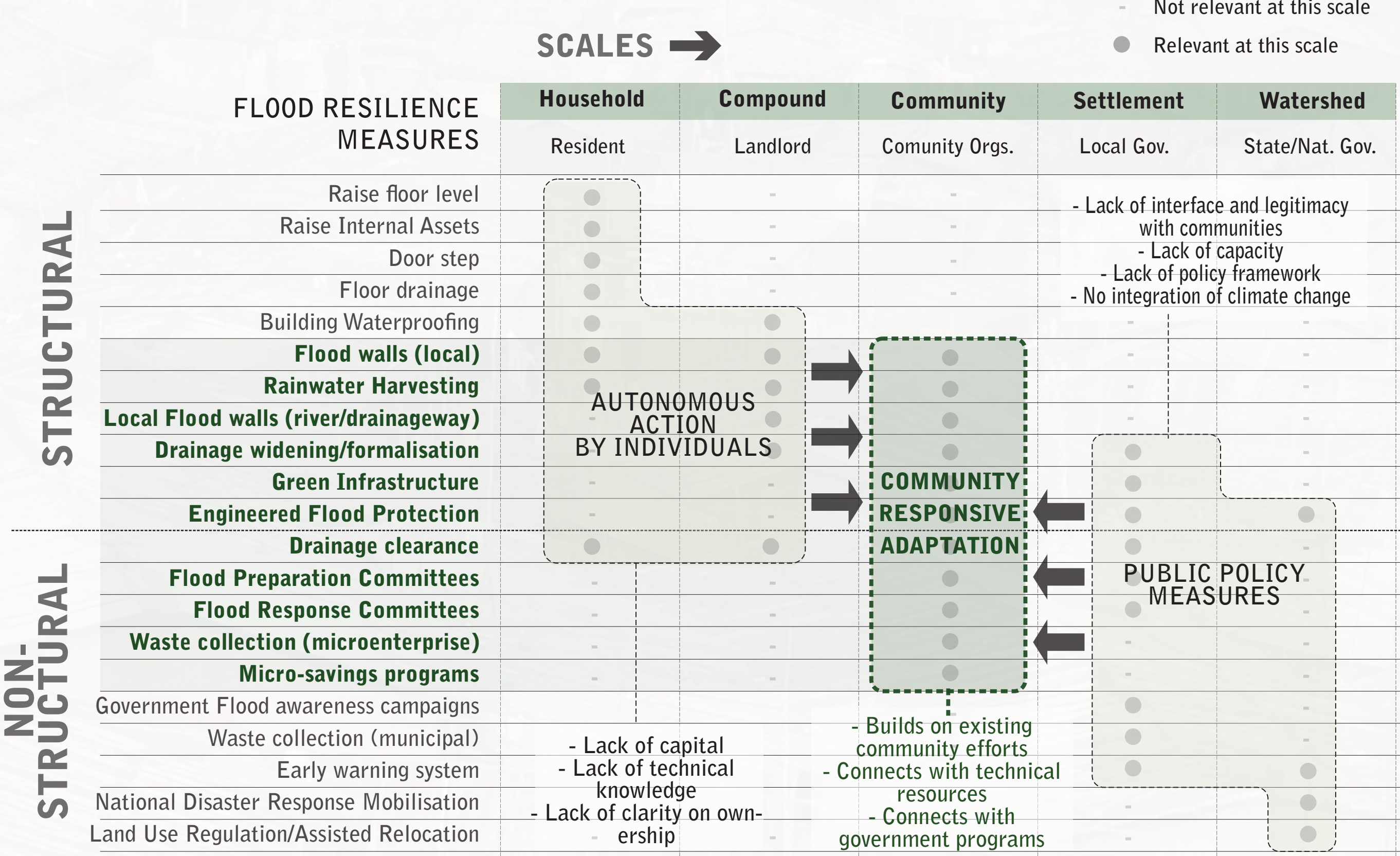
## 3. New evidence on the delivery, cost, impact of a model of “Community-Responsive Adaptation”

To date there are relatively few real-world examples of projects that successfully implement “Community-Responsive Adaptation”. To our knowledge, none of these precedents have been systematically evaluated, either in terms of costs, or impact. This study addresses this knowledge gap. In partnership with the non-governmental organization (NGO), Kounkuey Design Initiative (KDI), and with slum residents and local government, we will co-design, build and evaluate three integrated adaptation

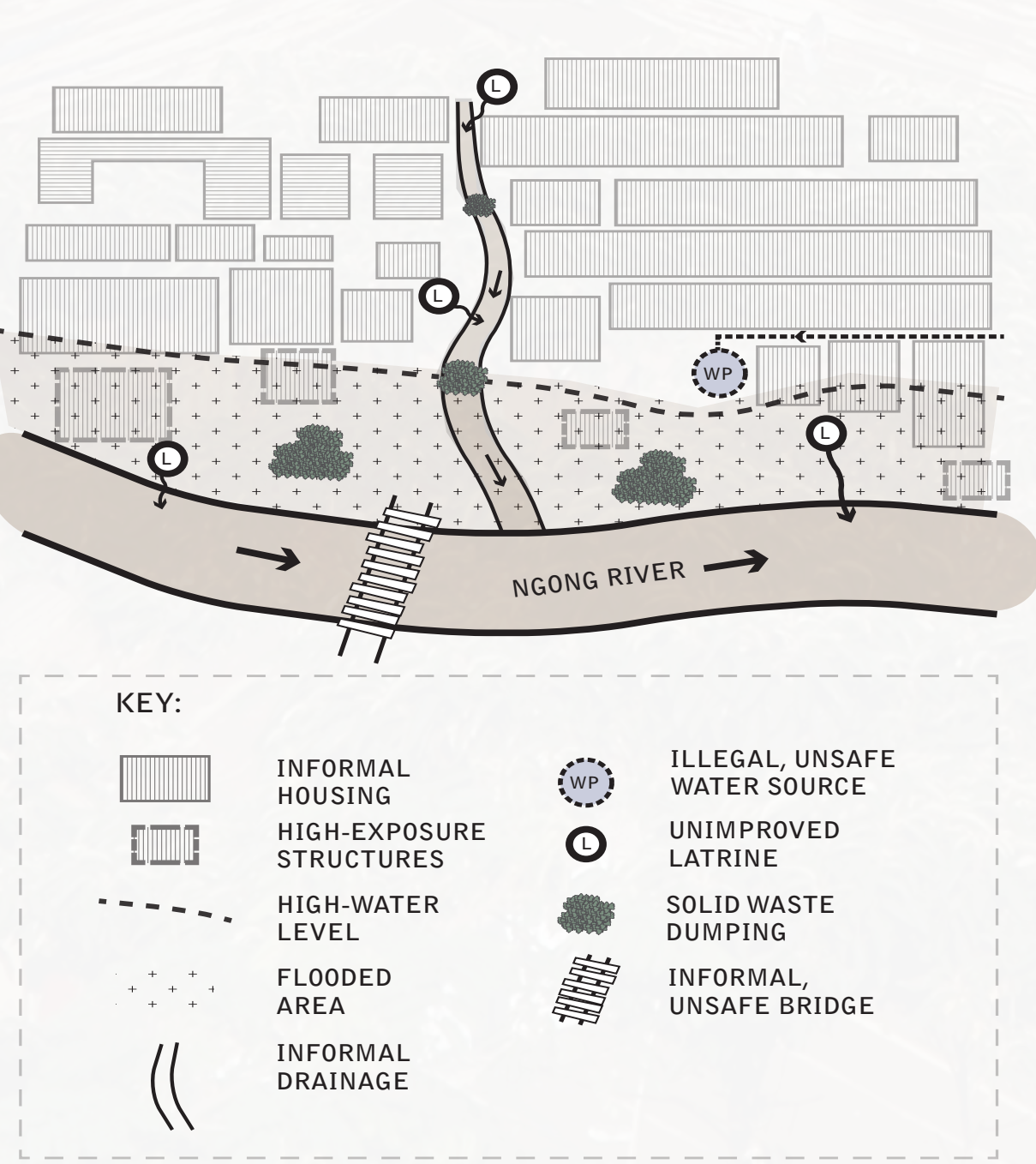
### Examples of autonomous adaptation in Kibera.



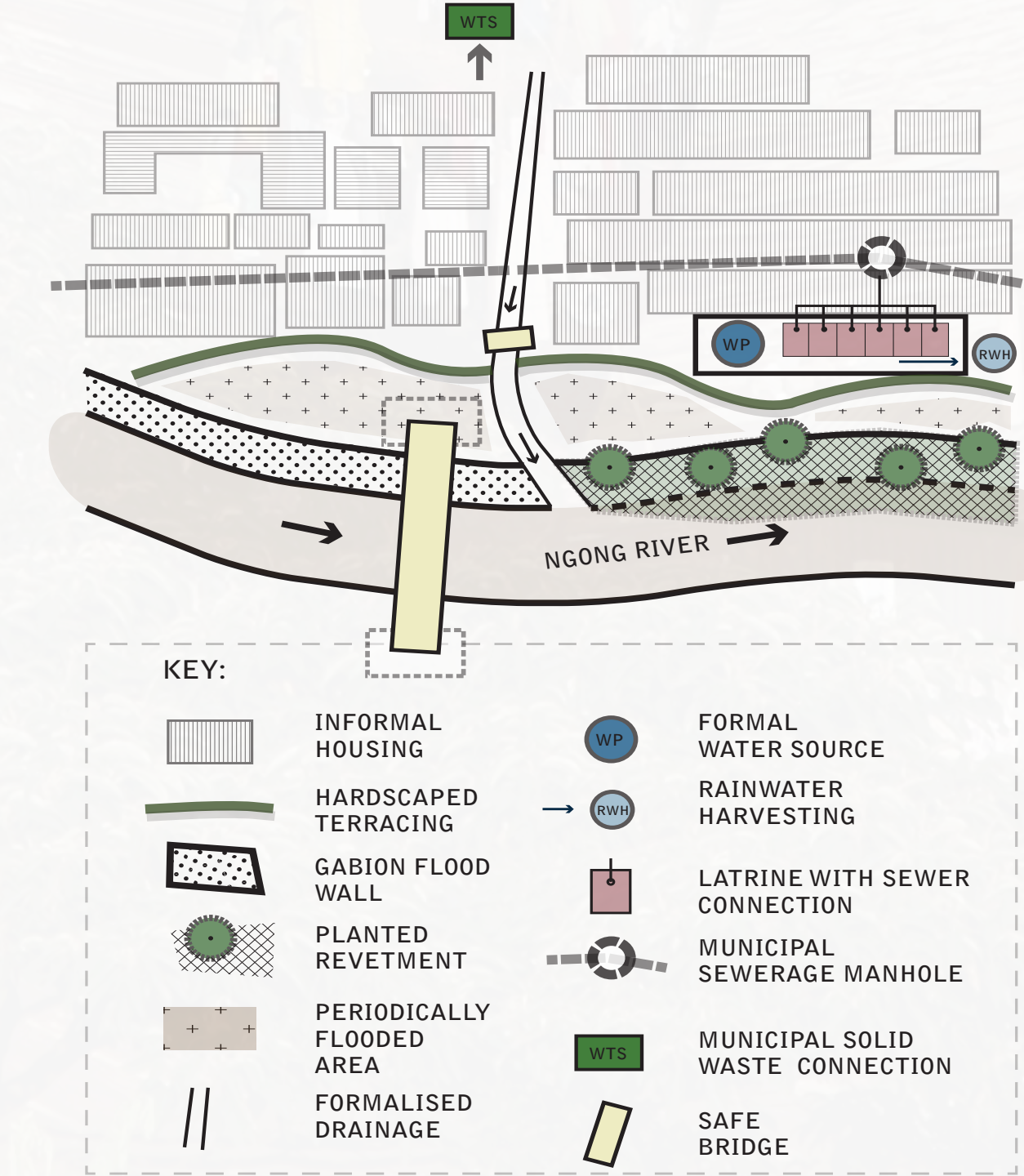
### Potential of “community-responsive adaptation” in linking resilience measures across scales. Adapted from Mulligan et al, 2016



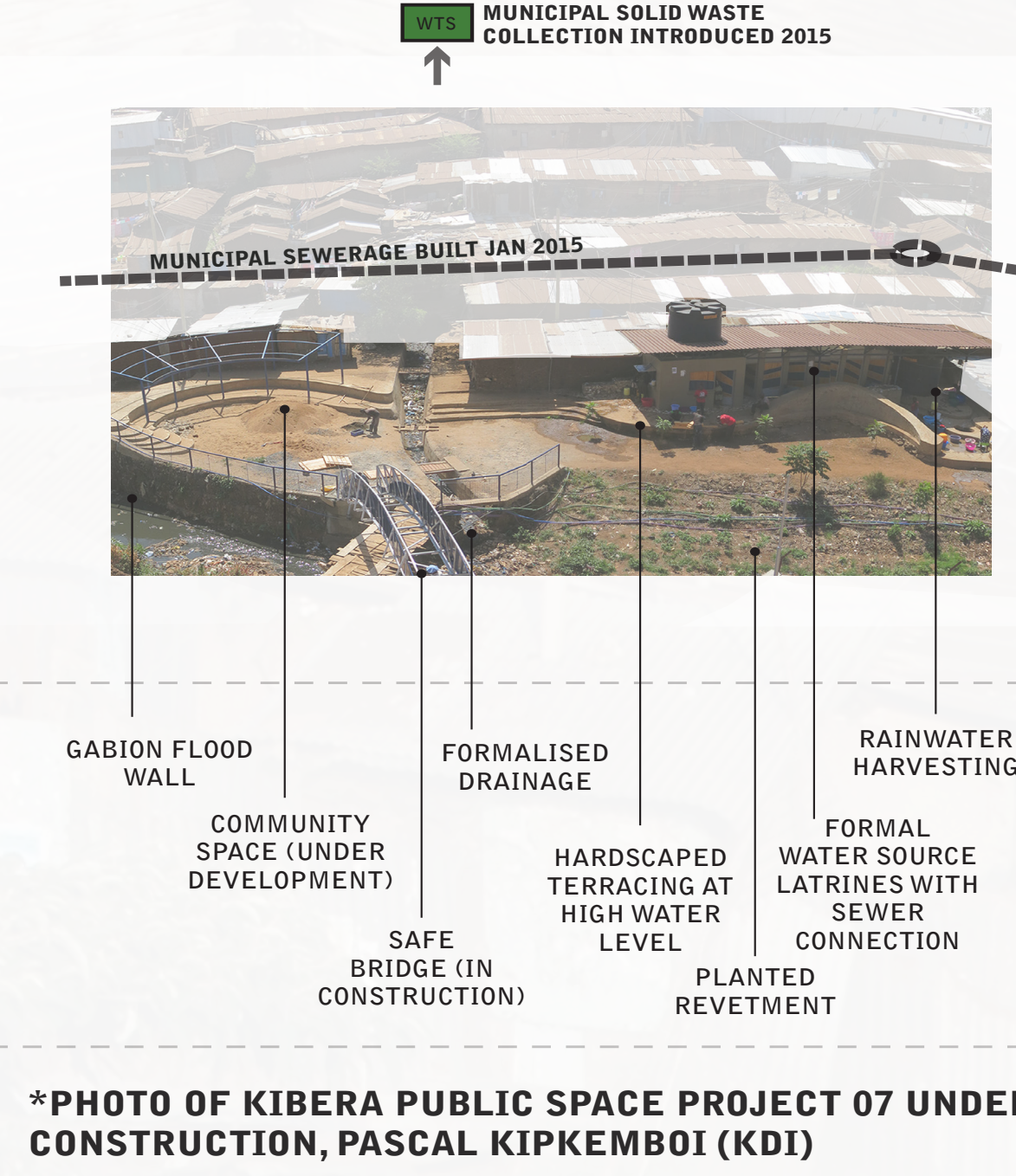
### 1. Typical Kibera Flooding Hotspot



### 2. “Community Responsive Adaptation”



### 3. Example of historical intervention



projects. The context for the study is Kibera, Nairobi’s most populous slum, which is exposed to high and increasing flood risk. Our study will provide the first systematic evidence on the delivery, costs and impact of a model of “Community-Responsive Adaptation” that integrates community and city-level climate adaptation efforts to reduce local flood risk.

## 4. Study Components

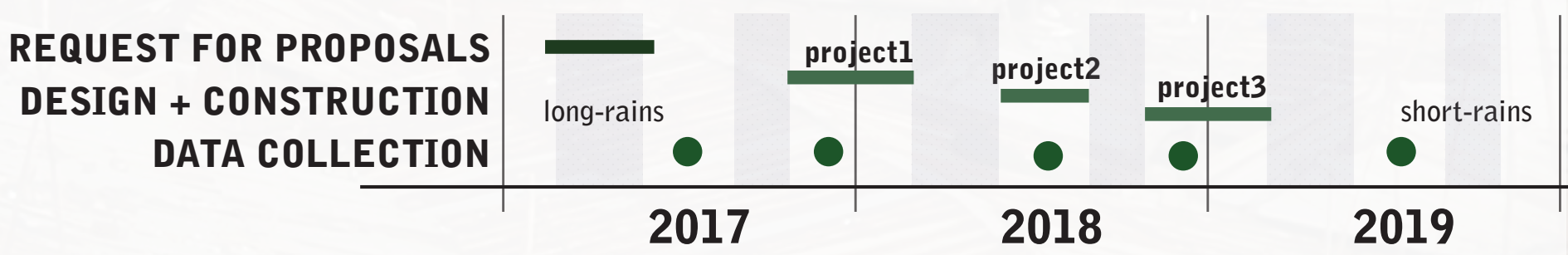
Our study has three components. First, we will co-design and implement a package of “Community-Responsive Adaptation” measures, which combine hard solutions (e.g. small-scale flood protection, drainage, rainwater harvesting) with soft interventions (e.g. flood preparedness, early-warning, solid waste management), at three high-exposure sites in Kibera, Nairobi, in partnership with community organisations and local government.

Second, we will quantify the impact of the package of “Community-Responsive Adaptation” measures on localised flood risk and vulnerability. To do this, we will carry out waves of a household survey in 1,500 households, before and after three rain seasons, across three treatment and three control sites. We will recruit both treatment and

control sites through a “Request for Proposals” issued to community groups in three areas with high-exposure to flooding in Kibera. We will evaluate the program’s impact on reported flood damages, impacts on health and other measures of welfare affected by flooding, as well as changes in housing investment, rents, health and effects on the movement of people.

Third, to evaluate the drivers for the effectiveness (or indeed, lack of effectiveness) of the different components of the package of interventions, we will carry out semi-structured interviews and focus group discussions with residents and other project stakeholders.

### Simplified Project Timeline



## 5. Expected Results

Our results will inform policy locally in Kibera, and other informal settlements across Kenya. However, other rapidly urbanising cities also face the fundamental challenges of informal housing encroaching in flood zones and a lack of an implementable spatial-planning policy to address the issue. As a result, we expect our results to have broad relevance across rapidly urbanizing cities in sub-Saharan Africa, and worldwide.

### Project Partners:



### Kibera household flooding in 2015 long-rains. Source: KDI

