

# Community-Led Climate Adaptation in Informal Settlements

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## GUIDANCE NOTE



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## Preface

This Guidance Note forms part of a wider project and global report on community-led climate adaptation in informal settlements. As part of the project, the World Bank piloted community-led data collection in two informal settlements in Dar es Salaam, Tanzania. Community members collected data in one settlement that had received infrastructure investments as part of the World Bank Dar es Salaam Metropolitan Development Project (DMDP phase 1) and another that had not. The findings, which helped validate some of the key points in the global report and this Note, will feed into ongoing operations of DMDP phase 2.

# 1. A bottom-up approach to climate adaptation in cities is essential and urgent

**Climate analysis suggests that some 3.6 billion people globally are currently exposed to extreme climate hazards.** Forecasts indicate that this could rise to more than 5 billion people by 2030 if temperatures are 1.5°C above pre-industrial levels.

**Fast-paced urbanization will add 2.2 billion people to city populations by 2050, with 90 percent of this growth occurring in Asia and Africa.** Rising populations, exposure to adverse weather events, and a lack of capacity in governments to manage growing demand for land and services mean that cities in developing countries face great risks from worsening climate conditions.

**Within cities, informal settlements, which frequently form a majority of residential development in rapidly growing cities, will be disproportionately affected.** The location of housing in high-risk areas, poor-quality building construction, a lack of access to basic services, and the impact of low incomes and poverty all increase the vulnerability of people to climate risks and limit their ability to adapt. These conditions also make informal settlements very complex environments to plan and implement upgrading and climate adaptation (Table 1). While the risks and difficulties

are widely recognized by governments and donor organizations, climate policy, finance, and the systems delivering climate adaptation have been slow to change. Most climate planning is driven nationally or sub-nationally in a top-down fashion, with limited focus on, engagement of, or disaggregated data about, low-income communities, where the risks are highest. Building a bottom-up approach is essential to:

- **Close information and knowledge gaps**—understanding populations and conditions in settlements is vital to designing and implementing solutions that reduce climate risks and contribute to poverty reduction;
- **Encourage governments to recognize that communities in informal settlements are part of the solution to climate adaptation**—particularly where a majority of housing and the economy is informal;
- **Deliver urban adaptation at scale**—by connecting top-down policy with bottom-up action, thus creating a more integrated approach to urban development;
- **Meet the vast costs of climate adaptation**—with up to one-third of annual household income in informal settlements spent on coping and recovering from climate conditions, there is huge potential to better align public and private investment to deliver adaptation; and
- **Build a shared ownership of change**—driving decision making to the local level by creating the structures for collaboration can create more inclusive and sustainable cities.



**Table 1: Characteristics of Informal Settlements and Implications for Climate Risk**

| Characteristic                                | Implications for Climate Risk   |
|---|---|
| Location of settlements                       | Marginal and at-risk locations increase the difficulty and costs of adaptation and upgrading. Settlements are often on sites that are unsuitable for housing because of environmental factors (e.g., landslides, flooding, coastal erosion).  |
| Household poverty                             | Multi-dimensional poverty compounds vulnerability to climate risks. When climate shocks hit, losses can diminish financial stability and resilience, reducing ability to cope with changing climate conditions.   |
| Building quality and settlement configuration | Construction materials have little structural integrity and homes may require rebuilding rather than adaptation, increasing costs and complexity. Unplanned settlements make construction access difficult, and settlements may require reconfiguration to allow installation of infrastructure and in situ climate adaptation.   |
| Lack of tenure security                       | The lack of legal status deters investment by both landlords and tenants to adapt dwellings. Contested ownership is a barrier to investment for donors and private sector. Local governments may use the illegal/informal ownership of land to justify excluding informal settlements from climate planning and city development. |
| Basic services and infrastructure             | Lack of access to services and infrastructure (e.g., water, sanitation, drainage, roads, energy supply) increase the vulnerability of settlements and the costs of adaptation actions. Weak commercial models for utilities <sup>1</sup> in informal settlements limit investment options.  |
| Unstable work and income                      | Reliance on informal employment produces low and unstable incomes that reduce the ability of people to invest in adaptation or afford and move to better and safer areas of the city that are close to places of work and markets.  |
| Loss of natural environments                  | The absence of green space and trees and the presence of impervious surfaces contribute to heat island effects and reduce the resilience of the environment to flooding and storm conditions.   |
| Information deficit                           | Limited access to disaggregated data (e.g., scientific, geospatial, qualitative) on climate risk and early-warning systems for informal settlements makes planning of adaptation difficult for governments, donors, and community members.  |

1 For example, access to improved urban infrastructure, such as sanitation, may not benefit low-income households that cannot afford connection fees or the costs of adaptations to homes. Results-based financing has used incentive models and subsidies to bridge affordability gaps and shift operational practice to improve service access. See for example World Bank. 2021. [Output-based Aid Sanitation Facility for Greater Accra in Ghana: RBF Case Study](#). World Bank GPRBA. Washington DC.

## 2. Organized Communities are Key Partners to Support World Bank Project Delivery



**Communities are a vital source of information, knowledge and experience about the conditions and needs of urban informal settlements.** Where housing and businesses are not registered and people lack rights of tenure, official data and maps often exclude informal settlements from public records. This creates a major gap in evidence and can undermine the accuracy and effectiveness of development, disaster reduction, and climate adaptations planned at a city or national level.

**Organized communities are a route to close this gap, when networks and non-governmental organizations (NGOs) have engaged and mobilized residents of informal settlements.** These organized groups:

- Provide **access to communities** that may be distrustful of outside organizations and officials;
- Have **leadership structures** to bring people together for meetings, consultation, and data collection on settlements and their needs;
- Provide **capacity to co-ordinate local actions**, such as waste reduction initiatives, tree planting, and community learning about climate risks; and
- Have the **credibility to involve under-represented groups**, such as women, youth, and refugees, to include their voices in discussions and data collection.

### Box 1. Global Networks of Grassroots Groups

- ✓ [Slum Dwellers International](#) (SDI), a network of grassroots and NGO affiliate groups in 30 countries.
- ✓ [Asian Coalition for Housing Rights](#) (ACHR), a regional network of community organizations working to tackle poverty and improve housing.
- ✓ [Women in Informal Employment Globalizing and Organizing](#) (WIEGO), a global network supporting workers in informal employment.

**While not all cities and informal settlement have set up organized structures, a growing number can be found either through information held by local government partners or via global networks, such as SDI (Box 1).** Where organized community groups exist, they can provide vital inputs into the planning and implementation of projects and have insights often unavailable through official sources.

**As part of project preparatory arrangements, mapping of community networks in target areas can help identify partners and gaps in local structures that need to be filled.** This can be vital information to assess the extent to which organized communities are able to participate as stakeholders or delivery partners and what level of support is needed to enable bottom-up upgrading and climate adaptation.

**When organized community structures do not exist, flexible funding can be used to support community development activity, bringing together residents.** This can be an extension of World Bank project engagement and support of networking groups (such as those found in Box 1) to mobilize community members.

### 3. Community-led Data Collection as an Entry Point for Urban, Disaster Risk Management, and Land Projects

**Commissioning community-led data collection can be an effective way to establish a relationship with leaders and residents of informal settlements and gain insights into the contexts and conditions for project delivery.** Building on information already available, World Bank project teams can conduct targeted data collection at a relatively low cost (community-led household surveys and qualitative tools in one or two informal settlements cost between US\$15,000 and US\$25,000) and be completed in about 12-16 weeks.

**Community-led data collection adds value to standard engagement and context analysis by drilling down spatially into targeted settlements and exploring perceptions, experiences, and local responses to adverse environmental, economic, or climate conditions.** It is scalable, flexible, and adaptable to changing conditions, as found during the COVID-19 pandemic.

**The use of community-led data collection can complement official and technical data to provide a fuller picture of local conditions (Table 2).** Community-led data can provide in-depth information that not only fills gaps, but also provides insights into the perceptions and behaviors of target communities:

- **Understanding nuances** helps to more effectively target delivery to benefit the most vulnerable communities;
- **Geo-spatial analysis** shows variation in need that can be used to focus investment;
- **Linking social, economic, and environmental data** highlights structural issues of exclusion by such factors as gender, age, and ethnicity; and
- **Mapping coping strategies** may identify effective and scalable local solutions to development or climate challenges.

**Table 2: Complementing State and Community-led Data**

| Topic                     | Barrier to Accurate Data   | State-led Data Sources                            | Community-led Data Actions  | Examples of Outputs from Community-led Data Collection  |
|---------------------------|--|---|---|---|
| Urban populations         | Informality, lack of citizen registration, and cadastral (land records and property boundaries) data | Census of people in registered/ formal properties | Settlement enumerations of populations                            | <ul style="list-style-type: none"> <li>- Mapping of boundaries of informal settlements</li> <li>- Demographic profile of residents</li> <li>- Housing condition surveys</li> </ul>  |
| Poverty levels            | Majority of employment is informal   | Formal work, income and tax data                  | Local-level surveys on sources of income and expenditure          | <ul style="list-style-type: none"> <li>- Patterns and sources of earnings</li> <li>- Living costs relative to income</li> <li>- Savings and reliance on remittances</li> </ul>  |
| Access to services        | Illegal tapping and use of commercial services, such as electricity and water                        | Public service and utilities customer data        | Surveys of service access points, costs, and uptake               | <ul style="list-style-type: none"> <li>- Mapping of service (e.g., water points) availability</li> <li>- Costs and reliability of service provision</li> <li>- Identify barriers to using services and impacts</li> </ul> |
| Exposure to climate risks | Impacts unreported to government   | High-level weather and remote sensing mapping     | Local-level experience and impact mapping in informal settlements | <ul style="list-style-type: none"> <li>- Perceptions of changing climate conditions</li> <li>- Impacts on health and livelihoods</li> <li>- Types and costs of coping strategies</li> </ul>                               |

**Early engagement of organized communities is important to define specific data gaps and the need for additional data collection beyond project consultation arrangements.** As part of the context and technical analysis, World Bank teams have the opportunity to define data collection objectives with organized community groups. Scoping additional data collection on specific knowledge gaps is key to ensuring added value (Box 2).

### **Box 2. Questions for Designing Community-led Data Collection**

- ✓ **Spatial**—Are informal settlements mapped? How have they changed over time? Are they located in places of high risk? Are they shown in planning documents? What is the population of settlements? Where do new residents/migrants come from?
- ✓ **Physical**—How are settlements configured? Do they connect with city service infrastructure? How are buildings constructed? How do people access health and education services? Are the settlements serviced by transport systems? Are they vulnerable to fire, flooding, and other disasters? Do they have waste collection? Do they have secure tenure? How much do they pay for basic services? Are the service delivery points functional?
- ✓ **Social and security**—What is the demographic profile? Are there social or political tensions? What are the primary risks for residents (e.g., health)? Who is vulnerable to social or security risks?
- ✓ **Economic**—What is the primary source of employment? What are average local earnings? Are there job opportunities for youth, women, or minority groups? What is the average level of educational attainment? Are most people working in the informal sector? How much do they spend on climate adaptation every year?
- ✓ **Institutional**—How does local government perceive the settlement? Are there existing tensions? Has the government sought to engage residents? Are residents politically engaged?





**Grassroots groups and NGOs may lack financial and technical capacity to undertake data collection without World Bank support.** Their principal strength is their social networks. In most cases, community leaders will work with an NGO partner experienced in undertaking research, using data management tools and Geographic Information Systems (GIS). The output of these partnerships can be vitally important, as was found during COVID-19, to inform public policy and action. (Box 3 and Appendix 1 provide examples of data generated by communities across eight cities.)

**Working with community partners will require Bank teams to consider:**

- **Contracting arrangements**—to provide grant or performance payments structured to reflect limited financial capacity;
- **Technical training**—using World Bank expertise or partners such as research institutes and universities to support skills development within grassroots groups or NGOs (Box 3); and
- **Political contexts**—to allow sufficient time for local groups to get permission and support from community and political leaders.



**Along with gathering new and additional data to inform project design and implementation, strengthening community capacity to undertake data collection has other important benefits.** These can be useful in the short-term to mobilize communities and obtain vital information and also have a longer-term impact on the capacity of communities to develop and lead local level upgrading or adaptation, including:

- **Building local understanding** of environmental and climate risks and the actions and behaviors that can reduce risks;
- **Strengthening skills and confidence** of residents of informal settlements to be stakeholders and hold governments to account;
- **Making space for collaboration**, including overcoming negative perceptions and demonstrating that partnerships between communities and government can work;
- **Enhancing community structures**, including building local capacity and legitimizing the role of community groups as stakeholders; and
- **Creating capacity for local action**, including enabling communities to use data to plan locally led actions that can complement city development and adaptation programs.

**Box 3. Examples of Designing-in Community-led Data Collection**

**Indonesia**—The World Bank has used Community Spatial Development Plans to enable communities, with support from urban planners, to develop five-year plans for infrastructure and service provision. Active engagement of community members, through networks and a program of data collection, workshops, and collaborative planning events were used to involve residents of target settlements in the development of slum upgrading programs. Data collection included the social, economic, and spatial dimensions of poverty and environmental conditions, which enabled the program to achieve both hard targets and improvements in quality of life.

**Republic of Congo**—The World Bank trained residents of informal settlements in Brazzaville in open-source mapping to capture local experiences of floods, erosion, and other natural disasters affecting the targeted settlements. Being able to collect and digitalize local knowledge and perceptions of climate risk improved the targeting of investment and created an information resource for community-led adaptation actions.

**Kenya**—The World Bank slum improvement program produced community-upgrading plans. Locally led Settlement Executive Committees ensured that upgrading plans reflected the priorities of communities, led local mobilization, linked residents to program managers, and facilitated enumerations and production of plans.

**Community-led data collection is best initiated at the start of projects but can be introduced at any point in the delivery cycle.** There is a range of experience across World Bank teams of integrating community-led data collection into governance and delivery structures that can be built upon (Box 4).

Community-led data collection can be built into each stage of approved projects. The World Bank has a key role to support and challenge governments to engage communities, using community-led data collection to build skills and organizational capacity to lead upgrading and adaptation actions. Community-led data collection can take many forms in relation to the project stage and activity (Figure 1). Tailored to the specific needs of projects, community-led data collection can provide insight into all types of World Bank delivery activity.



#### **Box 4. Community-led Data Collection, Dar es Salaam**

The World Bank conducted a pilot community-led data collection project in two informal settlements in Dar es Salaam in 2024 to investigate the experiences and impacts of changing climate conditions and the coping strategies of local residents. The pilot contributed data and insights into a [global report](#) and also generated a [local report](#) on specific interventions to reduce vulnerability and build community adaptive capacity.

The data provided insights into the relationships between household income and coping with climate change (Appendix 2 shows extracts from the data collection). The data showed how residents are locked into short-term patterns of repair and recovery that do little to reduce their long-term exposure to risk. The economic consequence of weather events is significant, with residents estimated to spend up to one third of their annual income on coping with climate conditions.

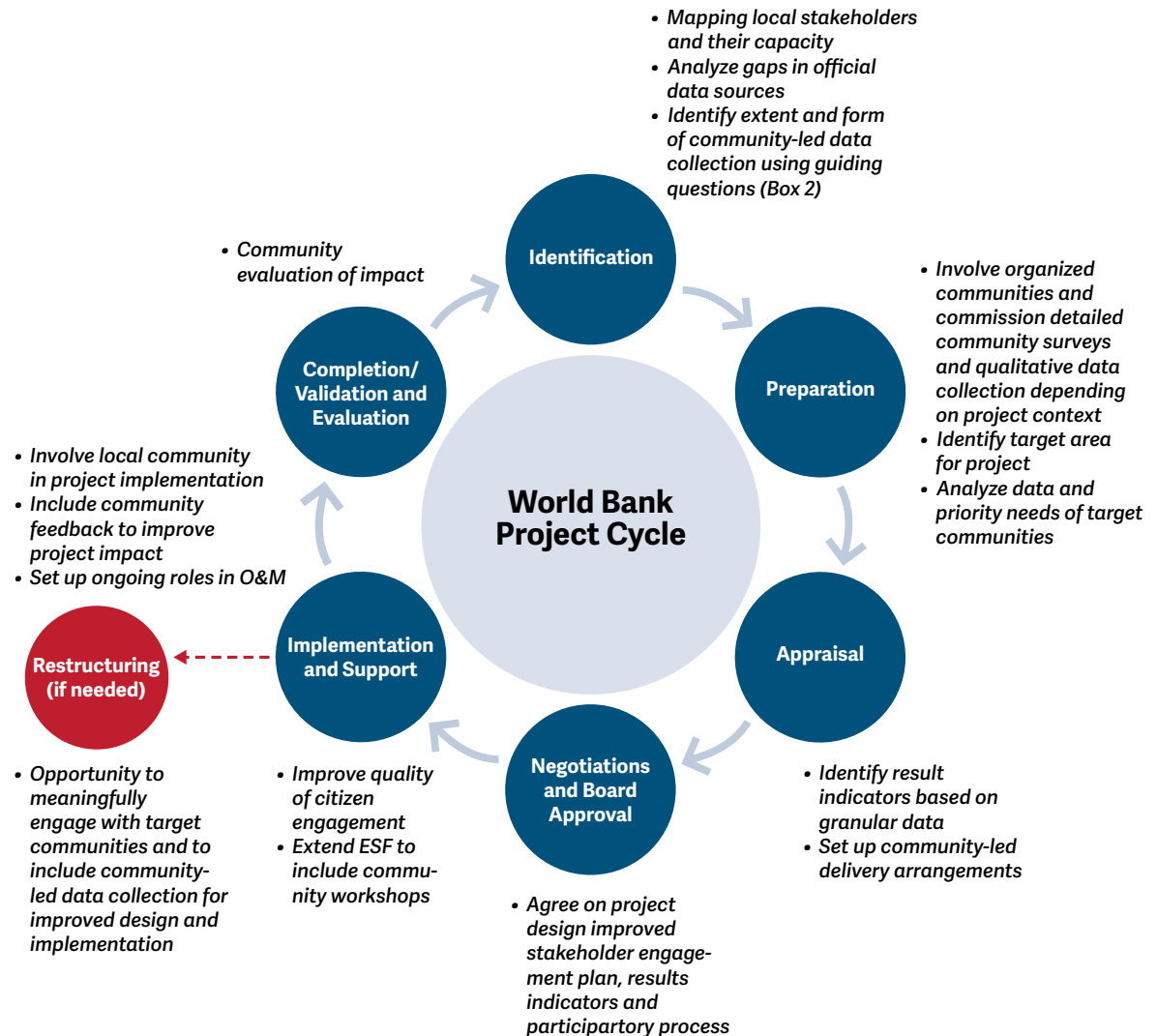
The project underlines the value of in-depth and disaggregated data and contributes to further stages of the World Bank's Dar es Salaam Metropolitan Development Project. The process of community training and research is replicable to other contexts and provides the basis for standardizing community-led data collection.

## 4. Community-led Data Collection Through the Project Cycle

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**Figure 1: Entry Points for Community-led Data Collection During the World Bank Project Cycle**



**Table 3: Community Participation Across the Settlement Upgrading Process**

| Stage                                   | Initiation  | Planning   | Design   | Implementation   | Operation and Maintenance  |
|---|---|--|--|--|--|
| <b>World Bank / National Government</b> | <ul style="list-style-type: none"> <li>• Problem scoping</li> <li>• Gather evidence on context and challenges</li> <li>• Define geographies for interventions</li> <li>• Technical and context appraisal</li> <li>• Stakeholder engagement</li> </ul> | <ul style="list-style-type: none"> <li>• Project and financial plans</li> <li>• Impact assessments</li> <li>• Monitoring framework</li> <li>• Community-upgrading plans</li> </ul>                           | <ul style="list-style-type: none"> <li>• Feasibility and technical design project elements</li> <li>• Contract setting and issue</li> <li>• Institutional strengthening</li> <li>• Delivery plans</li> </ul> | <ul style="list-style-type: none"> <li>• Management of project delivery</li> <li>• Performance and payments</li> <li>• Project adjustments</li> <li>• Progress evaluation</li> </ul>         | <ul style="list-style-type: none"> <li>• Handover to national/ local government</li> <li>• Contract for ongoing maintenance</li> <li>• Manage ongoing operation</li> </ul> |
| <b>Coordinating Actions</b>             | <ul style="list-style-type: none"> <li>• Test government capacity for community-led action</li> <li>• Gap analysis and align and official and local-level data</li> </ul>   | <ul style="list-style-type: none"> <li>• Make space for local discussions and inputs into plans</li> </ul>   | <ul style="list-style-type: none"> <li>• Identify opportunities for complementary community action</li> </ul>  | <ul style="list-style-type: none"> <li>• Enable communities to provide feedback during delivery</li> </ul>   | <ul style="list-style-type: none"> <li>• Provide training and contracts for communities to support O&amp;M of improvements</li> </ul>                                      |
| <b>Community-led Data Collection</b>    | <ul style="list-style-type: none"> <li>• Engage local leaders to build dialogue and trust</li> <li>• Hold workshops/public meetings</li> <li>• Identify local priorities</li> <li>• Collect/ collate existing mapping/ research data</li> </ul>       | <ul style="list-style-type: none"> <li>• Workshop objective setting</li> <li>• Visioning/planning meetings</li> <li>• Community mapping/ GIS</li> <li>• Household surveys</li> <li>• Focus groups</li> </ul> | <ul style="list-style-type: none"> <li>• Design workshops</li> <li>• Commission community works</li> <li>• Design collection action</li> </ul>   | <ul style="list-style-type: none"> <li>• Oversight and feedback groups</li> <li>• Volunteer local action, e.g., solid waste management clearance</li> <li>• Community contracting</li> </ul> | <ul style="list-style-type: none"> <li>• Committees provide feedback on operational performance</li> <li>• Undertake small maintenance works</li> </ul>                    |

Source: Adapted from World Bank. 2021. *Guidance Note on Community Participation in Slum Upgrading*. World Bank. Washington DC.

## 5. Incentivizing and Embedding Community-led Action

### Community-led data collection and local climate action can be supported either as stand-alone learning projects or incorporated into wider programs of work.

In both cases, World Bank teams can use a mix of grants and performance Results-based Finance (RBF) to create the capacity and incentives to build the capability of grassroots organizations to be effective stakeholders in urban development and adaptation projects. Bank teams have several options to fund, incentivize, and embed community-led actions (Table 4).

**Table 4: Funding Community-led Action**

| What Needs to be Funded  | Intended Outcome  | Grant Funding  | RBF Funding   |
|--|---|--|---|
| Engaging local leaders and building structures for collaboration                           | <ul style="list-style-type: none"> <li>Strengthening community involvement through the project cycle</li> </ul>                         | <ul style="list-style-type: none"> <li>Stakeholder, consultation, and grievance committee structures</li> </ul>            | <ul style="list-style-type: none"> <li>Incentivize active participation and ownership of improvements</li> </ul>                      |
| Strengthening institutional systems to include community-led action                        | <ul style="list-style-type: none"> <li>Institutional systems have the capacity to support community-led action</li> </ul>               | <ul style="list-style-type: none"> <li>Investment in national/local government staffing, skills, and technology</li> </ul> | <ul style="list-style-type: none"> <li>Incentivize improvements to administration to enable community contracting</li> </ul>          |
| Training and capacity building for grassroots groups and NGOs                              | <ul style="list-style-type: none"> <li>Local groups are able to develop and retain skills to undertake quality research</li> </ul>      | <ul style="list-style-type: none"> <li>Commissioned technical and contexts reports</li> </ul>                              | <ul style="list-style-type: none"> <li>Performance fund to improve skills and technical capacity of grassroots groups/NGOs</li> </ul> |
| Data collection exercises undertaken by community members and their NGO partners           | <ul style="list-style-type: none"> <li>Communities use and own data to influence governments and undertake collective action</li> </ul> | <ul style="list-style-type: none"> <li>Consultation activity and production of community plans</li> </ul>                  | <ul style="list-style-type: none"> <li>Fund targeted data collection to identify and engage most vulnerable target groups</li> </ul>  |
| Extending public service infrastructure to informal settlement                             | <ul style="list-style-type: none"> <li>Improved provision and access to basic services in informal settlements.</li> </ul>              | <ul style="list-style-type: none"> <li>Procurement of capital works and improvements</li> </ul>                            | <ul style="list-style-type: none"> <li>Subsidy funding to reduce set-up costs that allow service markets to function</li> </ul>       |
| Planning and delivery of community collective upgrading and adaptation actions             | <ul style="list-style-type: none"> <li>Increased level of community and collective investment in improved housing</li> </ul>            | <ul style="list-style-type: none"> <li>Improvement to city infrastructure systems and networks</li> </ul>                  | <ul style="list-style-type: none"> <li>Incentivize household investment in 'last yard' infrastructure connections</li> </ul>          |
| Closing finance gaps for private/ social enterprise investment in settlements and services | <ul style="list-style-type: none"> <li>Diversified sources of funding used to deliver settlement upgrading and adaptation</li> </ul>    | <ul style="list-style-type: none"> <li>Rising economic performance and land values from urban improvements</li> </ul>      | <ul style="list-style-type: none"> <li>Leverage private and social capital investment in settlements</li> </ul>                       |

**RBF is a flexible but underused financial instrument that can support community-led actions at all stages of a project cycle.**

It is particularly effective when aligned with large-scale grant funding to drive innovation or to overcome institutional blockages to improve targeting of delivery.

RBF's focus on performance and outcomes creates space for tailoring delivery to meet the specific needs of vulnerable social groups or underserved areas, such as informal settlements. It can be structured to reflect limited capacity of delivery partners, such as grassroots organizations in fragile contexts, balancing grant payments with performance-driven targeting and incentives.

RBF can be used to incentivize the behaviors of key stakeholder groups and be used through various forms of financing agreement, from results-based grant aid through to payment by results and impact bonds (Figure 2).

RBF also can support and incentivize community-based organizations and would be particularly suitable when grassroots groups are working collaboratively or under contract with local authorities. A key role for RBF is to influence and strengthen local government systems to position community-led action as an acceptable form of delivery

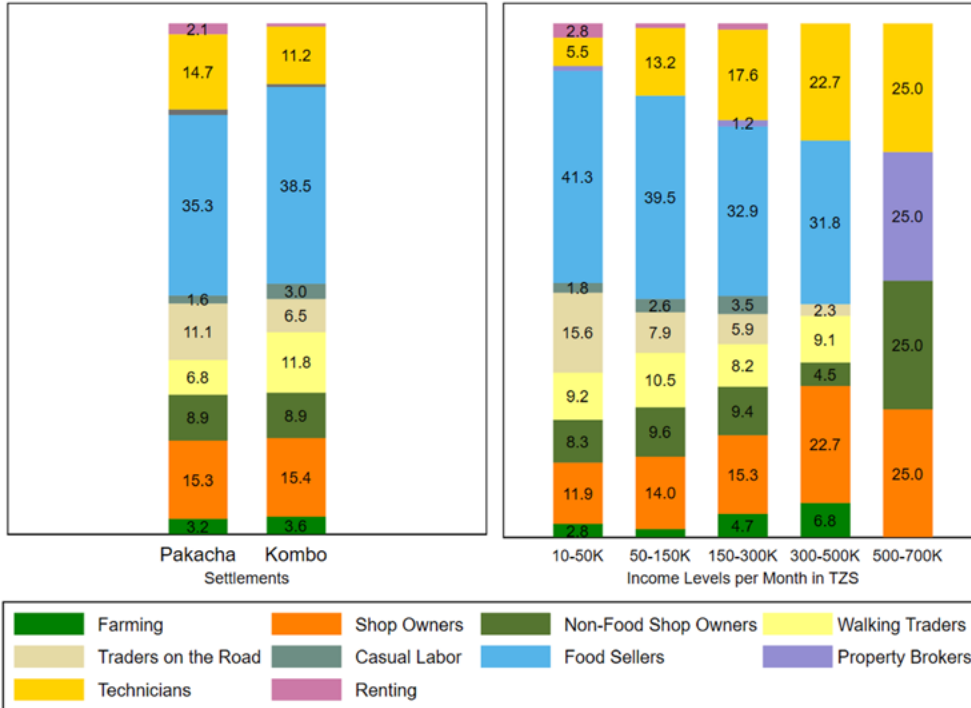
**Figure 2: Overview of RBF Instruments**

| LEVEL OF CHANGE        | SYSTEM  |  | PROGRAM  |   |  |  |
|------------------------|---|--|--|---|--|--|
| INTERVENTION MATURITY  |   |  |  |   |  |  |
| INTENDED EFFECT OF RBF | <b>Strengthening Institutional Capacity &amp; Enhancing Effectiveness</b><br>                                 | <b>Scaling Cost-effective, Evidence-based Programs</b><br>   |  | <b>Catalyzing the Adoption of Promising Interventions</b><br>       | <b>Encouraging Outcomes-oriented Interventions</b><br>   |  |
| RBF INSTRUMENT         | Results-based Aid   | Performance-based loans  | Performance-based transfer   | Performance-based contracts   | Impact bonds   | Prized-based challenges  |
|                        | A multilateral agency or a foreign government awards resources to a government if predefined results are met. | A development bank provides a loan to the government with disbursements conditioned upon the achievement of pre-defined results. | An intragovernmental fiscal transfer based on the achievement of predefined results. | A service provider receives payments if predefined results are met. | An investor provides upfront capital to a service provider and only gets paid back by the government (SIB) or I donor (DIB) if the predefined results are reached. | An open bid competition that awards a predefined prize for the best innovation developed in a predefined time. |
| INCENTIVIZED ACTOR     | <b>National Government</b>  | <b>Local Government</b>  | <b>Service Provider</b>  |   |  |  |
| OUTCOME PAYER          | <b>Multilateral or Bilateral</b>  |  | <b>National Government</b>   |   | <b>Donor/Government</b>  |  |

Source: GPRBA. 2024. Using Results-based Financing to Address Forced Displacement in Cities. Global Partnership for Result-Based Approaches (GPRBA). World Bank. Washington, DC.

**Appendix 1: Sample Data Collected by CCI & Federation Team**

Sectors of Self Employment and Income Levels per Month (%)



| What impact does extreme heat have on health? | Percent |
|---|---------|
| Skin condition / problems                     | 52.86   |
| Respiratory diseases                          | 11.90   |
| Dehydration                                   | 9.76    |
| Heat exhaustion                               | 6.43    |
| Cardiovascular problems                       | 5.00    |
| Dizziness and Fatigue                         | 4.52    |
| Heat stress                                   | 4.29    |
| UTI-Urinary Tract Infections                  | 4.29    |
| Heatstroke                                    | 0.24    |
| Faint   | 0.71    |

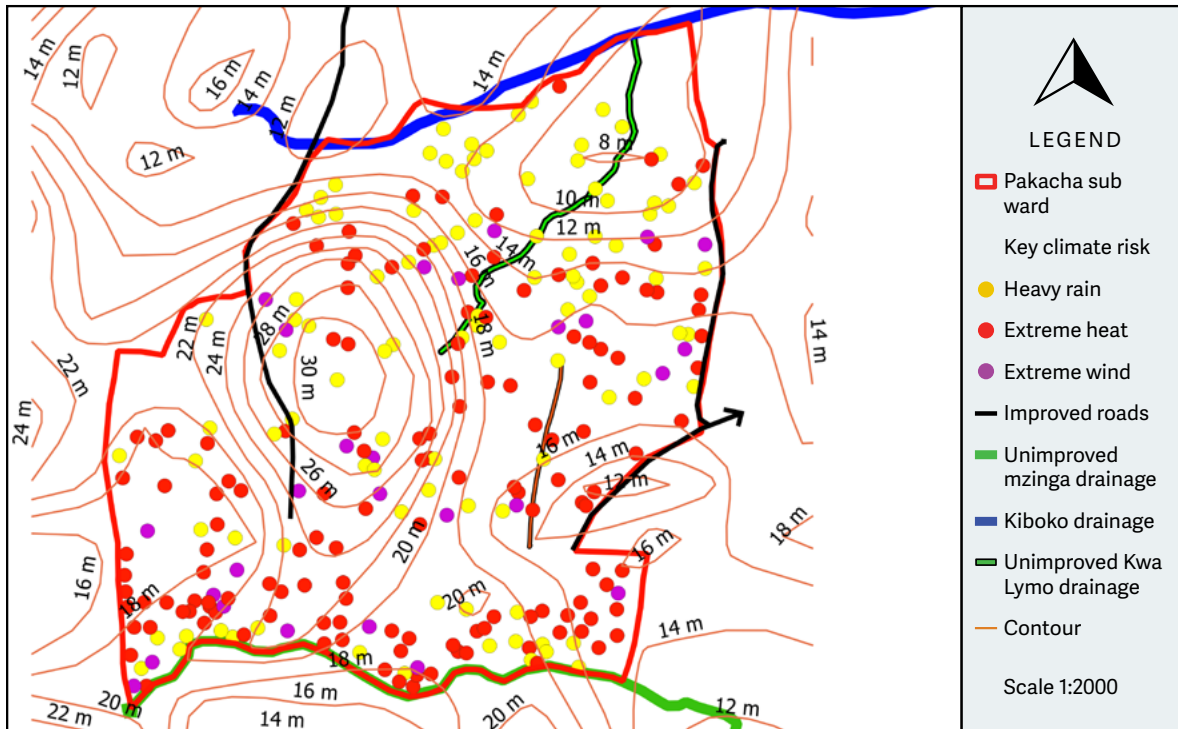
### Temporary Relocation Due to Climate Risks, Kombo



| What actions do households take to reduce risk of flooding? | Percent |
|---|---------|
| Improve drainage  | 31.99   |
| Waterproof walls  | 28.53   |
| Repair roofs  | 12.68   |
| Raise foundation  | 10.09   |
| Uplift doorsteps  | 9.51    |
| Use sandbags  | 6.05    |
| Second storey added   | 1.15    |

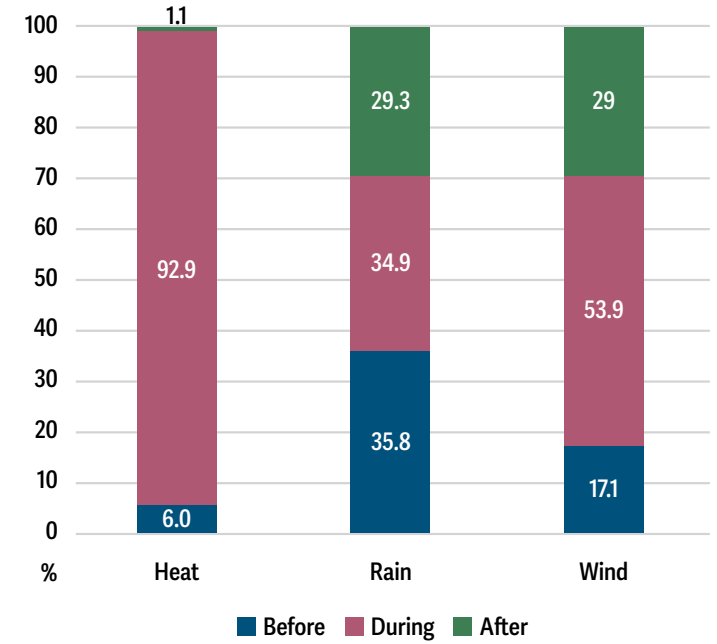


### Spatial Mapping of Risk Perception, Pakacha



Note: Perceptions of climate risk change with topography, those in lower ground and near unimproved water courses see flooding as the main threat

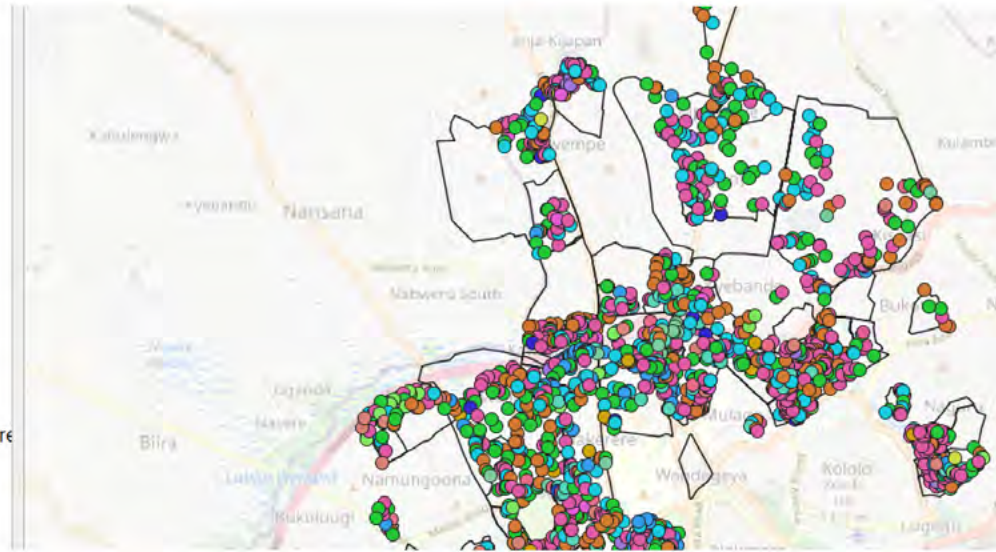
### When People Take Action to Cope with Climate Risks



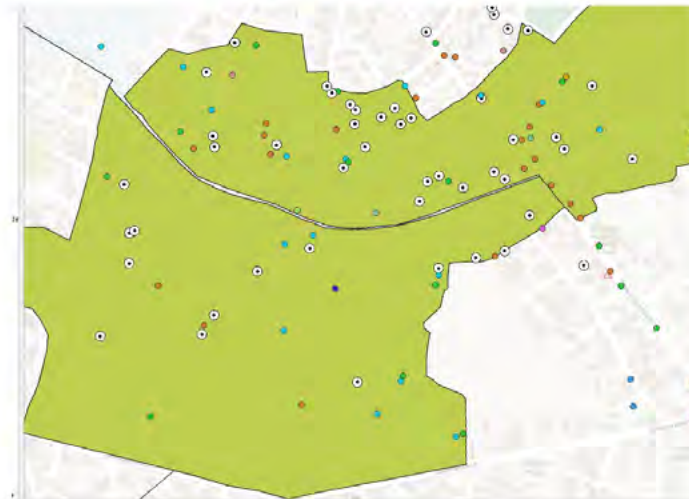
Note: Very little preparation for climate risks, with most reactive responses during or after the event.

**Appendix 2: Sample GIS data collected by SDI team**

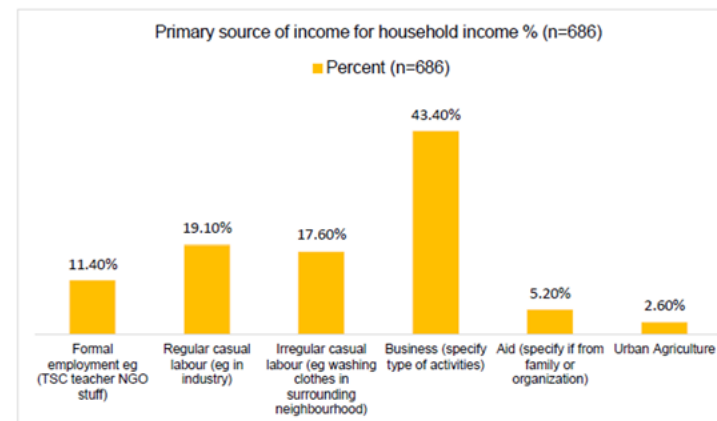
- ✓ ● Community Kitchen
- ✓ ● Education Facility
- ✓ ● Flood light
- ✓ ● Garage
- ✓ ● Handwashing Facility
- ✓ ● Health facility
- ✓ ● Local Administrative Office
- ✓ ● Local Organization/NGO office
- ✓ ● Market
- ✓ ● Open Space
- ✓ ● Others
- ✓ ● Police Station
- ✓ ● Religious institution
- ✓ ● Social Hall/Community Centre/Resource Centre
- ✓ ● Toilet Facility
- ✓ ● Waste Collection Bin/Open Dumping Area
- ✓ ● Water point



| Rank    | List the communities 5 most important priorities. What are the most important problems you wish to solve as a community? | Count |
|---------|--|-------|
| Rank 1  | Drainage/ Transportation   | 53    |
| Rank 2  | Sanitation/ Sewerage   | 47    |
| Rank 3  | Livelihoods  | 45    |
| Rank 4  | Security/ Peace and Order  | 40    |
| Rank 5  | Water  | 34    |
| Rank 6  | Electricity  | 20    |
| Rank 7  | Housing/ Land tenure   | 16    |
| Rank 8  | Garbage management   | 5     |
| Rank 9  | Health Issues  | 5     |
| Rank 10 | Education  | 3     |
| Rank 11 | Community Hall   | 2     |
| Rank 12 | Street Lights  | 1     |



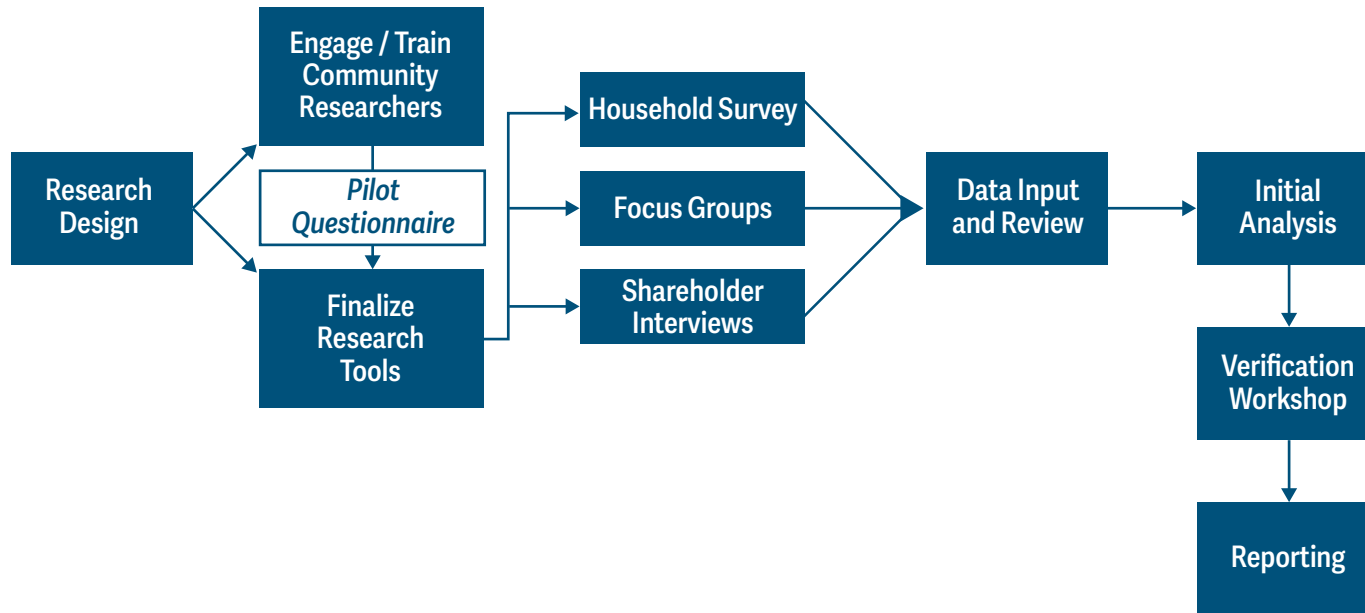
| Facility_T  | Type_of_wa          | Source_of_                | Water_cost | Facilities         | Functional | Function_1           | Status      | Managing_a         |
|-------------|---------------------|---------------------------|------------|--------------------|------------|----------------------|-------------|--------------------|
| Water point | Individual water... | Main Water Network (NWSC) | 100 Ugx    | NA                 | Yes        | Yes - Always fun...  | Good        | Individual (e.g... |
| Water point | Water kiosk         | Main Water Network (NWSC) | 200 Ugx    | None               | Yes        | Yes - Always fun...  | Good        | Individual (e.g... |
| Water point | Public water tap    | Main Water Network (NWSC) | 100 Ugx    | N/A                | Yes        | Yes - Always fun...  | Fair        | Government         |
| Water point | Individual water... | Main Water Network (NWSC) | 100 Ugx    | None               | Yes        | Yes - Always fun...  | Fair        | Individual (e.g... |
| Water point | Individual water... | Main Water Network (NWSC) | 200 Ugx    | Clinic             | Yes        | Very rarely funct... | Fair        | Individual (e.g... |
| Water point | Individual water... | Main Water Network (NWSC) | 100 Ugx    | Not applicable     | No         | No - has not fu...   | Dilapidated | Individual (e.g... |
| Water point | Borehole            | Private Borehole/Well     | Free Water | Non                | Yes        | Yes - Always fun...  | Good        | NGO                |
| Water point | Public water tap    | Main Water Network (NWSC) | 200 Ugx    | N/A                | Yes        | Yes - Always fun...  | Good        | Individual (e.g... |
| Water point | Individual water... | Main Water Network (NWSC) | 200 Ugx    | Spare parts        | Yes        | Yes - Always fun...  | Good        | Individual (e.g... |
| Water point | Individual water... | Main Water Network (NWSC) | 200 Ugx    | Motorcycle spar... | Yes        | Yes - Always fun...  | Fair        | Individual (e.g... |
| Water point | Public water tap    | Main Water Network (NWSC) | 100 Ugx    | N/A                | Yes        | Yes - Always fun...  | Good        | Private Compar     |
| Water point | Public water tap    | Main Water Network (NWSC) | 200 Ugx    | Health center      | Yes        | Yes - Always fun...  | Good        | Community Gr       |
| Water point | Individual water... | Main Water Network (NWSC) | Free Water | Church Great mi... | Yes        | Yes - Always fun...  | Dilapidated | Individual (e.g... |
| Water point | Public water tap    | Main Water Network (NWSC) | 100 Ugx    | NA                 | No         | Rarely functions...  | Dilapidated | Community Gr       |
| Water point | Public water tap    | Main Water Network (NWSC) | 200 Ugx    | NA                 | Yes        | Yes - Always fun...  | Good        | Individual (e.g... |
| Water point | Public water tap    | Main Water Network (NWSC) | 200 Ugx    | NA                 | Yes        | Yes - Always fun...  | Good        | Individual (e.g... |
| Water point | Public water tap    | Main Water Network (NWSC) | 200 Ugx    | NA                 | Yes        | Yes - Always fun...  | Good        | Individual (e.g... |
| Water point | Public water tap    | Main Water Network (NWSC) | 200 Ugx    | NA                 | Yes        | Yes - Always fun...  | Good        | Individual (e.g... |



| When was the settlement Established? | Land Tenure?               | Has the settlement ever faced eviction? | Is the Settlement Currently under the threat of eviction? | What is the Settlement size (Acres)? | How many Households live in the Settlement? | Estimate Number of People living in the Settlement | relation to the Settlements Location, Poses a Risk to the Settlement | Why is the Settlement considered dangerous? | What are some of the Natural Disasters experienced in the Settlement in the past? | What faced ang Social Problems in the last 12 | Concerns of the Community related to | Structures in the Settlement are used for Residential Purposes Only? | Structures in the Settlement are used for Business Only? | How many Structures in the Settlement are used for Business Only? | other Structures are in the Settlement | Total Number of Structures in the Settlement | ment Connected to the Main Sewer | Public Toilets in the Settlement? |
|--------------------------------------|----------------------------|---|---|--------------------------------------|---|--|--|---|---|---|--------------------------------------|--|--|---|--|--|----------------------------------|-----------------------------------|
| 1972                                 | Community land             | Yes                                     | Yes   | 411                                  | 2245  | 11225  | Road side, open  | Insecurity.                                 | -   | Evictions, ri                                 | Mugging, ro                          | 826  | 7  | 70  | 293                                    | 1196   | No                               | 8                                 |
| 1945                                 | Private land               | Yes                                     | Yes   | 143.88                               | 3605  | 23940  | Road side, area t  | Floods                                      | Floods, strong winds.   | Crime, com                                    | Mugging, hc                          | 1067   | 9  | 123   | 497                                    | 1698   | No                               | 40                                |
| 1945                                 | Riparian reserve (80%), Pr | Yes                                     | Yes   | 90.99                                | 2476  | 13808  | Sinking soil, water  | Wild animals, flo                           | Floods, earthquakes.  | Evictions, c                                  | Drug abuse,                          | 634  | None   | 114   | 139                                    | 887  | No                               | 30                                |
| 1962                                 | Private owners             | No                                      | No  | 100.07                               | 4533  | 18132  | Water body   | Prone to attack.                            | Fires (1984, 1996)  | Crime   | Mugging,                             | 542  | 6  | 164   | 263                                    | 975  | No                               | 1                                 |
| 1960s                                | Community land             | Yes                                     | Yes   | 33.16                                | 835   | 5010   | Slope, garbage d   | Insecurity.                                 | -   | Evictions, ri                                 | Mugging, ro                          | 208  | None   | 51  | 133                                    | 392  | No                               | -                                 |
| 1960s                                | Private land               | No                                      | No  | 56.33                                | 1899  | 11394  | -  | Insecurity.                                 | Fires (2014)  | Crime   | Mugging, ro                          | 230  | None   | 8   | 117                                    | 355  | No                               | 2                                 |

**Appendix 3: Community-led Data Collection in Dar es Salaam (Pilot under this study)**

**Process of Community-led Data Collection**



| Initiation and Planning  | Design   | Implementation   | Outcomes  |
|--|--|--|---|
| <ul style="list-style-type: none"> <li>- NGO partner ( CCI) appointed to lead delivery of project</li> <li>- TUPF leaders and local government engaged to discuss the research.</li> <li>- Workshop held to define research goals and methods.</li> <li>- Agree delivery process and timetable.</li> </ul> | <ul style="list-style-type: none"> <li>- Identify and recruit 12 community researchers.</li> <li>- Training workshop held over three days.</li> <li>- Question frame and language tested with community researchers.</li> <li>- Pilot and finalise questionnaire.</li> <li>- Fieldwork planned and teams set up to collect survey data.</li> </ul> | <ul style="list-style-type: none"> <li>- Collect survey data over 5 days using weblinkedhand-held devices</li> <li>- Data uploaded daily and checked by CCI.</li> <li>- Nine focus group meetings facilitated by CCI.</li> <li>- Five stakeholder interviews led by CCI.</li> <li>- Dataset reviewed prior to analysis.</li> </ul> | <ul style="list-style-type: none"> <li>- Initial data analysis of surveys, charts, mapping and transcripts to produce headline findings by CCI.</li> <li>- Findings presented and workshopped with TUPF leaders.</li> <li>- Recommendations developed by CCI and TUPF.</li> <li>- Draft report reviewed by TUPF prior to wider consultation. -Report produced.</li> </ul> |

## Photography and Maps

### Cover

Centre for Community Initiatives, CCI Tanzania

### Page 3

Jonathan Ernst / World Bank – Overlooking the central Kumasi market at closing time in Kumasi, Ghana, June 22, 2006.

### Pages 4, 6, 9, and 10

Centre for Community Initiatives, CCI Tanzania

### Page 14

Nick N A / Shutterstock — Kibera slum in Nairobi during sunny day with blue sky and clouds. Kibera is the biggest slum in Africa. Slums in Nairobi, Kenya.

### Pages 15 and 17

Maps from [QGIS Geographic Information System](#). QGIS Association, with analysis by CCI Tanzania