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Implementing Urban Participatory Climate Change Adaptation Appraisals: A Methodological Guideline

Global Urban Research Centre Working Paper No. 5

By Caroline Moser and Alfredo Stein

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Acronyms

CBO	Community Based Organization
CC	Climate Change
CDF	Constituency Development Fund
FAMA	Foundation for the Support of Micro-enterprise
LICODEP	Likoni Community Development Program
NGO	Non-governmental Organization
NITLAPAN	Institute for Applied Research and Local Development
PCCAA	Participatory Climate Change Adaptation Appraisal
PRA	Participatory Rural Appraisal
PUA	Participatory Urban Appraisal
RRIA	Rapid Risk Institutional Appraisal

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Executive Summary

This paper provides conceptual and methodological guidelines for researchers seeking to undertake an urban participatory climate change adaptation appraisal (PCCAA) that highlights the importance of hearing local people's voices relating to slow, invidious, incremental and often unnoticed severe weather associated with climate change. The conceptual framework distinguishes between the analysis of asset vulnerability, and the identification of asset-based operational strategies, and sets out a number of methodological principles and practices for undertaking a PCCAA – including selection of researchers, the fieldwork process and the selection of cities and communities. The paper then outlines the main research themes and associated techniques for implementing a PCCAA, identifying the perceptions of community groups, small-businesses and households concerning the impacts of severe weather on their capital assets – physical, social, human and financial- as well as their perceptions of the role that local institutions play to assist them build long-term resilience, protect their assets during severe weather and rebuild them after such events. The paper draws on the results of a recent PCCAA, undertaken in Mombasa, Kenya, and Estelí, Nicaragua, to address five main themes: community characteristics, severe weather related to climate change, vulnerability to severe weather, asset adaptation to severe weather and institutions supporting local adaptation. For each of these it identifies potential tools for eliciting information, illustrated by examples from Mombasa, Kenya and Estelí, Nicaragua. The paper concludes with guidance on the challenging issue of the quantification of PCCAA focus group results.

Key words: climate change, severe weather, asset vulnerability, asset adaptation, participatory urban appraisal methodology

Implementing Urban Participatory Climate Change Adaptation Appraisals: A Methodological Guideline

Caroline Moser and Alfredo Stein

1. Guideline Objective

The objective of this guideline is to briefly outline the methodology for implementing an urban participatory climate change adaptation appraisal (PCCAA). Through the voices of poor people themselves, this methodology identifies how severe weather associated with climate change (CC) directly or indirectly erodes their assets. The PCCAA includes the perceptions of community groups, small-businesses and households concerning the impacts of severe weather on their capital assets – physical, social, human and financial- as well as their perceptions of the role that local institutions play to assist them build long-term resilience, protect their assets during severe weather and rebuild them after such events.

Box 1: Summary of urban climate change appraisal components

These comprise the following three methodological tools:

Participatory Climate Change Asset Adaptation Appraisal (PCCAA) uses participatory methodology to identify 'bottom up', both asset vulnerability to CC, as well as asset adaptation strategies to build long-term resilience, protect assets during adverse weather and rebuild them.

Rapid Risk and Institutional Appraisal (RRIA) provides a 'top down' review of the policy domain, in terms of the institutions tasked to deal with CC, the relevant national, regional, and municipal level policies, regulations and mandates relating to CC, as well as associated programs – and budgetary allocations.

Consultation / Validation of Results

The process of results validation depends on the level of commitment by different social actors. In Estelí an action planning exercise triangulated the results, allowing urban poor communities and public authorities to identify common problems, structure solutions, and negotiate collaboration. In Mombasa, consultation was more limited and prioritized an information sharing and capacity building event.

The use of participatory urban appraisal to understand local people's perceptions of their adaptation to climate-change related severe weather is still in the early stages of development. Nevertheless this methodological guideline, based on recent field testing of a unique pro-poor climate change asset adaptation framework (Moser and Satterthwaite 2010; Moser 2009), undertaken in Mombasa and Estelí, is intended to assist researchers wishing to undertake urban appraisals of the impacts of climate change on poor communities.[1] Complementing the PCCAA, are two further components of urban climate change appraisals, namely a rapid risk and institutional appraisal (RRIA), and the consultation and validation of results. These two components are briefly mentioned in Box 1, and will be further elaborated in a subsequent working paper.

[1] This working paper draws heavily on the empirical data from a recently completed study undertaken in Mombasa and Estelí. See Moser, C., Norton, A., Stein, A., and Georgieva S. (2010).

2. Contextual Background

2.1 Climate change

With climate change firmly established as a major global concern, urban centres in low and middle-income countries concentrate a large proportion of those most at risk from its effects for a number of reasons, including the following:

- A growing number of severe weather related disasters, although not 'proof of climate change' (which is difficult to ascertain) is proof of the vulnerability of cities and smaller settlements to severe weather events whose frequency and intensity climate change is likely to increase (Moser and Satterthwaite 2010).
- Low and middle-income countries not only have close to three-quarters of the world's population, they also have most of the urban population at greatest risk from the increased intensity and/or frequency of storms, flooding, landslides, heat waves and constraints on fresh water that climate change is already bringing, or will bring in the future.
- Rapid urbanisation is perceived as increasing the impacts of climate change's possible effects in the context of urban poverty and inequality. Since 1950, the sevenfold population increase has brought an increased concentration of people in low-lying coastal zones at risk from sea-level rise and severe weather events (McGranahan, Balk and Anderson 2007).
- A very high proportion of global deaths from disasters related to severe weather occur in these countries, with a large and growing proportion of such deaths in urban areas (UN-Habitat 2007).

2.2 Hearing local people's voices and participatory methodology

Based on recognition of the importance of hearing local people's voices and priorities, participatory methodologies were first developed by Robert Chambers (1994) and others undertaking participatory rural appraisals (PRA) of poverty[2]. Rather than individual or household questionnaires, participatory methodology is based on purposive sampling from a range of focus groups that are representative of community members, in terms of age, gender, ethnicity, economic activities and other culturally specific variables. Since the introduction of a participatory methodology, over a decade ago, it has been widely used, particularly for participatory poverty assessments undertaken in both rural and urban areas, with an extensive

Box 2: Some key principles of participatory methodology

-Reversal of learning – 'handing over the stick', learning from local people, flexible use of methods
-Learning rapidly and progressively –no blueprint
-Triangulation – cross checking – plural investigation
-Embracing diversity – not rejecting exceptions
-Researchers facilitate, but do not do it- they do it. This involves handing over the stick, no interruptions, generation of own outcomes
-Sharing of information by researchers, local NGOs and communities- everyone has access and ownership of the information
-Shift from verbal to visual; primary use of diagrams rather than the written word
-From individual to group based normally
-From extracting to empowering
-Scope to innovate new tools

Source: Chambers, n.d.

[2] As Chambers stated, participatory methodology is 'a growing field of approaches and methods to enable local (rural and urban) people to express, enhance, share and analyze their knowledge of life and conditions to plan and act' (1994:953)

associated debate reflecting both the advantages and limitations of this methodology (see, for instance Brock and McGee 2002; Kanbur 2003; Holland and Campbell 2005).

The PCCAA methodology introduced in this working paper was adapted from earlier research by Caroline Moser, Cathy McIlwaine and other colleagues who modified PRA for use in urban contexts. This included the development of participatory urban appraisal (PUA) methodology specifically to understand local community perceptions of urban violence and insecurity, and its implementation in studies in cities in Jamaica, Colombia and Guatemala (Moser and Holland 1997; Moser and McIlwaine 2004), as well as its use as a technique to build the capacity of women's organization in Colombia to participate in peace building processes (Moser, Acosta and Vasquez 2006).

Turning to the issue of climate change, a community-level participatory approach at the micro-level is intended to provide insights into the experience of the impacts of severe weather among low-income groups in a way that macro-level analyses cannot do. A PCCAA not only allows poor groups to identify the extent to which climate change-related problems affect their communities, but also encourages them to assess their vulnerabilities as a consequence of climate change. Furthermore, such an approach assists in identifying interventions from the perspective of the poor, rather than from that of policy makers or academics.

While all participatory appraisal methodologies share a number of common tools or techniques that can be applied to different political, social, economic and environmental problems within urban contexts, at the same time such methodologies also need to be adapted to address each particular concern, as in this case where the focus is specifically on the newly emerging problematic of climate change[3].

2.3 Definitions for research on climate change

There are inherent contradictions in using preconceived conceptual frameworks in any participatory urban appraisal. Nevertheless, as research on asset adaptation to climate change in urban poor communities in low- and middle-low income countries is relatively new, it is useful to define some of the basic concepts that may be important in undertaking such research.

Adaptation*:* Actions to reduce the vulnerability of an institutional system (e.g. a city government), population (e.g. low-income community in a city) or an individual or household to the adverse impacts of anticipated climate change. Adaptation to climate variability consists of actions to reduce vulnerability to short-term weather shocks and to climate variability. (Satterthwaite et. al. 2007).

Asset*:* An asset is identified as a "stock of financial, human, natural or social resources that can be acquired, developed, improved and transferred across generations. It generates flows or consumption, as well as additional stock" (Ford Foundation 2004). The concept of assets or capital endowments includes both tangible and intangible assets. The capital assets of the poor are most commonly identified as physical, financial, human, social and natural (see Box 3). In addition to these five assets, which are grounded in empirically measured research (Grootaert and Bastelaer 2002), additional intangible asset categories are in the process of being developed. These include "aspirational" (Appadurai 2004), psychological (Alsop, Bertelsen, and Holland

[3] See Moser and McIlwaine (1999) for an earlier guideline which describes the participatory methodology for appraisals of urban violence and insecurity. This provided a preliminary structure for the development of this working paper.

2006), political assets, most commonly associated with human rights (Moser 2007; Ferguson, Moser, and Norton 2007), and civic assets (Ginienievicz 2009). These intangible assets illustrate the growing importance of thinking outside the box and moving beyond well-established categories of capital assets.

Box 3: Definition of the most important capital assets for individuals, households and communities

Physical capital: the stock of plant, equipment, infrastructure and other productive resources owned by individuals, the business sector or the country itself.

Financial capital: the financial resources available to people (savings, supplies of credit).

Human capital: investments in education, health and nutrition of individuals. Labour is linked to investments in human capital; health status influences people's capacity to work, and skill and education determine the returns from their labour.

Social capital: an intangible asset, defined as the rules, norms, obligations, reciprocity and trust embedded in social relations, social structures, and societies' institutional arrangements. It is embedded at the micro-institutional level (communities and households) as well as in the rules and regulations governing formalized institutions in the marketplace, political system and civil society.

Natural capital: the stock of environmentally provided assets such as soil, atmosphere, forests, minerals, water and wetlands. In rural communities land is a critical productive asset for the poor; in urban areas, land for shelter is also a critical productive asset.

Sources: Bebbington (1999); Carney (1998); Narayan (1997); Portes (1998); Putnam (1993)

Climate change: A change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period of time (typically decades or longer) whether due to natural variability or as a result of human activity (IPCC 2007).

Climate change risk*:* Additional risks to people and their assets (e.g. buildings, infrastructure) due to the potential impacts of climate change. These risks can be direct, as in larger and/or more frequent floods, or more intense and/or frequent storms, or heat waves, or less direct as climate change negatively affects livelihoods or food supplies (and prices) or access to water needed for domestic consumption or livelihoods. Certain groups may face increased risks from measures taken in response to climate change (for instance, measures to protect particular areas of a city from flooding which increase flood-risks "downstream" or emphasis on new hydropower schemes that displace large numbers of people) (Satterthwaite et. al. 2007).

Disaster: A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources. A disaster is a function of the risk process. It results from the combination of hazards, conditions of vulnerability and insufficient capacity or measures to reduce the potential negative consequences of risk (ISDR n.d.).

Disaster risk management: The process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and non-

structural measures to avoid (prevention) or to limit (mitigation and preparedness) the adverse effects of hazards (ISDR n.d.).

Exposure: The susceptibility of a receptor to be affected by a climate hazard or impact due to its location. Exposure can also relate to underlying climatic conditions and any projected changes to those conditions. Exposure relates to people who live or work in locations exposed to hazards related to the direct or indirect impacts of climate change; or in areas which lack infrastructure that reduces risk; and to homes and neighbourhoods that face the greatest risks when impacts occur (ISDR n.d.).

Mitigation (of disaster risk): Mitigation is concerned with measures to reduce the severity of the human and material damage caused by the disaster. Structural and non-structural measures can be undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards (ISDR n.d.).

Mitigation of climate change: This is the reduction of greenhouse-gas emissions, which results in avoiding the adverse impacts of climate change in the long run (at least the incremental impacts due to the greenhouse gases emitted). (Satterthwaite et. al. 2007).

Natural Hazard: Natural processes or phenomena occurring in the biosphere that may constitute a damaging event. Natural hazards can be classified by origin, namely: geological (i.e, earthquakes) hydro-meteorological (i.e. weather) or biological (i.e. viruses). Hazardous events can vary in magnitude or intensity, frequency, duration, area of extent, speed of onset, spatial dispersion and temporal spacing (ISDR n.d.).

Resilience: Resilience indicates a capacity to adapt and maintain core functions in the face of hazard threats and impacts, especially for vulnerable populations. It usually requires a capacity to anticipate climate change and plan needed adaptations. An entity‘s resilience to climate change and variability interacts with its resilience to other dynamic pressures including economic change, conflict and violence (Satterthwaite et. al. 2007).

Climate change vulnerability: The potential of people to be killed, injured or otherwise harmed by the direct or indirect impacts of climate change. This is most obvious in relation to risk from severe events (such as storms or floods); but it includes risk from less direct impacts – for instance, declining freshwater availability or livelihoods dependent upon climate-sensitive resources (Satterthwaite et. al. 2007).

3. The conceptual framework and methodology for the PCCAA

This section introduces the conceptual framework for the PCCAA and highlights a range of methodological issues that are important for planning and implementation.

3.1 The conceptual framework

The objective of the PCCAA is twofold; first to understand the **asset vulnerability** of poor households, businesses and community organizations as they relate to severe weather associated with climate change, and second to identify the types of **asset adaptation strategies** implemented

by the same social actors to address this issue. To undertake research, the PCCAA comprises the following two associated components:

i. An asset vulnerability analytical framework

This identifies the links between different vulnerabilities and the poor's capital assets. These relate both to external shocks and stresses, as well as to internal capacities to resist or withstand them. Vulnerabilities can be economic, political, social and psychological in nature and can affect different groups of the population, particularly women and children (see Moser and Satterthwaite 2010).

In the Mombasa and Estelí studies, for instance, three types of vulnerability emerged as of particular importance;

- *Physical vulnerability* relating to the inadequate, or lack of provision of three types of physical infrastructure, namely sewerage, drainage and garbage collection, with the interrelationship presenting particular health related hazards
- *Politico-legal vulnerability* linked to the lack of land tenure rights with implications for settlement location, lack of settlement planning and post-severe weather infrastructure support
- *Social vulnerability* identifying those groups most at risk to increasing intensity of severe weather.

ii. An asset-based adaptation operational framework

This explores and classifies the asset-based adaptation strategies as households, small businesses and communities exploit opportunities to develop resilience and resist, or to recover from, the negative effects of climate severes. Three closely interrelated phases of asset-based adaptation were usefully identified.

- Asset adaptation to build long-term resilience
- Asset damage limitation and protection during severe weather events
- Asset rebuilding after severe weather and disasters

For each phase of asset-based adaptation strategies, associated institutions that support or undermine actions at household, community and government level require identification.

3.2 Methodological principles and practices of participatory methodology

The research methodology is neither random nor arbitrary but builds on a well established set of principles and practices used in a range of earlier PUA studies (Chambers 1994; Norton 1998; Shah 1995). It is useful to briefly outline some of the generic participatory methodology issues before turning to methodological issues specific to the PCCAA.

i. **Selection of researchers and local teams**

First and foremost, participatory research requires collaborative research partnerships with researchers (and their counterpart institutions) that have had hands-on research experience using PUA/PRA techniques, even if not specifically in relation to climate change. Another essential requirement is that such researchers are able to be 'gate-keepers' directly, or through close trust networks, to local poor communities. Finally it is these local researchers who have responsibility for identifying local fieldworkers that are capable and confident about undertaking participatory fieldwork in poor urban communities. Constructing research teams that can undertake PUAs requires skills in judging local capacities – and key to this is finding researchers, if not fieldworkers, already confident about working in slums and doing participatory fieldwork.

ii. **The fieldwork process**

Once all the preparation work is completed, following the same fieldwork process already used in many such participatory studies, the actual research is undertaken over a five week period. This breaks down into the following tasks:

- Week 1: Capacity building of local researchers to train them in the conceptual framework and participatory tools and techniques used in the study (see Box 4)
- Week 2: Study of pilot community (see Box 5)
  Week 3 and 4: Study of 4 further communities (2 per research team)
- Week 5: Local researchers' analysis of data and completion of preliminary research results

This intensive five-week methodology requires the full-time commitment and **participation of all researchers,** who start with the first two weeks of training. However, only those that have satisfactorily completed the training requirements can take part in the next stages of the research. Of critical importance is the piloting stage. As well as learning the techniques, this allows researchers to assess the participatory appraisal tools in terms of their applicability to the issue, to practice their use, and to modify the methodology as considered necessary. The methodology also structures each day in the field so as to allow time both for undertaking focus groups as well as writing up daily notes. In the fifth week all the daily notes are compiled and analyzed, with the research process ending with a final workshop and presentation of preliminary findings.

Box 4: Training of local researchers

Training includes the following:

- The theoretical foundation of participatory research techniques on urban poverty.
- Conceptual framework on community, household and local enterprise assets of the urban poor, and their adaptation to severe changes in climate and weather.
- Introduction to participatory research techniques appropriate for studying the urban poor's asset adaptation to climate change.
- Logistics needed for participatory research

Training methods include the following;

- Short presentations, including videos, power points, on the theoretical and methodological frameworks.
- Role play, using participatory research methods
- Group discussions and plenary presentations
- Simulations, individual and group analysis.
- Preparation of the logistics required for the pilot including; the selection of neighborhoods and the methodology for contacting organizations

Source: Adapted from Moser and Mcilwaine 1999

iii. Research techniques

PUAs use a range of techniques or forums for discussing issues with community members. These can include the following:

- Group discussions;
- Semi-structured interviews (on a one-to-one basis);
- Direct observation;
- Ethno-histories and biographies (on a one-to-one basis);
- Local stories, portraits, and case studies.

However, **group discussions** are the most commonly used. This technique encourages extended analysis and conversation among community participants. Groups can range from 2 to 3 people to 25 to 30, although it is advisable to divide larger groups into sub groups of about 10 to 15. There are several types of groups that include the following, often overlapping categories:

- *Interest groups*—people in the community who share a common interest (occupational groups, religious groups, neighborhood gangs, Parent-Teachers Associations, sports groups).
- *Mixed groups*—people from all walks of life, representing the community as a whole.
- *Focus groups*—people convened to discuss a particular topic.

The composition of groups can vary by gender, with single-sex as well as mixed groups, by age and generation, (with mixed-age groups and young, middle aged, and elderly groups), and by race and ethnicity, with mixed-race and ethnically uniform groups. Because perceptions often vary with these characteristics, it is important to identify the gender, age and ethnicity of all participants throughout the research. Women and men tend to identify different issues, as do young and old.

Box 5: Piloting stage

A piloting stage is invaluable as it allows researchers to assess which tools are the least and most successful for studying climate change in a particular community as well as identifying any other issues which may help ameliorate the participatory process. The pilot provides the opportunity for researchers to practice and modify the methodology.

The pilot stages in Mombasa allowed researchers to recognize that local people, despite their urban location knew about weather, perceived variations in weather patterns, and had reasonable knowledge as to how it affects their assets and well being. However, researchers discovered that they would have to avoid using the terms ‘disaster‘ and ‘climate change‘, because participants would then only recount dramatic climatic events which had occurred in the community. Adopting the terms ‘weather‘ and ‘seasons‘ was far more successful in ensuring that participants identified not only ‘disasters‘ but other significant slow trends in the increasing variability and intensity of weather-related events.

The basic rules of participatory urban appraisal require discussants rather than the facilitator to determine the agenda, ensuring that the discussants themselves write or draw (‘handing over the stick‘), and encouraging visual rather than written or verbal accounts of situations or issues (Shah 1995). Triangulation is an important technique that comprises asking different groups the same questions. It not only provides a means of cross-checking but also helps to incorporate the views of different interest groups with influence over community organizations or key informants who may not live in the community, but have an in-depth knowledge of the area and its population. Members of different constituencies can participate in focus group discussions or in one-to-one, semi-structured interviews (see Box 4).

iv. **Locations for conducting participatory urban appraisal in communities**

There are two main ways of conducting a PUA in a community. Both methods have advantages and disadvantages, and a combination of the two is ideal. The first method is to carry out **‘formal’** focus group discussions in a local community centre or communal building. This involves negotiating the use of the building with community leaders beforehand. It allows community members to come to the centre to participate in the research at pre-arranged times and is useful when working with large or interest groups. However, conducting a participatory urban appraisal in a community centre can risk excluding groups that normally do not participate in community activities.

The second method is to use participatory urban appraisal tools with **‘informal’** focus groups, identified on the spot while walking through the community, as well as in shops, and bars, beside football pitches or basketball courts, or outside people‘s houses. This method allows greater flexibility and access to a more representative cross-section of community members, some of whom may be reluctant to go to a community centre. The main disadvantage is that groups can be

very fluid, with people entering and leaving, and generally it is unlikely that those involved will commit as much time as in formally arranged groups.

v. Analysis of the research data

The research analysis can go through a number of stages. Often the in-country researchers start by producing a report, based on the daily field notes and the preliminary research findings of the fieldworkers. This data is then reworked, often going back to original focus group field notes by the commissioning research team. At this stage data is often quantified so as to provide representative information at the level of communities, or the aggregate of communities within the city studied. This requires the numerical counting of such tools as listing, ranking and institutional maps (see section 6).

3.3 The application of data techniques for PCCAA

Along with the principles and practices of participatory methodology are a number of important issues specifically relating to data and techniques in undertaking a PCCAA, which are briefly summarized in this section.

i. Selection of cities and communities

The selection of cities is an important part of the participatory appraisal process with a number of criteria influencing selection. First, it is beneficial to move away from big cities to secondary cities. Not only have these been growing more rapidly in terms of population, densification, and economic growth, but in addition the focus on climate change issues to date has tended to prioritize capital cities. Second, selected cities must already be recognized as ‘at risk‘ to climate change hazards. For instance, as a coastal city, Mombasa is prone to flooding, while Estelí has experienced the impacts of climate change such asas flooding and drought. Finally, researchers need to select cities where they have, or can identify, appropriate research partner institutions committed to the study and with contacts with local public authorities, civil society organizations and local researchers. This ensures that recommendations from the study have a realistic potential of implementation by municipal authorities or other local institutions.

Within the city it is then necessary to identify communities for the study. This involves site visits, walking together with the local researchers through a number of different localities to assess suitability. It is important to ensure that communities are both poor and at risk to climate change. Housing standards and the level of service provision provide useful proxy indicators of poverty levels.

Local organizations and leaders, and in some cases, local municipalities, are crucial in gaining access to communities and reaching agreement about undertaking a PCCAA. This requires building relationships with local organizations, leaders or other institutions with a presence in a given community. The process of identifying research communities varies according to the context. For example, in Mombasa, researchers established contacts with a local NGO, and through it with community based organizations (CBO‘s) in a ‘bottom-up‘ process. Once the research objectives had been explained and the CBO‘s commitment gained, they assisted in identifying local community researchers as well as facilities for training, daily report back sessions, and final analysis. In contrast more of a ‘top down‘ process was used to identify research communities in Estelí. The Mayor and his technical staff lead consultations together with the Institute for Applied Research and Local Development (NITLAPAN). A combined team conducted overview visits to different neighbourhoods in the city, and then analysed municipal

data in terms of poverty, risk vulnerability and infrastructure levels. The team then selected four neighbourhoods as representative of those areas most at risk to severe weather.

ii. Community profile

Prior to entering a community it is useful to elicit some basic community characteristics. One method is to request the counterpart organizations to construct a simple community profile with basic descriptive information on the community and its resources. This needs to include demographic and social data—location, geographic characteristics, a brief history, population size, number of dwellings, ethnic composition, predominant household structures. Information on economic activities is also required—major income sources, access to credit, land tenure, community infrastructure and facilities such as water, electricity, sanitation, schools, and health posts. The information for the profile can be collected from secondary sources, such as census data and household surveys, other studies of the community, and from other sources.

4. Research themes and associated techniques for participatory climate change asset adaptation appraisal

4.1 Introduction

A PCCAA addresses a series of themes, each with a range of associated tools for eliciting information. Themes are derived from the background contextual discussions and analysis of the asset vulnerability, asset adaptation and climate change nexus. These include the following:

i. **Community characteristics**: Background identification of the community‘s most salient and general characteristics.
ii. **Severe weather related to climate change**: Identification of types of severe weather, the history of community in relation to changes in severe weather over time.
iii. **Vulnerability to severe weather**: Identification of vulnerable groups, areas and assets, affected by severe weather associated with climate change.
iv. **Asset adaptation to severe weather**: Identification of assets at household, small business and community level, and strategies and solutions of asset adaptation to climate change.
v. **Institutions supporting local adaptation:** Identification of institutions and their importance in adaptation to climate change.

The selection of tools used depends on the context of the discussions; it is neither necessary nor possible to implement all the tools in a given group discussion.

As mentioned above, the basic rule of participatory urban appraisal ensures that discussants rather than the facilitator determine the agenda, discussants themselves write or draw (‘handing over the stick‘), and that visual rather than written or verbal accounts of situations or issues are encouraged. The tools can be modified according to issue and context. In Kenya and Nicaragua researchers and discussants made innovative changes to the basic sets of tools to address specific issues relating to climate change. Where relevant, these innovations are included below.

The structure of this section is as follows:

- Description of each research theme
- Identification of potential tools for eliciting information on the associated theme
- Example of the use of tools drawn from the range of PCCAA fieldwork conducted in Mombasa, Kenya and Estelí, Nicaragua.

4.2 The PCCAA Themes and Tools

i. Community characteristics

Information on community characteristics forms the foundation of a PCCAA. The tools for gathering this information should be implemented at the beginning of the appraisal to establish the context at the outset (Tool box 1). In particular, the transect walk should be carried out with community leaders, on initial entry into the community. This high-profile walk not only dispels suspicion of outsiders, but also informs researchers of areas that have greater vulnerability to severe weather.

The matrix on general data is most usefully conducted with community leaders or people who have lived in the community for a long time. Unlike many of the other tools, this matrix needs to be implemented only once or twice, at the beginning of the research. For ease of implementation it can be combined with the matrix on social organization.

Table 1 Matrix on general data for Ziwa La Ngombe, Mombasa

Foundation of community	According to elders, the community was founded in 1986, although there were scattered houses long before that
Geographical orientation	On the periphery of Mombasa Island in a relatively low-lying area
Public Services	Water: 50% Electricity: 90% Telephones: 0% Rubbish collection: 0%
Population	2, 816
Ethnic groups	Majority are mijikendas, the rest are from a diverse range of ethnic groups, such as; Akambas, Taitas, Swahilis and Agikuyus.
Migration	Majority of the migrants come from other provinces of Kenya with a very small proportion of foreigners who are white and Indians. Rural-urban migration is the highest in the community.
Transport links	There are *matatus* (small buses) available as the public means of transport by roads.
Sources of income	Source of income is mostly through small business and casual labour.
Average daily earnings	Women – 100 – 500 shillings (2 dollars) Men – 250 shillings (3 dollars)

Participants: Ten community leaders

Table 1 shows a matrix from Ziwa La Ngombe community, Kenya, conducted with ten community leaders. Considerable detailed information can be gathered quickly and in a systematic way using such a matrix. Furthermore, the layout of a matrix ensures that information is clearly displayed and easily understood.

Tool box 1 Eliciting information on community characteristics

Tool	*Function*
Transect walk	• Helps break ice—critically important to dispel suspicion of outsiders • Mechanism for first informal contact with a range of community members • Visual identification of areas most vulnerable to severe weather
Matrix on general data	• Provides information about the community • Covers population, infrastructure, source of income by gender, family size and division of labor, migration, communications, and ethnic groups
Participatory mapping of: ▪ **Community** ▪ **Areas affected by severe weather**	• Maps spatial characteristics of a community (can be combined with the transect walk) • Maps the most important features of the community, such as boundaries, houses, roads, police stations, health posts, and schools • Identifies areas vulnerable to, or affected by, severe weather associated with climate change

Another tool for collecting basic community information is a map. This often acts as an important ice breaker. Figure 1 shows a participatory map drawn by several researchers in Bofu, Mombasa. It identifies both the general layout and the services within the community, as well as the location of vulnerable areas within the settlement.

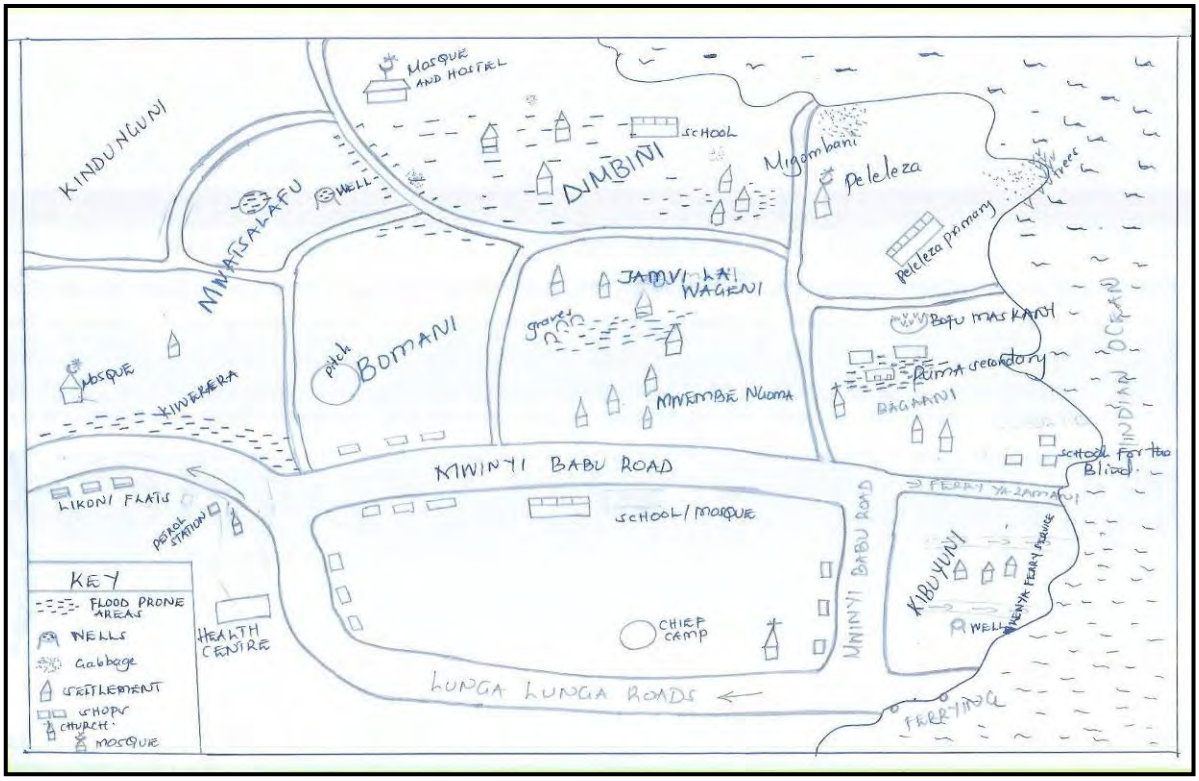

Figure 1 Participatory Map, Bofu, Mombasa
Participants: Researchers

ii. Severe weather related to climate change

The next step in the PCCAA process involves gathering information on how climate is experienced within a community. This includes identification of types of severe weather, the history of a community, changes in severe weather over time and associated general problems. There are several tools which can be used to carry out this stage, as identified in Tool box 2.

Tool box 2 Gathering information on the climate in a community

Tool	*Function*
Listing and Ranking	• Listings identify perceptions of types of severe weather • Ranking then prioritize which most affect local communities
Community history matrix	• Details the history of the community • Identifies periods of climate change-related events and their affects on a community
Time line	• Provides visual representation of types of weather change and associated problems – such as severe droughts (water scarcity), issues around food insecurity, heat waves, floods, and disease cycles.

Unlike other participatory urban appraisal, the PCCAA does **not** start with a listing and ranking of general problems. It starts directly with the issue of weather, using these tools to ascertain how communities list and rank severe weather. The reason for not starting with general problem history relates to the complexity of researching severe weather. Unlike well established problems such as violence (see Moser and McIlwaine 1999), the slow invidious changes of weather may not be considered a priority problem by local communities in comparison to other basic needs. This could well result in an extensive amount of time spent on problem listings and rankings of other problems. While interesting in themselves, they may not provide the necessary entry point to then address the issue of weather.

Therefore it is necessary to start by asking focus groups to **list, and then rank** their perceptions as to which types of weather most impact on their lives. Here it is critical that researchers do not use the terms ‘climate change‘ as this is a contested concept which is yet to be concretely defined; it is also a term with which the urban poor may be unfamiliar. The term ‘disaster‘ should also be avoided as researchers want to investigate the slow incremental effects of climate change, not solely severe climatic events. Instead, words such as ‘weather‘ and ‘seasons‘ should be adopted using local language and terminology.

Table 2 Listing and ranking of severe weather events, Bofu, Mombasa

Type of severe weather	Tally	Rank
Flood	III III III III III	1
Heat	III III III I	2
El Niño	III III	3
Cyclone	II	4

Participants: Mixed focus group of men, women and children of all ages

Table 2 above shows the use of listing and ranking tools. This particular focus group in Bofu community, Mombasa ranked flooding as the most problematic severe weather event. Once the simple listing and ranking of weather has been achieved, a range of additional tools can be implemented to broaden our understanding of the complexities of weather.

Time lines allow for more specific understanding as to how weather has changed over time, or how different types of weather have become more or less important according to the perception of the urban poor. Such timelines are best undertaken with older or established community members with an in depth knowledge of change over time. The tool used may vary, depending on the time frame. For example, time lines can be used to examine changes over a day, a week, a month, a year, or a range of years.

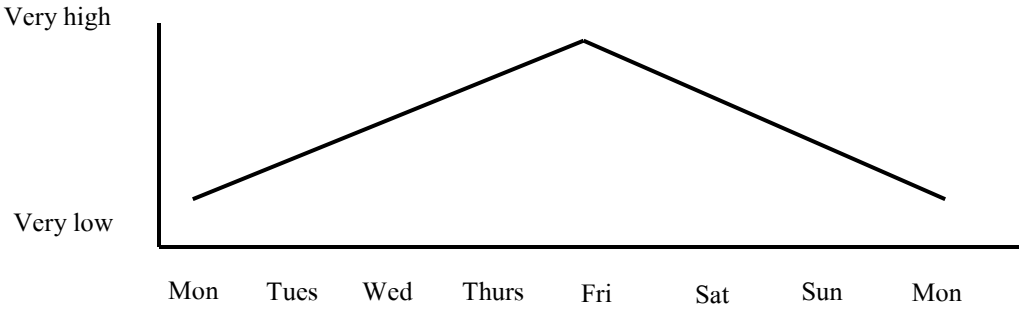

Figure 2 Timeline of the weekly magnitude of tides in Tudor, Mombasa

Participants: 6 adult men and 10 adult women

Figure 2 illustrates the changes in the tide during one week in Tudor community, Mombasa according to sixteen community members. In this particular example, it is clear that the tide is highest on Friday and at its lowest on Monday. In contrast to the very short-term time line shown above, longer term time lines, such as that undertaken by a mixed group in Estelí (Figure 3) shows the relationship between severe weather trends and other noteworthy historical events and associated problems.

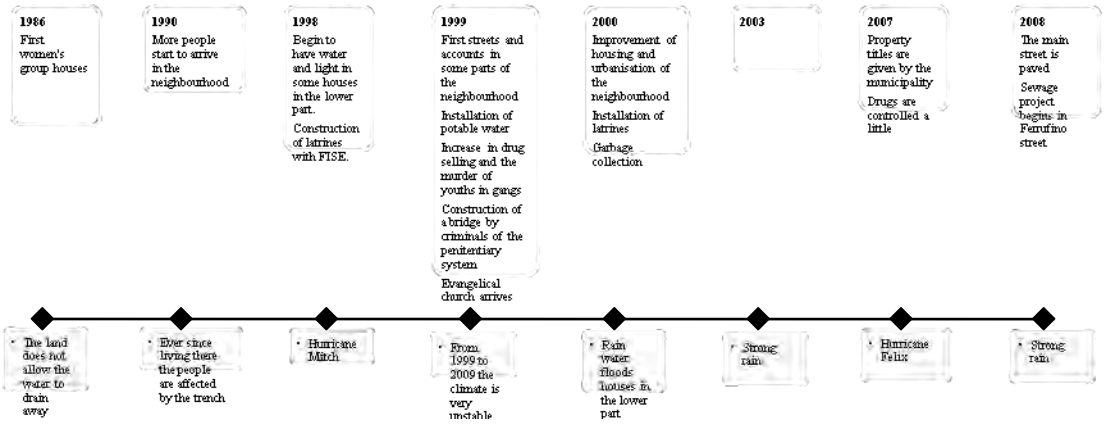

Figure 3 Timeline of events and climate change-related events in Miguel Alonso, Estelí

Participants: 5 leaders, 2 women and 3 men

In this timeline the focus group identified their perception of important events in the community's history (above the line) along with severe weather events (below the line). In terms of the process, participants first identified the installation of latrines. This event helped them to remember that time as a period when rain water flooded houses in the lower parts of the community. Therefore, instead of initially asking participants to identify weather-related events only, it was useful to begin a timeline identifying general events which had occurred in their community.

While timelines provide important visual tools, matrices of the history of the community can usefully synthesise considerable information. In some cultural contexts, such was the case in Estelí, these have proved to be an excellent 'ice breaker' and a good entry point for group discussions (Figure 4). For example, the matrix from Monte Sinai, Estelí below provides information on the chronology of key events in the community, as well as its affect on the community and initiatives from community members made in response to such events.

Year	*Key event*	*Effect on the community*
1999-2000	• The municipality announces the sale of lots. The municipality starts receiving applications for the purchase of lots	•
2000	• The people begin to request land from the municipality	•
2004	• The first lots are approved. The promise of sales is given.	• The people start to pay for the lots, but they still don't begin construction
2005	• The new owners organise themselves. The name of the district is chosen and they begin to install the first small houses.	• The wind damages the weak constructions.
2006	• A potable water project arrives. The people request electrical energy and reforestation begins.	• The people plant trees to protect against the wind.
2007	• Commencement of the construction of 140 houses to be paid for by the settlers in accordance with terms and favourable quotas begins.	• The people receive additional amounts to pay, which according to them, they had not contemplated.
2008	• CDI begins to operate in a house, until its construction is effective.	• The possibility of single mothers leaving their children in care arrives.
2009	• A new community organization through the GPC is constituted. CDI begins operation with the support of MINED and Aldeas SOS.	• The possibility to resolve pending problems in the community (sewage, public lighting) is opened.

Figure 4 Matrix showing the principal historical events of Monte Sinai, Estelí

iii. Vulnerability to severe weather

Once the types of severe weather that affect communities have been identified, the next important stage is to focus specifically on the issue of vulnerability. This includes the identification of specific groups, spatial areas and all assets vulnerable to severe weather associated with climate change. Again a range of participatory tools, as shown in Tool box 3 are useful to ascertain different types of information from focus groups. Some of these, such as maps and timelines, are similar to those used for the identification of severe weather; while other, such as causal flow diagrams, trend matrices and problem trees are more specifically focused on identifying the types of severe weather vulnerability.

Community maps not only identify spatially vulnerable areas and physical vulnerability relating to inadequate drainage, sewerage and garbage collection. They also provide an entry-point for identifying the extent to which the lack of legal land tenure (what can be termed politico-legal vulnerability), makes some households particularly vulnerable, and their relationship to other types of vulnerability. In Mombasa for instance, vulnerability deriving from varying degrees of insecurity had three main manifestations; location on marginal land, lack of adequate settlement planning and the lack of installation of services.

Tool box 3 Investigating vulnerability to severe weather

Tool	*Function*
Community maps	• Identifies vulnerable areas and locations within a community • Identifies the type of vulnerability (flooding, heat, water clogging)
Severe weather / climate change/ disaster time lines	• Identifies the affects of severe weather on individuals and household, small business and community assets over a period of time
Causal flow diagram	• Identifies main causes and consequences of severe weather associated vulnerability*(with the size of the circles indicating importance)* • Relationship between climate induced disasters and loss of assets (i.e. flood, drainage clogging, and late school attendance, outbreak of diseases) • Indirect effects arising from assets being affected (i.e. people's health from contaminated water)
Problem Tree	• Analyses causes (in the roots) and effects (in the branches) of particular types of severe weather

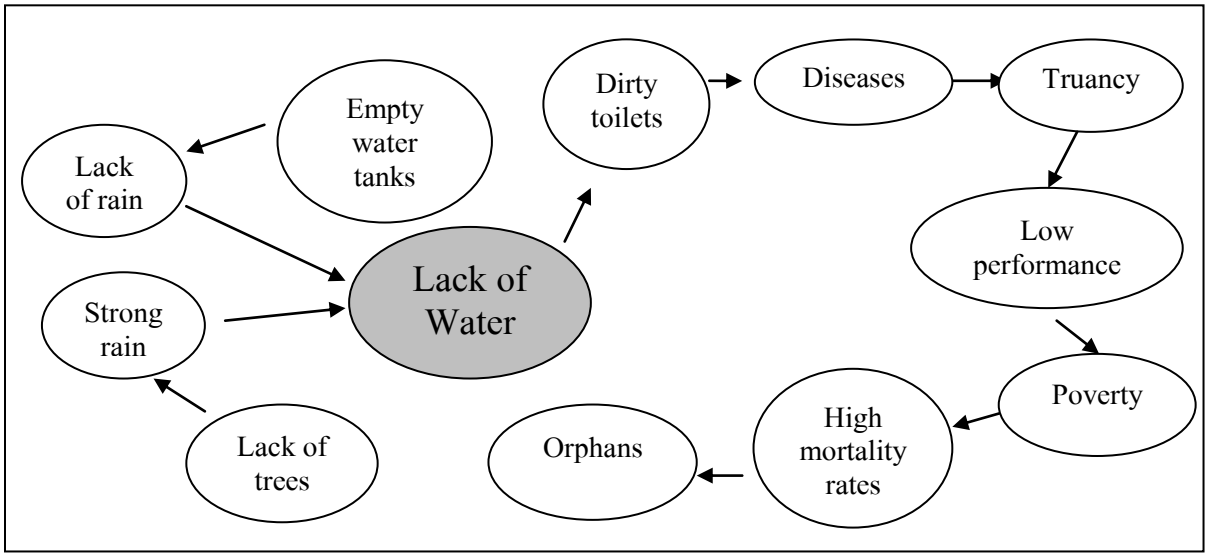

Figure 5 Causal flow diagram of the consequences of climate change-related events on school children's health in Timbwani, Mombasa
Participants: 2 adult men and 3 adult women

Causal flow diagrams can be used to identify the causes and consequences of asset vulnerability and the extent to which these are linked with severe weather. In addition they can identify the nature of networks of relationships among neighbours for lending money, providing child care, and so on. This tool is also able to assess the relationship between severe weather and such factors as employment, education and health. In Kenya and Nicaragua, severe weather was found to erode certain assets which led to negative consequences, such as disease, truancy or increased mortality, depending on the context and particular asset. Figure 5 below shows a causal flow diagram from Timbwani, Mombasa. It not only highlights the impacts of climate change-related events on water (a natural asset), but also shows that a lack of water in the community lead to a variety of problems, such as dirty toilets, truancy and even death.

Another important type of vulnerability is the social vulnerability associated with such social characteristics as age, gender, ethnicity or disability. This latter type of vulnerability was highlighted in Mombasa where a causal flow diagram drawn by a group of people with disabilities (PWD) in Ziwa La Ngombe (Figure 6) identified how their mobility was affected by rains and associated flooding, and discussed potential ways in which this could be addressed.

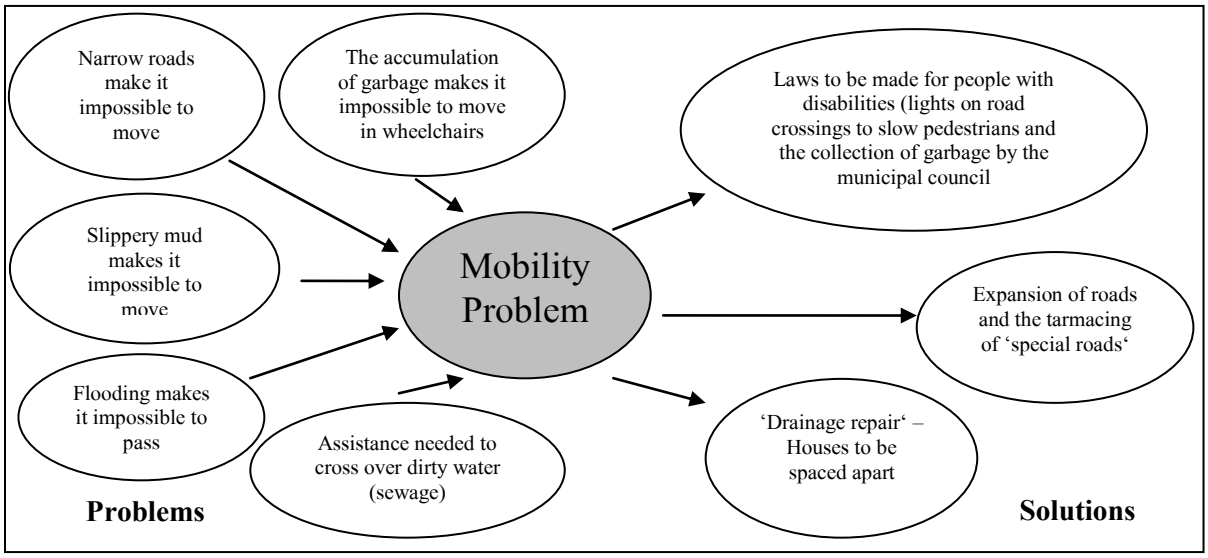

Figure 6 Causal flow diagram on mobility for disabled people in Ziwa la Ngombe, Mombasa

Participants: 5 women and 1 man, aged 33 - 48 years

iv. Asset adaptation to severe weather

One of the most critical components of the PCCAA relates to the identification of asset adaptation strategies at household, small business and community level, and their associated sources of resilience. This is undertaken in two stages; first listings and rankings identify the assets considered most important by the three different groups; and second, matrices assist in elaborating strategies, and potential and actual solutions to adapt assets to severe weather associated with climate change. Here an important time-related distinction is made between the following:

- Before: Actions to strengthen sources of resilience
- During: Actions implemented during the period of acute weather
- After: Actions designed to address rebuilding after the acute weather condition has abated

It is important to recognize that responses may not be large scale, highly visible interventions, but rather a range of small, modest, incremental activities designed to build resilience against, or respond to, the onset of increasingly recurrent patterns of severe weather.

Tool box 4 Identifying assets and assets adaptation

Tool	*Function*
Listings and Rankings	• Identifies assets and perceptions of levels of importance at household, small business and community level • Identifies adaptive strategies as identified by different groups and prioritization of effective strategies
Matrices	• Identifies assets of different groups • Identifies potential and actual strategies and solutions to adapt specific assets to severe weather • Identifies solutions offered by different groups
Causal flow diagram	• Identifies the impacts and consequences of different types of severe weather on assets • Identifies possible strategies and solutions to adapt specific assets to severe weather by different groups
Community maps	• Location of community assets
Timelines	• Identification of strategies over time

Several tools can be useful in this stage, including listings and rankings, matrices and causal flow diagrams. As shown in Tool Box 4, there is some overlap, with the same tools used for different purposes. Nevertheless, the examples below provide illustrations of those considered most useful to identify different issues relating to sources of asset resilience.

Table 3 Focus group listing of key household assets in the four communities in Estelí

Upper Monte Sinai	**Upper and Central 29th October**	**Belen**	**Miguel Alonso**
• Housing • Home Business • Human skills • Pots, pans and crockery • Electrical Appliances • Household goods • Ovens	• House • Health • Businesses • Human resources • Work • Food • Income	• House • Health • Latrines • Crops • Businesses • Electrical Appliances • Animals • Family	• Housing • Electrical Appliances • Ovens • Animals • Furniture • Cash • Latrines
Lower Monte Sinai	**Lower 29th October**		
• Housing • Cash • Children • Work • Crops	• Houses • Health • River • Household goods • Crops		

Participants: Focus groups in four communities

The first task in this stage of the PCCAA is to list and then rank assets. This not only identifies assets but also clarifies the level of importance of each as perceived by local residents. Table 3 below shows a composite listing from all the four communities in Estelí, identifying both common and distinct assets across communities.

Table 4 below then shows the mechanics of moving from listings to rankings. Members of the Ziwa La Ngombe Water Project Group in Mombasa first listed the most important assets in the community. These were then ranked by each member who gave 3 points to the most important, two to the asset of second importance and one to the asset of third importance.

Table 4 Listing and ranking of community assets, Ziwa La Ngombe, Mombasa

Asset Listing	Asset Ranking	Rank
House	III III III III III III III III III III III	1
School	III III III	2
Water Project	III III III	2
Shops	III III I	4
Hospital	III III II	3

Participants: Eleven adult men and women aged 50 - 60 years, members of the Ziwa La Ngombe Water Project

Such listings and rankings, undertaken with all three groups, households, local businesses and community groups provide the requisite information for then asking focus groups to identify their perceptions of interventions, before, during, and after severe weather. Table 5 identifies how community leaders in Miguel Alonso, Estelí adapt specific assets to flooding before, during, and after this particular climatic event. The fact that this tool highlights both action, as well as inactivity, provides equally insightful information about grassroots climate change asset-based adaptation.

Table 5 Matrix of asset-based adaptation strategies applied by households during rains/floods in Miguel Alonso, Estelí

Asset	Before	During	After
Electrical appliances	Don Juan unplugs electrical appliances. Others do not do anything	Ask a neighbor to keep some things for us. trust in God	Clean the house and return the electrical appliances to the same place
Chairs	Nothing	Throw water out of the house with buckets	Those that have the resources repair their walls
Plates/Glasses/Tables	Nothing	Move them so they do not get wet	Clean them and return them to the same place
Wardrobes/Beds	Nothing	Move them	Put them in another place
Food	Nothing	Put food in buckets, they cover the food	Request aid if everything is lost
Gas cookers	Nothing	Unplug the gas cylinder	Place it in the same place
Clothes/Shoes	Nothing	Put them in plastic bags	Place them in the same place

Participants: Four community leaders, 3 male and 1 female

Another example, this time from Mombasa, introduces differentiation into focus group discussions. Here the different strategies between home owners and renters, to build resilience and adapt their house as an asset indicates the extent to which ownership affects housing associated strategies.

Table 6 Adaptation strategies applied by tenants and owner occupiers during rains/floods in Mombasa

Asset Holder	Strategies		
	Before	**During**	**After**
Tenants	• Repair roof • Build strong foundations • Dig trenches around the houses • Clear drainage	• Seal leaking areas • Vacate flooding houses • Open up water passage routes	• Block water passage routes • Repair houses
Owner occupiers	• Make water drains • Repair houses • Build concrete skirting around the houses • Pile sands around the houses • Seal holes/leakages • Build barriers at entrances to houses • Build strong houses	• Unblock/clear drains • Mover to safer houses • Remove water from house	• Rebuilding and repairs

Participants: Focus groups in all four study communities

Finally, causal flow diagrams can be used not only to show causes and effects of vulnerability, as described in the previous section, but also as a very effective visual tool to identify the relationship between a weather related problem and solutions to address it. In Figure 7 below a mixed focus group from Tudor Mombasa discussed the relationship between causes and solutions of the outbreak of disease - an issue that had come up in an asset matrix.

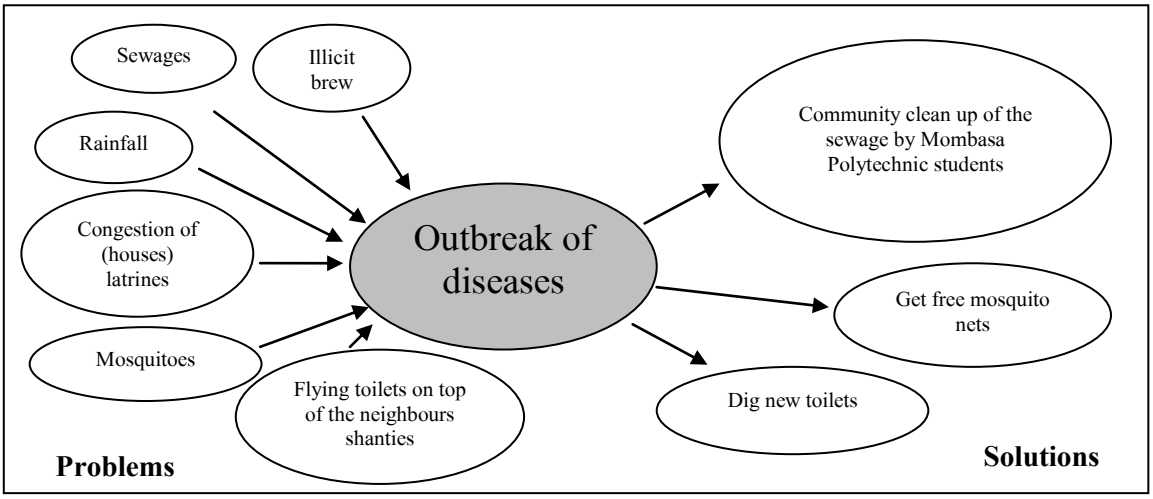

Figure 7 Casual flow diagram of the effects of climate change-related events on health and possible solutions, Tudor, Mombasa

Participants: 6 adult men and 3 adult women

They identified the main causes of the outbreak of diseases in their community as rainfall, sewage and congested shanties amongst others. This tool also allowed them to outline both potential short-term coping strategies as well as longer-term solutions.

While listings and matrices provide basic facts relating to asset adaptation, it is often causal flow diagrams that produce the most interesting information, as illustrated by the discussion among a group of tailors who rent their space in Ziwa la Ngombe, Mombasa. They identified that dust caused by strong wind, had important effects on small business assets. For instance, influenza related health problems made them unable to work; it also affected productive assets such as sewing machines which ceased to function if sand got inside them. In identifying adaption strategies, as renters they distinguished between their modest efforts to clean their sewing machines and the more permanent solutions that landlords could provide, such as introducing glass doors, that would enhance resilience

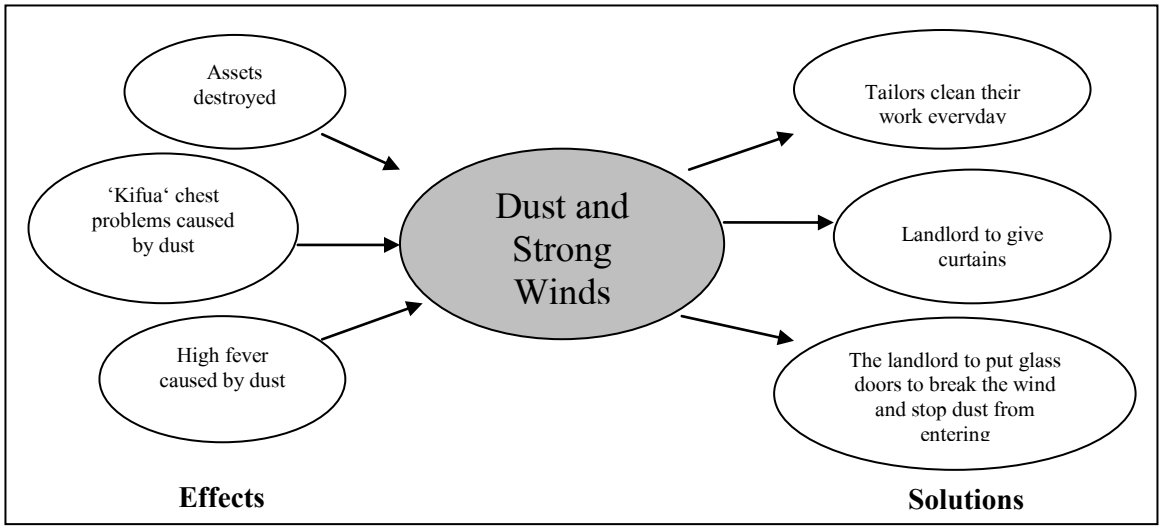

Figure 8 Effects of and solutions to dust and strong winds in Ziwa la Ngombe, Mombasa

Participants: 15 Tailors aged 20 - 35 years

v. Institutions supporting local adaptation

The final stage in the PCCAA is the identification of local institutions in terms of their importance and support to local communities when experiencing severe weather associated with climate change. As with the previous stage, this is a two phase process. Focus groups first identify institutions that are perceived to be important generally in local communities. Institutional (or Venn) mapping is an important tool for focus groups to identify three aspects:

- Spatial location (inside or outside the community) - indicated by whether they are located inside or outside the circle
- Relative importance - indicated by the size of the circle
- Perceived as positive or negative - with focus groups members identifying them as positive or negative (or even ranking them in this way).

Second, focus groups then identify those institutions that particularly assist local communities in building resilience or responding to severe weather. This allows focus groups to recognize that

these are not always the same institutions as those identified in the first institutional mapping exercise. Listing and ranking tools assist in prioritizing those that are most important while matrices can be used to identify institutional strategies and solutions. The different tools are identified below (Tool box 5).

Tool box 5 Identifying the importance of institutions supporting local adaptation

Tool	*Function*
Institutional /Venn mapping	• Identified the comparative importance of institutions • Identifies whether institutions are located inside or outside the community • Identifies whether institutions are positive or negative • Identifies the importance of institutions in adapting to severe weather • Identifies whether there are relationship / linkages between institutions
Listing and ranking	• Identifies institutions inside and outside of a community • Categorizes the institutions by type i.e. NGO, CBO, Local government, National government. • Ranks institutions by importance
Matrix	• Identifies the level of importance of the institution in general and in adapting to severe weather • Identifies the institutions inside and outside of a community

Figure 9 shows an institutional map undertaken in Bofu, Mombasa. As always the case, it is important that the map is drawn by focus group members, with the map displayed in full view so that everybody can be encouraged to contribute.

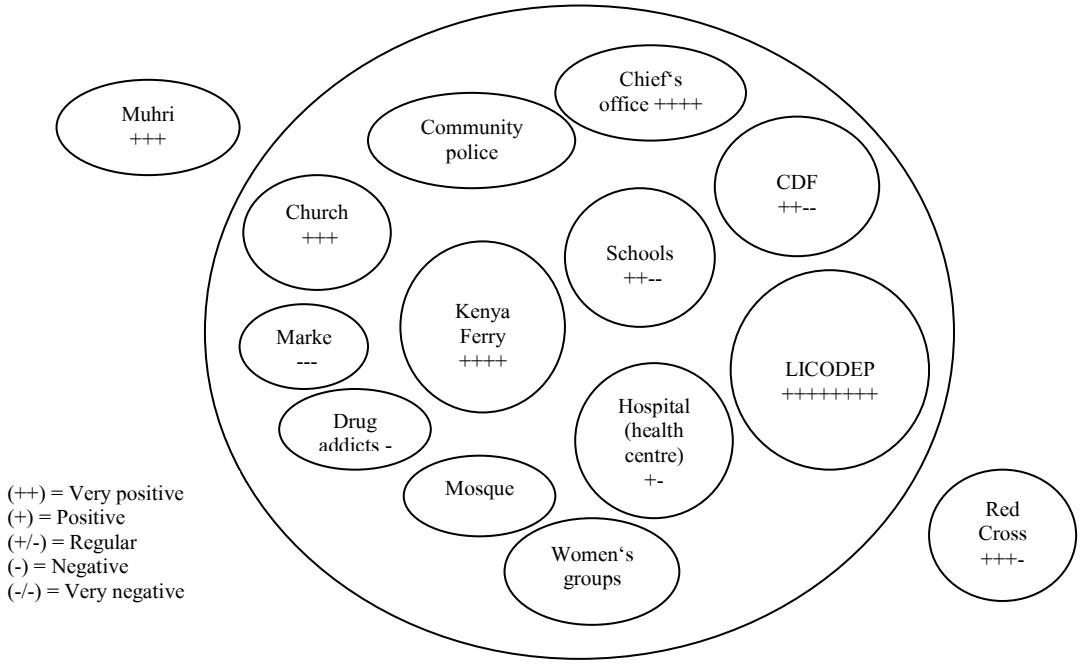

Figure 9 Institutional mapping of important institutions in Bofu, Mombasa

Participants: Four adult men, aged 53 – 77

Local institutional support can range from informal associations to formal state and religious institutions. However, those identified as important in local communities do not necessarily assist them in building resilience or responding to severe weather.

Institutional mapping in all four communities in Estelí illustrated that in all four communities, key individuals, either within or outside the neighborhood, were perceived as important agents in community coping strategies. These included charitable persons, valued for their knowledge, contacts and capacity to solve problems especially in emergencies. In Lower Sinai, the coordinator of the neighboring community was recognized as an important actor. In 29th October, four individuals were amongst the most influential and ranked higher than some institutions (Figure 10). This institutional map also highlights the historical roles that community based organizations have played in negotiations with local authorities, for land and services, and in coping with natural disasters.

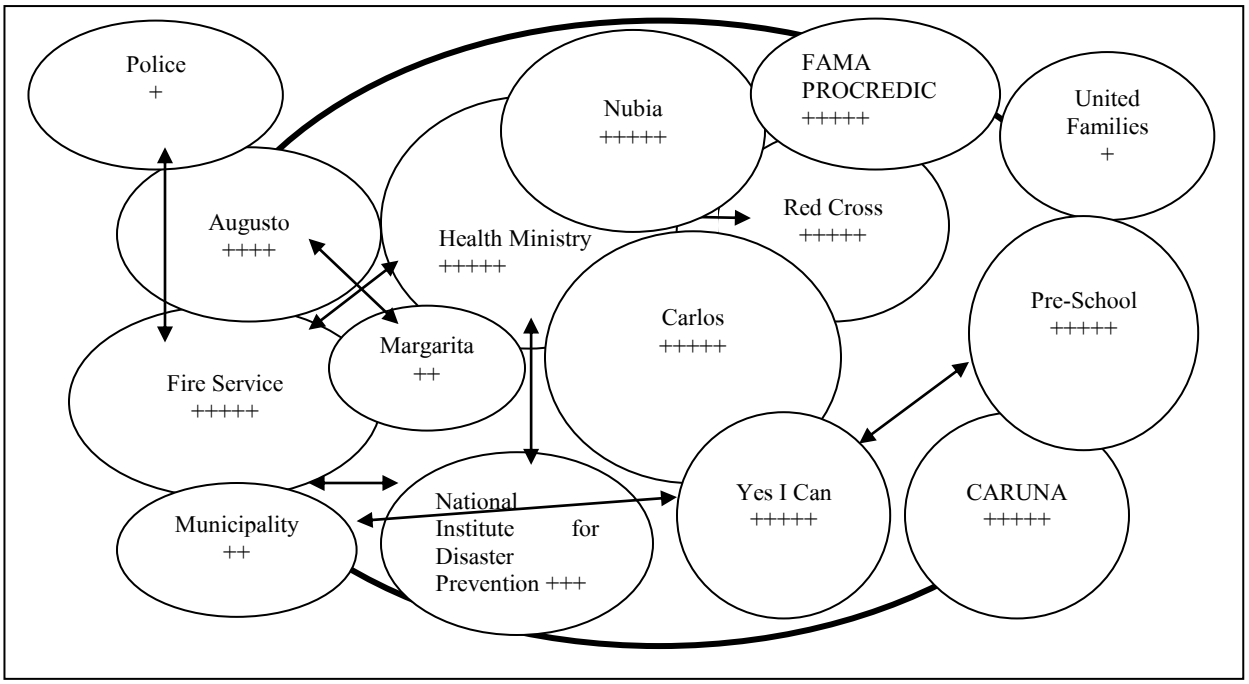

Figure 10 Mapping of important institutions in adapting to weather in 29th October, Estelí

Participants: 6 adult females and 3 adult males aged 36 – 70 years

5. Summary of participatory climate change adaptation appraisal tools

While there are no set rules on the number of tools that should be used when conducting a PCCAA, recent research in Kenya and Nicaragua showed the utility of providing a list of tools and a recommended number of exercises to be done in each community during a one-week period. Although the imposition of particular tools and the number of exercises is somewhat deterministic and therefore has drawbacks, nevertheless it is particularly useful in projects where research teams work simultaneously in a large number of communities. Furthermore, because it

produces a comparable and consistent set of information, it makes cross-community comparisons considerably easier. Toolbox 6 lists the basic tools for a PCCAA and the recommended number of exercises to be applied in a one week period. The list serves only as a guideline; other tools can be implemented, depending on the context.

Tool box 6 Summary of main tools for a PCCAA and recommended number of exercises

Tool	*Number of exercises*
Map of the community	1 – 5
Map of areas most affected by severe weather in the community	5
Matrices of general community information	1 – 2
Matrices of history of the community	1-2
Listing and ranking of types of severe weather[4]	15 – 20
Map of institutional relationships	3 – 5
Matrix of trends on types of severe weather	5 – 10
Weather Timeline – daily, weekly, monthly	3 – 5
Weather Timeline – yearly and long-term	3 – 5
Causal flow diagram of severe weather-related problems	10 – 15
Listing and ranking of assets	15 – 20
Listing and ranking of coping strategies before, during and after severe weather	10 – 15
Diagram of strategies to cope with severe weather	5 – 7
Listing of solutions to build resilience before during and after severe weather	10 – 15

6. Preliminary analysis of PCCAA: The issue of quantification

While a detailed description of the analysis of PCCAA data goes beyond the scope of this paper, it is useful to point to the fact that it can take two forms. First, it can identify broad patterns from in-depth content analysis of the focus group exercises. These can then be illustrated using the most appropriate tools. Second, in order to move beyond individual focus group experiences at the analysis stage it may be useful to quantify some of the information. While the quantification of participatory data presents particular challenges as to its representativeness (see Moser 2002), nevertheless it can assist is providing strong messages particularly to policy makers who have a tendency to dismiss such work as anecdotal.

In the PCCAA in both Mombasa and Estelí, focus groups all used the same tools when addressing each issue. This meant that those tools lending themselves to quantification, such as ranking and listings, could produce quantitative results – as well as cross city comparisons. It is important to stress that quantification depends on focus groups using exactly the same tools, or the data will not be compatible – hence the importance of training. Using the total number of listings (the number of times a listing was conducted) as the universe, it was possible to conduct some basic statistical analysis. Equally information gained from rankings could be quantified – using the prescribed participatory methodology on ranking information (3 for first priority, 2 for second and 1 for third) (See Moser 2002). While this data was only representative for the focus groups, nevertheless it assisted in showing the broader picture[5].

[4] Although listings and rankings are two exercises, the second follows on from the first and therefore these are itemized together.

[5] For other examples of quantification of focus groups, see Moser and McIlwaine (2004).

The following examples show how city-specific data as well as comparative Mombasa / Estelí data was quantified.

6.1 Quantification of listings and rankings of weather

As table 7 shows, listings and rankings from participatory focus groups in both cities showed similar perceptions of severe weather. Rain and associated flooding was identified as the most severe problem in both Mombasa (49.8%) and in Estelí (69.8%), with heat/drought/sun of second importance, followed by winds – more evident in Mombasa than Estelí[6].

Table 7 Composite matrix of perceptions of the most significant weather hazards in Mombasa and Estelí

Type of weather	**Mombasa***		**Estelí****	
	Ranking totals	**%**	**Ranking totals**	**%**
Flood/rain	166	49.8	312	69.8
Heat/sunny	105	31.4	116	25.8
Strong wind	55	16.4	20	4.4
Cold/chilly	8	2.4	-	-
Total	**334**	**100**	**448**	**100**

Participants: * Mombasa data from listing and rankings in 72 focus groups in four communities
** Estelí data from listings and ranking in 62 focus groups in four communities

6.2 Quantification of listings of asset actions before, during and after severe weather

The same methodology was used in this case to list actions, quantified in terms of the total number of asset adaptation matrices. As Table 8 shows, in Mombasa the majority (88.6%) of households, small business and community groups were resourceful at developing a range of resilience measures. Yet within the community there were also slight differences among different groups. Households responded more often than other groups (94%), with the greatest number of activities (90.6%) occurring during severe weather itself

[6] Some bias in the weather data reflected the fact that some of the tenants who, because they did not own their houses, did not care as much as did home owners. As a middle-aged woman from Bofu commented: *'Floods are not such a problem for me as I am a tenant'*

Table 8 Focus group matrices identifying asset actions before, during and after severe weather at household, small business and community level in Mombasa, Kenya

Focus groups from four communities	Number of assets adaptation matrices	Actions relating to severe weather (in numbers and %)							
		Before		During		After		Average	
Household adaptation	23	21	91 %	23	100 %	21	91 %	22	94 %
Small business adaptation	16	15	94 %	15	94 %	14	88 %	15	92 %
Community adaptation	32	25	78 %	25	78 %	27	84 %	26	80 %
Total	71	62	87.6 %	64	90.6 %	62	87.6 %	63	88.6 %

Participants: 68 household, 72 small business and 72 community focus groups undertaken in four communities

6.3 Quantification of listing and ranking of assets

Quantification of the listing and ranking of assets again helps identify those assets considered as priorities by households, small-scale business and communities. In Mombasa, the totals taken from asset listings and rankings, shows that housing, followed by health, was the most highly prioritized asset, whether owned by individual households or by business owners

Table 9 Composite matrix of important assets in the four study communities in Mombasa, Kenya

Category of asset-based adaptation	Asset ranking								
	First	**%**	**Second**	**%**	**Third**	**%**	**Fourth**	**%**	**Total %**
Household	House	38	Health	14	Children	9	Others	39	100
Business	Stock*	23	Machinery *	17	Health	14	Others	46	100
Collective	Wells / Latrines	27	Health/ Hospital	18	School/ Education	17	Others	38	100

* Includes: Stock itself, source of stock, various materials such as wood etc.
** Includes: Sewing machines, fishing gear and handcarts.
Participants: Focus groups in four communities

6.4 Quantification of institutional maps

Institutions important in the community in Mombasa were numerically quantified in terms of the number of times they appeared in the institutional maps. Focus groups first identified institutions that were perceived to be important generally in local communities, and identified whether they were inside or outside the community, and were perceived as positive or negative. The same

focus groups then identified those institutions that particularly assisted local communities in adapting or responding to severe weather. This allowed for the quantitative, comparative identification of those institutions important in the community, and the extent to which the same institutions were, or were not, important in adapting to weather.

In Table 10 the first number in each column indicates the order of importance from first to third, with the numbers in brackets the absolute numbers. This result shows that institutions considered important by community members were not necessarily the same as those they perceived as assisting them in relation to severe weather. While local government representatives such as chiefs and elders were identified as important local institutions, they did not take an active role in dealing with severe weather problems, except in Tudor.

Table 10 Listing of institutions in the four study communities in Mombasa, by general importance and in adapting to severe weather

Name of community	Institution	Important in community	Important in adapting to weather
Bofu	LICODEP	1 (10)	1 (15)
	Women‘s Group	2 (7)	
	CDF	3 (6)	2 (6)
	Schools	3 (6)	
	Church/Mosque		3 (4)
Ziwa la Ngombe	Schools	1 (8)	1 (18)
	Chief	1 (8)	
	Action Aid	2 (7)	2 (16)
	Women‘s groups	3 (6)	3 (14)
	Youth Group	3 (6)	
Timbwani	Hospital/health centre	1 (10)	1 (21)
	Schools	2 (9)	
	CDF	3 (8)	
	Chief	3 (8)	
	LICODEP		2 (20)
	Church/mosque		3 (16)
Tudor	Chief	1 (6)	1 (16)
	Elders	2 (5)	1 (16)
	Women‘s Group	2 (5)	3 (8)
	Youth club	3 (4)	3 (8)
	Red Cross	3 (4)	
	Municipality	3 (4)	
	Community group		2 (9)

Participants: Focus groups in the four study communities. *LICODEP* is a local CBO, CDF stands for the Community Development Fund

7. Concluding comment

The limited number of PCCAAs means that to date researchers conducting such appraisals have had little experience on which to draw. While recognising that participatory appraisals are inherently flexible and should be guided by the people in the research communities, this paper provides some basic guidelines. It provides a useful starting point for designing research and a way of systematising analysis. It also shows that some participatory urban appraisal tools are more suitable for exploring severe weather associated with climate change than others. Thus

while the guidelines are entirely flexible and based only on a potential range of tools, it is hoped that they will assist researchers seeking to undertake research in this area.

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