

Sub-Saharan African Cities:



Five-City Network to Pioneer Climate Adaptation through Participatory Research and Local Action

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Abstract:

This project addresses knowledge, resource, capacity and networking gaps on the theme: 'Strengthening urban governments in planning adaptation.'

The main objective of this project is to develop an adaptation framework for managing the increased risk to African local government and their communities due to climate change impact. The ultimate beneficiaries of this project will be African local governments and their communities. The guiding and well-tested ICLEI principle of locally designed and owned projects for the global common good, specifically in a developing world context, will be applied throughout project design, inception and delivery.

Additionally, the research will test the theory that the most vulnerable living and working in different geographical, climatic and ecosystem zones will be impacted differently and as such, will require a different set of actions to be taken. Potential commonalities will be sought towards regional participatory learning and wider applicability. The five urban centres chosen for this study, based on selection criteria, include: Cape Town, South Africa, Dar es Salaam, Tanzania; Maputo, Mozambique; Windhoek, Namibia; and Port St. Louis, Mauritius.

Through a participatory process, this project will carry out a desk-top study, long-term, multi-discipline, multi-sectoral stakeholder platforms in five Southern African cities comprising of academics, communities and the local government in order to facilitate knowledge-sharing, promote proactive climate adaptation and resource opportunities available for African cities, develop five tailor-made Adaptation Frameworks and explore regional applicability. A network of stakeholders within each urban centre will be established, feeding into a larger regional network of local authorities and partners in Sub-Saharan Africa, and globally through existing ICLEI global (e.g. the ICLEI Cities for Climate Protection programme), ICLEI Africa and UCLG-A members and networks, ensuring global best practice, roll-out, and long-term sustainability.

Key words: Adaptation, Africa, Climate Change, Policy, Participatory Action Research, Local Governments.

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1. Research problem and justification

Many African cities are set for either rapid urban expansion or rural-urban and/or regional in-migration, or a combination of these. Africa's cities will be impacted by climate change. How African cities manage both short-term and long-term impacts of climate change will have consequences for their communities working and living in these urban centres, most notably so for the poorer sectors of such communities, often set to grow fastest while located at urban edges, with least access to infrastructure and services.

This study focused on the most immediate and compounding impacts of climate change in the selected African cities and helped identify what adaptation measures should be adopted to assist the most vulnerable sectors of these urban centres. The project also established the important cross-sectoral relationships for the horizontal and vertical sharing of knowledge, ideas and research. The cross-sectoral relationships were established and/or built upon the stakeholder platforms within which, the participating stakeholders comprised of individuals who represent groups that have different knowledge, experiences and needs relating to extreme climatic events. The different stakeholders also comprised of individuals who have different social and economic backgrounds, education and political influences. These platforms ensured that the project and recommendations were made as inclusive as possible and that the awareness, perception and knowledge of climate change induced impacts varied among the stakeholders based on the aforementioned factors.

Five cities from five countries were selected, each coastal, but experiencing different extreme climatic events. These were:

- **Flooding in Maputo, Mozambique:** Oxfam has reported regular flooding in Mozambique over the recent past, resulting in areas being declared disaster zones. The flooding results in displacement of people, lack of water supply and sanitation and outbreaks of diarrhea and malaria. During a study entitled¹ “National Institute for Disaster Management” by Van Logchem and Brito, it was noted that an increase in the number of natural disasters observed in Mozambique over the past three decades have shown that the country has become more prone to tropical cyclones, floods and epidemics.

¹ “National Institute for Disaster Management”. 2009. *Synthesis report. INGC Climate Change Report: Study on the Impact of Climate Change on Disaster Risk in Mozambique*” by Van Logchem, and Brito

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- **Changes in wind speed in Mauritius, Port St Louis:** According to the Africa Environment Outlook², the Western Indian Ocean Islands, including Mauritius, are already prone to cyclones and strong winds. Warming of the ocean surface around Mauritius has resulted in an increase in wind speed, negatively impacting on local agriculture. An IPCC report³ indicates that the numbers of intense cyclones are predicted to increase. Changes in precipitation events have also been observed, resulting in stress on existing water resources.
- **Sea-level rise events in Walvis Bay, Namibia:** There is concern about the impact of extreme sea levels on infrastructure and services along the coastline of Namibia, especially with the threats of sea level rise and increased storminess associated with global warming, as stated by Namibian Ministry of Environment and Tourism⁴. Currently there is an initial “risk and impact assessment of sea level rise” being undertaken for the coast of Namibia. It will be a joint venture by LaquaR Consultants CC and Consulting Services Africa (CSA), funded by the UNFCCC.
- **Drought in Dar es Salaam:** According to Matari, in the 2007 book chapter entitled “Effects of some Meteorological Parameters on Land Degradation in Tanzania⁵”, Tanzania historic data indicates that droughts occurred every four years from 1984 onwards affecting over 3.6 million people. The droughts necessitated the rationing of hydroelectric power that resulted in negative economic growth. The primary cause of the droughts has been increased temperatures and a consequent decrease in precipitation.
- **Increases in temperature in Cape Town, South Africa:** The scientific community has established that the temperature in South Africa increased significantly between 1990 and 2003 (0.13 degree Celsius) and will increase by a further 1 degree Celsius by 2050⁶. A direct consequence of this has been an increase in food insecurity as the increased temperatures reduce the yield of food crops.

² Arthurton, R. and Karateng, K. 2006. Chapter 5: Coastal and Marine Environments. UNEP.

³ Mimura, N., L. Nurse, R.F. McLean, J. Agard, L. Briguglio, P. Lefale, R. Payet and G. Sem. 2007. Small islands. In: M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (Eds) Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, 687-716.

⁴ Namibian Ministry of Environment and Tourism. 2002. Namibia Initial National Communication to the UNFCCC.

⁵ Sivakumar, M.V.K. and Ndiang'ui, N. 2007. Climate and Land Degradation. Springer Publishers: Berlin.

⁶ Benhin, J.K.A. 2006. Climate Change and South African Agriculture: Impacts and Adaptation Options. CEEPA Discussion Paper no 21. CEEPA: Johannesburg.

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The sectors considered when analysing the development priorities were:

- Water and sanitation,
- Energy,
- Transport,
- Health, and
- Livelihoods.

2. Objectives:

Overarching Objective:

To develop frameworks for managing the increases risk to African cities due to climate change.

Specific objectives:

1. To establish multi-disciplinary, multi-sectoral stakeholder platforms in five Southern African cities comprising of academics, communities and the local governments in order to facilitate knowledge-sharing;
2. To identify and understand the current and projected risks associated with climate change impacts for African municipal/local governments and urban populations;
3. To facilitate urban communities to identify and test current and alternative adaptation strategies to cope with risks associated with climate change;
4. To strengthen the capacity and knowledge of local communities and governments through effective education and communication of climate change science and risks;
5. To develop and/or build on adaptation frameworks for a city-wide consolidated and coordinated approach to reducing vulnerability to short- to medium-term climate impacts for each of the selected five project cities.

3. Methodology

The methodology undertaken during this project has altered somewhat from the original submitted and approved proposal (methodology and conceptual framework) in order to encompass the latest research that has been undertaken, whilst also acknowledging that each city/local government is very different to another. In order to acknowledge these differences and whilst accepting and taking into consideration the different ways in which local governments govern and manage the services and infrastructure that they provide within their jurisdictions, the project methodology has been developed and altered as a process that can best allow for these individual differences.

As explained in the original proposal, climatic events represent and exert different pressures and risks in a multitude of ways that effect local governments and communities. While recognising that most governments and communities have practices and strategies in place to deal with routine climate variability, at present, even during the timeframe of this project, it has been increasingly recognised that these events (that have in some of the cities observed) have become more frequent and more intense in recent history. Given that climate change exerts pressure upon human populations across a range of demographics, one cannot assume to have the answers or processes for one city that will match that required for all others. Hence, the reasoning for the different methodologies adopted when interacting with each of the different project cities. These differences ranged in terms of focal points (size and area under observation), entry points (depending upon processes that were recognised or were deemed to be complementary to the overarching and specific objectives of this project), and the different sectors/and or groups (dependent upon the engagement, participatory and interactive processes undertaken within the project). Together these determined the application of (slightly modified) methodologies to ensure that the projects over-arching objectives were met (through the creation of a framework to manage increasing risks associated with climate change).

As outlined in the project proposal, the processes involved within the project have been shaped through numerous Participatory Action Research (PAR) processes, where each city involved in the project has had the opportunity to play the 'leading role' in the development of specific tools and methodologies in order to: i) enable each of the Local Governments to have a feeling of ownership in the project, processes and the project deliverables; ii) to be sure that they have enough understanding of the process to take it forward in order to identify and act upon other adaptation activities that may fall outside the realms of this project. It is worth noting here that throughout the project process, there were extensive efforts made to ensure that the key stakeholders within the project activities was

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representative of people from a variety of backgrounds and decision making processes (academics, local government technocrats and politicians, and community members, the private sectors). In each instance, the project had an element of its focus (varying in terms of the city) the urban poor, as they are generally considered to be the most vulnerable group to potential impacts associated with climate variability. In each of the interactive processes of the project, every effort has been made to encourage gender equality in the processes.

The original proposal also outlined that the research would focus upon a number of local government sectors, namely; water and sanitation, energy, transport, health and livelihoods. It is worth highlighting, however, that this has not always been practical. The challenges arise from the diversity and differences between the way that these sectors work together (in some cases, some of these sectors fall outside of the mandate of the local government and are rather the jurisdiction of a national or regional government department or ministry), the scope of the project (in terms of timeframe and budget availability), commitment given (at the local level) and demonstrated political will by the city representatives, in combination with the limitations associated with not being present permanently (in the physical sense of the word) in each of the project cities. In each instance, the questionnaires and participatory action processes and activities that have taken place have included discussions around observed and potential impacts associated with climate change on each of the sectors. However, due to the identification of focal areas within each of the cities and the call made by the various stakeholders within the cities, this has had to be accounted for and thus been the driving process behind the development of the final ‘climate resilient handbooks’, which have been tailored to each of the selected local governments.

The project deliverables and outputs pertaining to the different cities and overarching research aspects have thus incorporated the necessary changes and are explained below in more detail so as to give a better understanding of how some of the abovementioned differences have been incorporated.

Please note that it is well recognised by all of those involved in the project (either as city representatives, researchers, consultants and the project team staff), this project could not have been regarded as the success (nor achieved its objectives as laid out in the proposal) that it has been if the project funders and partners had not allowed and enabled the flexibility or offered the support that has been observed whilst undertaking this project.

In the original project document, the methodology has been described in terms of addressing the specific objectives that were identified. It is believed by the project practitioners that each of the

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specific objectives has been achieved. For the purposes of following the various activities that have been undertaken within the timeframe, it is clearer to discern them when compiled within the overarching processes and milestones that have been achieved. In previous interim reports (reporting on activities and actions undertaken) some of the activities took place within the different cities at time frames other than those specified within the project proposal in order to enable the actions and intended outputs and secure buy-in. In many cases such changes were external to the control of project staff ranging from a change in local government political power, political instability, internal restructuring etc. It is for this purpose that the description of the methodology is described below as a **process** that has been undertaken. The idea of which is then to allow for the process to be repeated by other practitioners or local government representatives or key stakeholders in other regions of the African continent. For ease of following, the project process is outlined in Figure 1 and explained in more detail below, whilst including some of the differences and different entry points for the various cities in the appropriate areas.



Figure 1: The Participatory Action Research Process undertaken within the project entitled, ‘Sub-Saharan African Cities: A Five-City Network to Pioneer Climate Adaptation through Participatory Research and Local Action’.

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The image displayed in Figure 1 broadly outlines the **5 milestone methodological process** undertaken in each of the five cities within this project. Below, for each of the milestones, there is a short description to describe the main building blocks of the actions/methods undertaken within the broader context of the project and its activities. Each of the cities undertook a slightly different approach to accomplish each of these milestones, while still accomplishing the main specific objectives, rather focusing on the needs of the local governments and beneficiaries. These evolutions and reasons are described below. Within *Section 5: Project Activities*, the specific activities undertaken within each of the cities and the tools developed and used to accomplish the milestones, are described in greater detail. In *Section 6: Project Outcomes*, the achieved products from the activities undertaken under the 5 milestone process are listed and described.

a. Local Government Champion

The first steps of the project were to ensure that the project gained sufficient political will and support within each of the project cities to enable the project staff to adequately engage with city representatives. Through the project ICLEI Africa established and enhanced relationships with the political leaders of the local government and increased awareness of climate change, the associated risk and impacts and how decisions can be informed through the following processes and milestones. It was also important that a ‘local champion’ or focal point within the designated local government department, i.e. Environmental Management, Urban Planning, or the likes thereof, was identified to support communications and facilitate coordination of activities at the local level with the local stakeholders.

b. Stakeholder Platform

The second milestone was to establish, with the assistance and guidance of the local champion, long-term, multi-disciplinary and multi-sectoral stakeholder platforms in each of the five Southern African cities. These platforms comprised of academics, community members and the local government officials. They facilitated knowledge-sharing and promoted proactive climate adaptation and resource opportunities in the cities. Networks of stakeholders were fed into larger regional network of local authorities and partners in Sub-Saharan Africa, and globally through the existing ICLEI global network, ensuring global best practice, roll-out, and long-term sustainability.

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Through the initial communications and baseline research, key stakeholders were identified that could be included within the future project workshops so as to ensure a diverse group of stakeholders from a cross-section of departments, programs and sectors that are operational within each of the cities. Presentation of the project and its broader objectives were then presented to the highest level of key stakeholders involved in decision making at the local government level. This objective was to ensure that the project process built sustainability: the city departments and locally appointed champions could, as a result, be relied upon to ensure a maintained momentum throughout each of the project milestones.

c. Identifying Climate Impacts

Scoping studies were undertaken within each of the project cities in order to identify the particular circumstances and dynamics involved within each of the local governments. A baseline research exercise was undertaken for each of the cities to gather all relevant and existing documents, research and similar projects pertaining to the project objectives to enable the project to build upon or enhance existing work.

Through the project workshop activities and using the physical interactive local climate change training tool kit, the workshop participants identified, through a participatory research action exercise, the climatic variables that exert the most impact on local government infrastructure, services and community livelihoods. Through this exercise two climatic variables were prioritised from which the stakeholder group were able to identify the impacts and risks that the climatic variable has on the local sectors. The sectors focused on for this project were water and sanitation, health, transport and energy. Each of the sectoral impacts described within this exercise exerted directly or indirectly upon the quality of livelihoods within the local government's jurisdiction, so an exercise to identify these immediately followed, also through group engagements and interactions.

d. Locally Appropriate Adaptation Solutions

Locally appropriate adaptation solutions were identified through a participatory action research activity within a workshop program at the city level. From the previous exercise of identifying and prioritising the sectoral impacts associated with the selected climatic variable, city stakeholder groups

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were provided with over 300 generic adaptation solutions, which had been used across the world to increase resilience, to choose from to use as possible locally appropriate adaptation solutions. Encouragement was given to the formulation of new solutions that would be locally suitable, cost efficient and beneficial for vulnerable groups of the community who were the most affected.

e. Smart Goals

SMART stands for Specific, Measurable, Achievable, Realistic and Time-framed, and is a tool to set feasible goals and to identify the different steps that are necessary for the cities implementation. Goals that are too abstract are difficult to break down into actions, and can leave decision-makers and practitioners feeling ‘lost’ in terms of how and who should initiate the implementation process. It is imperative that when a goal is set, key steps, responsibilities, time frames and budgets should be at least approximately determined. The SMART Goals for each of the cities were established through the processes followed in the first four milestones. They were then formally documented and presented in the form of a tailor-made adaptation framework within the ‘Building Resilient Climate Handbooks’.

f. Share best practices

The last milestone of the process – a continuous process that should be integrated through all activities and decisions made at the local level – is to share activity outcomes, lessons learnt and best practices with all relevant stakeholders at the local, national, regional and international levels. This is done through the appropriate networks and (ICLEI established) platforms (such as Resilient Cities, Local Climate Solutions for Africa and ICLEI World Congresses) that enable and facilitate the connection of leaders, initiating dialogue on sustainability challenges and solutions, where best practices can be explored and exchanged.

As mentioned in the introduction, each of the cities faced differences in terms of how the main outcomes were accomplished. The paragraphs below describe how these evolved from the original path outlined within the original proposal documentation.

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In the original project proposal it was outlined that the project would focus upon the impacts and adaptation actions associated with one particular climate variable, with the original intention of the proposal author to cover all climate variables with a particular focus on the aforementioned sectors. For ease of reference, these were; Sea Level Rise (Walvis Bay, Namibia), Temperature (Cape Town, South Africa), Flooding (Maputo, Mozambique), Drought (Dar es Salaam, Tanzania) and Wind, within the context of cyclones in this instance (Port Louis, Mauritius).

However, through the undertaking of the consultative participatory processes and during the timeframe of this project, it was made clear that the previously identified climate variables (as mentioned above), were not the only ones exerting pressure on the services, infrastructure and community members falling within their jurisdiction. In fact, after a number of extreme climate events, and after giving consideration to the capacity of city staff and city focal areas, it was deemed necessary to alter the direction of project related research and the interaction with city officials and key stakeholders (in terms of capacity building and consultative exercises) so as to address the needs of the beneficiaries of this project, whilst still achieving the overarching aims of establishing frameworks or stepwise approaches towards increasing adaptive capacity to climate change. For ease of reference, the areas that have been focused on in each of the project cities (and accompanying explanations) are outlined below. This being said, it is worth noting that where possible the project deliverables retained a broader focus upon all climate variables in the region and at the local level in order to ensure the impacts and risks were associated with a variety of climate variables (as the project team acknowledges that with any particular weather system, there are links between each of the climate variables) and to encourage communications and the sharing of challenges and lessons learned between the project cities.

Walvis Bay:

Having experienced two extreme flash flood events relatively early in the project timeframe, the project staff were requested to focus on delivering options and capacity building exercises to assist the local government and its key stakeholders to cope with, and prepare for the impacts and risks associated with this variable. In terms of sector focus, the interactions with key stakeholders was fairly broad and so covered energy, transport, health and water and sanitation sectors, the last of which in slightly more detail in response to government jurisdiction and mandate. The focus of

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livelihoods was considered during the consultative processes and the Topnaar community was also paid particular attention in all project processes.

Cape Town:

As described in the original proposal, the City of Cape Town had already undertaken quite a number of steps to increase capacity in understanding and decision making around the phenomenon of climate change. Activities included the establishment of numerous committees, active projects and discussion groups within the Energy and Climate Change arena. With the city being so large (in terms of population size, geographical distribution, management departments and sectors, policies and strategies etc.), it was agreed that a smaller focus area of research for this project would be most useful, both in terms of the city (and its planned future direction) and in terms of focusing upon aspects of community livelihoods (poverty alleviation) and how climate change may exert risks and impacts upon their various processes. As in line with a number of the City directives (when dealing specifically with Energy and Climate Change), the focus of this project, in terms of climate variable, has remained temperature. The research objective altered somewhat in order to augment an on-going livelihoods and climate mitigation programme that had already been initiated within the city and centred upon climate change mitigation and poverty alleviation. The objective, therefore, of this particular project partnership has been to understand the added benefits associated with the mitigative actions within the context of improving climate change resilience to extreme temperatures. The community, in which the majority of the research in Cape Town's jurisdiction has been based, has been the Mamre Community.

Maputo:

The climate variable focus for the city, in terms of researching and understanding associated risks has remained to be flooding. The sector of focus in this instance has been sanitation within the Chamanculo 'C' community.

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Dar es Salaam:

As a city that comprises of three local municipalities, each with their own mandates and political systems, it was agreed, through a consultative participatory process that the project research would reduce its geographical reach and focus specifically on one local municipality within the City of Dar es Salaam, this is the Temeke Municipality. It should be noted here that during each step and every process undertaken as part of the project processes, interaction and research, representatives from both political and technical perspectives and the larger city level were included. The climate variable focussed on and selected as a direct result of key local stakeholders experience during the project duration, has been drought and flooding as the municipality is currently almost eight years into a long-term drought. The broader City of Dar es Salaam had also faced and witnessed the impacts and risks associated with short term flooding.

Port Louis:

Given the nature of Port Louis (being the capital city of a small island state), the proposed focus was on the port because the city, and the island as whole, relies on the port for large amounts of exports and imports of goods. It was very important to explore the associated risks associated with increased variability of cyclones, storm surges and precipitation patterns and the inter-linkages, particularly when considering the long term sustainability of the city and other regions of the island. The capital is also located on the foot of a high rise mountain sloping towards the ocean causing high runoff and landslides causing damage to development on the slopes and flooding in the valley, these risks and impacts were also examined.

4. Project Activities:

This section describes the main activities that were undertaken under the 5 milestone process described in the Methodology Section. To avoid repetition from the previous interim reports submitted during the course of the project, the descriptions for each of the cities project workshops will be brief; accompanying annexure provide more detailed information. Activities within each of the cities were undertaken at different time periods during the course of the project period. Each of the PAR activities is described below (a-h), and section (g) lists when these activities actually took place within each of the cities. For each of the city workshops, a report describes further the activities and outcomes and provided as an Annex.

ICLEI Africa created a series of locally appropriate **tools** that assisted in building knowledge about climate change terminology and also facilitated the gathering of the necessary information (such as risks, impacts, extreme weather events etc.) that informed the development of the tailor-made Climate Resilient Handbooks. The tools were also developed in such a manner that they could be applied in different regions of Africa, with adjustments to accommodate language and cultural differences. The tools listed below were also developed to complement and be incorporated into the **Participatory Action Research (PAR) methodology** so that they could be carried out with a group of multi-sectoral and multi-dimensional stakeholders facilitating consensus building.

The tools used for each activity are described briefly below and detailed in the accompanying Annexure/s.

a. *PAR Activity 1: Building Climate Capacity with the local Interactive Climate Change and Climate Impact (ICCCI) Training Tool*

The Local Interactive Climate Change and Climate Impact (ICCCI) Training Toolkit was developed and used in each of the cities with a variety of stakeholders to provide simple explanations of what climate change is, the causal factors and the impacts. A physical diagrammatic tool was created with pictures mimicking the earth, sun, atmospheric layers, sun rays. Laminated cards depicting human activities enabled the images to be stuck on any available surface. Each image that was presented was accompanied by a brief and simple explanation describing each piece of the story. Time was allowed for translations or questions. The tool was also developed electronically to be show-cased in a workshop environment with a large audience. The description of the ICCCI training tool and the electronic PowerPoint version of ICCCI training tool can be seen in *Annex 1 and 2* respectively.

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Figure 2: Member of the Topnaar Community in Walvis Bay describing the climate change phenomena and associated risks to her fellow community members in order so that they understand the it in teir native language.

b. *PAR Activity 2: Questionnaires and interviews*

Questionnaires were developed for each of the cities in order to obtain climate change related information, perceptions from different stakeholders and to gain an understanding of climate related impacts (past and current) and how these affected infrastructure, services and quality of livelihoods. The responses to the questionnaires provided anecdotal information that was both qualitative and quantitative. This has been embedded into the project reports and the tailor made Climate Resilient Handbooks in the form of statistical figures or as case studies. City questionnaires are provided in each of the city activity sections below.



Figure 3: Member of the Mamre Community completing the 2nd Mamre survey with his neighbour.

C. PAR Activity 3: The Local Interactive Climate Change Risk and Adaptation Prioritisation (Local RAP) Part 1 Tool

The Local Interactive Climate Change Risk and Adaptation Prioritisation (Local RAP) Training Tool has two parts. **Part 1** enables the multi-dimensional stakeholder group to select and prioritise from the five climate variables (wind, temperature, precipitation, flooding and drought) the variable which is exerting the most pressure on the local infrastructure, service delivery and community livelihoods with accompanied reasoning to why they selected the climate variable. Accompanied questions asked to the stakeholders for this exercise were:

1. Explain how has the selected climatic variable has affected the community.
2. Give three examples of specific examples of events (with date) in the past whereby the climatic variable has created disturbance or damage within the community.
3. Report on the short term coping methods and long term adaptation methods that were adopted during this climatic event to reduce the impact and damage to community livelihoods and assets.

The total of the votes, together with the reasoning, are tallied to inform agreement on the prioritised climate variable(s) that will be the focus for the remainder of the activities. See *Annex 3* for further description on Local RAP Tool.



Figure 4: Members of the Tuamoyo community are given the opportunity to individual prioritise between the climate variables which one exerts the most pressure onto their daily lives.

d. PAR Activity 4: Sectoral Risk Tool

Once the climate variable is prioritised, stakeholders are introduced to the Sectoral Risk Tool the purpose of which is to identify the exact impacts and risks that are exerted on local sectors, such as transport, health, water and sanitation and energy. The group of stakeholders are provided with coloured laminated cards, different colour cards representing the four sectors, general impacts that have occurred within other cities provided such examples. The stakeholders chose from the impacts provided on the card and were encouraged to write their own sectoral impacts on the card to share with the research team. Following from this exercise the groups were tasked to provide the livelihood impacts that are associated with the selected sectoral risks. For example, when a flood occurs in the area damaging an important transport route, communities will be unable to travel to work or school and therefore loss of wages will affect the household. Once the sectoral risks and livelihood impacts were identified within small groups, the groups re-unite to discuss each sector and prioritise the Sectoral Risks to establish which are the most vulnerable and need of attention. These results and outcomes are used to undertake the next activity: *RAP Part 2 Tool*.

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Figure 5: Temeke stakeholders stick their groups selected sectoral risks on to the available surface for further discussion and prioritisation.

e. PAR Activity 5: RAP Part 2 Tool

Using the prioritised Sectoral Risks from the previous activities, the next tool used, which is aimed at identifying locally appropriate adaptation solutions for each of the sectoral risks, is Part 2 of the local RAP Tool. Part 2 presents a range of adaptation solutions that can be matched to a given impact or variety of sectoral impacts associated with the 5 climatic variables. The adaptation solutions were sourced from peer reviewed best practice case studies from a range of cities across the world, developed and developing region, examples of local action that can strengthen resilience.

The group of adaptation solutions are categorised from low cost interventions that communities can undertake as short term affective measures, to permanent infrastructures that would require large resources and high maintenance by the local and or regional governments. The 5 categories are Community Based Solutions, Biophysical Solutions, Institutional Solutions, Infrastructural Solutions and Managed Retreat Solutions. Managing Retreat Solutions refers to the moving of something physical from one location to another due to the high risk and vulnerability that imposes on the object. By way of example, this may involve relocating a building which has faced extreme damage on a continuous basis due to increased intensity and frequent flooding event, which has directly resulted in increased costs, maintenance and human life.

The stakeholder group is tasked to pair each of the prioritised Sector Risks with one or more

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adaptation solutions, they are encouraged to be innovative and record an adaptation solution that is not necessarily within the given options provided. Once the pairing is complete the stakeholders again discuss the selected adaptation options and prioritise the adaptation solutions in order to focus on the key issues and solutions at the local level. These identified local sectoral risks and solutions form the foundation of the development of the tailor-made Climate Resilient Handbooks which are further elaborated in a SMART Goal text box and table where resources, roles, responsibilities and timeframes are completed by the local governments to inform integrated planning and policy development.

f *PAR Activity 6: Photography Workshop*

A photography workshop was included as an additional exercise which complemented the previous activities undertaken above. This interactive activity enabled local community members and local government officials to identify through photography the vulnerable areas within their community and local jurisdiction that have been or presently are been affected by local climatic changes. The groups were provided with a digital disposable camera together with pre-formulated questions which they needed to answer through taking photos. The questions were:

1. How do you feel the environment is changing?
2. How are the climatic elements impacting upon the household/community
3. How is the community coping/adapting to the identified impacts (sea level rise, rainfall and precipitation, variability in temperature, wind changes)?

The groups analyzed their images by providing descriptions and anecdotal information of what was demonstrated within the image. The outcome from the photography session proved valuable and complimentary to the information that had been discussed during the previous session within the workshop. The images from this activity were used as small case studies embedded within the Climate Resilient Handbooks.

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Figure 6: Community members of Port Louis were given disposable cameras to capture areas of vulnerability within the community and surrounding areas. After which the youth were then able to analyse their photos the following day.

The above PAR activities were undertaken during respective workshops held with the relevant stakeholder groups. Each workshop is briefly discussed below providing the accompanied documentation for further reading. The outcomes of each of the city workshops were incorporated within the cities tailor-made Climate Resilient Handbooks, which are described in *Section 5: Project Outputs*.

Inception Visits

Introduction, aims and objectives, activities and work plan of the project was presented to each of the cities during the Inception Visits to each of the cities, which took place during the first four months of the project. During these visits ICLEI Africa identified and established relationships with the project focal point(s) and other relevant local government sectoral officials, academics and NGOs/CBOs in the urban jurisdiction. The project was introduced to a group of multi-sectoral and multi-dimensional stakeholder group where questions, answers and clarification created dialogue. Other organisations that were undertaking similar work or work that could compliment the projects aims and objectives provided an opportunity to present on the work and discussions were held where relevant to seek synergies and collaboration. The outline program and outcomes from each of the Inception Visits can be seen in detail in *Annex 4*. All relevant information was collected during these visits or through subsequent email communication which provided the information for the development of the city Baseline Studies, described in *Section 5: Project Outputs*.

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g. City Activities

The city activities are briefly described below, providing dates of workshops, activities undertaken within each workshop and main outcomes from the workshop.

Walvis Bay:

Workshop Series 1: 27-30 July 2010. This workshop was partnered with UN Habitat under the Cities and Climate Change Initiative (CCCI). UN Habitat provided a presentation of activities that was discussed and shared with stakeholders.

Activities:

- ICCCI Training;
- Presentation and discussion on the draft Walvis Bay Baseline Study document;
- Completion of Climate Change questionnaires; and
- Discussion of the formulation of a formal stakeholder group.

Main Outcomes:

- Identification of a vulnerable community – Topnaar community
- Climate change capacity building with key stakeholder and community members and completion of questionnaires which highlighted current risks and impacts associated with climate change at the local level.

Results of the activities are provided within the Walvis Bay Workshop Series 1 Report, *Annex 5*.

Workshop Series 2: 12-14 April 2011.

Activities:

- ICCCI Training;
- Local RAP Part 1 and 2 activities undertaken with Topnaar Community;
- Local RAP Part 1 and 2 activities were undertaken with the Local Government multi-

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dimensional stakeholder group.

Main Outcomes:

- Topnaar Community prioritised climatic variable (flooding and wind) and community based adaptation solutions were identified to increase resilience to these climatic variables.
- Local Government stakeholders prioritised climatic variable (flooding and sea level rise) and selected locally appropriate adaptation options to reduce vulnerability of associated climatic impacts.
- Walvis Bay Municipality officially announced the formation of the Walvis Bay Environmental Management Advisory Forum (WEMAF) and presented on the key aims, objectives and structure of the forum. The WEMAF is a permanent broad-based multi-stakeholder forum, which will advice, render support and take an equally active leading role in the formulating, promoting, enforcing and implementing of various environmental related policies, programmes, plans, projects and activities within the jurisdictional area of Walvis Bay in partnership with the forum stakeholders.

All workshop activities and outcomes for Walvis Bay Workshop Series 2 can be read in detail in *Annex 6*.

Workshop series 3: 20-24 August 2011. This workshop was incorporated with a national event, the National Namibian Mayoral Forum Annual General Meeting and was partnered and supported by UN Habitat.

Activities:

- National, Regional and Local stakeholders gathered to share knowledge and exchange information and best practice on climate related activities been undertaken within Namibia.
- Project activities that were undertaken under the project workshop agenda were:
 - Sectoral Risk Tool and
 - Photography Workshop.

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Main Outcomes:

- Increased capacity amongst all stakeholders who attended and participated in the national event and project workshop.
- Sectoral Risks were discussed, selected and prioritised.
- Photos/images of areas of climate vulnerability within Walvis Bay and accompanied descriptions and anecdotal information were composed for inclusion within final reports.

Workshop activity outcomes from Workshop Series 3 can be read in detail in *Annex 7*.

Cape Town:

Workshop Series 1: 9 June 2010.

Activities:

- Introduction of the project to the Mamre community.
- Facilitation and establishment of a volunteer committee group to manage activities undertaken at the community level.

Main Outcomes: Mamre Community volunteer committee established and committed to participate within a climate change training session and undertake a series of questionnaires to facilitate information gathering for the research purpose. See *Annex 8* for further details of Mamre workshop series 1 - 3.

Workshop Series 2: 30 June – 1 July 2011.

Activities:

- ICCCI Training and
- Capacity development on the first Mamre survey.

Main Outcomes: Increased climate change capacity amongst the community committee members

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and 10 completed surveys (Mamre Survey 1) by the committee.

The activities and engagement with the Mamre community that followed Workshop Series 2 were in the form of survey dissemination and completion by Mamre community members. The following section describes the aims and outcomes of the survey process.

The purpose of the survey series undertaken in Mamre, northern area of Cape Town, was to gain an understanding and to quantify the affects of the installation of insulated ceilings within low cost houses within the Mamre community and to gain an understanding of how this intervention improved the conditions of households and livelihoods in the light of changing climates and extreme conditions that occur in the Southern Cape Condensation Problem Area. The surveys also assessed the main factors, in relation to climate change, that affect the people of the Mamre community's livelihoods, and the typical relationships between these factors. The results and outcomes from the surveys and interviews with the community representatives are presented in the *'Mamre Ceiling Insulation Evaluation: Energy Retrofitting in low income communities'* Report (see *Annex 9*). These results and findings were absorbed within the final project output for Cape Town, entitled *'Building Climate Resilience: Retrofitting as an Adaptation Option for the City of Cape Town, South Africa'*. It is believed that the case for incorporating these into future planning and decision making processes at the municipal level has been made.

The first Mamre survey (*Annex 10*) was undertaken during the construction and installation of the household ceilings during the winter months of 2010. The second survey (*Annex 11*) was undertaken towards the end of the summer period (February 2011) so as to gather comparable information of the impacts of the ceilings subsequent to their installation during the warm temperatures experienced during summer and to ascertain the benefits, if any, of the ceiling upon community member livelihoods and well-being.

A third survey (*Annex 12*) was conducted subsequent to a cold and wet winter, in August 2011. This survey highlighted the savings relating to services used by the communities and how their general health had improved within the year of the ceiling installation. In all three surveys structure and content were based and altered slightly to suit the period of interview, with a focus upon and the health, energy and livelihoods.

The three interview surveys assessed the community vulnerability preceding both a summer and a winter season. The purpose was to understand and identify the effects on those households that were

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without a ceiling and by way of comparison to ascertain the benefits that the installed ceiling had on the quality of life and wellbeing.

All the findings from the three surveys are documented within ‘Mamre Ceiling Insulation Evaluation: Energy Retrofitting in low income communities’ report, which showcases the comparable results for each season. The results showcase improved climate resilience for the households as a result of significant improvement to the health of household members: increased thermal efficiency in the homes resulted in warmer houses and reduced energy consumption. There was, furthermore, a positive economic stimulus for the community as installations were carried out by unemployed local community members, affording them the opportunity to learn new skills while gaining employment.

Activity: Mamre Photography Workshop. 7 July 2011

ICLEI Africa and City of Cape Town undertook a photography workshop with the Mamre Primary School. The purpose of this workshop was to raise awareness amongst the youth about climate change adaptation and mitigation. The youth were given the opportunity to take photographs of what they understood to represent climate change, energy consumption and alternative energy sources and methods.

Dar es Salaam:

Workshop Series 1: 14-16 September 2010

Activities:

- ICCCI Training with the local government stakeholder group and with the Tuamoyo Community.
- Introduction of the projects aims, objectives and activities to the local government stakeholder group.
- Presentation of the draft Temeke Municipality, Dar es Salaam Baseline Study.

Main outcomes: Increased climate change adaptive capacity at the local government level and community level.

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Workshop Series 2 and 3: 8-11 August 2011

Activities:

- ICCCI Training with both Temeke Stakeholders and Tuamoyo community members;
- Local RAP Part 1 with both Temeke Stakeholders and Tuamoyo community members;
- Sector Risk Tool with Temeke Stakeholders;
- Local RAP Part 2 with both Temeke Stakeholders and Tuamoyo community members;
- Photography Workshop with both Temeke Stakeholders and Tuamoyo community members;
- Presentation of the draft Temeke Municipality, Dar es Salaam Baseline Study
- Presentation of the draft Climate Systems Regional Report.

These activities were undertaken with both the local government officials and the Tuamoyo Community on different locations.

Main outcomes:

- Increased climate change and adaptive capacity amongst all stakeholders.
- Identified and prioritised climatic variables by the local government stakeholders (flooding, drought and sea level rise) and Tuamoyo community (temperature and drought).
- Tuamoyo identified and selected community based adaptation solutions that would reduce vulnerability to the prioritised climatic variable.
- The local government stakeholder group identified sectoral risks at the local level and paired these with locally appropriate adaptation options.
- Both the stakeholder groups undertook the photography workshops within the respective program agendas.

All workshop series 2 and 3 results and outcomes are detailed in *Annex 13*.

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Maputo:

Project implementation for Maputo was delayed as there was a civil unrest in 2010 and there were severe floods in the first quarter of 2011. It was also difficult to identify and secure a local champion in Maputo presumably due to language differences. Through networking, ICLEI Africa established relationship with International Water Association (IWA), an institution that was undertaking a similar focused project in Maputo in partnership with University College London (UCL), and a learning alliance in Maputo named CLASS A in the second quarter of 2011.

Workshop Series 1/ Re-orientation visit: 11-15 July 2011. This workshop was undertaken in partnership with University College London (UCL) and International Water Association (IWA)

Activities:

- Meetings with two partners, namely: Class A and an UCL PhD student undertaking her research project entitled ‘Sustainable and Resilient Sanitation service Chains in Maputo province – action and piloting for the benefit of the urban poor’;
- Meeting with the Mayor of Maputo and technical representatives of Maputo City Council.

Main outcomes:

- Established partnership and contractual agreement with IWA’s Splash Water Project;
- Agreement that Class-A will facilitate further engagement and completion of the project activities with ICLEI Africa’s support.
- Renewed commitment and support by the Mayor of Maputo for continuation of the project.

Maputo re-orientation visit report can be read in *Annex 14*.

Workshop Series 2 and 3: 28-29 February 2012; 9-10 July 2012

These activities were undertaken in two separate workshops. The target group for the first workshop (28-29 February 2012) was the Chamanqulo C Community members while the second workshop (9-10 July 2012) was attended by key stakeholders from various political, professional and academic

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backgrounds. The activities undertaken during both workshops were as follows:

Activities:

- Explanation of the project aims and objectives to Chamanqulo C community;
- Adapted ICCCI Training Tool specifically speaking for Portuguese speakers in Maputo (*Annex 15*);
- Introduction of safe sanitation practice;
- Adapted RAP 1 & 2 Tool speaking for Portuguese speakers in Maputo;
- Photography Workshop, annotation of the photographs taken during the peak flooding season;
- Key interviews with stakeholders (*Annex 16*).

Main outcomes:

- Increased understanding of climate change science and improved capacity of the community and local government to manage sanitation systems effectively during and after floods;
- Draft framework development by multi-sectoral flood risk mitigation. This draft was circulated for review to other local government authorities and relevant national government ministries such as INAS, MISAU, meteorological offices and other NGOs to provide technical input for further development and completion of the document.

All workshop activities and detailed outcomes can be read from the Maputo Climate Resilient Handbook (*Annex 41*), see Section: Project Output section for further details on this annex.

Port Louis:

Workshop Series 1 and 2: 24 March – 1 April 2011

Activities: During this visit to Port Louis over a 7 day period, Port Louis Municipal Council arranged different meeting sessions for ICLEI to present the project and undertake the necessary project tools. The activities that took place during this period were as follows; also see the workshop program (*Annex 17*) for further details of this particular visit:

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- Field visit to vulnerable urban areas.
- ICCCI Training was undertaken with both the community and local government stakeholder groups.
- Local RAP Part 1 was undertaken with both the community and local government stakeholder groups.
- Local RAP Part and 2 was undertaken with local government stakeholder group.
- A community questionnaire focusing on the identification of climatic risks in urban poor areas was developed by the ICLEI Africa team; it was then reviewed by the Port Louis stakeholders during the participatory workshop and then further disseminated within the Port Louis communities by ward councillors and community members.

Main outcomes:

- Increased knowledge of the urban area and surrounding region and understanding of areas that are vulnerable as a result of climate change and extreme weather events.
- Both the local community and local government stakeholder groups prioritised winds, floods and temperature as the climate variables that are exerting pressure on local infrastructure, services and communities.
- The local government stakeholders selected and prioritised locally appropriate adaptation solutions. See all workshop outcomes detailed in the workshop report (*Annex 18*).

Workshop Series 3: 26-28 July 2011

In the third workshop series, ICLEI Africa's engagement with the Port Louis stakeholders was elevated to building capacity of a wider Small Island Development States (SIDS) audience. This was in response to a request from the Lord Mayor of Port Louis that a regional event be hosted in Port Louis to enhance capacity of the SIDS local political leaders on climate change and the impacts associated with extreme events. ICLEI Africa partnered with UNDP for this event and the event programme, which incorporated the African Mayors Climate Change Declaration (AMCCD), encouraged SIDS mayors to support this initiative and commit to sustainable urban development.

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With this in mind, the project activities undertook a different format to Workshop Series 3 workshops undertaken in the other cities. During this event the first draft of the localised downscaled Port Louis climate change report was presented by Dr Peter Johnston, CSAG. The climate scientist stated that the downscaled climate report should not be used in isolation but rather as a complementary document to the regional climate report. The report highlighted uncertainties when projecting rainfall and precipitation at a local scale; temperature projections are less uncertain.

The 3rd consultative workshop for Port Louis formed the second part of this high level event. The activities undertaken during this workshop were as follows:

- ICCCI Training;
- Presentation of the Downscaled Climate Report;
- Local RAP Part 1;
- Sectoral Risk;
- Photography Workshop;
- Launch of the first draft of the Port Louis tailor-made Climate Resilient Handbook, which was developed further in partnership with the key stakeholders attending the workshop.

Main outcomes: Identified and prioritised sectoral risk at the local level can be read in details within the comprehensive Workshop Series 3 Report, *Annex 19*.

Concluding visits:

During the period following the last workshop series in each of the cities, ICLEI Africa worked closely with consultants (who had extensive experience in the development of policies and planning frameworks), for the further development of the handbooks. The data, information and workshop outcomes were drawn together for the development of the tailor-made Climate Resilient Handbooks for each of the cities. After the drafting stages of the documents it was realised that a final visit to some of the cities was needed in order to consult with relevant stakeholders to conclude some of the handbooks chapters. Visits to Dar es Salaam, Port Louis and Maputo took place during the months of June, July and August 2012. These achieved their aims through a process of consultation with the

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relevant stakeholders on the draft handbook, reaching agreement upon the final SMART goals, and concluding project outcomes with both community members and local government officials.

h. *Network Activities*

1st Southern African Climate Change and Adaptation Conference (Local Climate Solutions for Africa 2011), 27 March – 3 February 2011

A Pan African congress entitled Local Climate Solutions for Africa 2011 attracted over 380 delegates from over 50 African cities. Participants engaged in more than 100 plenary and thematic sessions. The delegates participated in constructive debates around climate change issues, both mitigation and adaptation. The main outcome of this congress was the development of the African Mayors Climate Change Declaration (AMCCD) by the leaders of African local governments. The AMCCD was presented during the high-level segment of the UNFCCC COP17/CMP7 held in Durban from November 28 to December 9, 2011.

- ***Mobile Workshops***

The conference focused on immediate and quantifiable steps taken by local governments. Accordingly, the City organised and coordinated a series of mobile workshops or site visits during the conference that showcased a wide range of projects, including integrated urban water management, coastal innovations, urban mobility, energy efficiency, mitigation of the carbon footprint of major events and the business case for biodiversity. The project city representatives from the 5 Southern African regions participated in a mobile workshop, the ‘Coastal challenges, calls for innovative local climate action’, where participants visited sites along the coast where climate change variables are currently impacting upon the Cape Town coastline and where the City is implementing best practices to strengthen resilience towards extreme events.

- ***Technical Training Session***

All focal points and representatives from the five cities were present and participated in the Adapting to Climate Change Technical Training session on 1 March 2011. Lucinda Fairhurst’s presentation on the progress of the 5 city adaptation network project was followed by the city presentations, each highlighting their progress on climate change resilience. Anton Cartwright gave an informative presentation introducing the concept of risk and what this means for cities, defining the costs and the

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benefits if such extreme climatic events occur in a coastal city. The draft of the ‘Climate Systems Regional Report: Southern Africa Report’ was launched by Peter Johnston, Climate Systems Analysis Group (CSAG) to showcase past, current and future climatic trends and projections across southern Africa.

- ***Adaptation Competition***

The Southern African Adaptation Competition entitled: “Save Your City: Adapt to Climate Change” was launched at the Local Climate Solutions for Africa 2011 congress (March 2011) during the Adapting to Climate Change Technical Session. The competition was open to all 5 cities within the project, encouraging them to partner with each other on an initiative that would increase their adaptive capacity toward changes in climate. The final date for submissions was 8 June and there were a total of 3 proposals submitted. These were externally reviewed by a panel of experts (Professor Geoff Brundrit, owner and founder of GOOS; David Dodman, Senior Researcher for the Human Settlement and Climate Change Department of the International Institute for Environmental Department (IIED) and Lucy Kemp, an environmental consultant). The winning city, Walvis Bay Municipality that won the cash prize, was announced at the National Namibian event on 23 August 2011. During the Closing Workshop in July 2012, Walvis Bay presented on the winning project: Walvis Bay Interactive Climate Change (WICC) training tool and Walvis Bay Interactive Risk and Adaptation Prioritisation (WIRAP) training tool and how the funds were allocated and used to increase resilience at the local level.

Network Activity 2: 2nd Southern African Climate Change and Adaptation Conference (Closing Workshop), 4-6 July 2012

ICLEI Africa hosted the Closing Workshop for the 5 City Climate Change Adaptation project at the Southern Sun Cullinan Hotel in Cape Town, South Africa from 4-6 June 2012 (see Workshop Program, *Annex 20*). Representing each city was a political leader and the city focal point. Project pioneering cities participated in knowledge sharing sessions and discussions pertaining to the lessons that had been learned and shared between the project cities over the past three years. These adaptation lessons, and the implementation thereof, have been gained through the use of platforms and networks from local, regional and international areas that this project, combined with the ICLEI international network of sub national governments has provided.

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The World Bank supported and participated in the project and facilitated a Mayoral Round Table session during which all five city political leaders – the Mayors - engaged in dialogue pertaining to the climate risks and local solutions and best practices within their respective cities. In parallel to this high level Mayoral session, the technical officials participated in a technical tour using the new Rapid Bus Transit (BRT) System, MyCiti Bus, to areas within Cape Town that are vulnerable to the elements of climate change, specifically a combination of sea level rise, sea storm surges and flooding along the west coast of Cape Town. This site visit was followed by a visit to the Cape Town research focus community, Mamre, where the representative of the Mamre Information Centre greeted the international delegates and provided information on the Mamre Ceiling Project and how the research undertaken by ICLEI Africa and City of Cape Town has benefited the community as a whole by increasing awareness on climate change, energy efficiency and adaptation.

During the dinner hosted by ICLEI Africa on 5 July 2012, the ‘Save Your City: Adapt to Climate Change’ competition, an award plaque was presented to Walvis Bay, after which Walvis Bay provided an informative presentation of how the seed funding was used to develop and roll out a climate change capacity building training tool to school, communities and local government officials (see *Annex 21 and 22* for the Walvis Bay Competition Award Project Progress Report and Tool User Guide).

The Online Africa Cities Adapt Tool was launched and showcased to the city representatives and participating researchers. City officials were given the opportunity to provide input and feedback to the tool for further development. The cities will be provided a one year login to use and access the online process to further mould and develop their adaptation frameworks, SMART goals. These can then be incorporated into urban planning and inform decision making and policy development. See Section 5: Project Outputs for further information.

For further information on the knowledge exchange exercises and the decisions made on the legacy of the network, see the Closing Workshop Report, *Annex 23*.

i. Lessons Learned through implementation and management of the project activities

There were certain aspects of the project management and implementation that were particularly important to the success of the project.

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- A key aspect that played a large role of the success of the project was receiving political buy in and support from the political leaders of the local government. Once the buy-in was consolidated it was important for ICLEI Africa to build upon relations throughout the project and provide a platform where the local leaders between the cities had the opportunity to engage and have dialogue on sustainable development matters at their local level.
- The success of the project was also due to the already established network that ICLEI provides, creating a platform to connect cities and technical officials together at strategic events where challenges and best practices are exchanged and shared. Such events during the project lifespan were Resilient Cities 2010, 2011, and 2012; ICLEI World Congress 2009 and 2012; and Local Climate Solutions for Africa 2011.
- The project benefited from the partnerships made with other donor organisations and international UN organisations, such as the World Bank, UN Habitat, United Nations Development Program and the United Nations Environmental Program, who partnered with ICLEI Africa on some of the workshops and events held within the cities.
- The success of the delivery and completion of the project outputs were due to the range of academic experts and consultants who provided diverse and dynamic knowledge by tapping into new science and leading economic and social research from African experiences. Amongst the research bodies that provided key inputs to the project were the Stockholm Environmental Institute, the Climate Systems Analysis Group at the University of Cape Town; the International Institute for Environment and Development and the Global Ocean Observing System in Africa.
- A key element of the project that contributed to its success was the participatory research that ICLEI Africa facilitated with the local communities. The local government officials provided the support and the opportunity for the research team to understand the real challenges and risks that are being faced at the grass roots level, which were fed into local governments systems, planning process and decision-making.
- The project was very successful in working across all levels of the urban area, i.e.

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politicians, local government officials, community members and academics, researchers and non-governmental organisations. Through the project ICLEI Africa was able to bridge the information and communication gap that so often creates barriers between the spheres within a urban centre, especially when political and technical decisions impact on community livelihoods. With the change in climate and the research that has been undertaken, which provides proof of climatic and weather phenomena occurring more frequently and intensely, it is essential that politicians, technical experts and communities work in unison and that communication flows between the respective parties so as to reduce vulnerability in the face of such changes and natural disasters.

- The project team did overcome issues around translation, specifically at the community level within Dar es Salaam and Maputo urban areas. The team worked very closely with local leaders, local technical experts and members of the community who were able to translate workshop dialogue and material. An important factor was that the research team, working in close liaison with NGOs and local teams that were already working on the ground in these areas, were able to establish trust and relationships with communities who have very limited access to government services and infrastructure. Lessons learnt from working with communities is that sufficient project budget should be allocated for adequate translation and NGO services, thus ensuring locally appropriate services and support as well as increased capacity at the local level, translating into heightened awareness and action on the ground.

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i. Additional Activities:

ICLEI Africa participated in many additional international events showcasing the project, activities and results to global experts and stakeholders from across the world. The table below lists the events and who from the ICLEI Africa research team attended the event.

Table 1: Additional Activities undertaken in the course of the project life span that were supported by other international organisations.

Event Title	Dates	City, Country	Attended by
Local Government Climate Roadmap Summit	29 – 31 July 2009	Tswane, South Africa	Lucinda Fairhurst
CCAA workshop on Integrated Climate Risk Assessment	1 – 6 November 2009	Nairobi, Kenya	Tarryn Quayle
Advisory Board – Round table discussions	11 November 2009	Cape Town, South Africa	Tarryn Quayle
CCAA workshop on Monitoring and Evaluation	7 – 11 December 2009	Dakar, Senegal	Tarryn Quayle
UNFCCC – COP 15	05 – 14 December 2009	Copenhagen, Denmark	Lucinda Fairhurst & Lizanda Du Preez
Africities 5/ Citexpo 2009 – UN-HABITAT side event ‘Adaptation to climate change in the developing world’	15 – 20 December 2009	Marrakesch, Morocco	Lucinda Fairhurst
Community Based Adaptation	21 – 27 February 2010	Dar es Salaam, Tanzania	Lucinda Fairhurst
South Africa’s Green Economy summit	18 – 20 May 2010	Sandton, South Africa	Lucinda Fairhurst & Lizanda Du Preez & Priscilla Rowsell

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Resilient Cities 1 st Congress	28 – 30 May 2010	Bonn, Germany	Lucinda Fairhurst & Kobie Brand
CCAA – Consultative Participatory workshops. Cape Town, South Africa	30 June – 1, 7 July 2010	Cape Town, South Africa	Lucinda Fairhurst & Priscilla Rowswell
WIOMSA Conference: “Climate Change Impacts, Adaptation and Mitigation in the WIO region: Solutions to the Crisis”	21 – 23 March 2011	Balaclava, Mauritius,	Lucinda Fairhurst and Priscilla Rowswell
Reconstitution of the African Working Group for Disaster Risk Reduction	27 March – 1 April 2011	Nairobi, Kenya	Faith Chihumbiri.
Barriers to Adaptation Implementation workshop	3 – 4 April 2011	Johannesburg, South Africa	Lucinda Fairhurst
South African Adaptation Network	5 – 6 May 2011	Polokwane, Limpopo	Priscilla Rowswell.
UN Habitat best practices compendium	4 – 7 May 2011	Kenya, Nairobi	Lucinda Fairhurst
SADC Disaster Risk Reduction Partners and Member State workshop and meeting	23 – 26 May 2011:	Gaborone, Botswana	Priscilla Rowswell.
National Consultation Workshop of the SADC Protocol on Environmental Management for	1 – 2 June 2011	Johannesburg, South Africa	Lizanda du Preez

Sub-Saharan African Cities:



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Sustainable Development			
Resilient Cities 2011 Conference	2 – 5 June 2011	Bonn Germany	Kobie Brand and Lucinda Fairhurst
Climate Change Impacts on African Coastal Communities,	29 – 31 August 2011	Cape Town, South Africa	Project's external advisor, Prof Geoff Brundrit and two of the project's city focal points; Mr Mussa Natty, Dar es Salaam City Council, Tanzania and Mr David Uushona, Walvis Bay Municipality, Namibia.
SALGA Conference: Theme 2: Accelerating the pace of ensuring access of Sustainable Municipal Services for All.	30 August 2011	Durban South Africa	Lucinda Fairhurst
Localizing the Millennium Development Goals to address disparities and Marginalization at local government level. Pan African Conference of Sub-National Governments in pursuit of Millennium Development Goals	6 October 2011	Johannesburg, South Africa	Faith Chihumbiri

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SADC Disaster Risk Reduction and Preparedness and Planning Workshop	10 – 14 October 2011	Mahé Island, Seychelles	Priscilla Rowsell
International Disaster Day	12 October 2011	Cape Town, South Africa	Faith Chihumbiri
City-wide Sanitation Planning Meeting	8 – 9 November 2011	Dar es Salaam, Tanzania	Tarryn Quayle.
Ramsar COP11: ‘Wetlands, Tourism and Recreation’, The African Regional Preparatory Meeting	3 – 8 October 2011	Ouagadougou, Burkina Faso	Lucinda Fairhurst
Road towards UNFCCC COP17/CMP7 and beyond, Mitigation and Adaptation in Local Governments	23 November 2011	Bojanala Platinum District Municipality, South Africa	Sarah Birch and Tarryn Quayle
IDRC Climate Change Adaptation in Africa Writeshop	28 – 30 November 2011	Cape Town, South Africa	Priscilla Rowsell
Climate Change Learning Exchange	30 November 2011 – 1 December 2011	Durban, South Africa	Lucinda Fairhurst
Plenary 4: African Adaptation Perspectives, Durban Local Government Convention, Durban, South Africa (parallel event to UNFCCC COP17/CMP7)	2 – 4 December 2011	Durban, South Africa	Lucinda Fairhurst

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Local Renewables: South-South cooperation between cities in India, Indonesia and South Africa, Project Launch	Coimbatore, India	12 – 14 December 2011	Priscilla Rowswell
Resilient Cities 2012	12-15 May 2012	Bonn, Germany	Priscilla Rowswell
ICLEI World Congress	14-18 June 2012	Belo Horizonte	Priscilla Rowswell and Faith Chihumbiri
National Namibian Mayors Forum	4-5 September 2012	Windhoek, Namibia	Sarah Birch and Jenny Clover

5. Project Outputs

The project team completed everything that was expected from the project original proposal for the given project funding, and more. The list of Project Outputs: **a) Research Based** and **b) Capacity Build and Impact** are listed under the respective sections below accompanied by a short description and the link to the respective annexure.

i. Research Based

a) 5 Baseline Studies

The first deliverables of the project were the Baseline Studies for each of the five project cities, which indicate the projected impacts of climatic variables upon the four governmental sectors that were the focus areas of the research, namely; water and sanitation, energy, transport and health. These documents allowed the city stakeholders to truly understand what climate change is and what the global thoughts are surrounding the impacts. The reports provide:

1. An overview of the climatic changes in Africa, moving towards
2. A more detailed review at a regional level (Nationally), and then

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3. Specifically at a local level for each city; the infrastructure and services that fall under the municipality's jurisdiction, and the impacts and risks for these sectors relating to climate change.

Walvis Bay Baseline Study: Annex 24

Cape Town Baseline Study: Annex 25

Dar es Salaam Baseline Study: Annex 26

Maputo Baseline Study: Annex 27

Port Louis Baseline Study: Annex 28

b) Climate Systems Regional Report: Southern Africa

This report was compiled by Dr Mark Tadross and Dr Peter Johnston from CSAG, University of Cape Town. This report stands to serve as the first of its kind, focusing on the African changes in climate and building upon the findings of the IPCC's 4th Assessment and comparing the local (national) climate data to that of the GCMs.

The report provides an overview of the historical climatic trends for precipitation, winds and temperature for the southern African region. The report provides the model outputs based on the historical trends projected to provide future trends building in components of anthropogenic activities and increased carbon dioxide emissions in the atmosphere. The projections consider and note the uncertainties that lie in long term model projections.

Climate Systems Regional Report: Southern Africa (ISBN 978-0-9921794-6-5): Annex 29

c) Local Downscaled Climate Reports

5 local downscaled model reports were generated for each of the urban areas providing localised projections based on downscaled model simulations. The reports are hoped to provide local government officials with climatic information to better inform urban planning decision-making in the future. The reports were compiled by Dr Mark Tadross and Dr Peter Johnston from CSAG, University of Cape Town. The climate scientist stated that the downscaled climate reports should not be used in isolation but rather as a complementary document to the regional climate report. The reports showcased that there are uncertainties when projecting rainfall and precipitation at a local scale, however projecting temperature provides less uncertainty.

Climate Change Projections for Walvis Bay: Adding value through downscaling (ISBN 978-0-

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9921794-7-2): *Annex 30*

Climate Change Projections for Cape Town: Adding value through downscaling (ISBN 978-0-9921794-8-9): *Annex 31*

Climate Change Projections for Dar es Salaam: Adding value through downscaling (ISBN 978-0-9921794-9-6): *Annex 32*

Climate Change Projections for Maputo: Adding value through downscaling (ISBN 978-0-9921802-0-1): *Annex 33*

Climate Change Projections for Port Louis: Adding value through downscaling (ISBN 978-0-9921802-1-8): *Annex 34*

d) Risk Concept Paper

The Risk Concept Paper by Anton Cartwright focuses on the understanding of what risk means for local decisions makers. Risk as a concept is very complex and characterized by uncertainty. The costs and benefits underlying risk projections are very difficult to assess. The paper focuses on providing a better description of the concept of risk to climate change for better understanding by African local governments, thereby also increasing the reach of the project to other African Local Governments. The paper provides a baseline of information and reasoning to facilitate understanding of the specific and peculiar dynamics of climate change risk in order to assess the threat of climate change and the formulation of appropriate risk management approaches. The report clearly spells out that climate change is accompanied by high levels of uncertainty about the probability of events, the nature and impact of events and the socio-institutional responses to such events. The paper acknowledges the important decisions that are made at a local level and points out that decisions are risky when the probabilities of outcomes are known, and are uncertain when the probabilities are unknown, but in the context of climate, risk and uncertainty influence each other and the concept of risk can encompass uncertainty. However, the paper states that risks associated with climate disasters can be reduced by increasing the accuracy of prediction, although it is not possible to predict exactly how global warming will manifest in altered weather patterns, and even less possible to anticipate how people and institutions will respond to such events. This paper provides a better understanding of how risks and impacts associated with climate change can be reduced by increasing the awareness and understanding of the possibilities and threats that can occur within areas of risk and high vulnerability.

Further to the original project outline, the Risk Concept Paper has been developed in conjunction with a power point presentation (*Annex 35*) that will allow for further delivery and future capacity building with other African Local Governments.

e) Climate Resilient Handbooks

All of the above processes, interactions and participatory actions were synthesized and fed into the pool of information, which provided direction for the individual climate adaptation frameworks, now known as the Climate Resilient Handbooks. From the research, processes and activities undertaken it became clear that there is not one answer or process that can possibly be applicable for all African local, sub-national and national governments as each of these spheres of government interact with each other at very different levels within and between countries. For this reason, it is not simple when considering the roles, policies and strategies that are used to manage and provide decisions for the various services and infrastructures that we see as being crucially important for local communities to be resilient in the face of a changing climate.

As mentioned previously within this report, different processes and directions were undertaken within each of the municipalities based on the entry points, needs and focus areas, therefore it will be seen within the Handbooks for each of the cities that they are different and uniquely formulated to answer these specific needs. The handbooks briefly describe the context of the overarching 5 city project and its findings, whilst focusing specifically on the each of the local government jurisdictions, providing an account of the projected changes in climate that are anticipated to compromise the municipality's basic services, functions and the livelihoods of various communities and public sectors that fall within the administration of the urban area. The main aim of the development of the Handbooks is to assist the local authority and its key stakeholders to take the appropriate action, given the ability to undertake the necessary steps with the strengthened and enhanced adaptive capacity, implementation of the sustainable and smart solutions. It should be noted that the success of the Climate Resilience Handbooks are dependent upon the commitment and follow-through of all key stakeholders.

These Climate Resilient Handbooks provide the recommended and necessary steps to enable the future extension of a participatory approach with multiple stakeholders, for the implementation of climate change adaptation strategies and policies. Furthermore, each Handbook encourages the local government to continue with the processes undertaken during the Participatory Research Action (PAR) methodology that was undertaken in the course of the project. This will inform future decision making and planning with the involvement of and reference to vulnerable communities while incorporating gender issues.

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The sectoral risks and accompanied adaptation solutions identified and selected during the consultative workshop activities are outlined in the custom made SMART Goals identified for each of the cities, which outlines the locally appropriate adaptation solutions, roles, responsibilities, resources and timeframes for each adaptation action. **SMART** stands for Specific, Measurable, Achievable, Realistic and Time-framed, and is a tool to set feasible goals and to identify the different steps that are necessary for their implementation. Goals that are too abstract and are difficult to break down into actions, which can leave decision-makers and practitioners feeling ‘lost’ in terms of how and who should initiate the implementation process. It is imperative that when a goal is set, key steps, responsibilities, time frames and budgets should be at least approximately determined.

During the last 6 months of the project, ICLEI Africa contracted an information systems and tool designer to develop the Africa City Adapt Online Tool (see project output below), which is an internet based tool enabling the five pioneering cities access to the tool to create their own SMART Goals in consultation with the already formulated stakeholder groups. Because the development of the Africa Cities Adapt on-line tool took longer than expected, this, delayed the development of the full SMART Goals, which were to accompany the completed handbooks for each of the cities. The on-line tool was completed at the end of September 2012, after which ICLEI Africa will schedule webinar sessions with each of the cities individually to handover the username and login to the city’s version of the Africa City Adapt online tool. This will provide an opportunity for the cities to continue to work on their own SMART Goals into the future, providing the much needed information such as roles, responsibilities and time frames to accompany the identified actions listed within the handbooks.

The completion of the SMART Goal section of the on-line tool by the local governments, results in the generation of tailor-made reports. These reports are tailor-made as with undertaking all the features, functions and steps within the tool, there is much data captured during the process, which results in a very comprehensive report as a whole. However the tool allows for cities to decide on what sections of the tool outcomes they would like to feature in the report, depending on the required audience the document is presented to. The options for the report generated will range from an executive summary to a full report featuring all steps undertaken within the tool.

The SMART Goals are presented in a table format that can be easily updated, reviewed and new actions incorporated when needed within the tool. This online generated report will accompany the handbooks, providing further details of how the actions can be implemented and achieved.

Building Climate Resilience. A Handbook for Municipality of Walvis Bay, Namibia (ISBN978-0-

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9921794-0-3): Annex 37.

Building Climate Resilience. Retrofitting as an Adaptation Option for the City of Cape Town, South Africa (ISBN 978-0-9921794-3-4): Annex 38.

Building Climate Resilience. A Handbook for Port Louis Municipal Council, Mauritius (ISBN 978-0-9921794-1-0): Annex 39.

Building Climate Resilience. A Handbook for Temeke Municipality, Dar es Salaam, Tanzania (ISBN 978-0-9921794-2-7): Annex 40.

Adapting Sanitation Systems to Climate Change through participatory research and local action in Maputo (ISBN 978-0-9921794-4-1): Annex 41.

f) Physical Climate Change Adaptation Tools

A series of physical climate change adaptation training tool kits were developed to facilitate better approaches to PAR capacity building and information gathering processes. These tools were described in detail in Section 4: Project Activities of this report.

These tools have been used, with other local governments on special request, in workshops aimed at increasing knowledge and understanding about climate change and adaptation planning. The local governments that have received training using these tools are: i) all local governments in Namibia who attended the National Namibia Mayoral Forum AGM 2011, and ii) the Bojanala Platinum District Municipality (South Africa), including all relevant stakeholders who received climate change training by the ICLEI Africa team in November 2011 in preparation to the UNFCCC COP17 event in Durban, South Africa in December 2011.

g) Africa Cities Adapt Tool – web-based tool

The physical climate change adaptation tools and the accompanying activities, which were described in the above section and in Section 4: Project Activities of this report, have been incorporated into the ICLEI Africa online tool entitled: **African Cities Adapt Tool**. ICLEI Africa launched the interactive website during the projects Closing Workshop in July 2012 and showcased the functionality and features to the pioneering cities. The tool outlines, identifies and tests the process for African local governments to develop adaptation and climate resilient strategies, plans and actions that are locally appropriate to the risks and impacts that are being faced at the local level. The interactive tool/website is rooted within the project's Participatory Action Research (PAR) methodology, which was

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successfully undertaken through the consultative processes and used in the development of tailor-made climate resilient handbooks for each city. These handbooks outline locally appropriate actions (and the required sub-actions and resources) to increase climate preparedness at the local level. The main activities undertaken during the 5 milestone process are now embedded within the tools, these steps encompass:

- Building capacity of community members, private sector representatives and local decision makers alike;
- Assessing climate risk;
- Identifying and prioritizing locally appropriate adaptation options, related actions and responsibilities.

The African Cities Adapt Tool will be made available to the pioneering cities through scheduled webinar sessions during October 2012, where the final product will be showcased. The steps that have already been undertaken through the project activities have been recorded within the individual cities version of the tool (which is easily able to be updated through continuous and cyclic review of the planning stages). and therefore project cities will be asked to complete the last function/step of the tool which is the SMART Goal for the pre-selected and prioritized climatic variable, sectoral risks and adaptation solutions defined within the city handbook. The information (resources, roles, responsibilities and timeframes) required for the completion of the SMART Goals is only really accessible by the local governments themselves, and therefore these cannot be completed by external parties. Once a SMART Goal is created, cities are still able to access the tool to focus on another climatic variable/sectoral risk and adaptation solutions, allowing for continuous planning to inform decision making. The pioneering cities will receive a one year free subscription to the tool to support the cities beyond the duration of the project. ICLEI Africa invites and welcomes other cities to apply for the Program, which will incorporate functionality and usage of the online tool as a resource to facilitate climate change adaptation in African local governments.

h) Lessons learnt discussion paper: Planning for Climate Resilience at the local level: A Tale of 5 African Cities

For the duration of the project information has been gathered pertaining to all processes and activities, challenges and successes with a view to collating “lessons learnt”. Furthermore, a session was incorporated within the Closing Workshop to provide a platform for cities to report on successes (what went well), and on which aspects of the project could be improved upon - project management,

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implementation of activities, interaction of ICLEI Africa team members with the city and delivery of the project during the three years.

These are formally documented in a discussion paper, compiled by Marlene Laros, an environmental consultant, entitled: *Planning for Climate Resilience at the local level: A Tale of 5 African Cities* (Annex 42). Some of the lessons highlighted during the Closing Workshop are listed below:

- Successful implementation was highly dependent on a local champion and high level political buy-in from the start of the project.
- Interaction and participation with multi-dimensional, multi-sectoral and multi disciplinary stakeholder group enabled in-depth discussions on sustainability issues at the local level.
- Provision of local, regional and international platforms for dialogues on urban sustainability is important for networking. Networks/platforms connected local leaders and technical experts on the subject of climate change adaptation, which provided a gateway for solutions.
- The project provided opportunities of education and awareness of climate systems and process at all urban levels: political, technical officials and public participants.
- Interactive Climate Training Tools developed specifically for participatory action research approach, were flexible and fluid. This made for easy access and dissemination.
- The project process and step-by-step methodology was transparent, fluid, flexible, which enabled project activities to be mold accordingly to the local context for increased benefit and output.
- The participatory workshops provided a valuable and informative consultative process for participants to discuss local impacts and risks and appropriate solutions to increase local resilience.
- Through ongoing transparent city participation, cities gained leadership and confidence in addressing climate change related impacts and risks.
- Language barriers by the different communities were overcome by working with local social and community groups to carry out activities and communications.

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i) Marketing Material

- Project Overview Brochure (available in English and French): *Annex 43*
- Risk Assessment Brochure (available in English and French): *Annex 44*
- Adaptation Solution Brochure (available in English): *Annex 45*
- 5 City Project Banner: *Annex 46*
- ICLEI Africa Newsletter September 2012 (Full spread of 5 City Project): *Annex 47*

j) Other Publications:

- Fairhurst, L. and Rowswell, P. (2010). Coastal areas: An overview of governance systems in southern Africa. GPA: Blue Diamonds, Oceans and Coasts. Issue March 2010 (*Annex 48*)
- Fairhurst, L. and Rowswell, P. UN-Habitat (2011). Adaptation: Infrastructure, Slums and Deserts. Cape Town: Ceilings improve livelihoods in the face of climate change. In Print (*Annex 49*)
- Fairhurst, L., Rowswell, P. and Chihumbiri, F. Resilient Cities 2011. Participatory Action Adaptation: Tools for increasing climate change capacity and preparedness at the local government level. Springer. (*Annex 50*)
- Tadross, M. And P Johnston. 2012. Using Climate Projections for Assessing Impacts at the City Scale (*Annex 51*). This paper has not yet been submitted for a journal publication, however suggested journals for submission of this research paper have been explored, they are:
 - Climate and Development Journal: <http://www.tandfonline.com/toc/tcld20/current>;
 - The International Journal of Climate Change: Impacts and Responses - <http://on-climate.com/publications/journal/>;
 - Natural Hazards (Journal of the International Society for the Prevention and Mitigation of Natural Hazards)
<http://www.springer.com/earth+sciences+and+geography/natural+hazards/journal/11069>

ii. Capacity Build and Impacts

a) Number of Beneficiaries:

Direct beneficiaries: roughly 150 stakeholders per city, therefore 750 in total

- Indirectly the beneficiaries are the communities that reside in the urban area within the jurisdiction of each of the 5 cities (totalling about 8 million people).
- More broadly the city as a whole benefit through better planning and mainstreaming of climate change adaptation into development planning.

b) Type of beneficiaries:

Political leaders, local authority technical officials, NGO groups, private sector groups, community leaders and representatives including women, men and youth.

c) Impact on beneficiaries:

- Increased knowledge on climate change, the associated impacts and how to mitigate and reduce risk at the local level.
- Increased knowledge to inform decisions on past, current or future climate related impacts and risks across multiple sectors and services provided to city rate payers.
- Network provided connection of experts, local official and community members to engage on climate related pressures.
- Increased confidence on to react and prepare for climatic risks.
- Increased resilience resulting increased livelihood options benefiting life and well-being of communities in pro-poor and vulnerable conditions.

d) Transferability and up-scaling:

The process developed under this program has been designed in such a way that it is easily replicable and transferable to other local governments across Africa and abroad. The step-by-step methodology and tools verified and tested within the 5 local governments in southern Africa are accessible through an online process to any other city wishing to join the program. In addition, ICLEI Africa will take

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forward the lessons learned in all future adaptation work undertaken with cities across the African continent. ICLEI offers technical support, expertise and guidance for local authorities to complete the program within a given time period. The 5 Pioneering cities that were part of the initial project will play mentoring roles to new joining cities and provide lessons learnt, best practices and information exchange through the Network platform.

6. Project Outcomes

The Five City Network project had many qualitative and quantitative outcomes that emerged as a result of the Participatory Action Research methodology that was adopted. The success and extent of these varied within each participating city.

a) Scientific knowledge, research, or knowledge innovations:

The scientific research and knowledge innovation outcomes of this project are listed and described within the Section 6: Project Outputs of this report. The outcomes of this project are not only to the benefit and use of the selected 5 local government authorities and citizens, but the path and steps undertaken towards achieving the outcomes of the project are accessible through this well tested milestone process that ICLEI Africa has established. As mentioned before, it is a key to the success of the project that many research institutions and NGOs were involved during the planning and development of the outputs to ensure that new scientific knowledge and innovations were produced for the enhancement of urban planning but most importantly that the communication gaps were bridged between the science and policy makers.

b) Understanding of the science

Increased understanding of the science, research and knowledge of climate change and the associated impacts were achieved as a direct result of the main component of the project – promotion of interactive participation between ICLEI Africa, the five cities, the residing communities and the academic institutions. This was achieved mainly through workshops, continuous communication and interviews with respective stakeholders. To accommodate the different subject comprehension levels, ICLEI Africa facilitated a series of workshops in the five cities, aggregating invited audience into two groups namely:

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- i) Multi- disciplinary stakeholder workshop: audience included academia, researchers, technical local government officials and community leaders and representatives.
- ii) Community workshop: community leaders and members, ensuring gender and age equality, were invited to attend and were encouraged to actively participate.

Scientific terms were explained accordingly to the context where it was presented to providing opportunities throughout the activities and processes for explanation, questioning and areas of needed clarification from the respective audiences. Example of the workshop program activities between the technical stakeholders and community members is illustrated within Temeke Municipality, Dar es Salaam Workshop Series 2 and 3 Program, *Annex 50*, which showcases how simplified the community agenda was in comparison to the more informative sessions and presentations that took place within the technical stakeholders workshop agenda. Where possible transitions were used and tools were adapted for specific language needs, i.e, for the Maputo Portuguese speaking context, all the tool and workshop materials were translated into Portuguese. During each workshop proceeding invaluable anecdotal information on past and current climate trends were communicated and documented from diverse range of people: young, elderly, male and female. To augment this, manual tools were developed and used resulting in the active participation of the elderly and illiterate populace.



Figure 7: An elderly gentlemen within the Tuamoyo community of Temeke Municipality shares a past climate event with his fellow community members.

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Evidence of increased understanding of the subject was evident throughout the project period as both groups, community members and multi stakeholders identified:

- Climate variables of concern to their urban environment,
 - Locally appropriate and feasible adaptation options to mitigate the impacts of climate change.
- See Section 4: Project Activities and Section 5: Project Outputs for tools used for this exercise for the creation and development of a Climate Resilient Handbook.

Further evidence of increased understanding and interest simulation in the subject matter is also indicated from the consistency in the number of people that actively participated throughout workshop series during the three year project period.

c) Behavioural Change, Capacities and Networks

Behavioural change and perceptions of climate risk were continually being altered and changed during the course of the project period. Through the project processes and activities the project elements allowed for capacities to grow and build upon initial building blocks. The project activities were voluntary throughout the process, at no stage were any activities forced upon any stakeholders, therefore through a relaxed environment sharing and growth took place and will continue through local dialogues and interactions with colleagues, neighbours and friends. Items below describe the sustainability of the networks established through the project.

d) Five City Network

Through the project a Network was established between the cities and connections were made with other cities through ICLEI's already established networks and platforms. The legacy of the Five City Network, established at the onset of the project in 2009, was discussed during the projects closing workshop session. There was a firm commitment from both the political and technical participants to endeavour to sustain this network beyond the project period. Each of the cities are taking the project processes forward in different manners and are increasing sustainability across their city encompassing and integrating all sectors within the urban sphere. Where possible, the five cities indicated commitment to continue interacting and sharing best practices.

To illustrate the elements of social integration and inclusivity imbued in the project, the cities agreed to open the network to interested cities to join.

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Figure 8: Political representatives from each of the pioneering project cities commit to the longevity of the Africa Adaptation Network.

Municipality of Walvis Bay, Namibia is feeding their newly developed policies into national processes and have developed a mandated stakeholder platform, WEMAF, that feeds and informs council in decision making processes. Walvis Bay have also developed an climate change educational set of tools that will be rolled out across schools in Walvis Bay and surrounding areas to increase understanding and knowledge of the climate change phenomenon.

City of Cape Town, South Africa is taking the project processes forward and building on the suggestions to enhance manoeuvrability of funds for retrofitting of Reconstructive Development Program (RDP) houses, thereby reducing poverty and health, livelihoods and increasing climate resilience.

Maputo City Council, Mozambique is directly linking climate change and the associated impacts on a particular sector, sanitation, and sustainable sanitation is something that has not yet been fully analysed in the past in Maputo, however the project has provided the necessary steps and processes to fully understand the implicated risks of climate change on the sector at the local level, thereby enhancing the links between effective climate change adaptation and the attainment of the Millennium Development Goals (MDGs). There are commitments from local universities, such as Eduard

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Mondlane University, CFPAS Technical School, (CONDES -Conselho Desenvolvimento Sustentavel), Forum Provincial de Saneamento and other key players in Maputo to take the process forward into other regions and areas of Maputo whilst continuously feeding into the goals and objectives of the Pro-Maputo Plan.

The Mayor of **Dar es Salaam, Tanzania** has called upon the various players, to assist in the city's efforts to roll the process out across all three municipalities (that make up the City of Dar es Salaam). The City Director has stated that he will use the processes and outcomes of the project to build upon, feed into and align with of the cities Climate Adaptation Plan Action (CAPA).

Port Louis, Mauritius has taken steps to roll the process out within other local governments across the island and other neighbouring islands in the Indian Ocean. The process that was initiated in this project has sparked the development of a local Port Louis community group known as the 'green army' – where local community members have the ability to document and report upon areas and situations that are identified by the community as being vulnerable to the impacts associated with climate change. This is now mandated and falls within the new local government act that has recently been passed in Mauritius. The green army and its actions are now being sought to be replicated (accompanied by the processes involved and used within this project) in all local governments on the island.

The multi-stakeholder, multidiscipline and multi sectoral platforms established in Walvis Bay, Namibia, The WEMAF, the learning alliance in Maputo, Mozambique, CLASS A, and the Green Army in Mauritius was continuously strengthened through participating in this project, and continuously be enhanced through further interaction between the local governments officials, community members, researchers and NGOs in the respective cities and countries thereby influencing environmental management decisions taken at the local level.

e) Behaviour Change and Policy Influence

During the first Southern African Climate Change and Adaptation Conference held in Cape Town under the auspices of Local Climate Solutions for Africa 2011 Congress, mayors from Walvis Bay, Port Louis, Cape Town and Dar es Salaam led other African mayors were present during the formulation, adoption and signing of the **African Mayoral Climate Change Declaration (AMCCD)** (<http://locs4africa.iclei.org/outcomes/>). This mobilization demonstrates that these mayors, through engagement with the project amongst other capacity building initiatives on the continent, had grasped

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the need to prioritise issues of addressing climate change and the need for an institutionally structured argument from local governments ahead of the UNFCCC COP 17/CMP 7.

The Lord Mayor of Port Louis and Mayor of Walvis Bay, through support of their technical champions took further steps and hosted successful AMCCD signing events in their respective cities subsequent to LOCS 2011. This clearly demonstrated that these Mayors through the Five City Network Project understood that climate change was not an issue to be addressed in isolation, but rather to provide an opportunity for discussions and dialogues to take place between neighbouring leaders to address climate change challenges together and at a larger scale.

The Durban Local Government Convention: In December 2011, ICLEI Africa in partnership with South African Local Government Association, South African Cities Network (SACN), eThekweni Municipality, and the National Department of Environmental Affairs hosted the Durban Local Government Convention parallel to the UNFCCC COP 17/CMP 7 climate negotiations. The event culminated in the formulation and adoption of the Durban Adaptation Charter (DAC). On this occasion, political representatives and Mayors from Cape Town, Dar es Salaam, Walvis Bay and Port Louis joined other local government leaders in signing the charter. Local Governments can sign the charter at the following website: www.durbanadaptationcharter.org.

f) Technology development and adoption

ICLEI Africa's Africa City Adapt On-line: To sustain engagement with participating local authorities and catalyse implementation of the identified adaptation options during the capacity building processes of the project, ICLEI Africa developed the on line Africa Cities Adapt Tool. The tool is informed by the identified SMART Goals and serves to aid local government decision makers to set feasible goals and to identify the different steps that are necessary for realizing the goals. Through use of the tool, local governments are able to monitor and evaluate progress and effects of implementing the prioritized adaptation options. See Section 5 for further details on this tool.

During the full duration of the project, participating stakeholders within the cities were exposed and had access to relative and topical information, resources, material and technical guidance on climate change, such as those listed within Section 4: Project Outputs, such as Baseline Studies, Downscaled Climate Reports and Resilient Climate Handbooks. This provides local governments with knowledge and information to better assist local decision makers in the future to make more informed decisions and actions that would benefit and increase local the quality and wellbeing of livelihoods.

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g) General Lessons through approaches and design

In this section there are lessons learnt that are included or re-emphasised from previous sections of the report, to reinstate the key elements to the success of the project and where areas can be improved upon for replication and upscale.

Need for integrated approach in project implementation: It is crucial to understand the different socio-economic and geo - political contexts of local governments ahead of introducing a project. A reconnaissance survey needs to complement the desktop study and any literature reviews that maybe undertaken. Information from the initial visit will assist and inform consolidation of the methodology in the project proposal. It is important that the methodology and processes remain transparent and flexible to absorb any prevailing circumstances e.g. Maputo started the project in the last half of 2011 as there was a civil unrest during the first half of 2010, which made interaction virtually impossible which followed by severe floods in the second half of 2010.

Secondly, there are existing key players at local level across Sub-Saharan Africa within the sustainability and adaptation to climate change fields of research. From each of the local governments that were engaged with, it became apparent (and requested in most cases) that the local governments themselves were in fact overwhelmed by the number of programmes, groups, organisations (research, public etc.) that are acting within these different arenas, each with different priorities and requirements for the local government staff and resources. From this realisation, ICLEI pursued a number of engagements with the various role players in order to ascertain where and how to exploit the various synergies that could allow for alignment in terms of required deliverables, actions and human resources. Such an example was the collaboration with the Cities and Climate Change Initiative by UN Habitat.

Local champion: It is important to identify a dedicated local champion for the project. The person needs to be committed and knowledgeable on the subject matter

Political buy in: This is of paramount importance is to secure the political will of the relevant authority.

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Capacity building:

- The use of illustrations/pictures are pivotal in promoting engagement across various age/gender groups.
- Complimentary anecdotal information is better gathered from smaller group discussions as participants are not shy to share their experiences and engage with other community members as opposed to sharing in a session that is being facilitated by an external facilitator.
- Respect for local culture, tradition, norms and holidays crucial to public participation and sustaining attendance and participation during the workshops

Language: Language barriers added a challenge to interactions with Maputo (they are Lusophone speaking) which had to be managed with respect and to allow for additional costs and time for translation. ICLEI Africa partnered with CLASS A and University College of London in successfully implementing the project in Maputo

h) Important project aspects

The Participatory Research Action capacitates both at the grass roots community level and the local government technical officials. As a result, they are able to engage in activities for the identification of climate variables of concern, prioritising adaptation options and motivating for the implementation of locally appropriate mechanisms within the specific locale. The technique is ubiquitous and is a useful tool in planning that can be uniquely adapted and adopted to a range of climatic threats and impacts.

i) Success of the outcomes

The success of the project is attributed to the high level political buy that was established by the project management team during the inception phase of the project. Complimenting this was the correct identification of competent local champions who led the project at the local level and provided open communication channels during the three year project period.

On the technical side, active community and local government participation were key to

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developing the project outputs, provided much needed local input and feedback for high quality results which are outlined within the Climate Resilient Handbooks.

Through the extensive networking, ICLEI Africa was able to identify an opportunity to explore possibilities for the project to be carried out in Maputo, Mozambique. Through aligning the methodology to the UCL project which also been implemented with similar aims and objectives, ICLEI Africa avoided unnecessary duplication of research efforts and instead were successful in adding value and building upon the information and data that was already available on sanitation matters and flooding in Maputo.

7. Overall Assessment and Recommendations

a) Contributions towards development

The participation of local stakeholders in the project resulted in increased local government institutional capacity and understanding of climate change science. This was evident from the political leaders' participation in the formulation and adoption of the African Mayors Climate Change Declaration. The AMCCD called for the recognition of local governments in Africa on the climate change negotiations and delivery of an equitable and comprehensive pro-poor framing of the global response to climate change and the development of MRV (Measurable, Reportable and Verifiable) global climate framework deal in Durban on the occasion of the UNFCCC COP17/CMP7 that took place in Durban, South Africa in 2011.

The political leaders from the five cities, with the support from the technical officials from their respective constituencies, were instrumental in mobilizing and encouraging other politically elected local leaders and mayors to sign the Durban Adaptation Charter in December 2011. This document was a major milestone for local authorities that attended the UNFCCC COP 17/CMP 7 negotiations and the parallel Durban Local Government Convention which fed into high level session of the national negotiation processes of the UNFCCC COP17.

Through signing the Charter, local governments committed to unprecedented levels of local climate action to:

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- mainstream adaptation as a key informant of all local government development planning;
- ensure that adaptation strategies are aligned with mitigation strategies;
- promote the use of adaptation that recognizes the needs of vulnerable communities and
- ensure sustainable local economic development prioritize the role of functioning ecosystems as core municipal green infrastructure seek innovative funding mechanisms.

b) General/ useful lessons into the future (that are not already prescribed above)

Areas that could be improved upon for replication of the program and upscaling to incorporated new local authorities within the program are:

- Longer field visits within the urban area to gain more information and understanding of the local challenges of the local government;
- Regular scheduled webinars to discuss topical issues and challenges or to undertake training and capacity through sharing of information and best practices.
- Increased budget items for hiring of junior staff or interns or partnering with local universities to identify students to undertake and carry out necessary ground work for more comprehensive research on identified topical issues.

c) Importance of the project

Most governments and communities have practices and strategies in place to deal with routine climate variability. However, current global climate change projections indicate that local governments and their communities cannot rely on assumptions nor use the past trends as a proxy for extreme events that will happen in future. As the climate changes in the near and far future, human behaviour will need to adapt to the circumstances which requires an awareness of the risks associated with the projected climate scenarios but more importantly, an understanding of the relative significance of these risks.

The risks and impacts associated with climate change at the local government level may affect its reputation as a service provider and its ability to achieve some of its given mandates. The Participatory Action Research (PAR) approach adopted for the implementation the Five City Network Project increased awareness of participating local authorities and their communities on the science and impacts of climate change.

8. List of Annexure

1. ICCCI Training Tool description
2. ICCCI Training Tool PowerPoint
3. Local RAP Tool description
4. Inception Visits and Outcomes Report
5. Walvis Bay Workshop Series 1 Report
6. Walvis Bay Workshop Series 2 Report
7. Walvis Bay Workshop Series 3 Report
8. Mamre Workshop Series 1&2 Report
9. Mamre Ceiling Insulation Evaluation: Energy Retrofitting in low income communities
10. Mamre Survey 1
11. Mamre Survey 2
12. Mamre Survey 3
13. Dar es Salaam Workshop Series 2&3 Report
14. Maputo Re-orientation visit
15. Adapted ICCCI Tool for Maputo
16. Maputo Questionnaire (Portuguese)
17. Port Louis Workshop Series 1&2 Program
18. Port Louis Workshop Series 1&2 Report
19. Port Louis Workshop Series 3 Report
20. Closing Workshop Program
21. Walvis Bay Competition Award Project Report 1&2
22. Walvis Bay WICC & WIRAP User Guide
23. Closing Workshop Report
24. Walvis Bay Baseline Study
25. Cape Town Baseline Study
26. Dar es Salaam Baseline Study
27. Maputo Baseline Study
28. Port Louis Baseline Study
29. Climate Systems Regional Report: Southern Africa
30. Climate Change Projections for Walvis Bay: Adding value through downscaling
31. Climate Change Projections for Cape Town: Adding value through downscaling

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32. Climate Change Projections for Dar es Salaam: Adding value through downscaling
33. Climate Change Projections for Maputo: Adding value through downscaling
34. Climate Change Projections for Port Louis: Adding value through downscaling
35. Risk Concept Paper PowerPoint
36. Climate Change Adaptation: The Concept of Climate Risk
37. Building Climate Resilience. A Handbook for Municipality of Walvis Bay, Namibia
38. Building Climate Resilience. Retrofitting as an Adaptation Option for the City of Cape Town, South Africa
39. Building Climate Resilience. A Handbook for Port Louis Municipal Council, Mauritius
40. Building Climate Resilience. A Handbook for Temeke Municipality, Dar es Salaam, Tanzania
41. Adapting Sanitation Systems to Climate Change through participatory research and local action in Maputo
42. Planning for Climate Resilience at the local level: A Tale of 5 African Cities
43. Project Overview Brochure
44. Risk Assessment Brochure
45. Adaptation Solutions Brochure
46. 5 City Project Banner
47. ICLEI Africa Newsletter September 2012
48. Fairhurst, L. and Rowswell, P. (2010). Coastal areas: An overview of governance systems in southern Africa. GPA: Blue Diamonds, Oceans and Coasts. Issue March 2010
49. Fairhurst, L. and Rowswell, P. UN-Habitat (2011). Adaptation: Infrastructure, Slums and Deserts. Cape Town: Ceilings improve livelihoods in the face of climate change. In Print
50. Fairhurst, L., Rowswell, P. and Chihumbiri, F. Resilient Cities 2011. Participatory Action Adaptation: Tools for increasing climate change capacity and preparedness at the local government level. Springer.
51. Climate Systems Peer Review Paper.
52. LG Stakeholder and Community Workshop Program