Strengthening the role of civil society in water sector governance towards climate change adaptation in African cities – Durban, Maputo, Nairobi

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BASIC PROJECT INFORMATION

Abstract:

Water resources management is one of the most important climate change-related issues on international, national and urban public policy agendas. Income inequality in South Africa, Mozambique, and Kenya is among the largest in the world; in all three countries, equity struggles related to water are growing in social, political and ecological significance, which is both a symptom and a cause of urban vulnerabilities related to climate change. Democratic mediation of these conflicts, and sustainable long-term management of water resources in the face of climate change, requires public participation. But those most affected by water issues such as scarcity and flooding are also those least likely to be able to participate in governance and policy institutions. In particular, members of economically disadvantaged groups – especially women, in general – tend to be gravely impacted by poor water management, but also face great difficulties in participating effectively in governance bodies.

This project responded to that particular need, and has developed practical strategies for strengthening urban governments in planning investments in climate change adaptation. The project linked university researchers with community-based NGOs conducting environmental education and organizing participatory workshops in low-income urban areas with pressing climate change and water-related problems; built on proven methods of community-university collaboration to strengthen urban watershed governance; increased equity in public participation processes related to urban climate change adaptation; and fostered progressive local, national and international policy development on climate change-related water management – while training students, university researchers, NGO staff members, and community participants. The major research outcome of the project is its contribution to understanding effective ways of strengthening local governments, NGOs and civil society organizations involved in environmental education and organizing for improved public participation in watershed governance and climate change adaptation in African urban areas.

Keywords: Water resources management, climate change, public participation, adaptation, gender equity, environmental education, climate justice.

THE RESEARCH PROBLEM

Climate change is causing coastal erosion and periodic flooding in both Maputo and Durban, endangering scenic coastal roadways and causing saltwater intrusion, wind erosion, and desertification in urban food-producing areas; flooding in coastal slum areas; degradation of water quality in wells and potable water scarcity; and in Maputo the destruction of mangroves and threats to the locally-important shrimp fishery. There are clear signs that the sea level is rising, with concomitant expensive coastal management problems. In Nairobi, severe pre-existing infrastructure needs are being exacerbated by water supply fluctuations, rainfall variability, and slum flooding related to climate change. The Intergovernmental Panel on Climate Change (IPCC), in its extensive 2008 study on regional impacts of climate change, noted that by the year 2099 temperatures will likely increase by 3-4 degrees C across Africa, and by up to 7 degrees C for southern Africa in September - November. Precipitation projections, while subject to a number of uncertainties, indicate that rainfall will probably increase in much of eastern Africa but decrease in much of southern Africa, especially in the winter. Some studies predict summer rainfall increases in eastern South Africa. There may be more frequent and intense tropical storms/cyclones in the southern Indian Ocean. These climate impacts will likely hamper the efforts of many African countries to meet the Millenium Development Goals, especially those related to child and maternal health and poverty reduction (IPCC 2008:9.3).

The United Nations Habitat Cities in Climate Change Initiative emphasizes local government capacity-building, policy dialogue, climate change awareness, public education, and developing coordination mechanisms between all levels of government as priorities to help address these risks. Mozambique's national water law (1991) considers all water as state-owned, to be governed by the state for the benefit of the population, with water access for people, sustainability, and stakeholder participation as priorities. Four water basin committees have been established in Mozambique on the same general model as in Brazil. To make this participatory model more effective, the largest need is for capacity-building and community organizing to deepen and strengthen civil society's involvement in water governance. As Mozambique's capital, largest and densest city, and the home of the main university in the country, Maputo has a key role to play in setting the standard for progressive urban governance and water management.

Durban's municipal government has already developed a local climate change adaptation strategy; like Maputo, Durban faces coastal inundation and storm surges related to sea level rise, hotter temperatures and heat waves, changed rainfall and storm patterns, slum flooding and reduced drinking water supplies due to climate change. Local policy initiatives rely for effectiveness on awareness and capacity regarding climate change risks and adaptive responses in civil society. As in Mozambique, South Africa is implementing watershed committees or "catchment management agencies" (CMAs) to decentralize decision-making and create a framework for integrating the needs of all stakeholders in water governance. Environmental education and confidence-building through capacity-raising are recognized as crucial needs in this process; for example, the Inkomati CMA has

initiated outreach programs targeting rural poor, emerging farmers, women and youth. Grounded participatory research leading to accessible public education and responsive community-based programs with civil society organizations are needed to help address these significant water governance challenges. This type of action research is well-developed in Durban, partly due to the work of the Centre for Civil Society and its partner CSOs. Durban's proximity to Mozambique means that watersheds spanning both countries, and similar ecological situations, will help to facilitate the research networking of this project.

In Nairobi, just as in Maputo and Durban, environmental awareness and education leading to more equitable governance processes are required. As noted by the Kenyan delegation to the 2007 UN conference on climate change in Nairobi, Kenya's adaptation focuses include education, good governance, human resources development and training, institutional capacity building and management change, public finance improvement, and better national resources management. Nairobi, one of the largest and most complex cities in the world, provides a challenging arena for participatory governance research; results there may have wide application in other large African urban areas.

Mozambique submitted a National Adaptation Programme of Action (NAPA) to the UNFCCC Secretariat in 2007 (MICOA 2007); both Kenya and South Africa are still preparing theirs. Mozambique's NAPA mentions the vulnerability of Maputo to extreme weather events and flooding (p. 22), but is largely framed at the national level and contains no specific program actions at the local or community level in Maputo city. Its chapter on "Management of water resources under climate change" articulates the importance of improved information dissemination and civic education on climate change (p. 57), community engagement (p. 58), and active participation and collaboration of stakeholders (p. 59). This highlights the potential contribution of projects like ours to helping all three countries design civic engagement programs for vulnerable urban communities and groups, as part of their NAPA development and implementation as well as in ongoing policy development.

Since this project was designed, both weather-related and socio-political manifestations of climate changes have advanced rapidly. Extreme rainfall and flooding in southern Africa in late 2010/early 2011 lent urgency to our project's goal of contributing to improved water governance. For example, the lack of early warning systems for urban (and also rural) residents regarding flood danger, and of housing and other supports for flood refugees as well as prompt reconstruction funding mechanisms, are emerging as high-priority climate change-related governance needs.

This project offered an opportunity for sharing experiences and best practices among climate justice actors working independently of the global adaptation regime, which is currently being shaped under increasing influence from western powers (e.g., through the entrance of the World Bank and through the Green Climate Fund).

In the following sections of this report, we provide details regarding activities supported by the project and relate these to the project's objectives. In addition, we discuss our achievements, challenges, and lessons learned.

OBJECTIVES AND PROJECT DESIGN

This project's specific objectives were:

1. To characterize the institutional framework for urban water governance in the three cities, and explain how the different actors within this framework cope with climate change and variability;
2. To identify and test viable alternatives for enhancing civil society roles towards adaptation to climate change and variability by vulnerable groups (e.g. by developing education, training and awareness programmes); and
3. To share widely the knowledge generated for potential adoption by other cities in Africa.

In each of the three cities, the project linked university faculty and students with 2 community-based civil society organizations (CSOs). Students and research assistants based in the CSOs worked together on project activities.

The project team is proud to report that all three objectives have been successfully met. The following sections describe *how* each objective was met and discuss our project's outcomes in details.

Objective 1

To characterize the institutional framework for urban water governance in the three cities, and explain how the different actors within this framework cope with climate change and variability.

Research assistants within each partner CSO, students and academic partners worked together to characterize urban water governance frameworks in the three cities and to develop locally-appropriate ways of enhancing civil society's role in responding to climate change. This research has been assembled into a Synthesis Report—now available on the project's website (http://ccaa.irisyorku.ca)—with a detailed chapter on each city, including a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis of the city's water management structures with regard to civil society participation and the implications of climate change. The Synthesis Report has recently been adapted into a journal article entitled, "Urban Water Management in Africa in Times of Climate Change: The Importance of Public Engagement," which we are hoping to publish in an open access journal.

In addition, we have developed an illustrated brochure—based on the Synthesis Report, written in accessible language and easily reproducible—summarizing comparative information on water governance and climate change in Durban, Maputo and Nairobi. The brochure can be downloaded from the project's website at http://ccaa.irisyorku.ca/research-project/publications/.

Table 1 provides a comparative analytical framework summarizing and comparing information on climate change and water governance in the three cities.

TABLE 1

Climate Change and Climate Justice: Comparing Durban, Maputo and Nairobi

	Durban	Maputo	Nairobi
Main climate change impacts	Flooding, erosion, rising sealevel, infrastructure damage	Flooding, erosion, rising sealevel, infrastructure damage	Flooding, infrastructure damage, sanitation risks
Municipal water/sanitation challenges	Piped water shortages, sewer lines don't reach outer limits of city; pricing conflicts	Piped water shortages, insufficient access to piped water and sewers, poor maintenance	Piped water shortages, insufficient access to piped water and sewers, poor maintenance; pricing conflicts
Institutional structure for water governance	Well-developed and evolving institutions relate local and regional water systems	Bureaucratic silos; limited interactions or capacity to address infrastructure problems	Well-developed but rigid institutions struggle with infrastructure demands; urban water provision partly privatized
Participation of CSOs and community groups in water governance	Significant and productive	Almost none	Growing; mixed/privatized water sector makes participation difficult; few CSOs involved
Engagement of local CSOs and community groups in climate justice organizing and activism	CSOs are important critics and increasingly engaged on climate justice	CSOs muted; a few are critically engaged on environmental issues	CSOs are beginning to engage on climate justice

Source: *The Institutional Framework for Water Governance in Durban, Maputo, and Nairobi,* 2012 (Available at: http://ccaa.irisyorku.ca/wp-content/uploads/ccaa/2012/11/Synthesis-Report-Nov-1-2012.pdf).

This project has identified a significant difference in water governance between Maputo and the other two cities. In Durban and Nairobi, the water service authorities are not without their problems, but struggle to be responsive to the needs of residents and have a presence in the communities. In Durban, the presence of a Climate Protection Division within the municipality and a standing relationship between the city and the University of KwaZulu Natal researchers are producing substantial climate change adaptation efforts.

However, the relationship in Maputo between government and civil society does not seem as constructive. There seems to be some attention on the part of government institutions to the importance of civil society participation, but any opportunities are not yet particularly effective. This may be due to the limitations on democracy that exist within the political system and the tension between political, partisan and personal interests. Civil society organizations, rather than being seen as representing the "voice of the people," are sometimes viewed by decision-making bodies as groups that are opposed to development. This in turn can protect external agendas and perpetuate outside funding that uproots and alienates people, while ensuring private short-term benefits instead of responsible long-term governance. The integration of various civil society actors, policy harmonization at the regional level, and responsible governance with an integrated qualitative and quantitative vision for sustainability, remain elusive.

There is a need in all three countries to expand the democratic space in which CSOs function, increase their political legitimacy, and improve the attitudes and behaviors of government officials and elites toward NGOs and grassroots groups (Ghaus-Pasha, 2004).

In Kenya, this type of space for civil society has been newly recognized in the Bill of Rights and entrenched in the Constitution of Kenya (2010).

Limited collaboration among CSOs in each country also reduces their impact, since they tend to focus on individual projects rather than coalition building for broader improvements in governance. This can lead to a multiplicity of activities and duplication of initiatives and interventions. A clear framework for collaboration among CSOs thus might facilitate the kind of effective and sustainable civil society engagement which is especially needed to address climate change challenges.

In Kenya, there are opportunities for civil society engagement in water policy and decision-making at many levels in the country's existing institutional framework. Water Resource Users Associations and Catchment Area Advisory Committees envision stakeholder participation in water services provision and regulation at the local and regional levels. If citizens can come to understand the fairly complex institutional organization of water policy, given its importance and threatened status they are likely to engage more and more in water policy issues (K'Akumu, 2007).

Nairobi's water supplies are insufficient to meet the city's growing needs, and the effects of climate change are already increasing this deficit. The city will continue to vie with rural and other water users in the region for scarce water supplies. Inefficiencies and leakages

will need to be addressed, and conservation methods implemented. Environmental education and civil society engagement are crucial parts of this strategy, in both the short and long term.

In Durban, the eThekwini municipality seems to recognize the importance of its role as water service provider and is working to find innovative ways to address service challenges and other threats. Although civil society organizations (CSOs) face severe financial and other limitations, they are increasingly involved in water and environmental policy development.

All three of the cities where we have worked face an uncertain water future, with risks exacerbated by climate change. The challenges of growing urban populations -- fuelled by rural-urban migration -- and of rising water needs, are extreme. In all three cities, governments at various levels have initiated reforms, passed new legislation, and attempted to streamline and improve water services provision, regulation, and transparency. However, civil society's involvement in water decision-making, by individuals and/or groups, is still very far from the democratic ideal espoused in much of the international literature on water resources management.

Through public education, workshop and curriculum development in formal and informal settings, links between university and community-based organizations, and grassroots research on water needs, perspectives and insights, we have attempted to model ways of addressing these challenges which may be applicable not just in Durban, Maputo and Nairobi but also in other cities where participatory water governance is the goal.

Our project emphasized that progressive participatory governance is needed in order to achieve sustainable water resources management. This type of progressive governance implies the recognition that water resources are a "commons" rather than a "commodity" (Ostrom 1990, 2012) – and that democratic governance structures must be developed to prevent open access and the "tragedy of the commons" by ensuring equitable access to water, because of its vital importance for life and livelihoods, rather than allowing water management decisions to be made by the highest bidder (Conca 2006, Toulmin 2009, Adger et. al. 2006, Desai 2002, Murota and Takeshita 2013).

Objective 2

To identify and test viable alternatives for enhancing civil society roles towards adaptation to climate change and variability by vulnerable groups (e.g. by developing education, training and awareness programmes).

This project supported the activities of a range of civil society organizations that are working mainly outside the State to create water, sanitation, education, and organizing options for slum dwellers in the face of climate change. Justiça Ambiental (JA!) developed and tested an environmental education program in Maputo public schools – a supplement

to the normal state-supported curriculum, designed to bring greater environmental awareness to youth.

Educating young people on environmental and climate change realities is a priority if climate change is to be addressed at a structural level. Both JA! and Kilimanjaro Initiative (KI) are doing this explicitly, and young people provide the energy behind most CSO activism in all three cities. We also witnessed great energy and commitment among the young university students whose work fuelled our project.

Each of the partner CSOs developed a sub-project to test viable alternatives for enhancing civil society roles in adaptation to climate change and variability by vulnerable groups in their respective cities. More specifically, the team chose to use a thematic approach to explore adaptation through the window of water governance. One unique feature of this project was how it has assembled a team of researchers and civil society organizations that themselves approach water governance through their own unique windows. In the end, this formed an organic, grounded and diverse structure that revealed some remarkable findings.

The following is a more specific description of each of the sub-projects, by country and organization. Additional details can be found in the final reports of each organization, which are included as appendices.

Kenya

Kilimanjaro Initiative (KI)

One of this organization's most impressive ongoing projects is centred on the creation of a vibrant public space in Silanga village in the informal settlement of Kibera, the centerpiece of which is a formerly degraded and unused soccer pitch next to the Nairobi River that had become a site of crime.

Sports field in Kibera

After KI's involvement in initiating major upgrades (which involved leveling the field, draining it, sculpting it and building benches for spectators), the soccer pitch became a popular venue for recreation and community action. This rare open area amidst Kibera's very dense agglomeration of informal housing and small business structures has also attracted the attention of numerous community stakeholders who have realized the wider potential of the vibrant, multi-use public space centred on the pitch.

Stakeholders have recognized several opportunities to raise revenues through the site, improving its sustainability.

These opportunities include craftwork, gas sales from biodigesters, food sales from the nearby community gardens, rental of buildings for community use, and nominal fees to use the soccer pitch (which would go towards its upkeep).

A participatory process was initiated with local youth, community leaders, and other residents, in order to plan the development of the pitch.

Youth-led community garden in Kibera

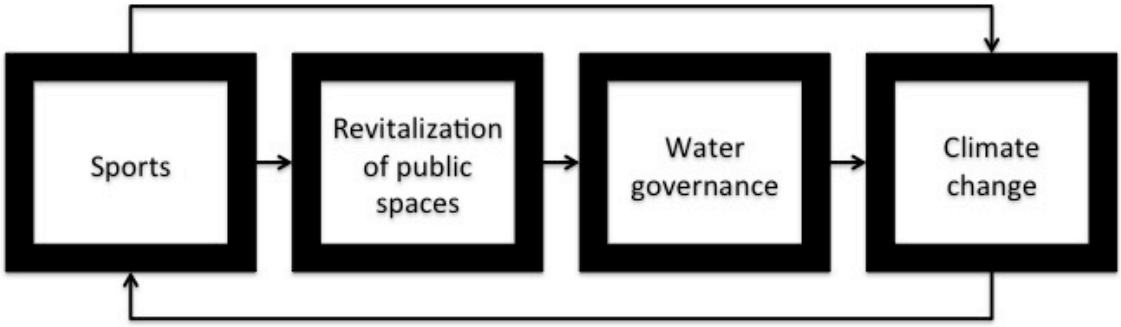


Figure 1: Kilimanjaro Initiative's Sub-project Framework

What can sports advocates, working to revitalize public spaces, reveal to us about water governance in times of climate change?

1) ***Sports and Community Networks.*** Some insights into water management in times of climate change come directly through sports, while some come from how sports connects a community and creates networks of trust. These networks can bring people together to discuss water-management issues.

KI has deep roots in Silanga and was able to organize and host presentations by community members on water issues experienced in Silanga in one of the buildings connected to the sports field and public space. One of the themes discussed by presenters concerned the strategies people used to deal with floods, which were indicative of the community's adaptive capacity.

Flooding in Kibera

Some made their own sandbags and piled them at their doorsteps to prevent water from entering their households. In other cases, people place large stones between their houses and the river to keep the houses from floating away in the floods. When things got worse, they dug to increase the depth of the stream.

Another strategy was to prevent some spaces from being used to build houses, for example in flood-prone areas – both to protect housing and to reduce rainfall runoff. This last point introduced a second important theme generated from the discussions: the difficulty of managing space over time through the village's demographic transitions.

Nairobi River at Silanga, near the Nairobi Dam

Silanga has grown considerably in population in recent years, but has mostly remained static in physical size – so its high population density is continually increasing. It also hosts the marshy remains of the Nairobi dam, a once-popular lake and recreation area now overrun with water hyacinth and garbage, and prone to flooding into nearby residential areas because there is no functional drainage.

Older residents at community meetings recalled a time when space was managed to ensure footpaths and roads through the community remained spacious enough to accommodate traffic. But, newcomers needing land on which to build their homes in recent years did not or could not observe the traditional measures used to reserve space for traffic flows. These stories raised questions on how space can be managed in informal settlements in a time of climate change and extreme hydrological events, in order to discourage people from building residences in hazardous areas.

By understanding and collectively articulating these issues, local residents can incorporate them in current and future political action on slum upgrading and land-use rights.

2) ***Space-Management through Sport.*** The public appreciation of sport offers a unique strategy for managing space. A key realization KI has made is that the space the soccer pitch uses is space that cannot be used for other purposes, thus creating a means of managing available building space. As Sadique Bilal writes in our book about the project, "The more sports fields we can build near the river where it floods, the fewer people's houses will get inundated or washed away. We are working with the city government to resettle people from flood-prone areas so that we can create and manage more public spaces for recreation" (Perkins, 2013: 30).

The wide popularity of the soccer pitch reserves that space for public use and prevents it from being used for housing—an important matter in areas where residential structures, if

built, are exposed to severe hazards. Such a grassroots approach could be used instead of more top-down (and possibly poorly enforced) government zoning restrictions in, for example, flood-prone areas. It would also hold some advantages over the types of draconian colonial strategies for controlling space recalled by older residents, which may be ignored by or unclear to newcomers.

3) ***The Need to Adapt Sporting-Related Spaces and Other Community Spaces to Climate Change.*** The viability of the soccer pitch site that has now attracted so many stakeholders will depend on water management, which climate change will make more challenging. The site's sustainability—the ability to realize its primary use as a soccer pitch—will be threatened to the degree that flooding remains a risk. Thus while the site offers some measures for climate change adaptation (through space management), it must itself be adapted to the effects of climate change. Flooding has so far been addressed by digging a small drainage channel around the pitch, but some of the projects attached to the site face difficulties during heavy rains, which could grow worse due to climate change. Members of one of the surrounding community gardens, for instance, complained of flooding wiping out their work.

Such projects could be designed from the outset to include climate change adaptation measures. Adding in the dimension of climate change adaptation could act as a selling point for potential donors and could even make the project eligible for additional sources of support.

Understood as a means of reducing people's vulnerability to climate change, adaptation goes beyond just building physical infrastructure. It recognizes that vulnerability to climate change has social, economic, political—and not only physical—sources. At the same time that a larger project like the one the soccer pitch has anchored might help to give some physical protection from effects of climate change through space management, it can also increase community resilience and adaptive capacity by providing more livelihood options, which appears to be underway in conjunction with KI's upgraded soccer pitch.

4) ***Sports and Environmental Messages.*** In addition to the above, we can identify some other inroads that sports can potentially make into communicating messages about water management and climate change. Following Kenya's post-election violence in 2007, which erupted along ethnic lines, KI organized a soccer tournament to address potential ethnic tensions within Kibera. Each village within Kibera was invited to enter one team into the tournament, but with an important catch: each team had to be multi-ethnic. The tournament was part of a cultural week in Kibera where people discussed cultural ways of resolving violence.

Similar to how that tournament was held under the theme of addressing post-election violence, KI plans to hold future soccer tournaments under themes that discuss environmental issues including water management or climate change. This could open channels of discussing climate change with the broader community in a way that is relevant to their lives.

KI has also managed to find opportunities for discussing climate change with youth on their annual climb up Mount Kilimanjaro. The theme of the 2009 climb was "Climbing to Combat Climate Change" and the 2010 theme was "Green Economy and Sustainable Development."

Climate change and water governance are now central parts of KI's ongoing work focused on youth leadership, sports, and community development in Silanga, Kibera.

Kenya Debt Relief Network (KENDREN)

The Kenya Debt Relief Network (KENDREN), also based in Nairobi, is a network that originated to carry forward (in Kenya) the Jubilee 2000 campaign of international debt cancellation. For this project, KENDREN used "debt clinics" – where the organization discusses public debt, international finance and its burden on Kenya – as an entry point to facilitate dialogue about water governance and climate change in Huruma, a low-income settlement in Nairobi.

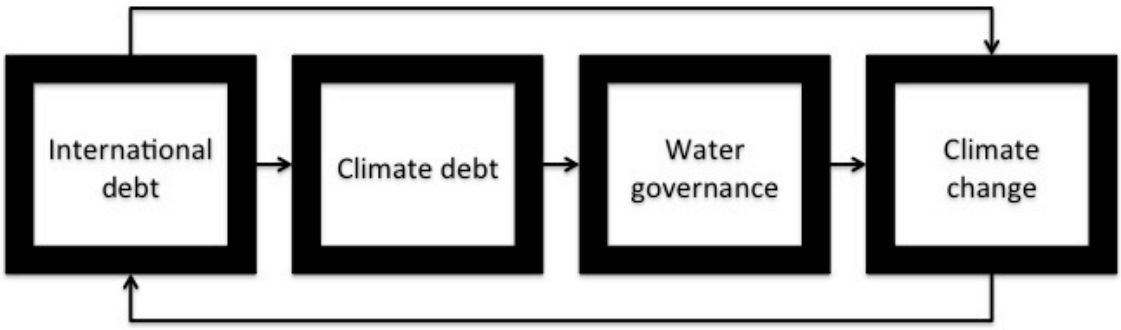


Figure 2: Kenya Debt Relief Network's Sub-project Framework

Through the window of debt, KENDREN looked into the window of water management with the aim to understand 1) why the ability of governments to provide water services to its most marginalized populations becomes constrained and 2) how autonomous measures are taken in response, to distribute water through different models of commodification. Through these windows KENDREN then looked onto climate change.

KENDREN has found that in places where debt has led to poor government service provision and where climate change has reduced water availability, the need has grown for people to take autonomous, and sometimes extra-legal, measures to acquire and distribute livelihood necessities.

During this project, KENDREN facilitated several community workshops and dialogue meetings on topics such as climate debt, public resource management, citizen participation, and water governance. These workshops led to the formation of a loose network within Huruma that focuses on issues of water access and management and engages with the City Council Water Directorate on behalf of the community.

In addition, KENDREN hosted a number of Climate Change "Teach-ins" to build this community's awareness and knowledge of climate change, some of which included participation by government officials.

In March of 2012, KENDREN began a process to identify the actors involved in water governance in Huruma and discuss water services within the community. In Huruma, water is captured in storage tanks by community organizations and sold to users. However, the money is not taken as profits but instead goes back into the community. This is a different model of water provision than that which exists in other areas of Nairobi, where water is sold to local residents by private-sector providers.

By bringing the issues of water governance and climate debt into KENDREN's existing and ongoing work on international debt, this project has enriched KENDREN's and local communities' analysis of government roles, expenditures, and the relationship between private, public, and civil society's responsibilities.

University of Nairobi

Faculty members from the University of Nairobi's Urban and Regional planning department found the tripartite relationship between the University of Nairobi, civil society organizations, and communities in Kibera to be a very powerful building block in conducting practical research. It built relationships of trust that allowed academics from the University to work closely with communities while protecting against the common problem of academics "mining" data from communities and returning little to them. The results of the research have been shared back with the members of the community in order to help empower community-based organizations to take practical action in improving their livelihoods. This model showed promise for wider adoption where community organizations realize the need to undertake climate change adaptation.

The tripartite relationship was particularly useful for the Urban Studio projects that a group of Masters students in the Department of Urban and Regional Planning completed in late 2012 as part of their graduate work. The team developed and shared with local residents a very rich and in-depth study on a number of issues facing Kibera—including water—in the context of slum-upgrading projects.

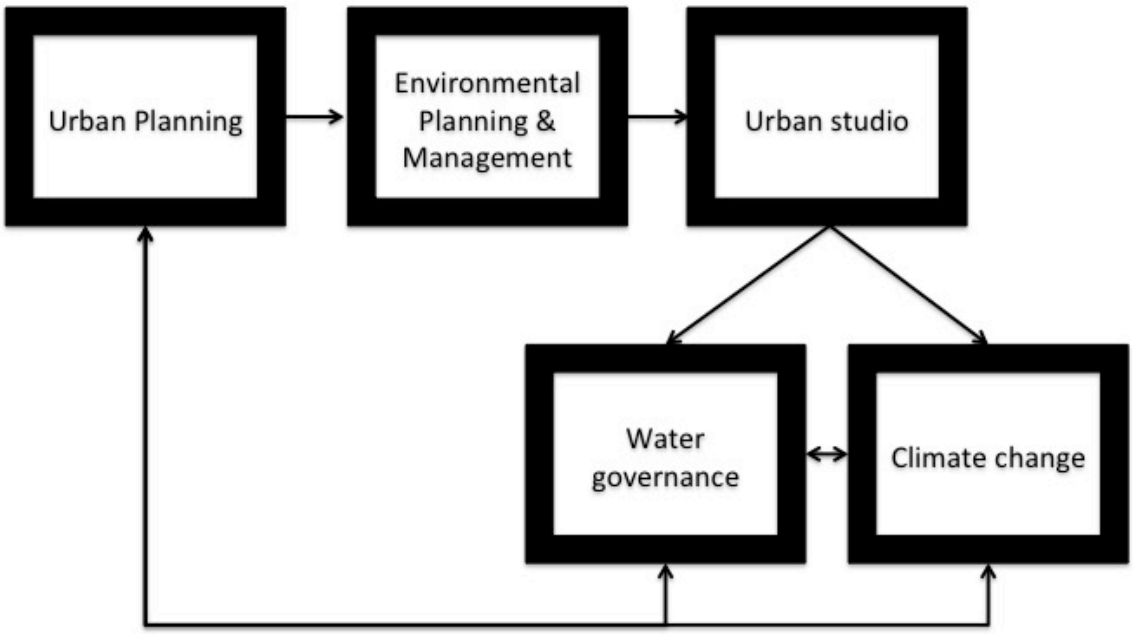


Figure 3: The University of Nairobi's Sub-project Framework

Stephen Otieno, an MA student at the University of Nairobi who participated in a project-sponsored exchange to Durban, also won a 2012 fellowship to conduct research in Canada through the Centre for International Governance Innovation (CIGI). His research indicates that Kenya is a water-scarce country not simply because of supply limitations, but also because of poor governance. Kenya's water governance structure under the 2002 Water Act remains very top-down and, as a result, unresponsive to water needs in informal settlements, where most of Nairobi lives. The poor service provision has several important consequences. First, it reduces the legitimacy of the state. Second, it forces people to take autonomous measures to acquire water. Autonomous measures like extra-legal tapping of water infrastructure are often done without the proper equipment, leading to water wastage. And water wastage goes far beyond the informal settlements. Otieno points to a World Bank report stating that Nairobi cannot account for a staggering 40-60% of the water it pumps. Nairobi is now talking about diverting water from additional rivers to meet growing needs. But the water accounting suggests there is considerable wastage. If existing water sources were used more efficiently, this would reduce the need to exploit new sources. Should climate change reduce the amount of water reaching Nairobi, ongoing wastage could unnecessarily expose people to water scarcity. Adapting Nairobi's water distribution to climate change can begin now by addressing existing governance and wastage issues.

Churches, youth groups, non-governmental organizations, and other civil society organizations have moved into the gap left by the state and organize community water points that provide cheap water and reduce the distance people need to travel to acquire it. Otieno identifies a potential synergy between groups like these and small companies, on

the one hand, and the state, on the other, in water provision. NGOs and small companies can develop distribution systems that reach people in informal settlements which existing water infrastructure fails to reach. The state, for its part, can ensure that community water management systems have the resources needed to work over the long term. But for this synergy to be realized, Otieno concludes, there needs to be a devolution in the structure of water governance in Kenya.

The University of Nairobi hosted an exchange visit by York University PhD student Aaron Saad in October – November 2012. Aaron participated in community meetings along with KI, wrote a report on the project's work in Nairobi, developed his own dissertation research plans, and made a presentation on his findings as part of the project's final meeting.

Overall, the University of Nairobi's involvement with this project has enhanced the ability of students and faculty members in the Department of Urban and Regional Planning to connect with local community members, conduct grassroots research, and understand the interactions among water governance, climate change, civic engagement, urban planning, and municipal policy. As part of an ongoing commitment to participatory research, University of Nairobi academics are building bridges with local communities on climate change and water governance.

Mozambique

Justiça Ambiental (JA!)

Justiça Ambiental, in partnership with Eduardo Mondlane University, created a pilot project on environmental education, entitled "*Small Gestures, Big Changes*." This project was intended to create awareness about environmental issues in schools and to give Eduardo Mondlane University students (who were enrolled in the Bachelor's in Environmental Education degree program) a chance to put into practice the environmental education methodologies they were learning about in class.

JA!'s sub-project thus employed a window on climate change and water governance that brought together activist-oriented environmental education (led by academics in partnership with CSOs) with children, communities and youth, climate justice, water, biodiversity and other aspects of climate change education. Students and young people thus became the information leaders, bringing their parents, teachers, and other students at their schools into connection with CSO, academic and government sources of information and ideas on climate change and water governance.

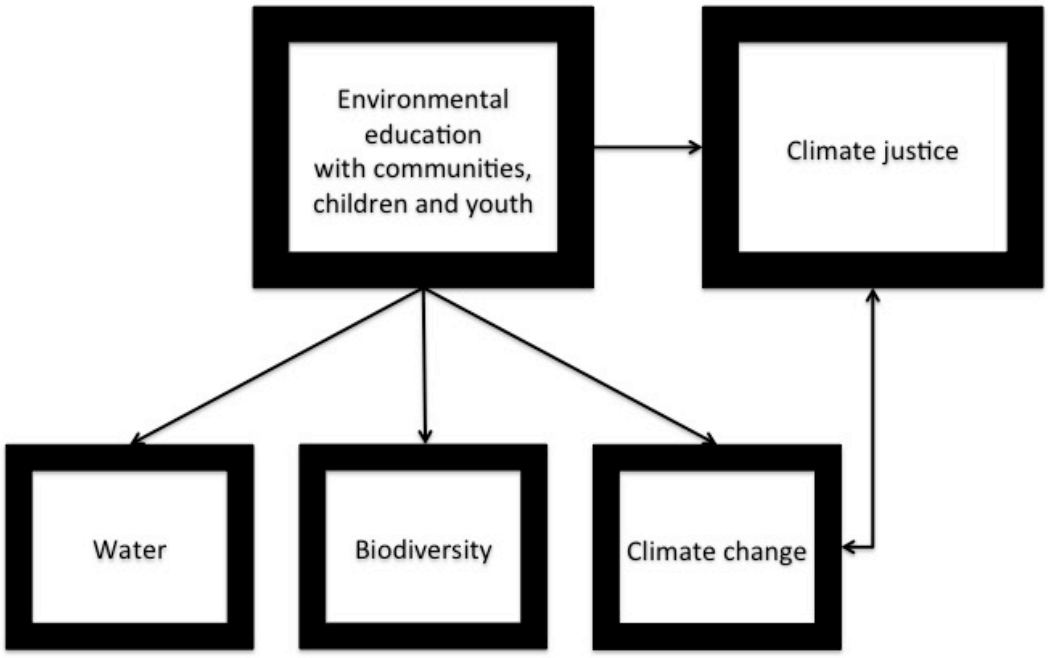


Figure 4: Justiça Ambiental's Sub-project Framework

JA!'s pilot project offered seminars on climate change and water, as well as interactive in-class activities, for grade 8 students at Colégio Arco-Iris, Escola Secundária Eduardo Mondlane (Eduardo Mondlane Secondary School). A total of 139 grade 8 students took part in several iterations of the program, led by JA! staff member Nilza Matavel and several Eduardo Mondlane University students. Classes were mandatory and lasted 45 minutes.

Some of the curriculum ideas for these seminars were based on Brazilian environmental education workshop ideas and materials which JA learned about through our initial project team meeting in 2010 in Brazil, hosted by the Ecoar Institute for Citizenship. In particular, Ecoar's *Manual de Metodologias Participativas para o Desenvolvimento Comunitário* served as a basis for some of the curriculum designs, such as the "workshop of the future" methodology which involves participatory discussions naming the blocks in the Wall of Tears (problems and barriers to community action) and leaves on the Tree of Dreams (collective visions and ideas of what community members would like to see happening in their area). This leads to discussion of grassroots strategies for planting and nourishing the Tree of Dreams which, as it grows, will gradually break down the Wall of Tears.

The structure of the lessons generally included:

1. 35 minutes of debate and discussion on the chosen topic
   10 minutes of interactive/fun activities and/or audiovisual presentations

OR

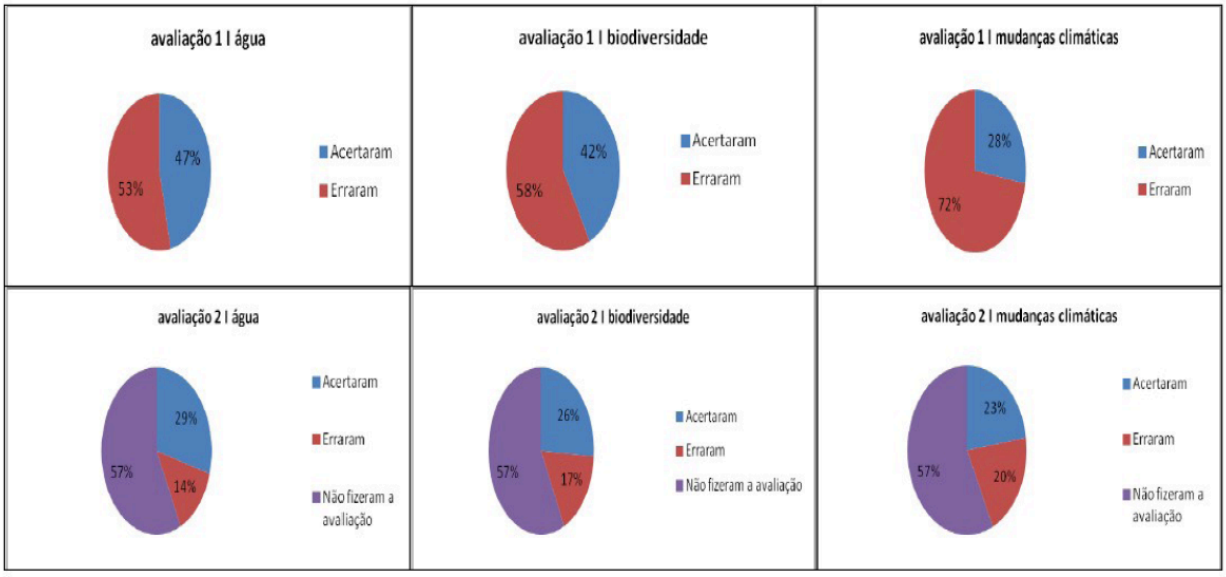
2. 30-minute video on topic, followed by 10-minute discussion

From Left: Students proudly display their Wall of Tears; Students pose with their Tree of Dreams; An Eduardo Mondlane Secondary School student speaks about JA!'s environmental education pilot project at her school; JA!-sponsored tree planting at a local orphanage (2012).

Students took two tests, one at the start of the program and one at the end. The first test evaluated the students' knowledge and understanding of environmental issues and the second evaluated their absorption of the concepts studied in class. Students were also evaluated on their participation and attention in class.

The following charts present the results of the evaluations carried out in each school before and after JA!'s environmental education pilot program.

Eduardo Mondlane Secondary School



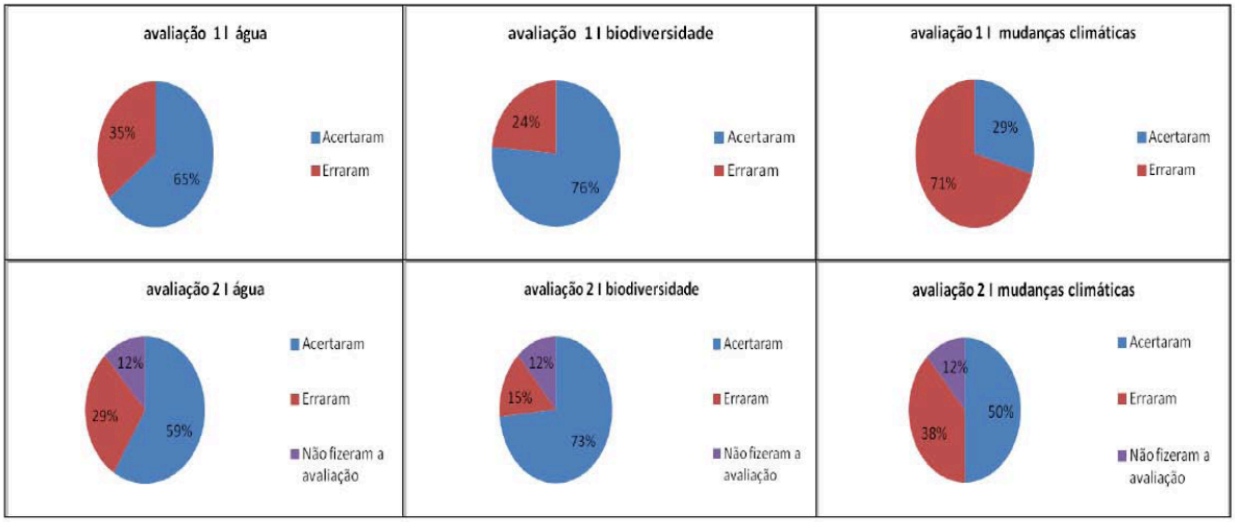
Evaluation 1: This evaluation was conducted prior to the implementation of the environmental education program

When asked water-related questions, 47% of students responded correctly, whereas 53% responded incorrectly. As for biodiversity-related questions, 42% of students responded correctly and 58% incorrectly. Lastly, only 28% of students responded climate change-related questions correctly and a staggering 72% incorrectly.

Evaluation 2: This evaluation was conducted following the conclusion of the environmental education program

Unfortunately, 57% of students chose not to participate in the second evaluation. Although this was the case, the percentage of students who answered the questions correctly was higher than those who answered incorrectly. Of the initial group, 29% answered water-related questions correctly and 17% responded incorrectly. As for biodiversity-related questions, 26% of students responded correctly and 17% incorrectly. Lastly, 23% of students responded climate change-related questions correctly, whereas 20% responded incorrectly.

Colégio Arco-Iris



Evaluation 1: This evaluation was conducted prior to the implementation of the environmental education program

When asked water-related questions, 65% of students responded correctly, whereas 35% responded incorrectly. As for biodiversity-related questions, 76% of students responded correctly and 24% incorrectly. Lastly, only 29% of students responded climate change-related questions correctly and a staggering 71% incorrectly.

Evaluation 2: This evaluation was conducted following the conclusion of the environmental education program

Twelve percent of students chose not to participate in the second evaluation. Of the initial group, 59% answered water-related questions correctly and 29% responded incorrectly. As for biodiversity-related questions, 73% of students responded correctly and 15% incorrectly. Lastly, 50% of students responded climate change-related questions correctly and 38% incorrectly.

In adopting the Wall of Tears / Tree of Dreams methodology in its workshops, JA!'s specific objectives were:

- To encourage students to identify environmental problems or degradation issues in their schools, homes and neighbourhoods and make a connection with their day-to-day habits (i.e. *how* they, their parents and communities contribute to these issues);
- To make a connection between these issues and climate change and water scarcity (if/when applicable) and;
- To understand the students' perceptions of climate change

The following are some of the issues identified by the students at Eduardo Mondlane Secondary School:

- Improper garbage and waste disposal;
- Energy waste;
- Poor management of natural resources and water in particular;
- Pollution of rivers and;
- Industrial pollution

The following are a few of the drawings created by the students to illustrate the environmental issues they deem most problematic in their schools, homes and neighbourhoods.

The Tree of Dreams was used to encourage students to imagine and envision the future they would like to see. JA!'s specific objectives were:

- To draw a connection between the solutions to the problems identified during the Wall of Tears exercise and solutions to climate change and water scarcity;
- To show students that even small steps can generate significant changes;
- To show students how we are all part of the solution to the problems we face, more specifically climate change and water scarcity

The students identified the following solutions to their problems:

- Build the capacity of students and teachers and increase their understanding of environmental issues;
- Fix leaky faucets in their schools and homes;
- Conserve energy;
- Reuse and recycle and;
- Inform local municipality of the above-mentioned issues

The following are a few of the drawings created by the students to illustrate their vision of an ideal world:

As part of its sub-project, JA! also occasionally conducted environmental education workshops and seminars at Casa Gaiato, an orphanage located in Massaca Neighbourhood in the Boane District (Province of Maputo). In 2011, JA! hosted a seminar on water and the environment at a local orphanage. 180 students were present (grades 3 to 5) attended the seminar. In addition, 100 children in grades 1 and 2 watched a video presentation about the environment. In 2012, JA! returned to the orphanage for a tree-planting day in celebration of national forest day. JA! representatives also gave a seminar presentation on conservation to 30 grade 9 students.

Through this project, JA! has deepened its experience with formal and informal environmental education for participatory action on climate justice, and also developed links with university students and professors in the Environmental Education program at Eduardo Mondlane University. JA! activists have also made important new international connections with other groups working on climate justice, participatory action, and environmental education.

Eduardo Mondlane University

Eduardo Mondlane University (UEM) professors and students, as noted above, worked with Justiça Ambiental! to develop the methodology, objectives and lessons of the Maputo

environmental education pilot project. In addition, six UEM students were selected to work with JA! in delivering the lessons, while one worked with another Maputo CSO, MuGeDe (Women, Gender and Development). MuGeDe unfortunately entered a difficult period in 2012 with the completion of another large project, and was forced to withdraw from active participation in this final year of our project's work. The UEM student then switched to work more closely with JA!.

Three of these students participated in an exchange trip to Durban in July and August of 2012. While in Durban, Neima Adamo, Ester Muamba and Sérgio Brito (the three selected students) conducted research on water security issues (with support and guidance from local partner CSOs, Umphilo waManzi and SDCEA) and gave a seminar at the Centre for Civil Society at UKZN. They also were able to improve their English through language classes at UKZN. Their research allowed them to compare CSO activism and water security / climate change challenges in Durban with those they were familiar with in Maputo, from their earlier research work in the Polana Caniço and Maxaquene Neighbourhoods.

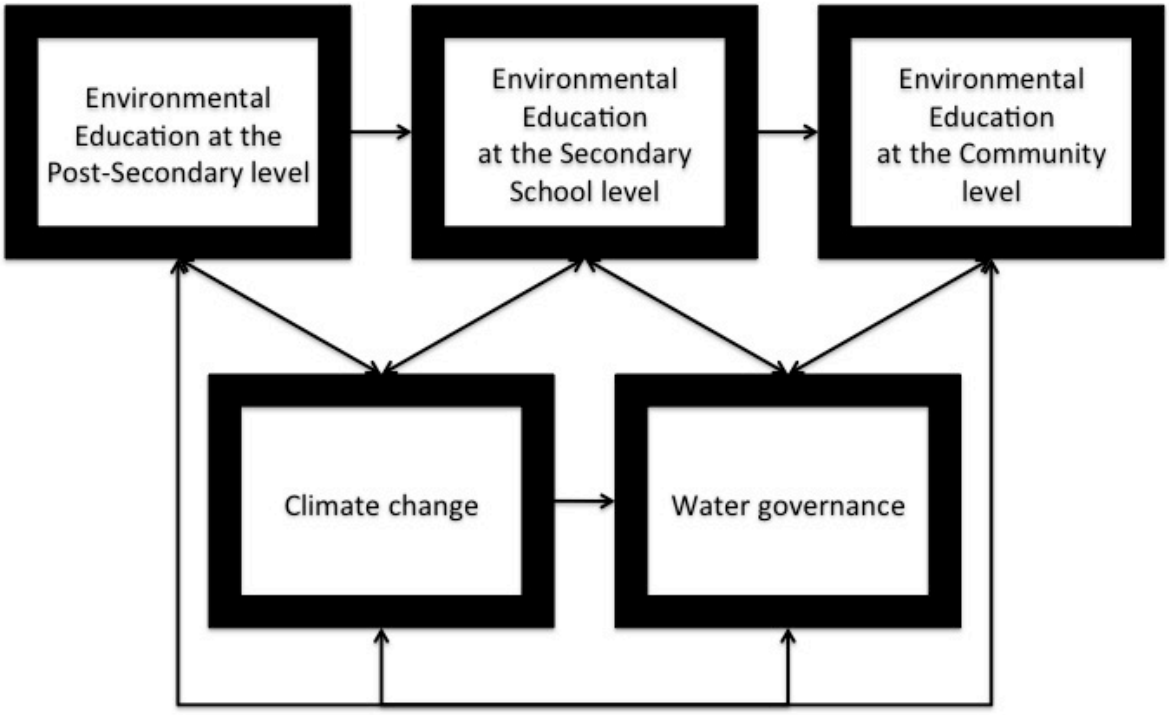


Figure 5: Eduardo Mondlane University's Sub-project Framework

The UEM sub-project not surprisingly adopted an environmental education window on climate change and water governance.

By focusing on the links and similarities among school-based and community-based environmental education, UEM researchers were able to develop partnerships with JA! and

informal community groups, while sponsoring and encouraging students to do practical grassroots research on climate change and water problems at the local level. By the end of the project, UEM professors were meeting with local water officials to present and discuss the results of students' research on water and climate vulnerabilities, thus developing new channels of communication and information-sharing among local community members, CSOs, academics and government. In addition, UEM instructor and project partner Elias Manjate won a scholarship in 2012 from the Melinda Gates Foundation to continue his education in Brazil, where in 2013 he began working towards a PhD in environmental education and water /sanitation.

South Africa

Umphilo waManzi

Umphilo waManzi's action research and advocacy work on this project included identifying and working with communities on water, sanitation and climate justice education and organizing, providing background information and PAR training for activists, initiating contact with the eThekwini municipality around plans, facilitating awareness-raising and climate change assessments in four communities in Durban through PAR workshops, facilitating "learning journeys" of community leaders from four communities to see different adaptation efforts, facilitating participation in COP 17 actions, conducting action planning workshops in four communities, and advocacy. (At the municipal level, eThekwini municipality is responsible for operation and maintenance of aqueducts and water mains that supply residents with potable water.)

Umphilo's sub-project was closely allied to its ongoing work linking water, sanitation, climate change and climate justice advocacy and organizing at the community level and bringing local leaders into contact with government officials.

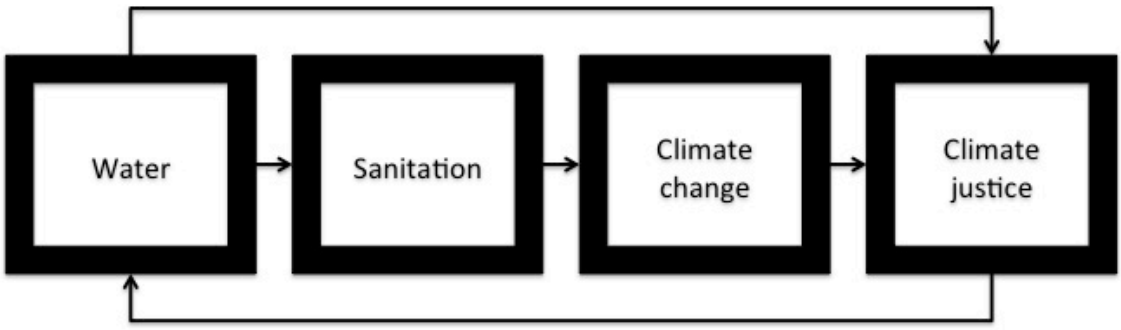


Figure 6: Umphilo waManzi's Sub-project Framework

The selection of four communities in peri-rural Durban around eThekwini municipality—Ntuzuma, Mzinyathi, Mpumalanga (Hammarsdale), and Mbumbulu—was informed by water scarcity and food security challenges, which result in usage of rainwater harvesting tanks for intensive household agriculture, poor water quality, compromised river health, and the need for community sample testing, prevalence of health and exploration of usefulness of dry sanitation such as Urine Diversion toilets, and flood preparation and responses.

Umbumbulu community members drawing a map of community and water resources at a participatory local assessment workshop.

Participatory assessment workshop in Umbumbulu

The first stage of Umphilo's sub-project was aimed at engaging communities to characterize and articulate how they were coping with climate change impacts, with a special focus on water. This was done through participatory workshops.

Using a range of PAR tools, Umphilo helped communities identify their vulnerabilities. Communities knew the impacts of climate change, but did not have an understanding of the broader issues. Participants received basic training about climate change, together with information about the approach of the local water utility.

The second stage of the project involved creating action plans for the four communities as well as providing training for community members on how to bring their issues forward to local officials and advocate for programs and services.

The objective was to encourage community members and local officials to work together to prepare for climate change impacts.

Umphilo held a final workshop in each of the four communities at the end of the project to assess progress on action plans and to provide support for their next steps. Umphilo's capacity-building work has been successful: local groups are operating on their own, taking steps to implement parts of their adaptation action plans.

For example, the Hammarsdale/Mpumalanga community developed relationships with government agencies at the local level, and they are now working together on a river rehabilitation project. Umphilo found that the closer officials are to working at the local leve, the more supportive they are of community involvement in planning and projects. This means that departments that operate locally provide openings for liaison and activities that are part of community adaptation plans.

The final stage of Umphilo's sub-project was to share its experiences and findings to influence the thinking of policy-makers and practitioners. This took place at the local level through regular liaison with local government councilors and traditional authorities, which had a positive impact. Alongside basic education on ecological issues, regular liaison began to affect the thinking of some of the councilors and izinduna (headmen). For example, together with community members involved in theis project, the local induna agreed to prevent people from settling in the area now recognized as a flood plain.

Umphilo also took the project to the national and international levels In the alternative civil society space during the UNFCCC COP 17 in Durban, Umphilo waManzi hosted a session on climate change and water adaptation, sharing the findings from this project. It also hosted a "water reality tour" to one of the four communities in Durban. The tour, which aimed at educating COP 17 attendees on Durban's water realities, especially challenges related to climate change and water resources, was featured in the Mail & Guardian Online, an internet-based news publication and one of South Africa's and Africa's major news publishers. A link to the clip is posted on the project's website.

Umphilo also produced a 12-minute DVD on this project, which was viewed within COP at a side event attended by nearly 100 top decision-makers in the water sector, including stakeholders from government, business, and civil society. They included the chairperson of AMCOW (African Ministers Committee on Water), the Director General of DWA (the Department of Water Affairs) in South Africa, Roland Schulz (a top global hydrological scientist and climate change expert from UKZN), Oxfam, social movement leaders, Eskom and Sasol (oil companies) leaders, and others. The project was also profiled as part of the alternative space at the Alternative World Water Forum in Marseilles, France in 2012. It generated important discussion about the need to pursue community-based adaptation, while continuing to advocate mitigation. Umphilo's dissemination of the project's methodology and outcomes is ongoing.

Umphilo engaged with several government bodies and representatives throughout the project.

- In the project's early days, Dr. Debra Roberts from the eThekwini Municipality Environmental Management Department and Neil MacLeod of eThekwini Water and Sanitation were invited to attend Umphilo's initial meeting with traditional authorities and councilors as well as stakeholders from the four communities;
- Neil MacLeod was invited to present at Umphilo and SDCEA's PAR training session, which was held in March of 2011;
- Regular emails and personal meetings between Umphilo's director and these officials allowed issues identified in workshops to be discussed, and possible ways to collaborate.
- Mary Galvin, Umphilo's director, met with a representative from eThekwini Environmental Planning and Climate Protection Division in late 2012 to discuss issues identified in workshops as well as possible ways to collaborate.

The methodology and structure of participatory local assessment workshops included the following:

A map of the Umgeni River around Ntuzuma community, drawn by workshop participants.

Maps and charts were produced by community members to serve as a framework for identifying climate vulnerabilities as well as strengths and weaknesses with regards to water services, availability and quality. These workshops placed special emphasis on indigenous knowledge (within these communities) and helped to document the experiences of community members.

The assessment process consisted of four exercises:

1. Participants created a spatial map illustrating the location of resources in the community in relation to water and community development;
2. A timeline of significant events in the community is created with a particular focus on issues of flooding, drought, storms, etc. over the last 30 years
3. A time trend is created to represent how the significant events identified in the timeline, such as flooding and drought have impacted the community in terms of housing, land quality, water quality, river health, food security, etc.
4. Participants create a Venn diagram to illustrate the sociopolitical environment in the community, illustrating relationships between community services, government agencies, and traditional councils. The Venn diagram helps the community identify whom they can approach with their concerns and which services they can access to help them adapt.

As previously mentioned, Umphilo waManzi's work in the four communities listed above focused on flooding, urine diversion (UD) toilets, rainwater harvesting and river health. Yet Umphilo waManzi's action research in the community indicated a long list of additional issues, including a lack of consultation with community members about operation and maintenance, construction problems, hygiene challenges, and other social issues, such as the use of these facilities by people with disabilities.

Researchers from the University of KwaZulu Natal's Pollution Research Group in Durban have been studying the composition of fecal matter from UD toilets and the effects of nitrate leaking from the urine soak-away pits into local groundwater sources.

Mary Galvin and Simphiwe Nojiyeza presenting on the social implications of urine diversion toilets at the University of KwaZulu Natal

Together with Umphilo waManzi, they have begun sharing information regarding the health concerns and social implications of these toilets.

They intend to share this information and community knowledge with the municipality to address some of the above-mentioned issues and improve sanitation service delivery.

In addition to the above-mentioned activities, Umphilo waManzi hosted a tree-planting day at Senzokuhle Primary School (Umzinyathi) in April 2012—participants included Urban Lower Primary School learners with Rural Senzokuhle Lower Primary School learners; meetings eThekwini Water Department; community leaders Workshops, etc.

Prior to the COP17 meeting in Durban in December, 2011, Umphilo organized community meetings and seminars on water governance towards climate chage adaptation in Durban. Working with UKZN graduate student Simphiwe Nojiyeza, Umphilo developed a guide for community groups on the COP, summarizing relevant climate change documents and government policies, with questions and issues for community groups, which was published in both English and Zulu. Umphilo participated in planning sessions for civil society actions in connection with COP17.

Through this project, Umphilo gained experience in applying Participatory Rural Appraisal to climate change and water adaptation. This was critical to seeing what works and how helpful it can be. While there was success, Umphilo intends to develop these techniques further and has obtained project funding to develop the method in the form of a "tool" that can be applied elsewhere. Umphilo's relationship with the four communities where it carried out project-related work is also evolving. Umphilo arranges exchange visits among the communities, and assists filmmakers and academics who want to understand local climate justice challenges and/or visit these areas. Umphilo has built on its experience with this project to explore means of informing action plans with hydrological information from scientists downscaling models to the local level, and with experiences and materials used in other countries around community adaptation plans. This project resulted in Umphilo initiating a three-year action research project with funding from the Water Research Commission; Umphilo is acting as project leader with partners including the Environmental Monitoring Group, the University of Cape Town, and the Hydrology Department of UKZN.

South Durban Community Environmental Alliance (SDCEA)

SDCEA's position on climate justice in South Durban is that climate change is exacerbating water scarcity, but so is the lack of adaptive capacity in urban and rural environments, the

lack of institutional capacity for water management, and ongoing threats to freshwater quality, including pollution, poor sanitation, and industry.

The uMlazi River, situated in South Durban, provides water to the major industrial complex of the municipality. The river flows through an intensive commercial and agricultural region northeast of the city and then through the industrial zone of south Durban before flowing out to sea through an artificial concrete canal. Climate change seems to be producing ever-greater rainfall variability, with interactive, diverse and far-ranging effects on agriculture, housing, pollution, infrastructure, employment, water availability, and other livelihood issues for local residents.

SDCEA developed a multi-pronged approach to implement this project's goals. More specifically, SDCEA's sub-project involved delivering community workshops on topics relating to climate change and water; working with youth and making presentations at local secondary institutions on these issues; organizing protests to enhance community activism; writing for the media on environment, water, and climate justice topics related to South Durban; organizing "toxic tours" of South Durban; and serving as a local and international focal point on climate justice in relation to ongoing environmental challenges in South Durban.

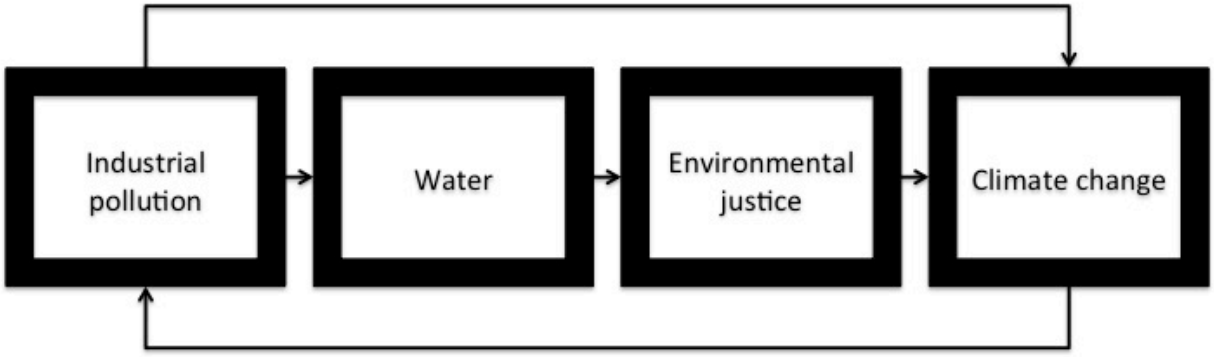


Figure 7: The South Durban Community Environmental Alliance's Sub-project Framework

The following paragraphs describe some of SDCEA's project-related initiatives and activities in more detail.

In August 2012, SDCEA hosted a climate change and water workshop to create awareness of issues pertaining to water shortage and conservation, as well as climate change and what it means to youth. This workshop took place in Umlazi, the second largest township in South Africa. SDCEA chose this particular place since it is one of the most disadvantaged communities in south Durban, where a large number of residents have limited access to water or proper sanitation. They invited secondary school students, ages 14 to 18, to attend and participate in this event. These were secondary schools from all over south Durban, and about 12 schools with 14 students and 1 adult teacher attended.

As a follow up to SDCEA's famous "Toxic Tours" of the South Durban area, a meeting was conducted with local water waste and sanitation officials, health officials and provincial government officials to address the situation. This meeting resulted in more rigorous monitoring by the officials and regular sampling of all our water streams into the Indian Ocean in Durban. Industries were served with notices to clean up the pollution at their own cost.

In Durban residents have experienced heavy rains, flooding and strong winds in late 2012, resulting in debris and pollutants entering into streams, the Durban Harbour and the Indian Ocean. As this affected all the beaches, SDCEA -- through releasing media statements -- was able to capture the attention of the department responsible for protecting and safeguarding waters resources, which led to a massive beach cleanup. This work of cleaning up rivers and streams has been ongoing, led by SDCEA through work with local youth. SDCEA has constantly monitored government water testing results to ensure that the health of beach users is protected.

Oil pipeline leaks in the Durban Harbour, which SDCEA helped identify, are polluting the water and destroying natural habitats. After seeing evidence of petroleum and diesel leaks in the water at the Durban Harbor, SDCEA alerted the Transnet National Ports Authority officials, health officials, and emergency officials, who blocked off the entire area and hired a company to request a cleanup. This resulted in the oil company Engen (a subsidiary of ExxonMobil) conducting its own investigation to establish the root cause of the incident. The Transnet port authorities held the company responsible for the cost of the cleanup and conducted meetings with SDCEA and the company to find a solution to the problem.

SDCEA has been involved with informal dwellers living in the Clairwood area in regard to access to water, sanitation and housing. After some local dwellings were broken down and the residents were brought to live in tents by the municipality in Durban without water and sanitation being provided, SDCEA was able by applying pressure to get the municipality to provide accommodation that has water and sanitation facilities in the complex.

SDCEA has also been involved with the situation of residents who live in a block of flats in Durban where disputes over water bills have resulted in the threat of disconnecting the water supply. SDCEA has taken up the case with the Legal Resources center in Durban (public interest lawyers) to defend the pensioners and poor against the Durban municipality's threat to cut off water, as this is a basic right enshrined in the South African constitution. This case is proceeding in the Durban High court; however the eThekwini municipality has been interdicted from proceedings to disconnect whilst the final arguments have not been heard.

Prior to the COP17 meeting in Durban in December, 2011, SDCEA took a lead role in planning for civil society groups' participation in side events, demonstrations and educational meetings on climate change and climate justice. Also in 2010 and 2011, SDCEA planned and conducted a range of workshops throughout KwaZulu-Natal for community youth, on food gardens, rainwater harvesting, and "climate change road shows".

With the funding provided through this project, SDCEA was able to increase its organizing work and witnessed larger community participation on environmental and water-related issues. SDCEA reached more people and saw very positive feedback and progress. More communities became aware of the issues and were able to identify the effects of climate change. Also, more youth are participating and wanting to become more aware of the issues surrounding catastrophic events and climate change in Durban and internationally.

University of KwaZulu-Natal (UKZN)

The Centre for Civil Society of the University of KwaZulu-Natal has a well-established tradition of building activist links with civil society organizations working for social change. CCS's sub-project thus centred on extending the theoretical, practical an docllaborative aspects of its work on water, energy, and climate justice through academic activism.

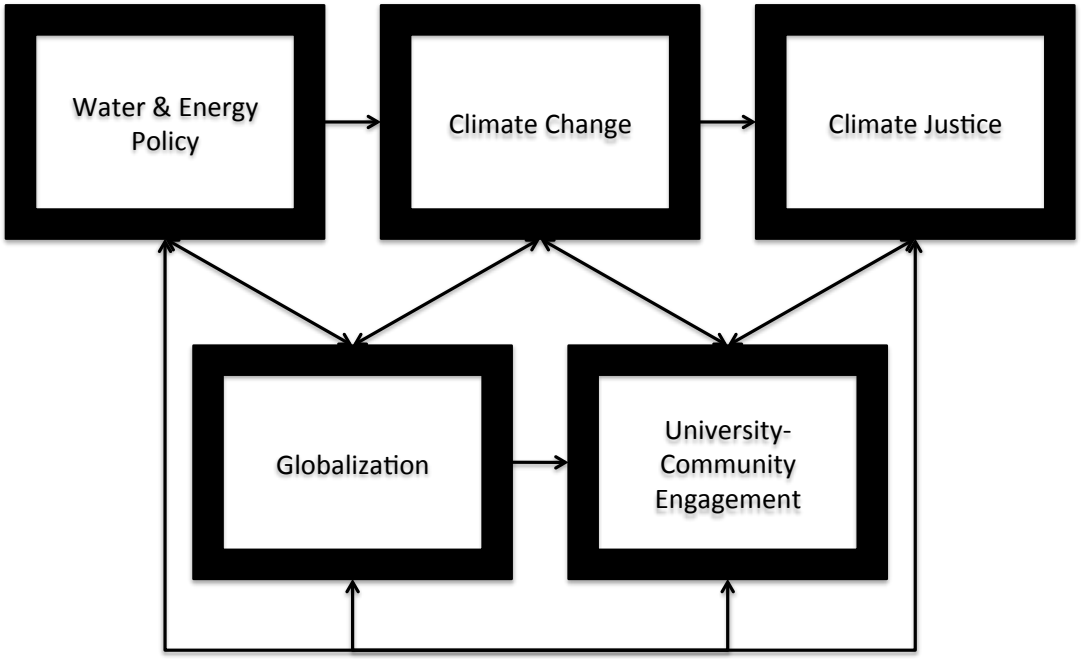


Figure 8: Centre for Civil Society of the University of KwaZul-Natal's Sub-project Framework

Simphiwe Nojiyeza, a CCS PhD student, worked with Umphilo waManzi on a number of its community-based water projects, as well as continuing his watershed cleanup work with WET Africa, another CSO. Umphilo organizer Dudu Khumalo was appointed a "community scholar" at CCS.

CCS also hosted the project's exchange student visitors to Durban from Kenya, Mozambique and Canada. Kenyans Stephen Otieno and Elizabeth Wamuchiru (who were in Durban from

August – September, 2011, observing and participating in the work of both SDCEA and Umphilo). They presented a joint seminar at CCSS on August 26, 2011 with Canadians Elizabeth Lorimer (who was in Durban from June – August 2011, working mainly with Umphilo waManzi) and Alexander Todd (who was in Durban from June – September, 2011 and worked mainly with SDCEA). Mozambicans Ester Uamba, Sergio Brito, and Neima Adamo visited Durban from July – August 2012, taking English language classes at UKZN as well as working with SDCEA and Umphilo and giving a seminar at CCS in August, 2012.

Because of academic schedules and other commitments, it was not possible to arrange exchange trips for CCS students to partner countries, although Simphiwe Nojiyeza did participate in the project's 2010 Inception Meeting in Brazil.

CCS Professor Patrick Bond, whose research has long focused on water and climate justice and on academic-community collaboration for social justice, provided crucial academic leadership for this project, as witnessed by his many publications and dissemination contributions. He was also a key collaborator in developing the "Praxis Mapping" evaluation methodology, which we developed and tested.

This project supported and furthered CCS's outstanding research and practice in academic-CSO collaboration in the areas of progressive democratic social/environmental practice in times of climate change.

Objective 3

To share widely the knowledge generated for potential adoption by other cities in Africa.

As outlined in our project's Communications Plan, in our dissemination of the process and results of this project we have prioritized the principles of Plain Language, translation, community-based communication, equity and inclusion of the marginalized, international access and digital information-sharing, networking through academic and formal education systems, and alternative media. We have developed local, national, and international strategies for sharing the knowledge generated by our project, through the ongoing work of our civil society organization and academic partners, community-based publications and media, networking, websites and digital links, educational institutions' classroom and curriculum development, academic publications and books.

Knowledge generated by this project has been disseminated in the following ways:

Community Meetings

Members of the project team shared information about our project and its methodologies and results at many community workshops, meetings, and information sessions in the

three cities throughout the project, which were attended by hundreds of local residents and a wide range of government and traditional officials. A list of these workshops and meetings is included in Appendix A.

Project Reports

All reports of this project, with the exception of the financial reports, are available at: http://ccaa.irisyorku.ca/research-project/publications/

These include:

- Inception report submitted in August, 2010
- Inception Meeting report submitted on January 31, 2011
- First technical report covering the first 12 months of Research Work submitted in February 2011
- Second Interim Report submitted in August 2011
- Communications plan submitted in September 2011
- Monitoring & Evaluation plan submitted in September 2011
- Second Annual Meeting report submitted in November 2011
- Second technical report covering the period of February 2011 to February 2012 submitted February 2012
- Synthesis Report on the Institutional Framework for Water Governance in the three cities, submitted July 2012
- Praxis Mapping report submitted May 2013
- Final technical report submitted May 2013

Books and Book Chapters

Information on climate change impacts and civil society's current responses and needs in each city became a book manuscript with chapters by project team members. The book, edited by Patricia E. Perkins and entitled Water and Climate Change in Africa: Challenges and Community Initiatives in Durban, Maputo and Nairobi, was published by Routledge (April, 2013).

"Climate justice partnership linking universities and community organizations in Toronto, Durban, Maputo, and Nairobi," by Patricia E. Perkins with Ana Louise Tavares Leary. Published in Sustainable Development at Universities: New Horizons, edited by Walter Leal (Frankfurt: Peter Lang Scientific Publishers, 2012), pp. 207-215.

"Social vulnerability and climate justice: community-based strategies for political engagement," by Patricia E. Perkins. Submitted December 2, 2011 for publication in A Global Survey of Sustainable Development in Areas of Social Vulnerability, edited by Adenrele Awotona.

"Women, watershed governance, and climate change," by Patricia E. Perkins, submitted April 2013, to be published in A Feminist Political Ecology of Water and Global Environmental Change, edited by Stephanie Beuchler and Anne-Marie Hansen.

UKZN professor Patrick Bond also published several books and book chapters on climate justice and water issues, drawing in part on project-related research, contacts and results. These include:

Water Rights and Wrongs: Commodities and Commons in South Africa (by Patrick Bond with Jackie Dugard). Manuscript submitted, Pietermaritzburg, University of KwaZulu-Natal Press.

Politics of Climate Justice: Paralysis Above, Movement Below, by Patrick Bond. Pietermaritzburg, University of KwaZulu-Natal Press, January 2012.

Durban's Climate Gamble: Trading Carbon, Betting the Earth, edited by Patrick Bond. Pretoria, University of South Africa Press, November 2011.

"The Right to the City and the Eco-Social Commoning of Water: Discursive and Political Lessons from South Africa," by Patrick Bond. In Farhana Saltana and Alex Loftus (eds.), The Right to Water, London, Earthscan, 2011.

'Global Warming, Carbon Trade and the Climate Debt owed Africa' by Patrick Bond, in E. Sahle (Ed), Developments in Africa in a Globalizing System, Lexington Books and Pietermaritzburg, University of KwaZulu-Natal Press, 2013.

'Carbon Rush or Climate Justice?' by Patrick Bond, in A.Miller (Ed), Carbon Rush, Montreal, Red Books Press, 2013.

'Climate Justice' by Patrick Bond, in C.Death (ed), Critical Environmental Politics, New York, Routledge, 2013.

'Above and Beyond South Africa's Minerals-Energy Complex' by Patrick Bond with Khadija Sharife, New South Africa Review 2, Johannesburg, University of Witwatersrand Press, 2012, pp.279-299.

'South Africa's Minerals Energy Complex' by Patrick Bond with Khadija Sharife, in H.Healy, J.Martinez-Alier, L.Temper, M.Walter and J.Gerber (Eds), Ecological Economics from the Ground Up, London, Routledge, 2012.

'Durban's Conference of Polluters, Market Failure and Critic Failure' by Patrick Bond, in S.Böhm, A.Murtola and S.Spoelstra (Eds), The Atmosphere Business, London, Mayfly Books, 2012.

'Introduction', in P. Bond (Ed), Durban's Climate Gamble: Trading Carbon, Betting the Earth, Pretoria, University of South Africa Press, 2011.

'Prefigurative Political Ecology and Socio-Environmental Injustice in Central Durban' by Patrick Bond with Ashwin Desai, in P. Bond (Ed), Durban's Climate Gamble: Trading Carbon, Betting the Earth, Pretoria, University of South Africa Press, 2011.

'Durban's Water Wars, Sewage Spills, Fish Kills and Blue Flag Beaches', in P. Bond (Ed), Durban's Climate Gamble: Trading Carbon, Betting the Earth, Pretoria, University of South Africa Press, 2011.

'Coega, Energy, Corporate Welfare and Climate Crisis' by Patrick Bond, in G. Ruiters (Ed), Development Challenges in the Eastern Cape, Pietermaritzburg, University of KwaZulu-Natal Press, 2011, pp.164-72.

'When Mega Projects Crowd out Development: Coega and Lesotho Dams' by Patrick Bond with Molefi Ndlovu, in B. Freund and H. Witt (Eds), Development Dilemmas in Post-Apartheid South Africa, Pietermaritzburg, University of KwaZulu-Natal Press, 2010.

'Community Resistance to Energy Privatization in South Africa' by Patrick Bond with T. Ngwane, in K.Abramsky (Ed), Sparking a Worldwide Energy Revolution: Social Struggles in the Transition to a Post-Petrol World, Oakland, AK Press, 2010, pp.197-208.

Articles in Refereed Journals

"Women and Water Management in Times of Climate Change" by Patricia Figueiredo and Patricia E. Perkins, Faculty of Environmental Studies, York University. Abstract approved and paper submitted to the Journal of Cleaner Production special issue on "Women, Water, Waste, Wisdom and Wealth," May 16, 2011; accepted February 18, 2012.

"Urban watershed management in Africa in times of climate change: the importance of equitable public engagement" by Patricia E. Perkins, Mary Galvin, Elias Manjate, Simphiwe Nojiyeza, Elizabeth Lorimer, Stephen Otieno, Nilza Matavel, and Romanus Opiyo, submitted for publication in the open access journal Water, submitted for review May 2013.

"Women's organizations and the struggle for water and sanitation services in Chatsworth and Inanda, Durban: The Westcliff Flats Residents Association and the Didiyela Women's Group" by Shauna Mottiar, Orlean Naidoo and Dudu Khumalo (Centre for Civil Society, UKZN), Agenda vol. 25, iss. 2, special issue on the Politics of Water, 2011, pp. 122-130. http://www.tandfonline.com/toc/ragn20/25/2#.UZEXjCvtiFc

"Participating in urban myths about women's rural water struggles," by Mary Galvin. Agenda vol. 25, iss. 2, special issue on the Politics of Water, 2011, pp. 87-100. http://www.tandfonline.com/toc/ragn20/25/2#.UZEXjCvtiFc

Capitalism Nature Socialism*: Special Issue on the Durban Climate Summit,* 4, December 2011, edited by Patrick Bond.

'Rights-Based Water Strategies against Payment for Environmental Services: Contradictions and Commons' by Patrick Bond, South African Journal of Human Rights, June 2013.

'Ecological Reparations: Can the 'Green Economy' Incorporate Litigative Justice and EcoDebt Payments, or does Global Climate Governance Require Environmental Justice and a Redistributive Basic Income Grant?' by Patrick Bond with Khadija Sharife, South African Journal of Human Rights, June 2013.

'Climate Crisis, Carbon Market Failure and Market Booster Failure' by Patrick Bond, Capitalism Nature Socialism, 24, 1, March 2013, pp. 54-61.

'Market Failure at Durban's Climate Summit', by Patrick Bond, South African Geographical Journal, December 2012, pp.89-102.

'Climate Activism Quandaries: Eco-Socialist Responses to Durban's COP17' by Patrick Bond with Kim Min-Jung, Marxism 21, 9, 2, June 2012, pp.257-284.

'Durban's Conference of Polluters, Market Failure and Critic Failure' by Patrick Bond, ephemera, 12, 1-2, March 2012, pp.42-69.

'Emissions Trading, New Enclosures and Eco-Social Contestations' by Patrick Bond, Antipode, 44, 3, March 2012, pp.684-701.

'COP17 and Labour' by Patrick Bond, South African Labour Bulletin, March 2012, pp.33-37.

'Carbon Capital's Trial, the Kyoto Protocol's Demise, and Openings for Climate Justice' by Patrick Bond, Capitalism Nature Socialism, 22, 4, December 2011, pp. 3-17.

'Prefigurative Political Ecology and Socio-Environmental Injustice in Durban' by Patrick Bond with Ashwin Desai, Capitalism Nature Socialism, 22, 4, December 2011, pp.18-42.

'Croissance Économique Africaine, Destruction de l'Environnement et Contestation Sociale' ('African Economic Growth, Environmental Destruction and Social Contestation') by Patrick Bond, Ecologie & politique, 2011, 2, 42, p. 33-46.

'From Copenhagen to Cancún to Durban: Deckchair Shifting on the Climate Titanic' by Patrick Bond, Capitalism Nature Socialism, 22, 3, June 2011, pp.3-26.

'Anatomies of Environmental Knowledge and Resistance' by Patrick Bond with Michael Dorsey, Journal of Australian Political Economy ,66, December 2010, pp.286-316.

'Climate Justice Politics across Space and Scale' by Patrick Bond, Human Geography, 3, 2, September 2010, http://www.hugeog.com/index.php?option=com_content&view=article&id=164:cjpassh32n2&catid=41:v3n2&Itemid=64.

'Climate Debt Owed to Africa: What to Demand and How to Collect?' by Patrick Bond, African Journal of Science, Technology, Innovation and Development, 2, 1, 2010, pp. 83-113.

'Water, Health and the Commodification Debate' by Patrick Bond, Review of Radical Political Economics, 2010, 42, 3, September 2010.

'Maintaining Momentum after Copenhagen's Collapse: "Seal the Deal" or "'Seattle"' the Deal"?' by Patrick Bond, Capitalism Nature Socialism, 21, 1, March 2010, pp.14-27.

Papers Presented at Conferences

"Women, Watershed Governance, and Climate Change" by Patricia E. Perkins and Patricia Figueiredo Walker. Paper presented as part of a session on the Feminist Political Ecology of Watersheds, organized by Stephanie Buechler and Anne-Marie Hanson of the University of Arizona for the American Association of Geographers annual meeting. Los Angeles, California, April 9-13, 2013

"Gender Justice and Climate Justice: Community-based strategies to increase women's political agency in watershed management in times of climate change" by Patricia Figueiredo and Patricia E. Perkins, York University. Paper presented at the Ninth International Conference of the International Development Ethics Association (IDEA) on "GENDER JUSTICE AND DEVELOPMENT: LOCAL AND GLOBAL" Bryn Mawr College, Pennsylvania, June 9-11, 2011.

"Social Vulnerability and Climate Justice: Community-based strategies for political engagement," by Patricia E. Perkins, presented at the International Conference on Rebuilding Sustainable Communities After Disasters, University of Massachusetts Boston, November 18-19, 2011.

"Climate justice, redistribution, and ecological economics," by Patricia E. Perkins, presented at the International Society for Ecological Economics (ISEE) conference, Rio de Janeiro, Brazil, June 16-19, 2012.

"Climate justice partnership linking universities and community organizations in Toronto, Durban, Maputo and Nairobi" by Patricia E. Perkins and Ana Louise Tavares Leary, presented by Ana Leary at the Symposium on Sustainable Development at Universities (WEED-U 2012), Rio de Janeiro, Brazil, June 5-6, 2012.

"Social vulnerability and climate justice: Community-based strategies for political engagement," by Patricia E. Perkins, presented at the workshop on "Innovation, Diversity and Sustainable Development in Areas of Social Vulnerability," University of Massachusetts Boston, November 18-19, 2011.

"International synergies to address climate change: Participatory community organizing in Canada and Brazil" by Patricia E. Perkins and Ana Tavares Leary; presented by Ana Tavares Leary at the Global Studies Conference, Rio de Janeiro, Brazil, July 18-20, 2011.

"Politics of Climate Justice: Paralysis Above, Movement Below" by Patrick Bond, University of KwaZulu Natal. Paper presented to the Gyeongsang University Institute of Social Science, Jinju, Korea, May 27, 2011.

[and many other presentations by Patrick Bond at conferences, public meetings and workshops, 2010-2013 – please see the CCS website: http://ccs.ukzn.ac.za/]

"A Hot Climate for Civil Society Engagement with Water in Durban," by Mary Galvin, presented at the Alternative World Water Forum, Marseilles, March 14-17, 2012.

Dissertations, Theses and Major Research Papers

"Some, for all, forever – A Case Study of Participation in Water Management in South Africa's Umgeni River Catchment" by Elizabeth Lorimer (Major Paper, Faculty of Environmental Studies, York University, August 2012).

"Responding to Water Insecurity in Durban, South Africa" by Alexander Todd (Master's thesis, Department of Geography, York University, February 2013).

Elizabeth Wamuichiru, Master's thesis, Department of Urban and Regional Planning, University of Nairobi, 2012.

"Water Governance Challenges in Nairobi's Huruma Informal Settlement," by Stephen Otieno, Master's thesis, Department of Urban and Regional Planning, University of Nairobi, 2013.

Simphiwe Nojiyeza, PhD dissertation, Centre for Civil Society, University of KwaZulu-Natal – to be submitted in 2013.

Student Papers

"Water provision and sanitation: a comparative analysis," by Neima Adamo, Environmental Education Program, Faculty of Education, Eduardo Mondlane University.

"Environmental education in Maputo's postsecondary level: a comparative analysis," by Sérgio Brito, Environmental Education Program, Faculty of Education, Eduardo Mondlane University.

"Impact of the floods in the life of the communities in the urban and peri-urban zones of the Maputo and Durban," by Ester Uamba, Environmental Education Program, Faculty of Education, Eduardo Mondlane University.

"Climate Change and Water Governance in the Greater Toronto Area" by Alex Todd, York University.

“A History of the Green Change Project” by Elizabeth Lorimer, York University.

Research Reports

“Social Dynamics of Climate Change Adaptation in East Africa” by Paaristha Oomadath, Durban, South Africa.

Student presentations

"Redefining water governance in Nairobi in times of climate change"
Presenter: Stephen Otieno, MA candidate at the University of Nairobi, CIGI Scholar, and Visiting Scholar at FES
Date: Thursday, October 18, 2012
Venue: Faculty of Environmental Studies, York University, Canada

Climate Change and Water Workshop
Presenters: Sérgio Brito, Neima Adamo, and Ester Uamba
Date: August 7, 2012
Venue: Umlazi Secondary School, Durban, South Africa
On August 7th, 2012, the South Durban Community Environmental Alliance (SDCEA) hosted fourteen secondary school students along with one teacher, from twelve local schools for a workshop on water shortage, climate change and conservation issues. Located in disadvantaged Umlazi, the second-largest township in South Africa, where conditions and services are poor, the workshop was a success.
Neima, Ester and Sérgio, environmental education students at Eduardo Mondlane University in Maputo, gave a presentation about the importance of water, water scarcity, conservation and need for awareness to alleviate shortages worldwide. Their presentation was captivating and informative. Sérgio's component dealt with deforestation and industrial pollution, including oil spills. Neima and Ester dealt with water pollution, and took questions. Afterwards, Bongani Mthembu took Ester, Neima and Sérgio on a "Toxic Tour". SDCEA works with various NGO's/CBO's on environmental issues, based on Section 24a, the South African constitutional guarantee for citizens' right to an environment that is not harmful to their health or wellbeing. The SDCEA "Toxic Tour" tells a history of Durban, with the intent of informing the people about the dangers of emitting harmful chemicals in the petrol, diesel and paper refining processes. The three-to-four-hour tour moved through the South Durban locations of Merebank, Wentworth, bluff, Clairwood, Isipngo, Umlazi and the Jacobs area, discussing air, water and land pollution in the city. The stops along the tour include Quality Street, where Nelson Mandela promoted Section 24a of the constitution; Cuttings View Point, through which the majority of South Africa's oil imports are pumped; a primary school where recent health studies found that 52% of South Durban's population are Asthmatic, as compared to 2% in North Durban; the Engen Refinery, whose industrial waste is dumped at the Umlazi landfills; The Island View Storage

facilities; Clairwood, which is a problematic site for illegal trucking; and lastly the Industrial Oily Products refinery, which emits an unbearable mist of toxic chemicals.

"Climate, water and destructive development from Maputo to South Durban"
Speakers**:** Neima Adamo, Sergio Brito, Ester Uamba, Patrick Bond and Dimple Deonath
Date**:** Friday, 3 August 2012
Venue**:** CCS Seminar Room 602, 6th Floor, MTB Tower, Howard College, UKZN
Topic: The Centre for Civil Society has helped host a project investigating the confluence of climate change, water, municipal governance and social mobilisation in Maputo, Nairobi and Durban, in conjunction with the York University Faculty of Environmental Studies, the Eduardo Mondlane University and the University of Nairobi, as part of the Program on Climate Change and Adaptation in Africa sponsored by the International Development Research Centre in Ottawa. In 2011, a similar seminar interrogated adaptation and mitigation measures in Nairobi and Durban: http://ccs.ukzn.ac.za/default.asp?11,61,3,2381 and in this seminar, we further consider how African cities react to climate change. Maputo went literally under water due to flooding in 2000-01 and its notorious problems in supplying clean retail water to households remain a source of concern given the sea-side city's vulnerability to extreme weather. The South Durban case is complicated by the area's role as both victim and villain; the March 2007 destruction of the waterfront is one example of the former, while the incoming R250 billion Back of Ports and Dig-Out Port projects represent a huge increase in petro-chemical, industrial, shipping and freight emissions, not to mention the threat of vast residential displacement and local hazards. How are civil society organisations responding in both cities, and do they have any real chance of defeating the forces behind the eco-social destruction on the horizon?
Speakers: Neima Adamo, Sergio Brito and Ester Uamba are post-graduate students of Environmental Education at the University Eduardo Mondlane, Maputo; Patrick Bond lives on the Bluff, directs CCS and writes extensively on water and climate; and Dimple Deonath is a Merebank resident, a Brutus Community Scholar at CCS and a leading member in Earthlife Africa and Zero Fossils Durban.

United Nations Framework Convention on Climate Change COP17 Debrief Delegation Panel
Presenters: Alex Todd and Prof. Patricia E. Perkins
Date: Thursday, January12, 2012
Venue: Stedman Lecture Halls, York University, Canada

CCS Seminar: In Hot Water – Climate change and water adaptation in Nairobi and Durban
Presenters: Stephen Otieno, Elizabeth Wamuchiru, Alex Todd, and Beth Lorimer
Date: Friday, August 26, 2011
Venue: Howard College, University of KwaZulu-Natal, Durban, South Africa

Blog posts

"Water Cartels in Nairobi: Necessary Public Good or Threat to Resource Governance?" by Stephen Otieno

Available at: http://ccaa.irisyorku.ca/2012/08/water-cartels-in-nairobi-necessary-public-good-or-threat-to-resource-governance/

"Climate change and water issues in Umbumbulu, South Africa" by Beth Lorimer
Available at: http://ccaa.irisyorku.ca/2011/08/climate-change-and-water-issues-in-umbumbulu-south-africa/

"C17 July Meeting: The Movement's Progress" by Alex Todd
Available at: http://ccaa.irisyorku.ca/2011/07/c17-july-meeting-the-movement's-progress-2/

Flushing out the realities of urine diversion toilets in South Africa's eThekwini municipality" by Beth Lorimer
Available at: http://ccaa.irisyorku.ca/2011/07/flushing-out-the-realities-of-urine-diversion-toilets-in-south-africa's-ethekwini-municipality/

Blogs and backgrounders by Stephen Otieno for the Centre for International Governance Innovation's Africa Portal:

"Running for Ndakaini: Protecting Nairobi's main water source" (May 10, 2013) and "Water cartels in Nairobi: Necessary public good or threat to resource governance?" (August 10, 2012). Available at: http://www.africaportal.org/person/stephen-otieno

"From principle to practice: Improving water management in Nairobi" (February 25, 2013), Africa Portal Backgrounder No. 54. Available at: http://www.africaportal.org/articles/2013/02/25/principle-practice-improving-water-management-nairobi

"Water cartels in Nairobi: Necessary public good or threat to resource governance?" (August 1, 2012). Available at: http://www.africaportal.org/blogs/community-practice/water-cartels-nairobi-public-good-or-threat-water-governance

"Running for Ndakaini: Protecting Nairobi's main water source" (May 10, 2013). Available at: http://www.africaportal.org/blogs/community-practice/running-ndakaini-protecting-nairobi%E2%80%99s-main-water-source

Brochures

"Climate Justice and Water Management in Durban, Maputo and Nairobi" available at http://ccaa.irisyorku.ca/wp-content/uploads/ccaa/2011/08/Brochure-PDF.pdf

"Institutional Framework for Water Governance: Durban, Maputo, Nairobi" available at http://ccaa.irisyorku.ca/wp-content/uploads/ccaa/2011/08/Brochure2-PDF.pdf

Short Films

Flush, short film by Sara Marino on water and sanitation challenges in Nairobi and Durban including interviews with community activists; see link on the project website.

METHODOLOGY

This project's design was based in the proven methodologies of Participatory Action Research (as an initial intervention strategy with local communities and marginalized populations in the three cities) and Action Research (as a way of sharing information about the key issues identified in the initial stages of the project at larger scales and in policy arenas). The strengthening of community groups as well as the other institutional project partners has occurred through their involvement in the planning, analysis, implementation, and evaluation of the educational and community development interventions. This type of involvement of the project participants, respecting and making the best use of their strengths in all phases of the project, has been the basis for the continuity, sustainability, and ongoing impact of the project's work.

Because we engaged with local community leaders and groups through CSOs which had long-standing existing relationships with local constituencies, this helped to reduce some of the difficulties that PAR and AR researchers often encounter in building trust and mediating power dynamics within partner communities. The CSOs served as a "bridge" between university-based researchers and local community members, so that students (both from local universities and those visiting on exchange from universities in other cities) were seen as CSO staff rather than outsiders, or at least were tolerated as friendly observers. At the same time, the university-based researchers, advised by faculty partners on the project team, were able to bring the rigor and varied perspectives from their theoretical and comparative studies on climate change, adaptation, community development, land-use planning, and other topics to bear on their contributions to the project, which enhanced the CSOs' work while also benefitting our written and comparative results overall. In our view, linking university researchers with community-based organizations in this way has double benefits: students become familiar with the methodologies and advantages of PAR, while CSOs and community members gain respect and confidence that their knowledge and contributions have policy relevance and political legitimacy. We believe that there is great political potential in such local networks of people from academia and from the grassroots whose mutual trust comes from having worked together.

This project's aim was both to help at-risk groups reduce their level of climate risk by increasing their coping capacity/reducing their vulnerability, and to facilitate the involvement of civil society organizations and policy-makers in this adaptive and climate change response process. The specific adaptation mechanisms which were selected by

participants and tested by this project were the community intervention techniques (education and community organizing programs) which the CSO partners developed and implemented; the academic partners helped to document this process and disseminate it in policy circles and internationally.

The following research methods and techniques were used:

- **Community workshops**
  - **Spatial maps** (illustrating the location of resources in the community in relation to water and community development)
  - **Timelines** (of significant events in the community)
  - **Time trends** (created to represent how the significant events identified in the timelines, such as flooding and drought have impacted the community in terms of housing, land quality, water quality, river health, food security, etc.)
  - **Venn diagrams** (to illustrate the sociopolitical environment in the community, illustrating relationships between community services, government agencies, and traditional councils; helps the community identify whom they can approach with their concerns and which services they can access to help them adapt.)
  - **Collective storytelling**
  - **Climate change and climate debt teach-ins**
  - **Workshops of the Future**
- **Surveys and Questionnaires**
- **Interviews with community members and government officials**
- **"Water reality tours"**
- **Toxic Tours**
- **Participatory research by university student interns working with civil society organizations**
- **Student exchange trips and comparative research studies**
- **Document and literature reviews**
- **Dissemination of research results to community members in popular formats**
- **Films, videos, and online sharing of research results**

We have catalogued and explained these methods for advancing community-based research and organizing for climate justice in more detail in a published article (Figueiredo and Perkins 2012) and a forthcoming book chapter (Perkins in Awontona, forthcoming). This material also serves as the basis for another publication we have planned to continue working on jointly, an online Manual for Community-based Climate Justice Education and Organizing, to be published on the project website.

PROJECT ACTIVITIES

During this project, members of our team fostered collaborative relationships between community-based organizations and Civil Society Organizations (CSO) and universities in Durban, Maputo, and Nairobi. CSO staff members and university researchers worked

together in each city to plan and conduct several environmental education workshops in the cities' low-income areas, where water and climate change stresses are particularly evident. Research assistants within each partner CSO and student and faculty researchers worked together to characterize urban water governance frameworks in detail and to develop locally appropriate ways of enhancing civil society's role in responding to climate change. This research was assembled into a *Synthesis Report* on the institutional framework for water governance in the three cities, with a detailed chapter on each city including a SWOT analysis of the city's water management structures with regard to civil society participation and the implications of climate change. This report was submitted to IDRC in July 2012 and posted on the project's website (http://ccaa.irisyorku.ca). In addition, the content of this report has been summarized into a concise, easy-to-read brochure, which has also been posted on the website and printed for wide distribution by project partners in Africa.

At the beginning of the project, the academic members of our research team selected student interns to work with the CSOs and assist in documenting the project's processes, methods and findings, and to participate in exchange visits to other partner countries. In 2011, two graduate students from Nairobi, Stephen Otieno and Elizabeth Wamuchiru, visited Durban and Maputo, participated in the project's annual team meeting, and prepared a report on their exchange visit, which compares grassroots community climate change education work in Durban and Nairobi. In addition, two graduate students from York University went to Durban, South Africa to intern at local partner organizations SDCEA and Umphilo waManzi, where they helped to organize community workshops, document and report on project-related activities, present at public forums and community events, and conduct research on climate change and water-related issues in the city. Alex Todd and Beth Lorimer have since successfully completed their Masters' degrees and their respective Master's Papers now appear on the project's website.

Three students from Maputo, Neima Adamo, Sergio Brito, and Ester Muamba, also participated in our second annual meeting, including a short visit to Durban, and returned to Durban the following year for a longer exchange visit. During their stay, the students attended lectures and seminars at the University of KwaZulu-Natal and received English instruction at the University's Language Centre, so as to improve their ability to communicate and engage with local students, activists and academics. In addition, the three students helped to organize and attend events hosted by the South Durban Community Environmental Alliance (SDCEA)—where they interned—and presented their research on climate change and water at a local secondary school.

In late 2012, Aaron Saad, a York University PhD student, travelled to Nairobi, Kenya, to learn about and document the Nairobi team's research methods and community-based approaches to climate change adaptation. In his first week in Nairobi, Aaron joined members of Kilimanjaro Initiative (KI) on a field visit to Silanga, Kibera to observe a participatory planning meeting on the development of a public space centred on a newly upgraded soccer pitch. In the second week, he met with members of the University of Nairobi to finalize a research program that would fit his skill set and their project goals. The remainder of his time—before the project wrap-up in the final week—was used to

familiarize himself with the activities of the different groups that composed the Nairobi team and conduct interviews with the team members to discuss their findings. This field research contributed to Aaron's development of his dissertation plans.

From April to September 2012, a group of 17 Urban Planning graduate students from the University of Nairobi, under the supervision of Professor Elijah Ndegwa, engaged with residents of Silanga village, Kibera in a research process facilitated by the Kilimanjaro Initiative. This included discussions and knowledge-sharing between local residents, CSO staff, and the graduate students on urban planning, water/sanitation issues, and civic engagement. A total of 70 households and 15 institutions participated, including women's groups, community leaders, slum structure owners and youth groups. The goal was to explore a collaborative model for the Silanga neighbourhood's transition from where it currently is to where it would like to be in the future. Issues identified as challenges included: drainage and sewerage disposal, removal or lack of vegetation, pollution of underground and piped water due to leakage, leaky water pipes, inadequate toilet facilities, low community cohesion and sense of collectivity, frequent migration, lack of long-term contact between community members, and lack of common interest to take action. Information collected by the graduate students focused on local ecological and political knowledge of vulnerable population groups, mapping links and networks between civil society groups and local and central government, and identifying areas needing awareness programs for civil society organizations. A feedback meeting in early 2013 allowed the students to share their perspectives with local participants in the process, and reflect back their conclusions.

More detailed information on the field research activities of each project partner organization is provided above, in the descriptions of how the project's objectives have been met, and in their individual final reports which are included as Appendix A to this report.

Project Final Meeting

This project's final meeting was held in Nairobi, Kenya from November 5 to 8, 2012. The meeting very successfully allowed us to complete the circle of information sharing and reflect together on the outcomes of our project. Partners from Maputo and Durban were able to visit the sites where the Nairobi team has been working, in Kibera and Huruma, and speak with local people, officials, and students about climate change, sanitation and water governance (just as we did in the other two cities during our 2011 project meeting there).

In both formal presentations and informal conversations, partners shared information and compared situations and views. We reported to each other on the project's challenges and successes, made plans for further dissemination of the project's results.

The following paragraphs briefly summarize the meeting, drawing from two project reports – "Final Meeting Report" and "Praxis Mapping Report," both of which can be found at http://ccaa.irisyorku.ca/research-project/publications/.

Field Visits

On November 6, 2012, project partners visited the Kenya Wildlife Service, where growth of the city and animal conservation are both subject to climate change pressures in a complex web. They also attended a community meeting in Silanga, a village in Kibera – the largest informal settlement in Nairobi and second largest in Africa. There, participants visited a sports field upgraded by Kilimanjaro Initiative (KI), a partner CSO, and attended a community meeting hosted by village elders, youth representatives, KI and the University of Nairobi.

Silanga residents spoke to the group about challenges they currently face, including pollution of the Nairobi Dam, poor sanitation, migration and overpopulation, inadequate infrastructure and living conditions, lack of access to clean and potable water, flooding, and climate change. As the team witnessed while in Nairobi, intense rains prove a real challenge for residents of low-income areas in Nairobi, such as Silanga. In lieu of proper drainage systems, residents are forced to use sandbags to stop floodwaters from entering their homes.

Youth representatives spoke about youth involvement in criminal and illegal activities in Kibera due to lack of opportunities. The youth present (all of whom are now involved in productive work) have started a community garden with the financial assistance and guidance of Kilimanjaro Initiative. While in Kibera, the team visited the garden, which had been heavily impacted by recent heavy rainfall. KI and the youth have since started looking at different strategies to minimize the impact of heavy rains on the garden, which they hope will soon become a source of income.

Following the meeting, the team took a brief walking tour of Silanga, where sanitation is an income-generating system. Residents typically pay about US$0.10 to access public toilets. Although the municipality has set up public toilets in Kibera, local for-profit water cartels prevent the public from using these toilets, because they make profit out of selling this service.

Following the visit to Kibera, the team went to Mathare, Huruma – another informal settlement in Nairobi. The field visit was organized by the Kenya Debt Relief Network and hosted by local community groups, who spoke about political and sanitation challenges faced in Huruma and how the community is addressing them. During a walking tour of Mathare, community hosts showed our team alternative models to water commodification. The team was shown how water is captured in storage tanks by community organizations and sold to users. However, the money is not taken as profits but instead goes back into the community. There was a diversity of projects supported under this model, including a car wash and a community garden.

End-of-project Evaluation, Praxis Mapping, and Student Presentations

The evaluation session during our final project meeting was facilitated by Julius Nyangaga, Regional Monitoring, Evaluation and Learning Manager for the International Institute of

Rural Reconstruction (IIRR) in Nairobi and steward of the Outcome Mapping Learning Community.

During this end-of-project evaluation session, the team divided itself into country groups to review, critique, analyze and discuss its challenges and accomplishments. Together, each country group attempted to articulate whether and how it addressed, advanced and accomplished the project's three objectives.

→ Progress towards achieving objective one: *Characterized the institutional framework for water governance in each of the three cities and explain how they cope with climate change and variability*.

This objective was largely accomplished through our Synthesis Report on the institutional framework for water governance in Durban, Maputo and Nairobi (available on the project website). Members of the research team in all three cities were involved in compiling this report, which was completed in 2011.

The Nairobi team spoke about climate change and water governance and argued that alternative governance structures need to exist where community involvement in policy making can occur. Awareness-raising of water governance as it applies to local people needs to happen. Our project has thus identified some crucial gaps in the way water governance currently takes place.

Nilza, Eugenia and Elias of the Mozambique team pointed out how incorporating environmental awareness into school curricula is difficult as the school educational programmes are already full. They commented on the need for youth awareness and participation. JA!'s work has attempted to address these needs by providing extra curriculum support on environemental and climate change topics, and EUM's environmental education club also facilitates the sharing of knowledge between university students and others outside the university.

Patrick, from the South Africa group, spoke about the positive change that SDCEA, Umphilo, and other community partner organizations have been able to bring about. Mary Galvin, who was present via Skype, also commented on the increased awareness about climate change and water problems among community groups and individuals due to these efforts. Mama Dudu pointed out the problem of funding as a barrier to effective activism; local, sustainable funding is needed.

→ Progress towards achieving objective two: *Identify and test viable alternatives for enhancing civil society roles in climate change*.

This is our project's major area of research contribution. Civil society organizations and partners in each city have been working to develop and document ways of enhancing the important role of civil society in addressing climate change. These are detailed in each organization's final report, and in various project outputs.

Patrick and Mama Dudu gave examples of alternatives for enhancing civil society roles in climate change, emphasizing the need for participation at every stage. Community empowerment, local knowledge dissemination, and follow-up are necessary. The Nairobi team expressed the need for alternative official structures, but also identified the challenge therein, due to lack of accessibility to policy-making on the part of community members. The Maputo group's approach took the route of enhancing and strengthening the formal education system, looking to schools to implement awareness and environmental education programs for youth. Organizations engaging youth to discuss climate change issues are key.

→ Progress towards achieving objective three: *Share widely the knowledge generated for other cities in Africa.*

We are disseminating and sharing our project's results in a number of ways: on our website, through video and films, articles in open-access and other academic journals, a forthcoming book, blogs and links with other online information pathways. We hope to publish a manual on community-based climate change response workshop ideas and strategies.

A discussion on dissemination and promulgation of climate change issues and awareness pointed out the importance of networking and project partner meetings. Partners noted the differences we have identified between countries: what works in one might not work in the other. There are different struggles, different mindsets, different considerations in each place, so the project's results must be adapted by their users.

We agreed that it is a good idea to incorporate the use of social media to spread messages, share knowledge, and contact people across the world.

Praxis Mapping

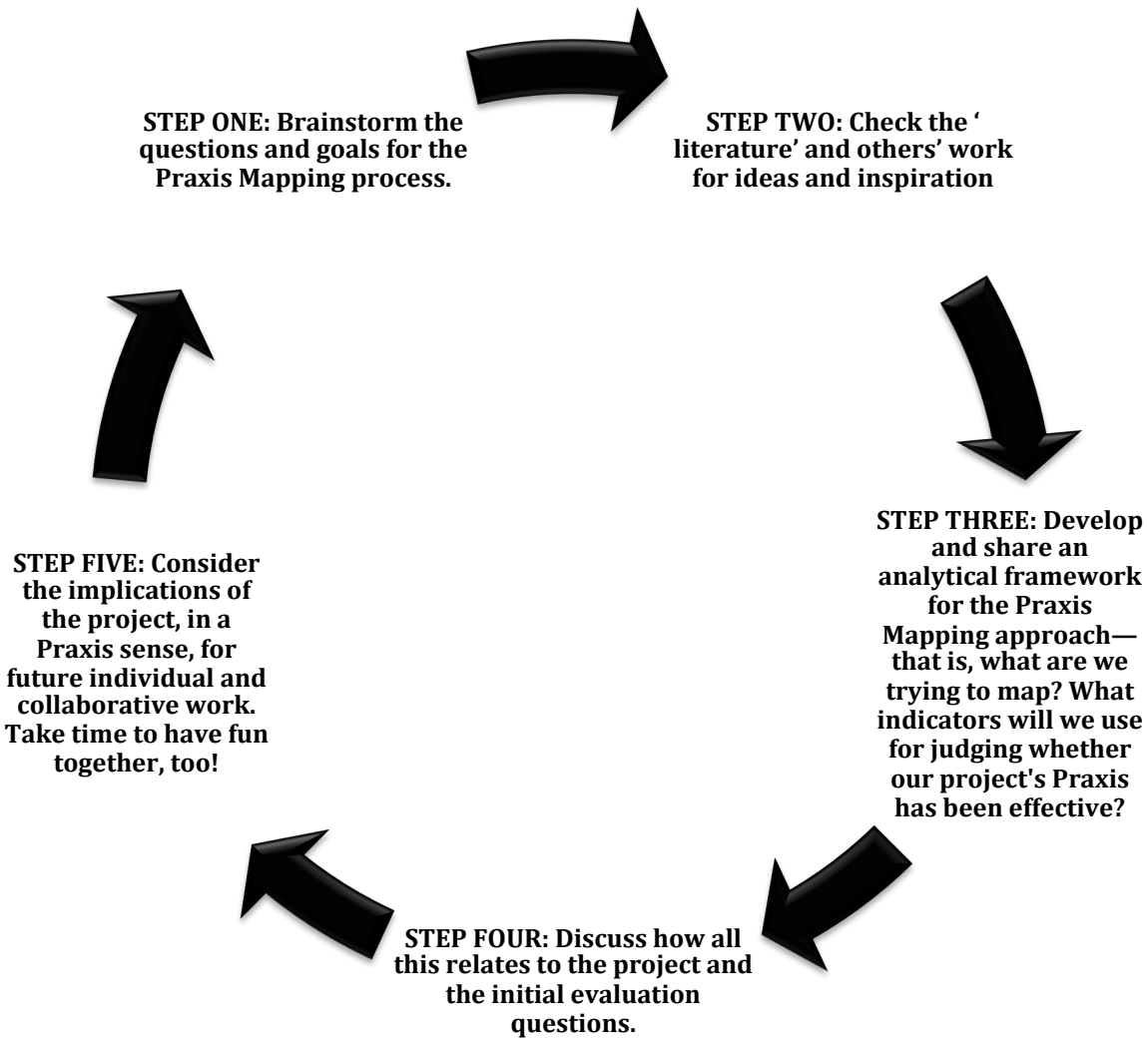
Following the project evaluation session facilitated by Julius Nyangaga, we also had a discussion about the overall political-economic impact of our work, which is described in a separate Praxis Mapping report (Report 2013A1). This session was facilitated by Patricia Perkins and Patrick Bond.

Praxis Mapping is a process we have developed in order to consider the long-term political implications of our project. We felt it important to not just consider *if* and *how* we had accomplished the project's original goals as outlined in our project proposal, but also to examine the effects of our project more broadly – its political impact on our various communities and the people we work with regularly, its implications for our own political understanding of the context within which we work, and its potential for advancing the broad political goals which will progressively help to build climate justice and equity in water governance in the coming months and years.

The following figure illustrates the five steps of Praxis Mapping.

Praxis Mapping: Steps

"Praxis Mapping" involves collective self-evaluation of how what a group did together relates to members' long-term visions of fundamental progressive social and political change. What was the project's broad, long-term political impact?



A report on this process, entitled, "PRAXIS MAPPING: A methodology for evaluating the political impacts of international projects," has been posted on the project website at http://ccaa.irisyorku.ca/research-project/publications/. We intend to try to publish this report, or a journal article based on it, in the coming months.

Student Presentations

Stephen Otieno, Master's student in Environmental Planning and Management at the University of Nairobi, gave a presentation at the final team meeting on his research on redefining water governance in Nairobi in times of climate change. Stephen also spoke about his experience as a visiting scholar at York University, which was supported by the Centre for International Governance Innovation's (CIGI) Africa Initiative Graduate Research program. Stephen's blogs and research paper on water challenges in Nairobi were published on the CIGI website.

Aaron Saad, a PhD student at York University's Faculty of Environmental Studies, also gave a presentation on his research on the political economy of climate change, vulnerability, and displacement. His research in Nairobi has been foundational to his dissertation development. Aaron spent six weeks in Nairobi, where he helped to document the Nairobi team's research methods and community-based approaches to climate change adaptation. Aaron's report can be found at http://ccaa.irisyorku.ca/publications.

PROJECT OUTPUTS AND OUTCOMES

Research

This project has produced a number of research reports, all of which have been posted on the project's website (http://ccaa.irisyorku.ca/research-project/publications-presentations/) and are accessible to the general public. Our research outputs are discussed much more fully in the "Objective 3" section above.

Capacity

The individuals and organizations that have completed Participatory Action Research (PAR) training, mentoring, or other capacity-development activities during the lifetime of this project include the following.

Umphilo waManzi and the South Durban Community Environmental Alliance, partner CSOs in Durban, held a PAR training session (see Report 2011A3) in March 2011. The training, which was facilitated by Patrick Mbanjwa and attended by SDCEA and Umphilo waManzi personnel, as well as activists and community members, including local activists from each of the four communities where Umphilo waManzi works.

In May 2011, the Nairobi team had what they described as "a very successful" PAR training workshop, which was facilitated by *Solutions Integrated Systems*. All the partners were present, as well as two University of Nairobi students, Stephen Otieno and Elizabeth Wamuchiru. Ten community representatives from Kibera (nominated by KI) and 10 community participants from Huruma (nominated by KENDREN) also participated in the training.

An IDRC PAR training workshop in Accra, Ghana, was attended by Kilimanjaro Initiative's Judy Waithera and MuGeDe's Fernando Pondeca in 2011.

At the Second Annual Meeting in August, 2011, all project team members participated in PAR-review session with Patrick Mbanjwa in Durban. This session allowed research assistants, CSOs and students to share their participatory methods with others and discuss critically how these methods are effective or how they can be improved. In addition, partners discussed ways to encourage active participation and involvement by marginalized peoples and/or visible minorities in community-based workshops; how to address power dynamics; how to strengthen the role of civil society organizations in water sector governance and climate change adaptation, etc.

As mentioned above, project partners participated in an end-of-project evaluation, as well as a Praxis Mapping session, at the project's final meeting in Nairobi in 2012. Reports on these processes can be found online at http://ccaa.irisyorku.ca/?page_id=799

Training, Exchange Trips and Internships

Elizabeth Wamuchiru and Stephen Otieno, University of Nairobi

Elizabeth Wamuchiru and Stephen Otieno

Elizabeth and Stephen, as part of their graduate research in Urban Planning at the University of Nairobi, used spatial maps of two communities, Haruma and Kibera, to identify water resources and climate change vulnerabilities in their own research. These maps identified the greatest needs for intervention and were included in their research presentations to the project team at the second annual meeting in August 2011.

Photographs of problem areas in the neighbourhoods (i.e. where flooding or pollution occurs) supplement the spatial element. By taking photographs, the researchers were able to interact with local residents and listen to their challenges and experiences. These stories

and visual elements of the neighbourhoods were also relayed to the project team at our second annual meeting.

Elizabeth and Stephen attended the project's second annual meeting held between August 14 and 22, 2011 in Durban, South Africa and Maputo, Mozambique. Following the meeting, these students stayed in Durban, where they attended several climate change and water-related seminars and learned about climate change adaptation in Durban. During their stay in Durban, Elizabeth and Stephen worked with Dr. Mary Galvin of Umphilo waManzi and Prof. Patrick Bond of UKZN.

In addition, they visited Cato Manor shacks with Prof. Patrick Bond, where they were able to witness the living conditions of the urban poor in Cato Manor. The poor infrastructure and magnitude of environmental degradation was evident. However, the people receive free clean water from the eThekiwini Municipality. They saw a slum-upgrading program close to the shacks where the poor are gradually being relocated to better houses fitted with solar water heaters to provide warm water during the winter season. Also worth noting were the flood mitigation strategies practices where old tires are used to prevent soil erosion and maintain the stability of the houses built in flood-prone areas.

Elizabeth and Stephen also had the opportunity to present their research projects at the Center for Civil Society, along with York University's Elizabeth Lorimer and Alex Todd. The seminar, entitled, *In Hot Water: Climate Change and Water Adaptation in Nairobi and Durban*, was held in August 2011.

Neima Adamo, Sérgio Brito and Ester Uamba, Eduardo Mondlane University

Neima Adamo, Sérgio Brito & Ester Uamba

Neima, Sérgio and Ester, undergraduate students in Environmental Education at the Eduardo Mondlane University, were instrumental in helping the Mozambican team assemble their chapter for the Synthesis Report on the institutional framework for water governance in Maputo.

In addition, they worked with the local partner CSOs, Justiça Ambiental (JA!) and Women, Gender and Development (MuGeDe) to implement the project. Neima worked with MuGeDe, whose sub-project involved conducting surveys in low-income neighbourhoods of Maputo to understand the knowledge of local citizens regarding climate change. Neima also assisted with community environmental education workshops. Sérgio and Ester worked with JA! to implement the organization's environmental education programme in secondary schools.

In July of 2012, these students went to Durban, South Africa to learn about water governance, watershed management, and climate change adaptation efforts and challenges in this city.

During their one-month stay in Durban, the students attended lectures and seminars at the University of KwaZulu-Natal and received English instruction at the University's Language Centre, so as to improve their ability to communicate and engage with local students, activists and academics. In addition, the three students helped to organize and attend events hosted by the South Durban Community Environmental Alliance (SDCEA)—where they interned—and presented their research on climate change and water at a local secondary school.

The students' trip to Durban helped to inform and strengthen their individual research papers, which addressed the following topics, respectively:

"Water provision and sanitation: a comparative analysis," by Neima Adamo

"Environmental education in Maputo's postsecondary level: a comparative analysis," by Sérgio Brito

"Impact of the floods in the life of the communities in the urban and peri-urban zones of the Maputo and Durban," by Ester Uamba

Elizabeth Lorimer, York University

Elizabeth Lorimer

As a student research intern for this project during her Masters in Environmental Studies program, Elizabeth was responsible for documenting activities and results associated with research activities and disseminating information. This offered her an opportunity to examine the relationship between academic research and community-based development work. Working on a participatory action research project in this environment, in particular, also allowed her to explore how knowledge is produced and recognize that it is not created exclusively in academic settings.

The project underscored the value of community-based knowledge by working with communities to highlight the knowledge within the community and by documenting this information in a useful way. During the assessment workshops, community members were not always able to identify climate change as climate change itself but as a series of events that have changed the water and landscape where they live. The historical knowledge provided by community members of water levels, water quality, and flood and drought events was vital in characterizing how climate change is affecting these communities.

Elizabeth participated in an exchange visit to Durban in 2012, and worked mainly with Umphilo waManzi. This provided an opportunity to learn how civil society can act as a boundary or gatekeeper between academia and communities. Many civil society groups or

community-based organizations are able to serve as translators or interpreters between these two environments.

Elizabeth was able to engage with many interesting individuals and organizations involved in the water sector and in particular water resources management, catchment management agencies, and river health. According to Elizabeth, these connections were an immense help in her preliminary research on catchment management forums and in learning about participatory approaches to water resources management.

Through this internship experience, she was able to immerse herself in all of these issues in a dynamic urban environment. She was able to engage in many issues from the prospective of civil society, while working at Umphilo and gain insight into what participation in water management could look like for her own research interests.

She was able to learn from meeting with government officials from different jurisdictions and conservation bodies whose work directly affects the environmental planning sector. Furthermore, she was able to engage in local issues around water quality, river and estuary health, and the health of urban riparian habitats.

The internship gave her the opportunity to acquire and strengthen skills in participatory action research methods and methods for participatory community development.

Elizabeth made a presentation entitled "Participation, Equity & Water Resource Management in the Umgeni Catchment" at the second annual project meeting (August 15, 2011) and a Centre for Civil Society Seminar titled "In Hot Water Climate change and water adaptation in Nairobi and Durban" (August 26, 2011). See http://ccs.ukzn.ac.za/default.asp?11,61,3,2381

Alex Todd, York University

Alex Todd

Alex interned (5-6 days per week) with SDCEA in Durban from June 9, 2011 until July 7, 2011. This included work and activism in the SDCEA office, throughout Durban, and across KwaZulu-Natal. After this point, he conducted interviews with various Durban residents and continued working with SDCEA, though less frequently than before. Alex also took part in CCAA project meetings in Durban from August 14-16 (where he presented on SDCEA's climate change workshops in KwaZulu-Natal) and in Maputo from August 17-21.

Alex presented some preliminary information on his research at a symposium at the Centre for Civil Society at the University of KwaZulu-Natal, alongside Elizabeth Lorimer, Stephen Otieno, and Elizabeth Wamuchiru. This took place on August 26, 2011.

Alex also gave a presentation based on his research at the Association of American Geographers (AAG) Annual Meeting in New York City, on February 24, 2012. These presentations, while different from one another, were each titled "Responding to Water Insecurity in Durban, South Africa."

He conducted interviews with residents as well as employees of eThekwini Water and Sanitation. This research investigated the question of how different actors cope with climate change and variability. Through his internship with SDCEA, Alex took part in community workshops and activism to promote awareness of climate change and its consequences. Furthermore, Alex shared this knowledge (and will continue to do so) through conference presentations and written work.

Alex's Master's thesis, entitled, "Responding to Water Insecurity in Durban, South Africa," can be found at:
http://ccaa.irisyorku.ca/wp-content/uploads/ccaa/2013/02/MRP-Complete-Alex-Todd.pdf

Aaron Saad, York University

Aaron Saad

Aaron travelled to Nairobi in October, 2012. In his first week in Nairobi, Kenya Aaron joined members of KI on a field visit to Silanga, Kibera to observe a participatory planning meeting on the development of a public space centred on a newly upgraded soccer pitch. In the second week, he met with members of the University of Nairobi in order to finalize a research program that would fit his skill set and their project goals. The remainder of his time before the project wrap-up in the final week was used in familiarizing himself with the activities of the different groups that compose the Nairobi team and conducting interviews with the team members to discuss their findings.

Aaron prepared a report on the work of the Nairobi project team, entitled "Climate Change Adaptation in Africa: Nairobi Team Contributions to Knowledge on Climate Change Adaptation," which is available on the project website.

Aaron's research over the course of his PhD in Environmental Studies at York University has focused on the theory and practice of participatory climate change adaptation among marginalized groups. He was able to use this background knowledge to situate the activities and findings of the Nairobi team within climate change adaptation practice.

The report he wrote as part of this project helps to advance Objective 3, which is concerned with the sharing of information, by highlighting those findings that will be useful for adaptation practice by others operating in similar contexts.

Policy and practice

At the August 23, 2011 launch of the document *Towards a Low-Carbon City: Focus on Durban by the Academy of Sciences of South Africa*, which was commissioned by the municipality, Dr. Debra Roberts, head of the Environmental Management Department, recognized comments and interventions by two of our project partners, the South Durban Community Environmental Alliance and the Centre for Civil Society (at UKZN).

The Durban Adaptation Charter, signed by more than 100 mayors representing nearly 1000 municipalities from around the world at the UNFCCC Conference of the Parties in December 2011, articulates their commitment to recognizing the needs of vulnerable communities, the importance of sustainable local economic development, and the need for inclusive, vulnerability-reducing community-based adaptation strategies (Durban Adaptation Charter 2011). Durban itself is already implementing the broad provisions of the Charter, and while some climate justice activists may disagree with some of the city government's actions and some aspects of the model, there exists a platform for action and ongoing discussion as well as a number of ongoing community-based adaptation projects. eThekwini Municipality is establishing a Climate Change Council which is to include labour, civil society organizations, councillors, local communities, traditional leaders and other stakeholders, along the same lines as the KwaZulu-Natal Climate Change Council, chaired by the provincial Premier and UKZN President Dr. Zweli Mkhize. In many ways Durban's climate change program sets the standard not just in South Africa but across the continent; the key factor however is that all local areas need to start from their own particular realities and needs to build unique, appropriate, participatory adaptation and climate justice solutions.

OVERALL ASSESSMENT AND RECOMMENDATIONS

By increasing the knowledge and awareness of local groups about issues relating to climate change, water governance, and the environment more broadly, the project team has witnessed an improvement in the ability of community members to articulate their perceptions and share their challenges. Furthermore, the team believes that the participatory process employed by this project has, in many instances, improved the ability and capacity of local citizens to participate more meaningfully in decision-making processes relating to the development and implementation of this project. In this sense, the project has achieved some success in contributing to development and furthering local peoples' capacity.

Our results are consistent with, and build on, the lessons of past IDRC-supported research on participatory resource management (Tyler 2006). These lessons include the importance of putting people at the centre of resource management, learning by doing, helping communities secure their access to natural resources, building new institutions for

resource management, delivering early returns on livelihood priorities of the poor, building linkages and networks, creating interdisciplinary and multidimensional innovations, and enabling local innovation (Ibid.). Working with existing local and community-based organizations as they expand their focus to include climate justice and water activities, via environmental education, capacity development, partnerships and networking, is an example of this kind of local interdisciplinary innovation to meet subsistence priorities. At the same time, Praxis Mapping can assist partners to assess the political realism of their work and focus on activities with concrete political outcomes.

In addition, we believe this project has improved the capacity of partner Civil Society Organizations (CSO) and academic institutions to engage with communities and each other. During the project's final meeting in Nairobi, Kenya in November 2012, project partners agreed that this project enabled them to develop a stronger local network of activists and professionals working in the field of climate change adaptation, as well as to develop new relationships with partners in other African nations and beyond. Furthermore, project partners have expanded their reach and established working relationships in communities where they had no presence prior to this project.

Our project team agreed that a longer time-frame in which to develop and build community-university relationships, in order to strengthen the work of civil society organizations working on environmental education and climate justice, would help to accomplish the goals of projects like this one.

APPENDIX A

The Appendix contains the following reports which were written by project partners over the course of the project. They are included by year and author. Because of the length of this document, it is available as a separate file.

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