

**“Gender Justice and Climate Justice: Community-based strategies to increase women’s political agency in watershed management in times of climate change”**

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**Abstract**

Socially vulnerable people, and women in particular, are disproportionately affected by global climate change because of their gendered socioeconomic roles and often their geographic location; yet they are least equipped to deal with those impacts due to their disadvantaged economic and political position. Women, however, have special contributions to make towards climate change adaptation because of gendered differences in positional knowledge of ecological and water-related conditions. To date, women have been largely underrepresented, and in the majority of cases, excluded from formal decision-making processes related to climate change mitigation and adaptation. Including

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women in these processes and building their capacity and resilience is required for the development of effective and gender-sensitive climate change adaptation policy. Also, preparing women for the short and long-term impacts of climate change is crucial for addressing some of the social aspects of this phenomenon and for preventing further aggravation of existing gender inequalities.

This paper discusses South-North initiatives and models for community-based environmental and climate change education which are using the democratic opening provided by watershed-based governance structures to broaden grassroots participation, especially of women, in political processes. We outline the activities and results of two international projects, the Sister Watersheds project, with Brazilian and Canadian partners (2002-2008), and a Climate Change Adaptation in Africa project with partners in Canada, Kenya, Mozambique, and South Africa (2010-2013).

## **Introduction**

Although the dominant climate change narrative often presents women as “victims, rather than as agents capable of contributing to solutions” (Terry 2009), women possess local ecological, social and political knowledge which is vital for designing efficient, cost-effective and sustainable climate change adaptation strategies. In African countries, as in most developing countries, women are the principal managers of natural resources, which they and their families rely on for their livelihoods. Rural women in the global South carry out most household tasks, such as fetching water and collecting firewood, and are primarily responsible for agricultural work. More and more, climate change and climate variability will negatively impact women's everyday lives and affect their ability to perform these daily tasks. Furthermore, climate variability (e.g. prolonged droughts and intense floods) and environmental degradation will compromise agriculture, subsequently affecting the livelihoods and wellbeing of rural women in developing countries. The United Nations estimates that by 2025, two-thirds of arable land in Africa will disappear (Bied-Charreton 2008).

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The urban poor, mostly women and men of colour, living in crowded informal settlements, also face uncertainty as the climate changes. According to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), “climate change will aggravate the water stress currently faced by some [African] countries, while some countries that currently do not experience water stress will become at risk of water stress” (IPCC 2007). In Nairobi, water scarcity already affects slum-dwellers, who “have started to tap into wastewater mains,” to meet their water needs (Barlow and Clarke 2002). Inadequate water and poor sanitation cause a multitude of health problems for poor people, including vector-borne diseases (e.g. dengue and malaria) and infectious bacterial diseases (e.g. cholera and leptospirosis).

“Despite urban populations in the southern African region achieving improved water access over recent years, about 35 million people in the region are still using unimproved water sources; the largest proportion being in Mozambique and the third largest in South Africa” (IPCC 2007). To avoid contamination, women travel great distances to find clean freshwater, so climate change may make their daily lives even more difficult. “As gendered work and family responsibilities make poor women the main cleaners and caregivers, poor women are the ones most affected by water issues” (Moraes and Perkins 2009).

Climate change is already altering “the *distribution* of precipitation, and intensity and frequency of precipitation events could potentially exacerbate both flooding and water scarcity” (Anisfeld 2010). Urban dwellers living in flood-prone areas are likely to experience more intense and longer floods and consequential landslides. Extreme weather events and natural disasters will disproportionately impact women, who typically possess fewer financial and social resources than men. For example, a recent study found that more women than men die during and immediately following natural disasters (Neumayer and Plümper 2007). This “gender gap in life expectancy” is attributed to women’s socioeconomic status, which limits their ability to prepare for and respond to disasters (Neumayer and Plümper 2007). These factors emphasize the urgent need to build women’s adaptive capacity and provide them with the necessary tools and

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information to meet the challenges climate change is causing their livelihoods. Adaptive capacity is “the potential to be actively involved in the processes of change, in order to minimize negative impacts and maximize any benefits from changes in the climate” (Penttengell 2010). Education and involvement of women in formal decision-making processes, directly influences their ability to respond and adapt to climate change.

**Addressing gender inequality in environmental policy**

Poverty and socially constructed gender inequalities exacerbate women's vulnerability to climate change. Yet, the interactions between climate change and gender inequalities are often overlooked (Terry 2009). Acknowledging and addressing these interactions is fundamental for the development of climate policy and adaptation strategies that are effective and gender-just and which do not further aggravate existing inequalities. In contrast to the top-down, bureaucratic project-based carbon trade/climate change adaptation schemes of most World Bank and United Nations adaptation institutions, a growing number of grassroots climate change approaches focus on laying the groundwork for broader political participation which can facilitate long-term self-directed community-based climate change defense strategies. These approaches see *social knowledge* (e.g. knowledge of people, norms, institutions, etc.) as equally relevant and important for political processes and climate change understanding as *scientific* or *technical knowledge*. As Ober puts it, *social knowledge* is “a prerequisite for meaningful participation in a democratic community” (Ober 2008). Women, as key agents of change in their communities, must therefore have the ability to share their unique knowledge of local issues and exercise their right to meaningfully participate in decisions which directly affect their wellbeing and that of their families.

**Community-based adaptation to climate-change**

Community-based education and organizing are fundamental to creating the conditions for local knowledge to be shared and utilized, through equitable democratic participation.

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Building inclusive governance structures and strengthening the role of civil society, especially women, in water governance are essential components for addressing vulnerability and fostering resilience and sustainability in urban centres as well as rural areas. According to the Intergovernmental Panel on Climate Change, “adaptation is shown to be successful and sustainable when linked to effective governance systems, civil and political rights and literacy” (Parry *et al.*, 2007). Non-governmental organizations in the Global South have expertise in such initiatives, which is potentially transferable to other places including some in the Global North. This paper outlines the activities and results of two international projects, the Sister Watersheds project with Canadian and Brazilian partners (2002-2008) and a Climate Change Adaptation in Africa project with partners in Canada, Kenya, Mozambique, and South Africa (2010-2012). Both projects have demonstrated the wide applicability of local-level efforts in vulnerable communities in Toronto and in African and Brazilian cities to address equity challenges by developing strategies and materials for increasing the knowledge, interest and engagement of local residents on water-related and climate change issues, focusing on low-income neighbourhoods, and in particular on women and youth.

Community-based environmental education initiatives which are relevant and interesting for local residents and increase their job opportunities, knowledge of watershed issues, understanding of basic political and ecological principles, and confidence to express and act on their views can serve as the basis of a climate change intervention approach which is progressive, constructive and democratic. This, in turn, increases the resilience and sustainability of watershed and climate change decision-making processes. It also lays the groundwork for community organizing and extension of the environmental education activities to larger constituencies in local areas affected by climate change. Such grassroots initiatives — and the global sharing of ideas on how to design and implement them, freely available for adaptation in other places — stand in contrast to top-down climate change adaptation mechanisms controlled from the Global North. In this sense, climate justice is a new manifestation of the bottom-up perspective in Development Studies more generally. Furthermore, it is a movement, which “best fuses a variety of progressive political-economic and political-ecological currents to combat climate

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change” (Bond and Dorsey 2010).

In the following sections, we discuss some specifics of this climate justice approach in relation to our work in Brazil, Africa and Canada.

**Climate change and water governance in Brazil**

Deforestation and environmental degradation, rural-urban migration and continued urbanization exacerbate Brazil's vulnerability to climate change. “In semi-arid northeastern Brazil, prolonged droughts have provoked rural-urban migration of subsistence farmers, while increases in precipitation and extreme rainfall events have been observed in Southern Brazil” (IPCC 2077). In North and Northeastern Brazil, the poor generally still lack access to adequate sanitation and clean water. Women, more specifically those living in informal settlements, are among the worst affected by this structural inequality.

While Brazil has a progressive watershed management system — requiring participation by civil society representatives on watershed committees — low-income people and women in particular are underrepresented. Watershed committees are formed “so that water users can collectively help to decide issues of allocation, infrastructure and regulation at the watershed level” (Hinchcliffe et.al., 1999; Perkins 2004). However, women often find themselves caught in a web of technical terms and develop feelings of inadequacy, consequently losing their motivation to participate in these processes. Special training is strongly needed to enable women to actively and effectively participate in these committees and to articulate their views and perspectives on local climate change and water-related challenges. Issues such as how to elicit and motivate effective public involvement among economically-stressed groups in civil society, how to easily convey and discuss complex ecological issues in public workshops, and how to build bridges between disadvantaged local communities and public officials at the watershed level, know no boundaries: this is a global problem.

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The Sister Watersheds project (2002-2008) linked universities and NGOs in Canada and Brazil in developing strategies and materials for increasing the knowledge, interest and engagement of local residents on water-related issues, focusing on low-income neighbourhoods in São Paulo and Toronto, and in particular on low-income women. This \$1.3 million project — funded by the Canadian International Development Agency (CIDA) through the Association for Universities and Colleges of Canada — combined student exchanges, research, community engagement, and “capacity-building” in both local communities and nearby universities. Its novel conceptualization and design were developed by progressive Brazilian environmental educators Dr. Marcos Sorrentino (a professor at the University of São Paulo who was subsequently appointed director of environmental education in the Brazilian federal Ministry of the Environment) and Larissa da Costa of the Ecoar Institute for Citizenship (ECOAR), who subsequently became environmental education director at the World Wildlife Fund in Brasilia. The project's design evolved throughout its implementation by organizers at ECOAR, a leading environmental education NGO based in São Paulo, Brazil and York University in Toronto, Canada.

Addressing the lack of participation by and inclusion of civil society representatives, especially women, in water sector governance, which of course has parallels in every country including Canada, was a primary objective of the Sister Watersheds project. The project developed and tested training programs by conducting workshops led by its local NGO partners with more than 1450 participants, approximately two-thirds of them women, and by partnering with other community organizations to present content on topics related to environmental education and watershed management. For example, staff from ECOAR contacted groups of elementary school teachers, public health extension agents, and other community-based workers and provided in-service training for them about water and health, basic ecology, and public policy questions related to water in their local communities. The various training programs were shaped and modified to be specifically appropriate for groups of women, children, youth, health agents, school groups, teachers, film/culture/music/arts organizations, and Agenda 21/environmental education groups. The workshops focused on water management, environmental

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education, community development, and democratic participation, with particular emphasis on gender and socioeconomic equity. The methodologies, techniques, and materials developed for these workshops and training programs — made freely available to other organizations through publications and websites — contributed to the capacity of project partner organizations and individual staff members and students to continue related work on watershed policy issues into the future.

The curriculum materials and techniques developed by the project were tested and fine-tuned in more than 220 workshops designed and led by project staff, student interns, and university exchange students in three watersheds — two in Brazil and one in Canada — where the university campuses are located near low-income residential areas. All of the workshop participants were potential participants in Brazil's watershed committees, as civil society representatives/organizers. The curriculum materials developed by the project include an illustrated Manual on Participatory Methodologies for Community Development containing a set of workshop activities and background materials for participatory community environmental education programs and training sessions focusing on water and gender equity issues; an illustrated guide with practical exercises focusing on urban agroecology; a full-colour socio-environmental atlas which brings together ecological, hydrological and social information about one local watershed in a series of interactive maps; a video about the history and environment of this watershed; a publication outlining Agenda 21 activities in schools; and several blogs and websites with materials and discussion-starters on watershed topics, as well as a book and many journal articles, masters' papers, and other academic publications contributing to the literature on participatory watershed education in Brazil and in Canada.

The community environmental perception surveys conducted by the project in each of the Brazilian watersheds established a database of information on public priorities and views on watershed issues. The socio-environmental atlas gathered and made available in one place a wide range of information on ecological, hydrological, social and political circumstances in the watershed — information which proved very useful to public officials and watershed committee members in understanding the watershed as a whole.



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The nearly 1,500 participants in workshops conducted by the project gained familiarity and experience with water-related issues and their own ability to influence water management and policy through watershed committee structures, community organizing, community arts, and other means.

This project helped both its university and NGO participants to bridge the gap between academic and community-based methods of environmental education. Graduate exchange students studied and contributed to local training programs; faculty members wrote about the theoretical and practical benefits of public participation in watershed management; NGOs supervised students who received academic credit for their community-organizing work; professors led local watershed governance structures; innovative methods for environmental education were shared internationally; this collaboration allowed new perspectives on water management to evolve, with benefits for all participants' training/education programs. The University of São Paulo, York University and ECOAR developed dozens of new partnerships with other community organizations as a result of this project. Students, both in Brazil and in Canada, played a crucial role in developing the linkages between academic institutions and community-based NGOs. Both locally and internationally, students sought out community organizations for their research and field experiences, and shared the results of their work with both academic and non-academic audiences. The student exchanges of this project thus fuelled its interdisciplinary and educational bridging contributions.

**Climate change and water governance in Canada**

The methods and approach of the Sister Watersheds project proved to be entirely applicable to climate change education and organizing in Canada as well. Beginning in the summer of 2006, using some of the workshop ideas and materials generated in Brazil, several teams of York University graduate assistants and volunteers conducted a series of environmental education workshops with young people from the Jane/Finch and Black Creek West neighbourhoods, which border York University, as part of summer-camp and after-school programs in a variety of local community centres and other venues. This

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programming contributed environmental content to the summer experiences of these young people, and gave York University students' practical opportunities to test their environmental education skills. The materials and workshop ideas generated for these summer programs served as the basis for Sister Watersheds graduate assistants' participation with a local community development organization, Doorsteps Neighbourhood Services, in after-school programs for children aged 8 to 13. ECOAR organizers visited the Doorsteps programs, and ongoing links developed, which enriched programming ideas, materials, and techniques on both sides. We found there are far more international commonalities than differences in doing community-based environmental education with youth.

Most of the neighbourhood youth workshop participants were girls, since the boys tended to gravitate towards sport-centred programs, and parents in the area, largely new Canadians, were more concerned to have their daughters enrolled in organized programming. When the environmental education included pulling on hip-waders and taking samples of the water in Black Creek for benthic invertebrate monitoring, however, the boys were very eager participants! The students and staff leaders of the workshops were mainly women, by a ratio of more than 4 to 1. Women generally form the core of those working in education, community development, and social justice/environmental activism.

One particular contribution of the York/Black Creek "sister" has been the evolving art-based "Black Creek Storytelling Parade," a participatory performance walk held periodically that follows the route of stormwater from York's campus to the banks of Black Creek, using different storytellers from neighbourhood organizations to recount the history of the natural and built environment. Various creative strategies — costumes, sidewalk chalk, and percussion instruments — are employed to engage the audience. The content of the stories includes natural, cultural and political dimensions: the First Nations land claim covering the entire City of Toronto, the Haudenesaunee village buried under electric lines just south of the campus, how the creek acts as a cultural divide between two very distinct neighbourhoods, and ecological restoration efforts as showcased by

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young students at a nearby elementary school. The Black Creek Storytelling Parade, which was developed by York graduate students in the area of Community Arts Practice, shakes up conventional understandings of nature by emphasizing social, cultural and political stories — tales often left untold in the city's official chronicles. This helps build an ecological imagination — the capacity to imagine how we could be living in such a way that people, plants and animals thrive in ecologically sustainable and socially just futures. It does so by sparking dialogue and dreams for a restored creek — restored not just in terms of greenery and cleanliness, but also in terms of social and cultural importance.

When the Sister Watersheds project began in 2002, there were no community organizations in the Jane-Finch/Black Creek West neighbourhood with environmental programming or a climate change focus. In 2008, Jane/Finch Community and Family Centre, a local NGO, began applying for funding to develop jobs training for local residents in the area of energy retrofit evaluation and other “green jobs.” The Green Change Project they developed has been phenomenally successful, won awards, and is now training its third cohort of Green Change Agents — local residents who gain skills, references, confidence and a forward-looking perspective which greatly increases their employment opportunities. York University students and faculty are involved in developing the curriculum, teaching workshop modules, and serving on the advisory board for the Green Change Project. At its gala fundraiser in March 2011, keynote speaker Majora Carter overviewed many similar initiatives in low-income neighbourhoods throughout the U.S. and other countries, where community development, green job creation, and ecological restoration are combining to produce powerful synergies. The Green Change Project was developed and is led by community activists, including women and about two-thirds of the Green Change Agents trained so far are women.

As part of a current international research/linkage project (see below), two York University graduate students are writing overviews of climate change and water-related equity issues in Toronto, in preparation for their exchange visits to African cities to study

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similar questions there. One of these Toronto studies is a history of the Green Change Project, which organizers will use on their website and in future grant proposals; the other student is writing an overview of the impacts of climate change and adaptation policies in Toronto through an equity lens.

The importance of shared watershed awareness and water infrastructure in times of climate change was underscored for the York University and Jane/Finch neighbourhood in August 2005, when a torrential thunderstorm caused massive flooding. Black Creek, normally a slow trickle, became a roaring torrent that overwhelmed and washed out the 1950's-era culvert built to carry it under Finch Avenue, a four-lane arterial roadway in northwest Toronto. Over a period of several hours, the creek carved a chasm about 50 meters wide and ten meters deep. Repairs, including a new bridge for Finch Avenue, cost more than \$3 million and took nearly six months to be completed. During this time, commuter traffic and city buses were diverted through the York University campus, causing major disruptions for the university and local residents alike.

This was a graphic example of how extreme weather events — which are increasing in frequency due to climate change — in conjunction with aging infrastructure and urban sprawl (including campus development) and, increasing rapid rainfall runoff, can have costly and traumatic effects on everyone in the watershed.

### **Climate Change and water governance in Africa**

According to the Intergovernmental Panel on Climate Change (IPCC), “Africa is one of the most vulnerable continents to climate change and climate variability. This vulnerability is exacerbated by existing developmental challenges such as endemic poverty, limited access to capital, ecosystem degradation, and complex disasters and conflicts” (IPCC 2007). 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.

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In Mozambique, climate change is causing coastal erosion and periodic flooding along scenic coastal roadways; 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 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 Maputo municipality; on three offshore islands mangroves are disappearing, water quality is declining, and desertification and erosion are increasing (UN Habitat, n.d., p. 2). The United Nations Habitat Cities in Climate Change Initiative, which has begun a pilot project in Maputo, 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 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. 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. 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

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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 NGOs.

In Nairobi, severe pre-existing infrastructure needs are being exacerbated by water supply fluctuations and slum flooding related to climate change. 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.

Democratic mediation of equity conflicts related to water, and sustainable long-term management of water resources in the face of climate change, requires public participation, in particular by low-income marginalized women.

“Strengthening the role of civil society in water sector governance towards climate change adaptation in African cities — Durban, Maputo, Nairobi” is a three-year project, which aims at improving watershed governance for climate change adaptation and increasing resilience and adaptive-capacity of vulnerable and marginalized groups, especially women. This project, which started in 2010, is supported by the Climate Change Adaptation in Africa (CCAA) program — a joint initiative of Canada's International Development Research Centre (IDRC) and the United Kingdom's Department for International Development (DFID). Like the Sister Watersheds Project, this project's methodology includes collaboration between students, NGOs and academics and, community-based research and environmental education. This project has

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partnered with universities and several NGOs in Africa, more specifically in Kenya, Mozambique and South Africa to achieve the project's objectives:

- 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;
- To identify and test viable alternatives for enhancing civil society's role towards adaptation to climate change and variability by vulnerable groups (e.g. by developing education, training and awareness programmes); and
- To share widely the knowledge generated for potential adoption by other cities in Africa.

The project is being implemented by the following community-based NGOs in Africa: Kilimanjaro Initiative (KI) and Kenya Debt Relief Network (KENDREN) in Nairobi; Women, Gender and Development (MuGeDe) and Justiça Ambiental (JA) in Maputo; and Umphilo waManzi (Water for Life) and the South Durban Community Environmental Alliance (SDCEA) in Durban. The University of Nairobi (Nairobi), the University of Eduardo Mondlane (Maputo), and the Centre for Civil Society at the University of KwaZulu-Natal (Durban) provide academic insight and student supervision for this project.

The project focuses on low-income areas of each city, as these tend to be most severely affected by periodic flooding, in particular. Furthermore, residents of these low-income areas often lack the ability to protect themselves from the impacts of extreme weather events. The capacity-building aspects of this project include training and research sponsorship for students and faculty in the partner universities; support of community-based research, workshops in low-income communities and secondary schools, curriculum and materials development, and skills development within the partner NGOs; training of environmental educators and organizers; contributions to the pool of experienced and qualified community workers in each country; strengthening of all the partner institutions' capabilities to carry out international projects; and contributions to

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the international literature and professional knowledge concerning water issues, environmental education techniques, and community organizing for improved civil society involvement in governance. The networks being built extend from local and community-based linkages through regional and national-level policy groupings to international academic and policy networks on civil society, watershed management, and governance.

The political process of policy development and implementation depends on the interchange between civil society groups, researchers on current realities, and government. This project attempts to challenge the conventional notion that only educational institutions “produce” knowledge. Understanding community needs and what helps particular civil society groups to see their role in democratic governance, for example, is something in which community organizations and NGOs have eminent expertise. This collaborative approach, also known as participatory action research (PAR) is broadly defined as “research by, with, and for people affected by a particular problem, which takes places in collaboration with academic researchers. It seeks to democratize knowledge production and foster opportunities for empowerment by those involved” (Kindon *et al.* 2008).

Part of the objective behind this project is to demonstrate how a partnership between academics and non-academics can be very stimulating and effective. This partnership encourages and allows the partner NGOs to reflect on and analyze their activities and to document “learning” more systematically than they are often able to do. The partnership also encourages the universities to be more pragmatic about teaching and research, and to “field-test” approaches towards community organization, equity, and capacity building. Students committed to the project's goals of fomenting participatory engagement by local people in municipal water decision-making are given practical opportunities to develop their skills, as a way of hastening each city's climate change preparedness. This project aims to contribute to the integration and meaningful participation of women in formal decision-making processes, as well as to build their adaptive capacity and increase their resilience and ability to cope with climate change. Specific examples of how climate



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change responses combine well with gender-aware community organizing, all of which are now underway through this project, include the following:

- The Kilimanjaro Initiative (KI), a youth-focused NGO working in Nairobi's Kibera slum, is building soccer fields on the banks of the Nairobi River, which prevents housing from being flooded during extreme weather events. Young women's leadership is central to their organizing.
- In Durban, NGOs led by women are coordinating "learning journeys" where government officials visit low-income neighbourhoods and hear about local women's experiences with flooding, sanitation and other types of climate change stresses, which helps them to bring these views into policy discourse.
- Maputo university environmental education students are working with intermediate school kids on after-school activities related to climate change. Participation by parents and teachers is also welcome. The bulk of all participants are women, young and old.

## **Conclusion**

Women's ability to survive and thrive in times of climate change depends heavily on initiatives to encourage and foster their participation and contribution to political decision-making processes. Women possess incomparable knowledge of local ecological and water conditions due to gendered roles and responsibilities and this knowledge must be shared and utilized in local, national and international negotiations and decision-making processes, if a just approach to climate change adaptation is to be taken. It is crucial to draw not only on *scientific knowledge*, but also on *social knowledge* to develop equitable solutions to climate change. Democratic mediation of equity conflicts related to water, and sustainable long-term management of water resources is only possible through public participation. Excluding women from formal decision-making processes hinders progress and further exacerbates their vulnerability to the adverse effects of climate change.

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Community-based, 'people-centred' approaches to climate change are needed for developing adaptation strategies which address social and gender inequalities and empower women to serve as active agents of change in their communities. Climate change does not happen in a vacuum — in developing countries existing developmental challenges, such as poverty, gender and structural inequalities, and inadequate infrastructure further aggravate the vulnerability of the poor, and women in particular. We must recognize and address the many interactions between climate change and existing gender inequalities, in order to reduce the likelihood that the livelihoods of already vulnerable and marginalized people will be significantly worsened by climate change. Starting in local communities with women's leadership is clearly the best way forward.

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