Chapter 23

University-Community Collaboration for Climate Justice Education and Organizing: Partnerships in Canada, Brazil, and Africa[i]

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Introduction

In the coming decades, countries around the world will face increasingly severe challenges related to global climate change. While the details vary from country to country, the impacts will be especially grave for marginalized people, whose access to food, potable water, and safe shelter may be threatened due to fluctuations in rainfall and temperature and to disasters related to extreme weather events.

International strategies for addressing climate change are in disarray. The complicated financial and carbon-trading mechanisms promoted by the United Nations and other global institutions are far too bureaucratic, weak, internally inconsistent, and scattered to represent meaningful solutions to climate change. Already the housing, health, and livelihoods of marginalized people worldwide are being threatened by the ramifications of climate change. This means that the marginalized in every community, by definition, have expertise in how priorities should be set to address climate change. Their experiences, knowledge, and views must be part of local, regional, national, and international governance—including urban planning and housing, water management, agriculture, health, and finance policies.

Satterthwaite et al.'s recent book on urban climate change adaptation summarizes the major challenges that low and middle-income countries face as a result of climate change:

> [M]ost of the world's urban population live in cities or smaller urban centers ill-equipped for adaptation—with weak and ineffective local governments and with very inadequate provision for the infrastructure and services needed to reduce climate-change-related risks and vulnerabilities. A key part of adaptation concerns infrastructure and buildings—but much of the urban population in Africa, Asia and Latin America have no infrastructure to adapt—no all-weather roads, piped water supplies or drains—and live in poor-quality housing in floodplains or on slopes at risk of landslides. Most international agencies have long refused to support urban programs, especially those that address these problems. (Satterthwaite et al., 2007, p. vi)

Climate change thus exacerbates already grave sustainable development challenges.

This chapter examines bottom-up strategies for facing these kinds of challenges, especially with regard to how these approaches address social vulnerability. The details of each particular community's situation—ecological, social, political—are crucial to this type of approach. How do communities organize socially and politically to meet biophysical and weather-related changes that affect their livelihoods? How are the needs of the most vulnerable addressed?

I have been involved with university-community collaborations to address these challenges through 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)—as well as recent green community development initiatives in several marginalized neighborhoods and several additional networking projects. This work has demonstrated the wide applicability of local-level efforts in vulnerable communities 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 in particular on women and youth. Collaborative partnerships between university researchers and community activists/organizers can generate fruitful synergies, especially regarding the spread of scientific knowledge, and they can also strengthen educational outreach, build skills, and foster global networking.

After giving some examples of ways in which local community organizations are addressing climate- and water-related challenges through innovative grassroots programs and initiatives, this chapter concludes by noting some similarities in these stories from the Global North and South and some ways in which communication and mutual reinforcement can strengthen and inspire global climate justice work.

Community-Based Responses to Climate Change: Green Community Organizing, North and South

In a warming world, heavier and more frequent precipitation is likely, as are more frequent and severe droughts. All over the world, climate-change-related disasters affect marginalized people first and hardest.

While environmental problems have long been a source of concern in many areas around the world, climate change is raising these issues on local agendas and adding

urgency to infrastructure needs. Community groups in many cities are addressing long-standing priorities of job creation, infrastructure development and repair, economic opportunities, and the need for recreational space, while also beginning to respond to the local effects of climate change. These groups' local ecological knowledge and social capital are very important for building disaster resilience strategies, including disaster forecasting, prevention, and early warning; environmental land-use planning; public participation and psychosocial engagement; and progressive approaches to reconstruction.

Attention to the value of vulnerable populations' contributions and ways of engaging them in policy processes should be a global priority. There are many North-South commonalities demonstrating how this can be done. Key to the political and policy impact of all the examples described below is the fact that a more organized and informed citizenry attracts attention from media and government, demands interventions to meet its identified needs and priorities, and is able to articulate its knowledge, perspectives, and rationales in public policy processes, thus contributing to more equitable disaster planning and response.

Sister Watersheds: Equity in São Paulo's Watershed Committees

Brazil has a progressive watershed management system which requires participation on the part of civil society representatives on watershed committees, but low-income people—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, for a variety of reasons, low-income local residents, especially women, are often not motivated to become involved in these processes.

The Sister Watersheds project (2002–2008) linked universities and NGOs in Canada and Brazil in developing strategies and materials to increase the knowledge, interest, and engagement of local residents on water-related issues, focusing on low-income neighborhoods in São Paulo, particularly 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 local communities and nearby universities. Its novel conceptualization and design were developed by progressive Brazilian environmental educators Dr. Marcos Sorrentino and Larissa da Costa of the Ecoar Institute for Citizenship (ECOAR), a leading environmental education NGO based in São Paulo. The project's design evolved throughout its implementation by organizers at ECOAR and York University in Toronto.

The project developed and tested training programs by conducting workshops led by its local NGO partners with more than 1,450 participants, approximately two-thirds of whom were 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 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 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 outreach materials developed by the project include an illustrated *Manual on Participatory Methodologies for Community Development*. It contains 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-color 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 one of the watersheds; 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 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. 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.

One particular contribution of the York/Black Creek "sister watershed" was the evolving arts-based "Black Creek Storytelling Parade," a participatory performance walk held periodically that follows the route of stormwater from the York University campus to the banks of Black Creek, using different storytellers from neighborhood 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 neighborhoods; and local ecological restoration

efforts, as showcased by 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 local residents 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.

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; and 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 in both Brazil and 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 fueled its interdisciplinary and educational bridging contributions.

The* Centro de Saberes*: Watershed-Level Organizing

An inspiring transnational model for intervention to increase public involvement in watershed management has been developed by the Center of Wisdom and Care for the La Plata Basin (*Centro de Saberes*), an organization largely funded through a fraction of the hydroelectric power revenues generated by the huge Iguaçu dam, located on the Paraná River where Brazil meets Paraguay and Argentina (Centro de Saberes, 2008). As most climate change impacts are felt through rainfall-related extreme weather events (mainly droughts and floods), water management is crucial for climate justice.

The Paraná watershed, which drains much of central and eastern South America and reaches the Atlantic Ocean via the La Plata River near Montevideo, also includes Bolivia and Uruguay, so the Centro de Saberes works in three languages—Portuguese, Spanish, and Guaraní, an official language of Paraguay. The Centro de Saberes convened a series of "permanent learning circles" attended by media, academic, activist, and government representatives from each of the five countries in the watershed. Each year, like ripples, the "permanent learning circles" expanded, as the participants from the year before invited additional representatives to attend in subsequent years. The circles grew from five participants (one from each country) in 2006 (the first year) to thirty-five the next year, to hundreds. The agenda and program of the meetings have included social exchanges among participants, discussions of local priorities for environmental and political action, transnational meetings by profession (with the journalists, government

officials, teachers, etc., sharing their concerns and strategies) and brainstorming about how to accomplish the goals identified by each group. The "permanent learning circle" meetings thus became an opportunity for participants to take back to their home contexts a watershed perspective on their day-to-day work-related challenges and goals. The Centro de Saberes has also facilitated watershed-based networking and information-sharing for improved public policy and environmental responsibility throughout the Paraná basin.

The Centro de Saberes' five operating principles include: water as the generator theme; the watershed as the operating territory; an ethic of protecting the diversity of life in the watershed and considering the different kinds of knowledge and protection available in the watershed; environmental education as an element capable of engaging society in action; and the collective construction of information, knowledge, and actions.

The political significance of an organization like the Centro de Saberes is that it spans existing political jurisdictions using ecological boundaries—the watershed—as the organizing and motivating principle for its actions. This also makes possible sharing across watersheds (of promising public engagement strategies or policy approaches to specific problems like how to reduce erosion or limit the use of agricultural chemicals, for example).

Climate Justice 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.

In Maputo, 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 and expensive coastal management problems in the Maputo municipality. On three offshore islands mangroves are disappearing, water quality is declining, and desertification and erosion are increasing (UN Habitat, p. 2). The UN 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 to be state-owned and governed 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

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greatest 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 on awareness and capacity for effectiveness with regard to 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 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 at the University of KwaZulu-Natal and its partner NGOs.

In Nairobi, severe 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.

The 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, particularly that of low-income marginalized women—the experts.

"Strengthening the role of civil society in water sector governance towards climate change adaptation in African cities—Durban, Maputo, Nairobi" was a three-year project (2010–2012) with African partners in the three cities. Its goal was to improve watershed governance for climate change adaptation and enhance the resilience and adaptive capacity of vulnerable and marginalized groups, especially women. This project was supported by the Climate Change Adaptation in Africa (CCAA) program—a joint initiative of Canada's International Development Research Centre (IDRC) and the UK's Department for International Development (DFID). Like the earlier Sister Watersheds Project, this project's methodology included collaboration between students, NGOs, and academics, as well as community-based research and environmental education. Project partners based in universities and several NGOs in Nairobi, Maputo, and Durban worked together to achieve the following objectives:

- To characterize the institutional framework for urban water governance in the three cities and explain how 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 programs); and

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

The project was 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. York University in Canada, the University of Nairobi (Nairobi), Eduardo Mondlane University (Maputo), and the Centre for Civil Society at the University of KwaZulu-Natal (Durban) provided academic research coordination and student supervision for this project.

The project focused on low-income areas of each city, as these tend to be most severely affected by periodic flooding and other climate change impacts. Residents of low-income areas often lack the ability to protect themselves against extreme weather events. The capacity-building aspects of this project included training and research sponsorship for students and faculty in the partner universities; support for community-based research, workshops in low-income communities and secondary schools, curriculum and materials development, and skills development within the partner NGOs and civil society organizations; 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 the international literature and professional knowledge

concerning water issues, environmental education techniques, and community organizing for improved civil society involvement in governance. The networks built extended 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 generating information on current realities, and government. This project attempted to challenge the conventional notion that only educational institutions "produce" knowledge. Understanding community needs and what helps particular civil society groups to see and act to strengthen 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 place in collaboration with academic researchers. It seeks to democratize knowledge production and foster opportunities for empowerment by those involved" (Kindon et al., 2008).

One objective of this project was to demonstrate how partnerships between academics and non-academics can be very stimulating and effective. This type of 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, by bringing student researchers into the NGOs as collaborators/interns. The partnership also encourages 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 the participatory engagement of 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 aimed 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 change responses combine well with gender-aware community organizing, as part of this project, included the following:

- The Kilimanjaro Initiative (KI), a youth-focused NGO, upgraded a sports field in Nairobi's Kibera slum, on the banks of the Nairobi River, which reduced disastrous flooding during extreme weather events because the flood plain was being used for much-needed public recreational space instead of housing. In addition, the KI organized community forums on sustainable water management and environmental education, as well as community and river clean-ups. Young women's leadership was central to this organizing.
- In Durban, women activists from Umphilo waManzi and the South Durban Community Environmental Alliance coordinated "learning journeys" where government officials visited low-income neighborhoods to hear about local women's experiences with flooding, sanitation, and other types of climate change stresses, helping them to bring these views into policy discourse.
- Maputo University environmental education students worked with intermediate school youth on after-school activities related to climate change, strengthening the school curriculum while developing university students'

community development skills and local knowledge. Most participants were women.

Agua Doce: ***Water and Livelihoods near Rio de Janeiro***

The potential impacts of both temperature and precipitation extremes for the city of Rio de Janeiro are many. Climate projections show that Rio will experience a 1.5°C increase in temperature by 2050 across all seasons. With warmer temperatures, droughts can be expected in winter, spring, and summer. This is likely to create water scarcity, as well as electricity deficits from shortfalls in hydroelectric production. Increases in ocean surface temperatures, however, could increase the chances of periodic and extreme storms and flooding. With climate change, extremes in precipitation are projected to increase in intensity.

In April 2010, heavy rains partially destroyed several downtown *favelas* (slums) in Rio de Janeiro and its suburb of Niteroi, leaving thousands homeless and forced to relocate with their families and remaining belongings (*O Globo*, 2010). Also severely hit by heavy rainfall in January 2011 was the *Região Serrana*, a mountainous region in the state of Rio de Janeiro to the north and northeast of Guanabara Bay. Housing infrastructure and social inequities compounded the effects of natural disasters on the marginalized in the Região Serrana; in the town of Nova Friburgo, where several hundred people died due to the floods, 60 percent of the population lived in illegal dwellings (Magalhães, 2011).

At the western edge of Guanabara Bay, in an economically depressed area around the Suruí River, the community development organization *Agua Doce* (Fresh Water) has

been building social resilience, fostering local cultural pride, and creating green jobs. Started by Vladimir Boff and Maria Regina Maroun in 2001, with seed funding from several Italian labor union and church organizations, Agua Doce's initiatives include community centers and kindergartens; biodigesters and a biomass recycling center; agricultural support offices and fruit processing centers to process locally grown fruits and create jobs for women; handicrafts training and support for women and girls; public health projects; and a public library and literacy center (Centro Clima, 2005, p. 57–64).

The Agua Doce organization, reinforcing Agenda 21 principles, aims to (re)introduce a more sustainable way of life for the people of the Guanabara region through a range of social and economic community development initiatives. Agua Doce and the local communities are particularly concerned about the imminent effects of climate change in the region, mostly due to their precarious geographical location. Increased rainfall from the mountains and the rising sea level in Guanabara Bay make the area particularly vulnerable to floods and mudslides. Health risks from water-borne illnesses are increasing, and fishing and crabbing are progressively endangered.

Agua Doce nurtures social capital in order to strengthen communities in the region. The organization offers literacy and environmental education workshops and supports schools and children's programs, as well as creating economic opportunities for women. It promotes social transformation and the building up of the capability of local citizens to participate in decision-making processes, especially concerning water, resource management, and local governance.

The organization has mobilized funds from a range of religious, private sector, international development assistance, and other donor organizations for its projects. Their

work demonstrates the interlinkages among literacy, economic, and social supports, including job creation, community-building, and the potential for marginalized community members to become involved in collective decision-making. The organization's attention to ecological sustainability, social sustainability, and governance provides a wealth of ideas for ways of integrating community members' environmental priorities with other pressing needs in the community and advancing on many fronts simultaneously through community development.

The Green Change Project: Urban Renewal and Environmental Jobs in Toronto

In Toronto, the effects of climate change are being noted, particularly through high amounts of summer rainfall and sudden storms with intense winds and heavy rain, which are becoming more frequent (Todd, 2011). Higher amounts of rainfall stress the aging urban water/sewer infrastructure, resulting in overflows of untreated sewage from the combined storm and sanitary sewers in the older parts of downtown Toronto during heavy storms, consequently degrading the water quality in local streams and Lake Ontario (Binstock, 2011). At times, local lakefront beaches are unswimmable for several days following heavy rains due to water pollution. The City of Toronto is undertaking several large infrastructure repairs and has built storage basins to retain sewer overflows until they can be treated, at a projected total cost of $1.047 billion over 25 years (City of Toronto, 2011a). The city has also launched basement flooding studies and programs to help homeowners disconnect their basement drains leading to the municipal sewer system, in order to prevent backups into basements during rainstorms. The increasing numbers of extremely hot days in the summer have led the city to develop a "cooling

centers" program where those without air conditioning can come to public libraries, community centers, and other communal spaces, which offer extended hours on very hot days.

From an equity perspective, both the weather extremes and the resulting policies have disproportionately negative effects on Toronto's low-income residents, as they are more likely than higher-income people to occupy basement apartments and to be renters, not house-owners (who can, in contrast, benefit from government infrastructure subsidies). Lower-income people are also more likely to depend on public transit (which is often disrupted during storms) and on public beaches and parks for recreation; they are less likely to have air conditioning in their homes, and they are more likely to have health conditions which are severely exacerbated by heat, such as diabetes, high blood pressure, and heart conditions. These equity implications of disaster risks have been noted in some reports, but have yet to be quantified or estimated in official publications or policy frameworks.

One particular low-income neighborhood in Toronto has borne the brunt of several recent extreme weather events—the Jane-Finch neighborhood, located in northwest Toronto near York University. Due to dense urban growth and university development, the area has become increasingly built-up over the past decade, which has increased the surface runoff into Black Creek, a tributary of the Humber River which empties into Lake Ontario. During an intense storm in August 2005, more than 150 mm of rain fell in the area, and the normally placid Black Creek became a rushing torrent which washed out its culvert under Finch Avenue, a local arterial roadway, leaving a 50 m-wide gaping hole. Construction of a new bridge for Finch Avenue took six months and

cost about CND$45 million. During this time, public buses and commuter traffic had to be rerouted through the York University campus, causing delays and problems 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, urban sprawl (including campus development), and increasing rapid rainfall runoff can have costly and traumatic effects on everyone in the watershed.

Since 2009, the Jane-Finch community has built a vibrant and growing initiative to create jobs while greening the local community. The project began with concerns of residents in local public housing buildings about waste management and energy conservation; about having no control over heating; about not having a place to recycle or compost; and about not being able to see any benefit to switching to more expensive compact fluorescent light bulbs. Residents were concerned about the costs that new "smart meters" would add to their monthly electricity bills. In the larger community, residents were concerned about storm water management and flooding in the area, especially following the 2005 Finch Avenue washout.

The Jane-Finch Community and Family Centre (JFCFC), a community-based social services organization, decided to build on the desire of community residents to be more eco-friendly and seek ways to expand community greening efforts. The JFCFC applied for funding and created partnerships with the Toronto Community Housing Corporation, the Toronto and Region Conservation Authority, and the NGO Zerofootprint to make Green Change happen in the community. Together they developed a 45-hour training program for Green Change Agents and put out a call for community volunteers to participate in the training. The training program introduced residents to five

key areas: energy conservation, waste management and recycling, green active living, social justice, and the green economy. Many residents signed up and participated in different aspects of the training and 60 residents completed the entire program, earning the right to call themselves Green Change Agents.

After finishing their training, the Green Change Agents shared their knowledge with the community by using an online calculator tool developed by Zerofootprint (www.zerofootprint.net) to document the carbon footprint of more than 900 households in the Jane-Finch area. Agents were paid for each household assessment they conducted. The Zerofootprint calculator measured and analyzed the carbon footprints of individuals and households in the Jane-Finch community and also provided tips for Green Change Agents to use to help community members save energy, save money, and be able to reduce their carbon footprints. In 2010, Green Change Agents assisted residents in reducing their carbon footprint by 2,000 tons. Many additional "green changes" have been made in the community, including the planting of a community garden, an eco-friendly Earth Hour event at a local school, tree planting, Earth Day celebrations, a summer farmer's market, and renovation/development of the ground floor of a social housing building into the Centre for Green Change. At the Centre for Green Change, local residents and youth who are concerned about the protection of the environment can become engaged in the process of green change and mobilize others while they increase their own knowledge and skills, initiating individual and collective actions toward building a healthy, safe, prosperous, and environmentally friendly neighborhood. The vision for the Centre includes a Pathways to Green Jobs Program, which will educate and promote environmental stewardship, green jobs, and eco entrepreneurship, modelled on

the successful work of the Carpenters Union's CHOICE Apprentice Program and incorporating an environmental training component. The Centre is mobilizing local resources to achieve this vision and working to expand the number of long-term, high-quality green jobs for local residents, especially for youth.

The Green Change Project held successful gala fundraising balls in 2010 and 2011, as part of its celebration of "Twelve Days for Green Change," with the support of a number of community partner organizations, including labor unions, health centers, local politicians, property owners and landlords, charitable organizations, and cultural/media groups. Brooklyn-based activist Majora Carter, who has developed a range of green community development initiatives in low-income neighborhoods across the Global North, was the dynamic keynote speaker at the Green Change 2011 gala (Carter, 2011).

The Green Change Project continues to win funding, awards, and accolades, including the 2010 Toronto Green Award in the Community category and the 2011 Urban Leader Award for Imagination. York University students work as graduate assistants on Green Change initiatives through a partnership with the Faculty of Environmental Studies, which also facilitates research grant partnerships that benefit the Centre.

Aspects of the project's success include its focus on connecting with the community directly and its emphasis on local skills and needs. The project aims to identify the skills and knowledge already possessed by community members and to empower them to use these assets for green change. The level of skills and knowledge in the Jane-Finch community is significant. Many neighborhood residents are recent immigrants to Canada, and many of them come highly trained and skilled from their

home countries, but are unable to break the barrier of employment in Canada. The Green Change project recognizes the skills and abilities of these individuals and aims, through Green Change Agent training, to create jobs. These individuals benefit from being able to support their families financially and also to contribute to the development of their community.

Participants in the Green Change Agent training find themselves being treated with respect in the community for the knowledge and skills they can offer for a change. The Centre space itself creates a focus for green community organizing in the neighborhood, and is a model across Toronto.

Watershed Education and Green Community Development in the U.S. and Canada

With university-based research input and support, online techniques can be effectively used to disseminate information about watersheds and their management in times of climate change. An example is the Water Atlas, a web portal developed by Dr. Paul Zandbergen and others at the University of South Florida. It brings together hydrological, weather, political and other data related to a number of Florida watersheds, much of which is updated in real time, with the goal of designing a "comprehensive data resource…to help citizens and scientists alike make informed decisions concerning our vital water resources." Such online materials may also be translated to be accessible transnationally across bioregional boundaries. By integrating and facilitating exchanges of academic/scientific, government-collected, and participatory local knowledge, such online tools can improve disaster planning and resilience while building social capital and policy relevance.

All of these examples of the interplay among equity-oriented green community development, watershed governance, and policy development, university-community partnerships, and climate justice demonstrate the parallels and similarities in this kind of work in the Global North and South. The following section summarizes and draws out these themes.

Common Themes in Green Community Organizing for Climate Justice

A number of commonalities are evident in the local stories outlined above. Marginalized people everywhere are eager for employment opportunities and public space for recreation, and community-building is almost always in short supply in marginalized neighborhoods. Local governments can play an important role in helping communities meet their needs, especially if people are mobilized and organized politically at the grassroots level—which can be effectively catalyzed by NGOs and civil society organizations and assisted by local universities. Infrastructure funding and disaster-oriented climate change adaptation funding may be available when local requirements are framed in appropriate ways. New, creative techniques for green community organizing are developing rapidly, aided by global networking advances and the hard work of many local and international activists. In combination, all of these trends are helping to strengthen resilience in many communities, allowing them to mobilize socially to meet new ecological and weather-related challenges.

The international commonalities and themes related to green community organizing in the face of climate change include the following:

Green Job Creation

In marginalized communities people are nearly always interested in increasing their employment opportunities. High levels of unemployment—that is, community members who are eager for training and work opportunities—represent a significant resource for poor communities, because environmental restoration and low-fossil-fuel production require large amounts of people-power. Examples of the kinds of green job creation which are needed in both poor and well-off communities include wetlands reconstruction; rebuilding and strengthening water/sewer systems and other infrastructure; rehabilitation of polluted areas, brownfields, and transportation corridors; construction and maintenance of rooftop, roadside, and other community gardens; production and processing of locally grown food; and development of new recreation options on land which is not appropriate for housing or industry (Jones, 2008). Funding which is available for infrastructure renewal, disaster prevention, and climate change adaptation can be used to support and catalyze these kinds of green jobs, producing powerful local economic benefits.

Environmental Education

Skills needed for evolving green jobs and for effective public involvement in watershed and other environmental policy processes can be developed and shared in marginalized communities via organized processes of continuing education. These can include environmental education programs for youth, seniors, and adults, and in-service training for working professionals such as public health agents/nurses, teachers, and government officials. Local community organizations and NGOs are ideally situated to

develop and fine-tune such educational programs, which can lead to increased employment opportunities and/or pay upgrades for local residents. Partnerships with local universities reinforce these initiatives while also improving the local relevance of university programs.

Community-Building to Develop Social Resilience and Political Intervention Potential

NGOs with local roots and long-standing community centers and social services organizations have important roles to play in marginalized communities' disaster readiness and response to climate change. Their contributions can include bringing people together to prepare for extreme weather events; collecting knowledge on the local weather, water, and environment, and bringing it to the attention of governments; building social capital and developing social networks for community resilience; and organizing community members politically to express their views and advance their priorities.

Recreation Spaces as Flood Buffers

Low-income communities with many unemployed people, especially youth, need recreation spaces, and these are usually in short supply due to land-use development pressures in urban areas. Increased weather variability and rainfall are expanding the areas which are subject to flooding and thus not appropriate for housing. A good alternative use for these areas is as public spaces, swimming / picnicking areas, and sports fields. If governments can equitably assist people to relocate housing from floodplains to higher land nearby, simultaneously creating jobs and community-

controlled recreation spaces in these areas, then climate change adaptation and disaster prevention can accomplish several goals at once.

Mobilizing Finance for Infrastructure Renovation

NGOs and government bodies may be able to use international connections and climate change funding mechanisms, both formal and informal, to carry out projects such as water / sewer infrastructure renewal and development, renewable energy plants, housing reconstruction, and public space provision. The "guilt factor" motivating progressive Northern groups who recognize the responsibility of the wealthy for climate change and who take action to fund remediation projects in the global South, lies behind some of these new global redistribution initiatives. Broader and more radical income redistribution measures to redress the "climate debt" of the rich have also been proposed (Bond, 2010). Community-academic partnerships may help generate funding proposals and documentation of pilot initiatives which can demonstrate the effectiveness of such redistributive measures.

Creative Organizing/Workshop Techniques/Strategies and International Sharing of Ideas

Ideas, designs, and financing proposals can be shared internationally through green / climate change channels. For example, civil society networking surrounding the UN Framework Convention on Climate Change annual COP meetings involves a wide range of community-based environmental NGOs which have participated in the civil society forums accompanying the governmental negotiations. Academic conferences can

bring together university-based researchers and local environmental activists for useful discussions on innovative policy and grassroots solutions to the pressing ecological situations people face on the ground. A conference on the question of "How Will Disenfranchised People Adapt to Climate Change?" at York University in April 2009, organized by the university's Institute for Research and Innovation in Sustainability, focused on local struggles and the importance of traditional ecological knowledge in addressing climate change in Arctic Canada, Brazil, South Africa, and India (IRIS, 2009). Likewise, Majora Carter's advocacy work highlights the common strategies marginalized areas can use in sparking green community development throughout the global North and South. Online networking has vastly broadened the spread of ideas and potential partners.

The Role of Municipal Government and Public Education

Cities worldwide have begun to develop climate change adaptation plans and to take stock of their new needs—physical, social, economic (Lucon and Goldemberg, 2010). When community groups organize to share their expertise and knowledge of challenges, as well as ideas on how to meet them, they may be able to build beneficial partnerships with local governments. Public officials everywhere need training in all aspects of climate change and disaster preparedness, and environmental education for the general public is also crucial in a warming world. Here, too, networking and global communication help policy-makers and local groups to learn from "best practices" and creative ideas which have worked elsewhere.

Rather than top-down, cookie-cutter strategies being imposed from outside, the importance of widespread bottom-up information-sharing lies in the ability of subsequent

adapters to use what is most relevant to their situation, building new and locally appropriate policy syntheses. University partners and youth can contribute the computer access, online research, and social media networking skills to make this possible.

Conclusion: Watersheds, Equity, and Climate Justice

Governments and development organizations worldwide are searching for new ideas on how to encourage more public participation in policy decision processes, especially in relation to climate change and disaster readiness. Social and political movements are also expanding their participatory outreach and organizing techniques. In the Great Lakes region of North America, for example, various jurisdictions emphasize public involvement and participation in source water protection (CIELAP, 2004). The Council of Canadians, through its Blue Planet project and other organizing initiatives, seeks to focus public opinion globally on the importance of water rights (Council of Canadians, 2006). The European Water Framework Directive is pushing jurisdictions and cross-jurisdictional water basin committees to implement new participatory processes. Researchers, consultants, and activists are generating practices which can be widely discussed and shared. In the end, however, while many insights can come from hearing what has worked and what has not in other places/situations, there is no substitute for locally designed and locally appropriate public participation processes, both within and outside of government.

As the conclusion of the *European Water Framework Directive Guidance Document on Public Participation* states,

> The preamble of the Water Framework Directive includes a very clear statement: active public involvement is most likely the key to success with regard to achieving the desired water quality objectives. This statement reflects several years of accumulated European water management experiences. In simple words: the water users and water polluters need to be turned into part of the solution, not…kept outside the considerations as part of the problem. This Guidance has presented a range of recommendations on how to ensure active involvement. It is important, however, to take into account that no blueprint solution can be provided. Each River Basin District has to find its own way to handle this, taking into account the prevailing cultural, socio-economic, democratic and administrative traditions. Careful planning, e.g. stakeholder analysis, is a particular recommendation, but each competent authority has to accept that a dynamic and learning process based on "trial and error" is the challenge to embark on. Experience shows, however, that given sufficient time it will pay off in the long run. (EC, 2002, p. 66)

In particular, the roles of class and gender, among other differences, must be acknowledged as determinants of everyone's standpoint and possibilities for participation. For example, are those who are too poor to pay for water "stakeholders"? The substantial consensus among ecological economists, sociologists, political scientists, planners, and radical activists that public participation is essential for good public policy may obscure the vital question of how fairly to elicit, structure, and make use of that participation (Perkins, 2008).

Engaging women is fundamentally important for durable climate change adaptation and disaster readiness. Women possess incomparable knowledge of local, social, and ecological conditions due to long-standing gendered roles and responsibilities, and this knowledge must be shared and utilized in local, national, and international negotiations and decision-making processes—for reasons of both justice and efficiency. Democratic mediation of equity conflicts, adequate disaster preparedness, and sustainable long-term management of resources are only possible through public participation.

While in practice it sometimes seems difficult to organize or elicit public participation (a "bottom-up" problem), and in some cases governments are reluctant to cede control by opening up decision processes for public examination and input (a "top-down" problem), at least in principle, broad public participation is the foundation of sustainable development. It also has a number of quite progressive implications—if it truly gives a political voice to people who have historically been left out of public decision-making.

To address both the "top-down" and the "bottom-up" challenges to broadening public involvement in decision processes, a creative combination of grassroots environmental education and community organizing is needed. Community-based environmental education initiatives which are relevant and interesting for local residents and increase their knowledge of watershed issues, understanding of basic political and ecological principles, and confidence to express their views can serve as the basis of an intervention approach which is progressive, constructive, and democratic. This, in turn, increases the resilience and sustainability of decision-making processes. It also lays the

groundwork for community organizing and extension of the environmental education activities to larger constituencies.

Community-based education and organizing are fundamental to creating the conditions for local knowledge to be shared and utilized, through equitable democratic participation. Building inclusive governance structures and strengthening the role of civil society, especially women, are essential for addressing climate change vulnerability and fostering resilience and sustainability in urban centers 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). NGOs in the Global South have expertise in such initiatives which is potentially transferable to other places, including some in the Global North.

Community-based environmental education initiatives which are relevant and interesting for local residents and increase their job opportunities, knowledge of local environmental 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, disaster, and climate change decision-making processes. It also lays the groundwork for community organizing and extension of 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, more general manifestation of the bottom-up perspective in Development Studies. Furthermore, it is a movement which "best fuses a variety of progressive political-economic and political-ecological currents to combat climate change" (Bond and Dorsey, 2010).

Climate justice—addressing the impacts of climate change on the poorest first—is a powerful imperative at every level, from the local to the global. Civil society groups worldwide, with support from university researchers, are using online and in-person networking tools to share ideas on how to promote climate justice, obtain funding, and press politically for policies addressing the needs of marginalized people. This bottom-up movement builds resilience in the face of the social and political repercussions of extreme weather events—a global priority, as we all inhabit this warming world together.

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