

**“Social Vulnerability and Climate Justice:
Community-based Strategies for Political Engagement”**

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ABSTRACT: Socially vulnerable people are simultaneously those most likely to be impacted by global climate change (because of their geographic location), and least equipped to deal with those impacts (because of their weak economic and political position). The field of “climate justice” addresses these problems and is developing indicators of vulnerability, surveys of the extent of climate change-related inequities, and policy proposals to deal with them. Just as in Development Studies more generally, a conceptual and practical bifurcation exists between top-down mechanisms for income redistribution controlled by international institutions, and grassroots strategies involving fundamental political/economic change and a greater voice for the vulnerable, starting at the local level.

This paper discusses climate justice in relation to the author’s work with NGOs and community groups in both the Global North (socially disadvantaged areas of Toronto, Ontario) and the Global South (Brazil, Mozambique, South Africa and Kenya) aimed at developing participatory community-based programs for environmental education and climate change awareness leading to increased political engagement by socially vulnerable people. Watersheds and water management, and gender equity, receive particular focus.

Keywords: climate justice, climate change, social vulnerability, gender, race, watershed management, public participation, civil society, environmental education, community development, equity, political agency, climate change adaptation, sustainable development

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I. 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 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. And the housing, health, and livelihoods of marginalized people worldwide are already being threatened by climate-change-related impacts. 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.

A 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 centres 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 programmes, especially those that address these problems” (Satterthwaite et. al., 2007, p. vi). Climate change thus exacerbates already-grave sustainable development challenges.

This paper 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 for 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?

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) -- as well as recent green community development initiatives in marginalized neighbourhoods in Toronto, Canada. 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.

After giving some examples of ways in which local community organizations are addressing climate and water-related challenges through innovative programs and initiatives at the grassroots, the paper 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.

II. 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 extreme weather events 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 also 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 need for recreational space while also beginning to respond to the local effects of climate change.

Sister Watersheds: equity on São Paulo's watershed committees

Brazil has a progressive watershed management system which requires participation by civil society representatives on watershed committees, but 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, low-income local residents and especially women often are 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 for increasing the knowledge, interest and engagement of local residents on water-related issues, focusing on low-income neighbourhoods in São Paulo, 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 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 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 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 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 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 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. 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 Durban, Maputo and Nairobi

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 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, 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 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.

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 – the experts.

“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 with African partners in three cities. Its goal is to improve watershed governance for climate change adaptation and enhance 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 earlier Sister Watersheds Project, this project's methodology includes 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 are working 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 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), Eduardo Mondlane University (Maputo), and the Centre for Civil Society at the University of KwaZulu-Natal (Durban) provide academic research coordination 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 and other climate change impacts. Residents of low-income areas often lack the ability to protect themselves against 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 for 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 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 generating information 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 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 is 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 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 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, is currently upgrading a sports field in Nairobi's Kibera slum, on the banks of the Nairobi River, which will prevent housing from being flooded during extreme weather events. In addition, KI organizes community forums on sustainable water management and environmental education, as well as community and river clean-ups. Young women's leadership is central to their organizing.
- In Durban, women activists from Umphilo waManzi and the South Durban Community Environmental Alliance are coordinating “learning journeys” where government officials visit low-income neighbourhoods to 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 youth on after-school activities related to climate change. Most participants are women.

Água 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 degree Celsius increase in temperature by 2050 across all seasons. With warmer temperatures, drought can be expected in winter, spring and summer. This will likely 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 (*ibid.*: 6).

In April of 2010 heavy rains partially destroyed several downtown favelas in Rio de Janeiro and Niteroi (across Guanabara Bay), 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 recent floods, sixty percent of the population lived in illegal dwellings (Magalhães, 2011).

At the western edge of Guanabara Bay, in an economically-depressed area of the Baixada Fluminense around the Surui River, the community development organization Agua Doce (Sweet 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 labour union and church organizations, Agua Doce's initiatives include community centres and kindergartens; biodigesters and a biomass recycling centre; agricultural support offices and fruit processing centres 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 / literacy centre (Centro Clima 2005:57-64).

The Água Doce organization, reinforcing Agenda 21 principles, aims to (re)introduce a more sustainable way of life for the people of the Baixada Fluminense through a range of social and economic community development initiatives. People at Água Doce and the communities of the Baixada Fluminense 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 rising sea levels from the Bay make the area particularly vulnerable to floods and mudslides. Health risks from water-borne illnesses are increasing. Fishing and crabbing are progressively endangered.

Água 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 programmes, as well as creating economic opportunities for women. Água Doce promotes social transformation and building 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 inter-linkages among literacy, economic, and social supports including job creation and community-building, and the potential of 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 at once through community development.

The GreenXChange 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 seem to be 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, degrading water quality in local streams and Lake Ontario (Binstock, 2011). At times, local lakefront beaches are unswimmable due to water pollution for several days following heavy rains. 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 centres” program where those without air conditioning can come to public libraries, community centres 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 disproportionate negative effects on low-income Toronto residents, since 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 have been noted in some reports, but have yet to be quantified or estimated in official publications or policy frameworks.

One particular low-income neighbourhood in Toronto has borne the brunt of several recent extreme weather events. It is the Jane-Finch neighbourhood, 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 normally-placid Black Creek became a rushing torrent which washed out its culvert under Finch Avenue, a local arterial roadway, leaving a 50-meter-wide gaping hole. Construction of a new bridge for Finch Avenue took six months and cost more than \$3 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 and 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 in northwest Toronto 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 beyond their own offices in one Toronto Community Housing building. 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 2000 tonnes.

Many 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 for Earth Day 2010, and a celebration of Earth Day 2011 in a space that was secured as a Centre for Green Change. At the Centre for Green Change -- a community training facility modeling green building techniques -- 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 neighbourhood. The vision for the Centre includes a

Pathways to Green Jobs Program, which will educate and promote environmental stewardship, green jobs, and eco entrepreneurship. It will build on the successful work of the Carpenters Union's CHOICE Apprentice Program and will incorporate an environmental training component. The Centre for Green Change works with residents to create and to innovate and to use their hands and creative minds while protecting the community's natural resources. The Centre will mobilize local resources to achieve this vision and explicitly work 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 labour unions, health centres, local politicians, property owners and landlords, charitable organizations, and cultural/media groups. Activist Majora Carter was the dynamic keynote speaker at the Green Change 2011 gala (Carter, 2011). In 2011, the initiative changed its name to the "GreenXChange Project" to acknowledge these partnerships and the many exchange opportunities generated by its green community development work. The project continues to win awards and accolades, including the 2010 Toronto Green Award in the Community category and the 2011 Urban Leader Award for Imagination.

Reasons for 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 present within 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 neighbourhood 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 financially support their families 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 change. The title Green Change Agent has allowed the individuals to gain respect on a par with environmental specialists in the area.

III. 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 neighbourhoods. Local governments can play an important role in helping communities meet their needs, especially if people are mobilized and organized politically at the grassroots – which can be effectively catalyzed by NGOs. Infrastructure funding and 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, since 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 poor – and also well-off – communities include wetlands reconstruction; rebuilding and strengthening water/sewer and other infrastructure; rehabilitation of polluted areas, brownfields, and transportation corridors; construction and maintenance of rooftop, roadside, and other community gardens; 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 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 and seniors, 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.

Community-building to develop social resilience and political intervention potential

NGOs with local roots and long-standing community centres and social services organizations have important roles to play in marginalized communities' 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; 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. 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 from floodplains to higher land nearby, simultaneously creating jobs and community-controlled spaces in these areas, then climate change adaptation 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).

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 United Nations 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 entitled “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 for 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.

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 preparedness, and environmental education for the general public is also crucial in a warming world. Here, too, networking and global communication help groups to learn from “best practices” and creative ideas in use elsewhere.

IV. Conclusion

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, in water governance are essential components for addressing climate change 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.

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 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 are using online and in-person networking tools to share ideas on how to promote climate justice, to obtain funding, and to 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, since we all inhabit this warming world together.

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