Cities and Governance: Coming to Terms with Climate Challenges

Patricia McCarney

Abstract If cities are to meet the challenges of climate change, effective solutions must be anchored in an empowered city governance approach. Empowered city governance depends on building effective decision-making in this volatile policy field, in developing evidence-based policy-making, and in building strong city governments capable of performing as new sites of governance in global negotiations on climate change. The objectives of this paper are twofold: first, to map the core risks for cities associated with climate change; second, as a governance response, to build a more informed set of planning norms and practices, more effective infrastructure investment and urban management, and a more inclusive urban governance.

Keywords Cities · Inclusive Governance · Planning · Intergovernmental · Risks (in Cities)

1 Introduction

Risks associated with climate change are increasingly finding expression in cities. Issues of greenhouse gas emissions, sea temperature change, sea level change, land and air temperature adjustments, air quality deterioration, shifting rain, wind and snow patterns, and other unstable climate shifts, while global in nature, find particular expression in the world's cities. These phenomena serve to introduce new layers in our interpretation of urban risk, new complexities in governing cities and

P. McCarney (✉)
University of Toronto, Global Cities Program, Canada
e-mail: patricia.mccarney@utoronto.ca

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new research challenges to measure and monitor these risks in order to inform policy, planning, and management. How do we address this multiple layering and new complexity?

Effective and long-term solutions must be anchored in an empowered city governance approach which acknowledges the respective roles and contributions of a wide array of actors (McCarney 2011; Tanner et al. 2008). Addressing climate change risk in cities (Hunt and Watkiss, 2007) must be considered in a broader framework of risks confronting cities. The centrality of cities in global governance is beginning to be recognized (Amen et al. 2011a, b). Cities in the 21st century are facing unprecedented challenges. The world's urban population is likely to reach 4.2 billion by 2020, and the urban slum population is expected to increase to 1.4 billion by 2020, meaning one out of every three people living in cities will live in impoverished, over-crowded and insecure living conditions (United Nations 2008a). Social cohesion, safety, security, and stability are being tested by social exclusion, inequities, and shortfalls in basic services.

2 Mapping Climate Change Risks in Cities: Core Risks and Urban Vulnerabilities

2.1 Urban Vulnerabilities Associated with Climate Change—Categorizing Risks

While assessment internationally on climate change and risks to cities is quite diverse and varied, for the purposes of this paper, four broad categories for considering urban vulnerabilities associated with climate change are here identified. These are: alterations in temperature; alterations in precipitation; alterations in storm intensity; and sea level change.

The first three, associated with extreme weather events, and the fourth, associated with sea level change, are not easily measured as discrete phenomena in terms of cities. For example, we do know that there has been a 50 % rise in extreme weather events associated with climate change from the 1950 to the 1990s, but we do not know how many cities were impacted by these events. We also know that there have been alterations in global precipitation levels, but we do not know the spatial aspects of this phenomenon with respect to the world's cities.

A further problem encountered in surveying the field of work on climate change is the coupling of natural disasters with climate change recordings. For example, we do know that between 1974 and 2003, 6,367 natural disasters occurred globally, causing the death of 2 million people and affecting 5.1 billion people (United Nations 2007). Global increases in those natural disasters specifically associated with climate change, however, are not well disaggregated. Natural disasters associated with climate change can be identified as having direct consequences for cities, but again these measures are not disaggregated. We also know, both through

informed professionals and broad ratings, that poorer urban households are usually at higher risk due to weaker structures, less safe city locations and building sites, and weaker resilience of infrastructure in poorer cities to withstand damage. Similarly, the relation between urban health and climate change risks is particularly heightened under conditions of urban poverty in cities. When basic infrastructure is inadequate, existing conditions of poor sanitation and drainage and impure drinking water are further stressed under conditions of extreme weather events and flooding, leading to the transmission of infectious diseases, which puts poor urban households at high risk.

This situation is worsened under circumstances of higher densities in urban areas. For example, in Dhaka approximately 80 % of the slum population lives in dense slum clusters with more than 90 % of slum residents sharing a single room with three or more people. A recent census in Dhaka, done by the Centre for Urban Studies, reveals that nearly 60 % of slums lack basic drainage and are prone to flooding. Flooding in slums can have serious impacts on the health of poor residents. Floodwaters in slums mix with raw sewage and breed water-borne diseases such as diarrhea, typhoid and scabies. Floods can also reduce the water supply due to contamination and infrastructure damage. As a result of the frequent flooding in Dhaka, the government has attempted to relieve some of the stresses on densely populated slums by completing construction of embankments, concrete reinforced walls and pumping stations (United Nations 2008a).

Cities in developing countries are disproportionately affected for similar reasons of vulnerability and weak institutional support and infrastructure systems. For example, many developing countries lack the health facilities to deal with large numbers of injured patients, resulting in higher death tolls than in countries better equipped for disaster. Disasters associated with climate change can paralyze entire cities and regions, and permanently destroy their social and economic assets. Creating measures and indicators across this spectrum of vulnerabilities, however, is required for informed decision-making, improved policy on climate resilience in cities, more effective urban management of risks, and a more empowered governance at the city level.

As a way forward to assessing urban vulnerabilities associated with climate change, the four categories here identified—alterations in temperature; alterations in precipitation; alterations in storm intensity, and; sea level change—can help to establish a framework for mapping and measuring climate risks in cities.

2.1.1 Assessing Urban Vulnerabilities Associated with Climate Change: Category One—Alterations in Temperature

Key consequences for cities associated with *alterations in temperature* include warmer and more frequent hot days and nights in cities and more extreme events such as heat waves, together creating a cluster of impacts that confront city governments. Alterations in temperature produce increased demand for cooling, declining air quality in cities, energy shortages, heat island effects, increased water

demand and water quality problems, human health effects, and increased risk of heat-related mortality. Each of these five vulnerabilities helps us identify specific measurement needs and core indicators for assessing urban vulnerabilities associated with alterations in temperature.

2.1.2 Assessing Urban Vulnerabilities Associated with Climate Change: Category Two—Alterations in Precipitation

With regard to the second category of urban vulnerabilities associated with climate change—alterations in precipitation—the consequences for governing, planning, and managing cities are far-reaching.

Increasing frequency and intensity of precipitation in cities and more extreme precipitation events can cause pressure on, and deterioration of, water and sanitation infrastructure, particularly where there are weak and/or aging municipal infrastructure facilities. In addition, these alterations create adverse effects on the quality of surface and groundwater; contaminate water supply; create waterborne diseases; increase risk of deaths, infectious respiratory and skin diseases; disrupt settlements, commerce and transport due to flooding, and; cause large displacements of people together with loss of property.

By contrast, alterations in precipitation leading to drought also lead to adverse effects in cities, such as escalating costs of food in cities and food crises and increased migration into cities from drought-affected regions. Lowered precipitation levels also lead to increases in migration into cities from climate change-affected areas. Water shortages in cities are also a consequence of alterations in precipitation linked to climate change that pose serious risks for the general urban population and, particularly, for the more vulnerable groups, such as the elderly, the young, and the chronically sick. These consequences and related vulnerabilities help us identify specific measurement needs and core indicators for assessing urban vulnerabilities associated with alterations in precipitation.

2.1.3 Assessing Urban Vulnerabilities Associated with Climate Change: Category Three—Alterations in Storm Frequency and Intensity

With regard to the third category of urban vulnerabilities associated with climate change—alterations in storm frequency and intensity—consequences for cities include power outages and disruption to the public water supply; disruptions to settlements associated with flood and high winds; migration of population under stress; loss of property; withdrawal of risk coverage or cost escalation of insurance by private insurers, and; more generally, increased risks of deaths, injuries, and water and food-borne diseases and post-traumatic stress disorders. While global and national data on storms is being generated, city level measures assessing these vulnerabilities are not yet well formulated. Categorizing these vulnerabilities helps

us identify specific measurement needs and core indicators for assessing urban vulnerabilities associated with alterations in storm frequency and intensity.

2.1.4 Assessing Urban Vulnerabilities Associated with Climate Change: Category Four—Sea Level Change

Key consequences associated with sea level change include permanent erosion and submersion of urban land and settlements; loss of property and livelihood; costs of coastal protection; costs of land use relocation; decreased freshwater availability due to saltwater intrusion and salinity in estuaries and coastal aquifers; increased risks of deaths and injuries by drowning in floods; rising water tables and impeded drainage; destruction of urban infrastructure, and; long-term effects on economic growth. Each of these vulnerabilities helps us identify specific measurement needs and core indicators for assessing urban vulnerabilities associated with sea level change. This framework of vulnerabilities can help to direct research towards identifying what city level measures already exist across this list of core vulnerabilities and then identifying gaps in our current information.

City leaders are not at the table when international protocols and agreements on climate change are discussed by member states and when states decide on whether to sign and support these international agreements (McCarney 2011). The vulnerability of cities to climate change risks is largely underestimated. There is no established set of city indicators on climate change that is globally standardized and comparable. With increasing urban vulnerability, however, estimated simply by the fact of the increasing dominance of city dwellers worldwide, city governments need to be considered as new sites of governance in global negotiations on climate change and be included in decision-making related to risk assessments.

With national governments increasingly confronting new and emerging global agendas on climate change—and because these agendas all place cities at risk—national governments while negotiating global commitments must also initiate dialogue and consensus at the city level to ensure that local authorities are part of the decision-making (Amen et al. 2011a, b) and, as importantly, integral parts of mitigation, adaptation, and implementation processes.

2.2 Mapping Cities and Climate Change

2.2.1 Cities and Greenhouse Gas Emissions

Cites are key actors in producing carbon emissions that contribute to climate change. According to the Clinton Foundation, large cities are responsible for about 75 % of the greenhouse gases (GHGs) released into our atmosphere. GHG emissions are usually under the control or influence of local governments since a majority of these emissions are linked to the urban form that affects transportation

and energy consumption. The World Bank estimates that the transport sector alone accounts for a third or more of total GHG emissions in metropolitan areas. For example, according to a recent calculation in Canada by the Province of British Columbia, 43 % of its provincial GHG emissions are under the control of local governments (Miller et al. 2008).

Cities can make a positive contribution to the climate change agenda by consciously making urban related decisions that are informed by a clear understanding of their contribution to the problem and finding ways to mitigate and adapt to it. However, measurements of emissions by cities are as yet uneven in both their development and application, which needs to be addressed before they can guide city mitigation strategies.

Several indicators are available to estimate a city's overall GHG emissions. The indicator of 'GHG emissions measured in tons per capita,' currently in use by the Global City Indicators Facility (GCIF), is based on existing methodologies in current use by the Intergovernmental Panel on Climate Change (IPCC) and the methodology adopted in the International Council for Local Environmental Initiatives' (ICLEI) Harmonized Emissions Analysis Tool (HEAT). This GCIF indicator measures the total tonnage of GHGs (equivalent carbon dioxide units) generated over the past year by all activities within the city (the numerator) divided by the current city population (the denominator) expressed as a per capita figure. A working group with the GCIF and World Bank participation is reviewing existing methodology and intends to propose a more comprehensive methodology for use in future data submissions (ERM 2007).

Various protocols exist for GHG emissions calculations. ICLEI's Local Government GHG Emissions Analysis Protocol is a two-pronged analysis in which local government emissions are a component of community emissions, together forming a complete GHG emissions inventory. Both the government and community scopes include measures for stationary combustion, mobile combustion, fugitive emissions, product use, other land use, and waste. Another protocol developed to calculate GHG emissions for cities (Kennedy et.al 2009) uses seven components: electricity, heating and industrial fuels, direct industrial emissions, ground transportation, air, marine and waste. Air and marine travel represents the main differences between the Kennedy and ICLEI's protocols. According to Kennedy, these emissions reflect a city's "gateway status," contributing to its economy, providing jobs and agglomeration effects.

2.2.2 City Mitigation Strategies on Climate Change

Given the global estimates that energy for heating and lighting residential and commercial buildings generates nearly a quarter of GHG emissions globally, and that transport contributes 13.5 % (of which 10 % is attributed to road transport), we can assume a sizeable portion of this volume of emissions is generated in cities. It is therefore reasonable to also assume that cities have the potential and, indeed, are becoming the key actors in global mitigation efforts. City governments can

influence patterns of energy and land use through important interventions under their control, including land use planning, urban design, zoning and local by-laws, including building codes and height by-laws and transport planning including transit planning road networks, master plan, and subdivision controls.

Kessler et al. (2009) have identified points of intervention by cities for climate change mitigation, suggesting available technologies and policy instruments available to cities. A few examples of city action in the field of climate change mitigation can assist us in considering measurements for targeting and monitoring mitigation efforts.

The Vienna City Council adopted the city's Climate Protection Programme as a framework for its Eco-Business plan and, as a result, the city has reduced its solid waste output by 109,300 tons, toxic solid wastes by 1,325 tons and carbon dioxide emissions by 42,765 tons. This Eco-Business plan has saved a total of 138.7 million KWh of energy and 1,325,000 cubic meters of drinking water. The Eco-Business plan is also now being implemented in Chennai, India, and Athens, Greece (United Nations 2008a).

In the building sector, improvements to building codes and certification processes for greener buildings are being adopted by a number of cities. The City of Johannesburg, South Africa, has implemented mitigation measures which include retrofitting of council buildings, energy savings in water pump installations, and methane gas recovery. One set of measures already well established is the Leadership in Energy and Environmental Design (LEED) certification framework that ensures a building is environmentally responsible by providing independent, third-party verification. LEED certification seeks to ensure that a building project meets the highest green building and performance measures. The average LEEDs building uses 30 % less energy, 30–50 % less water, and diverts up to 97 % of its waste from the landfill (U.S. Environmental Protection Agency 2007).

Portland has been a key player in adopting strategies to address climate change. In 2000, the Portland Office of Sustainable Development (OSD) launched a program to support the design and development of green buildings in the city. The program offers technical assistance, education and financial incentives, and has so far supported more than 300 local buildings. The City of Portland has taken various measures in order to reduce energy use by using renewable sources and making technological improvements. Technological improvements made by the City have reduced energy use by 80 %. For example, all traffic signals were converted to highly efficient LED bulbs and, by doing so, have saved the City almost five million kWh per year and over USD 500,000 annually in energy and maintenance costs (The City of Portland and Multnomah Country 2005).

When it comes to establishing GHG reduction targets, cities have an important role to play in helping to determine an equitable distribution of these targets, which will help to frame mitigation strategies on climate change. For example, current debates between per capita emissions of inner city residents versus suburban residents, between large city residents versus smaller city residents, and between wealthy cities versus poorer ones, raises issues of equity in sharing the burden in meeting reduction targets. Measures are weak and no methodology for determining

an equitable distribution of high-level GHG reduction targets has been established (Miller et al. 2008).

While it is generally assumed that suburban residents emit significantly more carbon dioxide than inner city residents, it could thus be concluded that it would be more equitable to require suburban communities to shoulder the largest burdens for reductions. However, indicators on this question are still weak. For example, while some estimate that suburban dwellers produce up to three times more GHGs per capita than inner city dwellers, recent data (Glaeser and Mathew 2008) suggest that this dichotomy is not so simple. They report that, indeed, while per capita emissions rise as you move away from the urban core of Boston, they level off once you are more than ten miles from downtown. Another exception they have found is with respect to Los Angeles, where emissions are actually lower in suburban LA than they are in the central cities of that metropolitan area.

Such issues are complicated further by considering the challenges and opportunities of high-growth versus low-growth communities, as well as questions of per capita versus total reduction targets. In the case of British Columbia, the Province plans to negotiate with local governments with the intention of arriving at an equitable allocation on a municipality by municipality basis.

Finally, a new set of indicators on climate change mitigation are also needed if policy-makers are to assess the capacity in communities for GHG reductions and what costs related changes would generate—physically, socially and economically—before they can act. Policy-makers need to know, for example, how redesign, urban form, and rebuilding of the suburbs might overcome, for example, car dependency (Miller et al. 2008).

2.2.3 City Adaptation Strategies on Climate Change

Indicators can help cities understand the problem of climate change and inform city managers and leaders in their role in building resilience to its adverse impacts. A number of adaptation measures to climate change in cities are largely made up of individual choices so knowledge through public education, research, and publicly accessible data on indicators can assist citizens towards action. Collective action at the community and municipal level carries potential for appropriate responses for climate change adaptation in an urban context.

Adaptation measures can take several forms: some actions are taken to reduce vulnerability to climate change; some involve spreading risk among a wider population (insurance); some involve eliminating activity or behavior that causes climate change; and some involve moving vulnerable populations away from hazards.

Many cities are developing strategic plans for climate adaptation. For example, strategies to adapt New York City (NYC) to “the unavoidable climate shifts ahead” (The City of New York 2007, p. 136) are included in PlaNYC 2030. NYC’s plan for climate change adaptation focuses on securing the city’s existing infrastructure, identifying and protecting floodplain zones and specific at-risk

communities, and establishing a citywide strategic planning process with emphasis on tracking emerging climate change data and its potential impacts on the city.

3 Using Indicators to Assess and Address Deeper and Enduring Risks and Long-Term Vulnerabilities in Cities

The severe consequences and threats that cities are now facing as a result of climate change, the pressing shortfalls in urban water, sanitation, and waste management services (Kurian and McCarney 2010), inadequate housing and insecurity of shelter, and the deteriorating quality of air and water in city environments, are being experienced in a context of intense urban growth of cities that increasingly manifests deepening poverty and income inequities, socio-economic exclusion, and socio-economic dualism (McCarney and Stren 2003).

The adoption, in the year 2000, of the Millennium Development Goals (MDGs) by the UN Member States, registers a commitment by the international community to development of the poorest regions of the world and to assist the most vulnerable. From this agreement, the UN Secretariat established eight goals, each with a set of quantitative targets and indicators, to ensure a common assessment and to track progress at global, national, and local levels towards achievement of the MDGs.

All eight of the MDGs can be directly connected to the theme of vulnerability in the world's cities. Indeed, it is the world's cities and the slums within them that are pivotal platforms for the successful achievement of each MDG. Each of the eight goals finds expression in cities as they relate to poverty, education, gender, child mortality, maternal health, diseases, environment, and global partnerships. In addition, meeting the time frame and the numerical targets of the MDGs will require a determined focus on cities since the majority of affected women, men, and children will be living in urban and peri-urban areas by the target dates of 2015 and 2020.

Goal 7—to "Ensure Environmental Sustainability"—sets out three targets: to reverse the loss of environmental resources; to improve access to safe drinking water, and; to improve the lives of slum dwellers. Linking these three targets helps to frame the challenges cities face in addressing climate change in a context of poverty.

The United Nations System assigned UN-Habitat responsibility to assist Member States in monitoring and gradually attaining "Goal 7 Target 11", which is referred to as the "Cities without Slums" target. Roughly 80 % of urban residents in the lowest-income countries are already living in slum conditions and, based upon projected demographic trends, the number of slum dwellers is expected to double by 2030. Given this twin problem of the existence of massive slums and the projected growth of slums worldwide, meeting the MDG 7 Target 11 must entail a

two-pronged approach: upgrading today's slums to improve the living conditions and the conditions for meeting most of the MDGs, and planning alternatives to slums for the future.

International development assistance, national and local governments and the private sector must be mobilized to partner with the urban poor to support their ongoing efforts and scale up urban poor-led upgrading. Addressing the deficiencies in urban infrastructure and services and sub-standard housing of slum dwellers is central to climate change adaptation.

Social cohesion, safety, security, and stability are being tested by social exclusion, inequities, and shortfalls in housing and basic services. Risks associated with each of these conditions are critical factors in the ongoing discussion on urban risks associated with climate change across the four categories identified in the foregoing. The situation of poverty in cities worldwide, but in particular in the less developed regions, must be recognized as a core conditioning factor in addressing climate change and building more climate-resilient cities. This means explicitly recognizing that climate change adaptation must in tandem reduce the vulnerability of the poor in cities. To do so, however, depends on meaningful data on city slums and indicators that track density; water and sanitation infrastructure inadequacies relative to climate change risks, particularly alterations in precipitation and sea level change, and; structural qualities of housing at increased risk from alterations in storm intensity and temperature change.

4 Cities at Risk: Emerging Approaches to Safer Cities

4.1 From Indicators to Governance—Evidence-Based Policy Formulation

The World Bank defines indicators as performance measures that aggregate information into a usable form. Indicators provide a useful tool in the prospective sense for policy-making and also in the retrospective sense for assessing policy implementation. Indicators offer assistance to policy-makers by aiding in comparison, evaluation, and prediction.

While country-level data and analysis on climate change have improved in recent years, serious gaps exist at the city level. Quantitative city data on climate change is being developed by cities in a discrete form that is often adapted from broadly accepted national level methods. Serious gaps and the lack of time series data on cities and climate change hamper efforts to diagnose emerging risks and problems, to assess policy options in terms of both mitigation and adaption strategies, and to gauge the effectiveness of their city-level programs.

Globally comparative, indicator-based knowledge on cities and climate change has become increasingly more important as national measures evolve and country-level policy positions emerge. City-level indicators that have a globally

standardized methodology are important, not for purposes of numerical ranking of cities, but for informing policy decision-making through comparative city data that provides policy leverage for city leaders locally, nationally, and globally. The GCIF provides a system for cities to use globally standardized indicators as a tool for informing policy-making through the use of international comparisons. For example, the Secretariat of Finance in Bogota uses indicators from the GCIF as a way to track the city's investments and to compare their city's performance relative to other international cities. By using indicators and drawing global comparisons, the Secretariat of Finance "is able to evaluate and monitor performance on their investments and to benchmark their performance in comparison to other cities" (City of Bogota—Finance Secretary 2009[1]).

As informational policy instruments, indicators provide more and better knowledge to local decision-makers and offer a methodical system of informing decisions. For example, the City of Sao Paulo, a member of the GCIF, recognizes the need for indicators as a tool for increasing transparency and accountability within their government. Sao Paulo is an important demonstration of how municipal governments can use indicators to enhance governance and institute evidence-based policy development in the City (City of Sao Paulo 2009[2]). The City of Sao Paulo has recently prepared its Plan—"Agenda 2012"—and states that the plan preparation is "a concrete example of how indicators improve governance, establish evidence-based policy making and promote civic engagement."

When indicators are well developed and soundly articulated, they can also influence how issues are constructed in the public realm. This is an important lesson related to cities and climate change since information can help to direct behavior in building climate action. Behavioral change can result from publicly accessible information by becoming embedded in the thoughts and practices, and institutions of users (Innes 1998, p. 84). Hezri and Dovers argue, for example, that "as a source of policy change, learning is dependent on the presence of appropriate information with the capacity to change society's behavior" (2006, p. 11) and "community indicator programs, or, state-of-the environment reporting, are usually aimed at influencing the social construction of the policy problem" (2006: 12). In addition, in a review on urban sustainability indicators, Mega and Pedersen (1998) suggest that indicators should aid in decision-making at various levels to promote local information, empowerment, and democracy.

City indicators on climate change can enhance understanding of the risks associated with climate change, influence opinion and behavior, shape policy, determine priorities, and thereby impact on a city's relative contribution to global climate change.

[1] Interview and case study material gathered from the City of Bogota—Finance Secretary 2009.

[2] Interview and case study material gathered from the City of Sao Paulo 2009.

4.2 The Role of City Indicators on Climate Change for Effective Planning and Management

When local government is recognized as a legitimate tier in the governance structure of a country, and when financial powers to raise revenues and responsibilities to deliver services are commensurate with the growth and expansion of cities, then the planning and management functions in cities take on meaning, and develop influence. Cities worldwide are entering into renewed dialogues with provincial and national governments to discuss this urban agenda. In this context, more rigorous data-driven policy analysis by cities creates leverage in intergovernmental relations. Moreover, indicators can help to build more effective planning and efficient management for climate action in cities.

Indicators on climate change at the city level can inform city officials and support their existing, and indeed potentially far-reaching, powers of planning, aimed at climate change adaptation and mitigation. For example, cities have the power to pass legislation related to GHG emissions; cities have the capacity to encourage participation and engage with related governmental agencies and local corporate organizations on climate change mitigation; to build more inclusive institutions in cities for achieving environmental objectives; cities have the power to plan and design transportation systems that support access by all citizens and rational choices on where to live and work that is in keeping with a climate change agenda for the city; cities have the power to ensure strong and robust local economic development patterns that build economic opportunity for all citizens while addressing climate change; cities have the power to address land tenure and land rights in the city and can thereby adopt a pro-poor set of policies governing access to and, environmentally safe use of, land in the city; cities have important powers over building codes and zoning by-laws and can adopt flexible standards governing safer construction of housing, buildings, and infrastructure that are more resilient to climate change risk and to adopt standards on greener buildings, and; cities have the power to develop creative financing tools for mobilizing investments that help to overcome climate-related threats derived from a lack of basic infrastructure and environmental amenities for all, and especially the poorest urban residents in cities.

However, there is an information crisis that seriously undermines effective urban planning on climate action. The lack of monitoring structures and standardized city indicators weakens the power of good planning decisions in cities, particularly cities of the developing world concerned with reducing vulnerability to climate change.

4.3 Addressing Risk and Vulnerability in Cities Through a More Empowered, Cohesive, and Inclusive Governance

Over the past few decades, efforts to improve and strengthen urban governance have focused on the essential first step of devolution of power, authority, and resources from the central to municipal level. Governed by the principle of subsidiarity, decentralization processes seek to ensure that decisions are taken, and services delivered, at the sphere of government closest to the people, while remaining consistent with the nature of the decisions and services involved. A responsible fiscal federalism that positions cities as critical partners in the governing relationship is now being recognized as a pivotal policy platform for global action on climate change and local responsibility for mitigating climate change and building climate-resilient cities.

World trends in urbanization are causing urban populations to spread out beyond their old city limits, rendering the traditional municipal boundaries and, by extension, the traditional governing structures and institutions, outdated. Single city jurisdictions of the past are being made more complex by multiple city jurisdictions that spread outward and build large and complex metropolitan governance systems.

As urban areas around the world continue to expand both in terms of density and horizontal space (Angel et al. 2005), there is a need to govern these large areas in a coherent fashion. Highly fragmented governance arrangements in many metropolitan areas make efficient planning, management, and urban financing for area-wide service provision a difficult and on-going challenge (Klink 2007; Lefèvre 2007). Climate change action, however, requires coherence and integration across these jurisdictions.

This metropolitan expansion is not just in terms of population settlement and spatial sprawl but, perhaps more importantly, in terms of their social and economic spheres of influence (McCarney and Stren 2008). The functional area of cities has extended beyond the jurisdictional boundaries. Cities have extensive labor markets, real estate markets, financial and business markets, and service markets that spread over the jurisdictional territories of several municipalities and, in some cases, over more than one state or provincial boundary. In a number of cases, cities have spread across international boundaries. This expansion is taking place regardless of municipal jurisdictional boundaries. Increasingly, effective climate change action demands more integrated planning, service delivery, and policy decisions than these multiple but individually bounded cities can provide. A decision taken in one municipality that is part of the larger city affects the whole city. This phenomenon introduces new challenges of governance and, in particular, metropolitan governance on climate change. There is a need to govern these large areas in a coherent fashion since they are the staging sites for meeting the serious challenges of climate change in the future.

Building effective and long-term solutions to climate change requires a city governance approach which acknowledges the respective roles and contributions

of a wide array of actors. An inclusive city government that involves long-term residents, international migrants, the poor, marginalized groups, national minorities, and indigenous peoples is fundamental to building safe, livable, and climate-resilient cities. The development of new policies and mechanisms for local governance is rooted in strong grassroots participation, that citizens and community groups are equipped with the understanding of democratic governance to hold local and more senior levels of government accountable, and that the poorest and most isolated communities are represented in the public debate. Addressing climate change risk in cities thus depends on the availability and accessibility of information on climate risks and an engaged, informed urban citizenry involved in the formulation of climate action plans.

Tanner et al. (2008) identify specific characteristics of good urban governance that improve urban climate resilience. The authors stress that improving citizens' access to information and maintaining a relationship of accountability between local governments and their citizens are key to improving cities' climate resilience (2008: 21). Participation and inclusion are closely related to the need for transparency, accountability, and information disclosure for good urban governance. Publishing information on official websites and providing procedures for citizens to request information ensures access to information for urban residents. Media and internet access, education levels, income levels, and local government's information disclosure culture determine the success of participatory and inclusive processes (2008: 26).

Engaging citizens in the running of their city can take many forms, and experiences in cities worldwide are being well documented. Typical steps include public consultations, public hearings and meetings, appointing citizens to advisory bodies inside municipal authorities, and designing community councils with stakeholder voice at municipal council sessions. Valuable research and evaluations have been undertaken of recent experiments involving citizen engagement in environmental and neighborhood impact studies, in the establishment of people's councils, in the inclusion of NGOs and other representatives from the private sector on local service boards and development councils in preparing development programs, allocating funds, and participating in planning and design initiatives for communities, in popular initiatives to put forward urban laws, and in the practice of participatory budgeting (McCarney 1996).

5 Conclusion

This paper has mapped the core risks for cities associated with climate change through literature review and city case studies, and has examined the use of city indicators in assessing and addressing these risks and vulnerabilities in cities. The paper has explored how knowledge derived from city indicators on climate change could help to direct a more informed set of planning norms and practices, more

effective infrastructure investment and urban management, and a more inclusive urban governance.

An argument has been put forward that indicators on cities and climate change can add new policy leverage for local governments, in terms of building empowered decision-making in this volatile policy field, in developing evidence-based policy-making, and in building strong city governments capable of performing as new sites of governance in global negotiations on climate change and in decision-making related to risk assessments.

In building this argument and identifying the potentials and opportunities for cities to increasingly play an active and, indeed, critical role on the global climate agenda, a core set of challenges are here recognized. First, research challenges in this emerging field of cities and climate change can be identified. Based on the mapping of risks in Part I of this paper, gaps in city indicators and/or weaknesses in methodologies for comparative indicators on cities and climate change pose important challenges for researchers, international agencies, and cities and their communities globally. Second, governance challenges for cities that arise as a result of new risks and vulnerabilities associated with climate change can be identified. Based on the mapping of governance, planning and management responsibilities in Part II, new challenges emerge for city governments in addressing climate change and developing climate action plans. This dual set of challenges will be presented here by way of conclusion, but more importantly to serve as a roadmap for next steps if cities are to be successful in confronting climate change risks and building more climate-resilient cities in the future.

The governance of cities is pivotal in confronting the challenges of climate change. City governments are constrained, however, on a number of fronts when it comes to formulating and implementing climate action. Many city governments are weakened due to only limited power and responsibility over key public services, including planning, housing, roads and transit, water, land use, drainage, waste management, and building standards. In many of the poorest cities of Asia, Africa, and Latin America, under-serviced informal areas of the city do not have basic services such as waste collection, piped water, storm and surface drains, and sanitation systems, placing large portions of cities at even higher risk of climate change impacts, particularly from storms, flooding and heat waves. City governments often lack powers (with respect to higher orders of government—state and national) to raise the revenues required to finance infrastructure investments and address climate change challenges. When governance capacity is weak and constrained, cities are limited in their abilities to take action on climate change.

Deficient intergovernmental relations, inadequate popular local representation processes, weak sub-national institutions, and poor financing mechanisms to support these sub-national government forms pose critical questions for policy-makers and leaders at all levels of government, as well as for researchers, planners, and international agencies concerned with climate change.

Addressing climate change risk in cities must also be considered in a broader framework of risks associated with poverty. Cities in the 21st century are facing unprecedented challenges. The world's urban population is likely to reach 4.2

billion by 2020, and the urban slum population is expected to increase to 1.4 billion by 2020, meaning one out of every three people living in cities will live in impoverished, over-crowded, and insecure living conditions. The situation of poverty in cities worldwide, but in particular in the less developed regions, must be recognized as a core conditioning factor in addressing climate change and building more climate-resilient cities. This means explicitly recognizing that climate change adaptation must in tandem reduce the vulnerability of the poor in cities.

A significant challenge confronting the larger metropolitan centers in addressing climate change is that associated with fragmentation. As urban populations grow and spread out beyond the old city limits, the traditional municipal boundaries and, by extension, the traditional governing structures and institutions are increasingly outdated. Highly fragmented governance arrangements in many metropolitan areas make efficient planning, management, and urban financing for climate action planning a difficult challenge. Climate change action requires coherence and integration across these jurisdictions.

When considering climate action in these large metropolitan areas, whether in terms of measuring risks, establishing indicators, creating mitigation or adaptation strategies, the challenges of metropolitan governance and the contexts of administrative, management, and political fragmentation are critical to confront.

Urban metropolitan areas demand and consume vast amounts of energy, water, and other material resources that impact on climate change. Cities are both victims and perpetrators of climate change. They generate the lion's share of solid waste, electricity demand, transport-related emissions, and space-heating and cooling demand. On the other hand, cities and local governments are well positioned to set the enabling framework for climate change mitigation strategies, as well for taking a leadership role in addressing the challenges related to hazard management as countries adapt to climate change. For cities to effectively address climate change, coordination and overcoming the problems of fragmentation in political institutions locally is a core requirement.

Five core governance challenges can be identified that are at the base of successful climate action:

1. *Effective leadership* is critical for overcoming fragmentation and building consensus in cities if effective climate action planning is to be achieved. Strong leadership can overcome individualism and competition across political 'turf' and build recognition that more metropolitan-wide collective action on climate change is empowering at both national and international levels. The ability to build consensus and coordination better facilitates investments in infrastructure and amenities that make the metropolis more resilient to climate change. Strong leadership in the affairs of metropolitan governance means not only building consensus, but also aggregating these fragmented interests in a way that builds legitimacy and accountability to stakeholders in the process.
2. *Efficient financing* is a core requirement for climate action by cities. Success to date with efforts to confront climate change challenges in cities has been hampered due to deficient financing tools at local levels of government. The

redistribution of responsibilities between different levels of government has not always been sustained by a corresponding allocation of resources or empowerment to adopt adequate financing tools needed to raise these resources. If these weaknesses are common at the level of individual municipalities, then the problems of raising finance to support the broader metropolitan areas are compounded. Highly fragmented governance arrangements in many metropolitan areas makes efficient financing for area-wide climate mitigation and adaptation strategies a difficult and on-going challenge. As witnessed in the Chicago Climate Action Plan, raising funds to support the initiative required substantial effort and collaborative work. Without a clear, permanent, and sufficient financial mechanism, it is indeed quite difficult to implement planning for more climate-resilient cities.

3. *Effective citizen participation and access to information.* Improving citizens' access to information and maintaining a relationship of accountability between local governments and their citizens are critical to improving a city's climate resilience. Principles of transparency and democracy require that the mechanisms of participation are accessible, easily understood, and with simple forms of representation. Addressing climate change risk in cities depends on the availability and accessibility of information on climate risks and an engaged, informed urban citizenry involved in the formulation of climate action plans.
4. *Jurisdictional coordination* is one of the most pressing governance challenges common to cities worldwide. This challenge takes two forms: multi-level jurisdictional coordination of services vertically across multiple levels of government, and inter-jurisdictional coordination of services horizontally across the metropolitan area. In the case of the former, the inter-governmental relations involved in the governance of cities are often in flux with extensive and complex decentralization processes in motion in many countries worldwide. Multiple tiers of government and various levels of state agencies are involved in the climate change agenda, and vertical coordination is often weak or non-existent. In the case of the latter, existing governing institutions are often horizontally fragmented, uncoordinated and, in many cases, ad-hoc when it comes to climate change strategy, due to multiple jurisdictional and electoral boundaries that span the territories of vast metropolitan areas. Coordination is fundamental not only in basic sectoral areas such as land, transport, energy, emergency preparedness, and related fiscal and funding solutions, but in addressing issues of poverty and social exclusion through innovative mechanisms of inter-territorial solidarity.
5. *Land use planning* is a key criterion for effective city governance in the arena of climate change strategies. Territorial and spatial strategies are key to addressing climate change risks and building effective mitigation and adaptation strategies. Land use planning in cities and their peri-urban areas and the broader hinterland of cities and transport and related infrastructure planning at urban and regional levels are core requirements in addressing climate change in cities worldwide. Managing transportation and infrastructure investments in large metropolitan areas is essential for the advancement of the climate change agenda and

addressing GHG emission targets. These investments and services, however, are often implemented, financed, managed, and regulated by different governing institutions and levels of government. Coordination of these processes relies on complex intergovernmental policy networks and organizational management. This coordination is an essential basis for making progress on the climate change agenda in cities globally.

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Author Biography

Professor Patricia McCarney teaches in Political Science at the University of Toronto and is Director of the Global City Indicators Facility—a program initiated by the World Bank and now based at the University of Toronto and positioned to be the definitive and authoritative compilation of validated, self-reported, comparative worldwide urban data. GCIF tracks progress on 115 indicators across more than 150 cities. Before joining the University of Toronto, between 1983 and 1994, Professor McCarney worked as a professional staff member in a number of international agencies, including the International Development Research Centre in Ottawa, the World Bank in Washington, and the United Nations Centre for Human Settlements (UN-HABITAT) in Nairobi. She has over twenty years' experience in the field of international development, specializing in cities, governance, comparative politics, climate change and planning in cities of Asia, Africa and Latin America, and global cities in comparative perspective.