CHAPTER 2

CITIES AND THE INTERNATIONAL CLIMATE CHANGE FRAMEWORK

Responses to the climate change challenge are taking place within the context of an international framework that shapes related actions and decisions at all levels.[1] This framework is defined here as the spectrum of agreements, mechanisms, instruments and actors governing and driving climate change action globally. The overall structure of this framework is complex and multidimensional in that it is comprised of elements that are quite different and distinct in many of their functions and approaches, constituencies, scope and focus.[2] While international agreements negotiated by national governments such as the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol remain crucial aspects of the framework, they are not the only mechanisms governing climate change action. Other layers of intervention have become equally important in implementing innovative climate change responses and policies, including those at the regional, sub-national and local levels.

Cities have a vital role to play in the implementation and achievement of commitments within the international climate change framework. They also stand to benefit from the opportunities created by this framework for local responses to climate change. Yet, local-level actors and authorities often lack an understanding of the nature and functioning of the various components of the international climate change framework and how they could utilize these to enhance their mitigation and adaptation strategies. For instance, many decision-makers operating at the city level lack a working knowledge of the opportunities and constraints associated with international financing options, including those established as part of the UNFCCC.[3] In view of this, the aim of this chapter is to highlight the key elements of the international climate change framework and its effects on interventions at the local level. It is also intended to frame discussions of climate change conditions, trends and policies in the rest of this Global Report.

The chapter starts by briefly describing the process by which climate change emerged as an issue of international concern culminating in the establishment of the UNFCCC as the key element of the international regime governing climate change issues. The core mechanisms, instruments and financing strategies of this Convention are then outlined. The Kyoto Protocol is also reviewed as the main international treaty with legally binding emission reduction commitments. Subsequently, the key actors, components and actions of climate governance at the international, regional, national and sub-national levels are considered. Finally, the implications of the international climate change framework for local action at the city level are outlined.

THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

Climate change issues have been discussed since the early 19th century (see Table 2.1), but only emerged as an international policy concern during the 1970s and 1980s when technological advances allowed scientists to state with more certainty that atmospheric concentrations of greenhouse gases (GHGs) were on the rise and that this could have profound ramifications for the Earth's climate. Between 1988 and 1990, national governments began to play a greater role in defining the climate change agenda, and the Intergovernmental Panel on Climate Change (IPCC) was established in 1988 to provide them with information on global warming trends through regular scientific assessments (see Box 2.1).

Local-level actors and authorities often lack an understanding of the nature and functioning of the various components of the international climate change framework

The process of formally negotiating an international climate change treaty started in December 1990, when the United Nations General Assembly created the Intergovernmental Negotiating Committee for a Framework Convention on Climate Change. In 1992, the committee adopted the United Nations Framework Convention on Climate Change (UNFCCC) at the United Nations Headquarters, New York. The UNFCCC, also known as the Climate Convention, entered into force in 1994 and had been ratified by 193 countries by October 2010.[4] The ultimate objective of the Convention is to stabilize global greenhouse gas (GHG) concentrations at a level that would prevent human interference with the climate system.[5] The Convention also aims to assist countries, especially developing ones, in their efforts to adapt to the effects of climate change.

The Convention's efforts to curb emissions are premised on some explicit and implicit norms which have

Table 2.1

Major milestones in international climate change governance

1827	French scientist Jean-Baptiste Fourier is the first to consider the 'greenhouse effect' – the phenomenon whereby atmospheric gases trap solar energy, increasing the Earth's surface temperature.
1896	Swedish chemist Svante Arrhenius blames the burning of fossil fuels producing CO_2, the main greenhouse gas, for contributing to climate change.
1950s	Global warming science grows with increasing information on the impacts of greenhouse gases upon the world's climate, together with the development and growth of environmental movements.
1979	First World Climate Conference in Geneva, Switzerland, calls on governments to forecast and prevent potential human-made changes in climate.
1988	The Intergovernmental Panel on Climate Change (IPCC) is established to produce regular scientific and technical assessments of climate change.
1992	The United Nations Framework Convention on Climate Change (UNFCCC) is adopted in New York, US, on 9 May 1992, and enters into force on 21 March 1994.
1997	The Kyoto Protocol to the Convention is adopted at COP-3 in Kyoto, Japan, and enters into force on 16 February 2005.
2001	The Marrakesh Accords, a set of detailed rules for the implementation of the Kyoto Protocol, is adopted during COP-7 in Marrakesh, Morocco.
2007	Negotiations for a new international treaty to take over from the Kyoto Protocol in 2012 begin in Bali, Indonesia, during COP-13. The Bali Road Map, a two-year process to finalize a binding agreement in 2009 during COP-15, is agreed upon.
2009	The main outcome of COP-15, the Copenhagen Accord, is a non-binding agreement which seeks to cap the global temperature rise and raise finances for climate change action in developing countries.
2010	The Cancún Agreements are adopted during COP-16 in Cancún, Mexico, containing a package of decisions on mitigation and adaptation targets, implementation and funding.
2011	COP-17, Durban, South Africa, 28 November–9 December 2011.

Sources: Baumert et al, 2005; ICLEI et al, 2009; *New Scientist*, 2009

become fundamental to the international climate regime. Chief among these are the principle of 'common but differentiated responsibilities and respective capabilities' and the 'precautionary principle'.[6] The first recognizes historical differences in the contribution of developed and developing countries to climate change, as well as differences in their respective economic and technical capacity to tackle these problems.[7] In this regard, the Convention places the greatest responsibility for fighting climate change on developed countries, given their role in generating much of the GHG emissions in the past. The second implies that even in the absence of full scientific certainty, countries are obliged to

Box 2.1 The Intergovernmental Panel on Climate Change

The IPCC was created in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) in order to keep world governments informed of climate change issues. The IPCC's 194 member countries meet once a year during sessions also attended by numerous other institutions and observer organizations.

The United Nations General Assembly resolution 43/53 of 6 December 1988 states that the role of the IPCC is to 'provide internationally coordinated scientific assessments of the magnitude, timing and potential environmental and socio-economic impact of climate change and realistic response strategies'. The same resolution requested the WMO and UNEP to initiate a comprehensive review and subsequent development of recommendations with respect to the following vis-à-vis the IPCC:

- the state of knowledge of the science of climate and climatic change;
- programmes and studies on the social and economic impact of climate change, including global warming;
- possible response strategies to delay, limit or mitigate the impact of adverse climate change;
- the identification and possible strengthening of relevant existing international legal instruments having a bearing on climate; and
- elements for inclusion in a possible future international convention on climate.

The IPCC analyses scientific and socio-economic information on climate change and its impacts, and assesses options for mitigation and adaptation. It provides scientific, technological, and socio-economic findings to the Conference of the Parties (COP) to the UNFCCC. The IPCC's assessment process is a vital interface between science and policy and a crucial mechanism by which science informs policy-making. Accordingly, the IPCC has played a crucial role in establishing the importance of the climate change issue; providing an authoritative resolution of policy-relevant scientific questions; demonstrating the benefits and costs of various policy options; identifying new research directions; and providing technical solutions.

To date, the IPCC has prepared comprehensive scientific reports on climate change on a regular basis. The First Assessment Report of the IPCC (published in 1990) indicated that levels of human-made GHGs were increasing in the atmosphere and predicted that these would exacerbate global warming. It also illustrated the need for a political platform for countries to tackle the consequences of climate change, thereby playing a critical role in the creation of the UNFCCC. Both the Second (1995) and Third (2001) Assessment Reports implied stronger linkages between human activity and climate change, thereby strengthening efforts for the negotiation of the Kyoto Protocol. The Fourth (and latest) Assessment Report (2007) noted that the evidence for global warming is 'unequivocal' and forecasted warming of 1.8 °C to 4.0°C by 2100. The IPCC is currently working on the Fifth Assessment Report, which is due to be released in 2014.

In addition to the assessment reports, the IPCC has prepared numerous other reports, methodologies and guidelines to support countries in implementing their commitments.

Sources: IPCC, undated a, undated b; UN, 1988; Brasseur et al, 2007

The IPCC's assessment process is a vital interface between science and policy and a crucial mechanism by which science informs policy-making

anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects.[8]

Countries ratifying the treaty are referred to as 'Parties to the Convention' and agree to develop national programmes to slow climate change. 'Annex I' countries include developed countries that were members of the Organisation for Economic Co-operation and Development (OECD) in 1992 and also countries with economies in transition. These countries are required to provide regular inventories of their GHG emissions using 1990 as the base year for these tabulations.[9] 'Annex II' countries consist of Annex I countries excluding countries with economies in transition. These parties are expected to support mitigation and adaptation activities in developing countries financially and through the transfer of technology. 'Non-Annex I' countries are developing countries and are given special consideration due to their limited capacity to respond to climate change.[10]

The main authority of the Convention is the 'Conference of the Parties' (COP), which is comprised of all parties and meets annually to assess 'progress made by Parties in meeting their commitments and in achieving the Convention's ultimate objectives'.[11] Sessions of the COP, of which 16 have taken place (by the end of 2010) since the Convention entered into force in 1994, serve as the main forums for negotiations between the parties and the adoption of key decisions and resolutions. This is particularly important since the Convention mostly contains general formulations that are deliberately ambiguous to accommodate the diverse positions of the parties. The COPs are also attended by a large number of observers, including intergovernmental, non-governmental and other civil society observers.[12]

The first Conference of the Parties (COP-1) took place in December 1995 in Berlin, Germany, and expressed concern about the ability of countries to meet their emissions targets and commitments. Through the Berlin Mandate adopted at this meeting, a committee was established to negotiate a protocol on climate change by 1997, including additional GHG emissions reduction commitments for developed countries for the post-2000 period.[13] By the time COP-2 took place in July 1996 in Geneva, Switzerland, consensus on the negotiation of a protocol was not yet in sight and preliminary national communications suggested that countries were unlikely to meet their emissions reduction targets (i.e. to return to their 1990 emissions levels by 2000).[14] However, the meeting endorsed the Second Assessment Report of the IPCC, and reaffirmed the need for legally binding 'quantified emission limitation reduction objectives'.[15] In 1997, the principles under the UNFCCC were finally translated into legally binding commitments through the Kyoto Protocol, which was adopted at COP-3 in Kyoto, Japan.[16]

In addition to its focus on emissions reduction, the UNFCCC also seeks to support adaptation activities in developing countries. Accordingly, in 2001, during COP-7 in Marrakesh, Morocco, three main funding mechanisms for adaptation were set up under the UNFCCC – namely, the Special Climate Change Fund, the Least Developed Countries Fund and the Adaptation Fund (see Box 2.2). These are administered by the Global Environment Facility (GEF), an international partnership between 182 countries, international institutions, non-governmental organizations (NGOs), and the private sector to address global environmental challenges. The GEF was established in 1991 as a pilot programme at the World Bank with UNEP and the United Nations Development Programme (UNDP) as implementing partners. During the United Nations Conference on Environment and Development (UNCED) in 1992, it was restructured to become a separate institution and the main entity managing the funding mechanisms of the UNFCCC.[17]

A key challenge for the UNFCCC is that its main goal is somewhat 'indeterminate'. In other words, although it conveys the long-term goal of reducing emissions, it cautiously avoids any quantitative expression of it.[18] This is partly because the climate domain is characterized by uncertainties regarding causes, impacts and relationships. Although the publication of the IPCC's Fourth Assessment Report in 2007 signalled that the scientific community has established with greater clarity that human activities are the main causal factors of the unprecedented changes in our climate system, climate science still faces challenges. For instance, it cannot currently help policy-makers to know, with absolute certainty, how much is too much (e.g. what is the point beyond which emissions are too high). Science also cannot objectively ascertain at what level human interference with climate becomes dangerous. Some form of value judgement is unavoidable. And value judgements are context specific, not only because climate impacts differ from place to place, but also because different people perceive the risks in diverse ways.[19]

A key challenge for the UNFCCC is that its main goal is somewhat 'indeterminate'

Box 2.2 Funding mechanisms of the UNFCCC

The *Special Climate Change Fund* is intended to finance activities related to adaptation, technology transfer and capacity-building, energy, transport, industry, agriculture, forestry, waste management and economic diversification. By September 2009, voluntary contributions of around US$120 million had been pledged for the fund and 24 projects had been approved.[a]

The *Least Developed Countries Fund* aims to assist 48 least developed countries to prepare and implement National Adaptation Programmes of Action (NAPAs) through which they identify priority adaptation activities for funding.[b] The rationale for this fund lies in the recognition of the limited ability of such countries to adapt to the consequences of climate change.[c] By March 2010, the United Nations Framework Convention on Climate Change (UNFCCC) had received NAPAs from 44 countries.[d] As of 30 September 2009, US$180 million had been pledged for this fund through voluntary contributions and, by 2010, 84 projects had been approved.[e]

The *Adaptation Fund* was established to finance adaptation projects and programmes in developing countries that are especially vulnerable to climate change impacts.[f] It is to be funded from a 2 per cent levy on all Clean Development Mechanism (CDM) project activities (see Box 2.3). The fund only became operational in 2010 and by October 2010, projects had been approved in only four countries – namely, the Solomon Islands, Nicaragua, Senegal and Pakistan.[g] Although the fund is expected to have grown to US$500 million by 2012, this falls short of the estimated US$50 billion required annually for adaptation activities in developing countries.[h]

Sources: a Climate Fund Update, undated a; UNFCCC, undated f; GEF, undated; World Bank, 2009b; b UNFCCC, undated g; c UNFCCC, undated h; d UNFCCC, undated i; e Climate Fund Update, undated b; GEF, undated; World Bank, 2009b; f Climate Fund Update, undated c; UNFCCC, undated j; g AlertNet, 2010a, 2010b; h IIED, 2009

Furthermore, because many of the cause-and-effect relationships are long and potentially irreversible, they require planning that goes beyond the tenure and even the lifetime of most current decision-makers and stakeholders. Complex interdependencies exist between different policy areas within and beyond climate policy, and the international community may fail to put in place the unprecedented series of response mechanisms that are required.[20] The difficulties related to international climate change negotiations (i.e. stalled negotiations during most of the COPs followed by last-minute key decisions by some parties) further complicate the operationalization and implementation of the UNFCCC.

The Kyoto Protocol … is a binding agreement which commits developed countries to stabilize their GHG emissions

THE KYOTO PROTOCOL

The Kyoto Protocol was adopted on 11 December 1997 in Kyoto, Japan, during COP-3, and entered into force on 16 February 2005. By the end of 2010, the protocol had been ratified by 191 countries.[21] While the protocol holds in common the objective and institutions of the UNFCCC, the two differ in that the protocol is a binding agreement which commits developed countries to stabilize their GHG emissions, while the Convention only encourages the same.[22] Key decisions and resolutions on the implementation of the Kyoto Protocol's provisions are taken during the Meeting of the Parties to the Kyoto Protocol (MOP), which occurs in conjunction with the meetings of the COP to the UNFCCC.[23] The rules for implementing the protocol were spelt out in the Marrakesh Accords adopted in 2001 at COP-7 in Marrakesh, Morocco.[24]

According to the protocol, developed countries commit to reduce their overall GHG emissions by at least 5 per cent below 1990 levels during the commitment period from 2008 to 2012.[25] They submit annual emission inventories and national reports at regular intervals and a compliance system is in place to assist countries to meet their targets. Some developed countries rejected the protocol but are developing alternative regulatory approaches.[26] Developing countries have also ratified the protocol but do not need to limit or reduce their emissions. In addition to reducing emissions, the Kyoto Protocol also seeks to assist vulnerable developing countries to adapt to the adverse effects of climate change, primarily through the Adaptation Fund (see Box 2.2). During COP-16 (in Cancún, Mexico) a decision on binding emissions targets for a 'second commitment period' (i.e. beyond 2012) was deferred to a future date.

Before its adoption, negotiations of the Kyoto Protocol were stalemated over two critical issues. *First*, developed countries were in disagreement regarding mitigation targets. The European Union (EU) supported a 15 per cent reduction in GHG emissions below 1990 levels; the US and Australia proposed lower targets; and Japan's position was somewhere in the middle. To deal with these differences, diverse emissions targets were set, ranging from a 10 per cent increase for Iceland to an 8 per cent reduction for Germany, Canada and other countries.[27] Rather than being based on what the scientific community would consider necessary to stabilize emissions at current levels, or reflecting the levels of reductions that countries could achieve, emissions targets were the outcome of tough bargaining in closed-door sessions between representatives of the US, the EU and Japan during the final hours of COP-3 in Kyoto, Japan.[28]

Second, the flexibility of implementation mechanisms was an issue of contention. While developing countries and the EU supported domestic action as the main means to achieve emissions reduction targets, the US and some industries (mostly from the energy sector) argued that developed countries could achieve their targets through emissions-abatement projects in other countries or through emissions trading. Thus, although countries are expected to meet their mitigation targets primarily through national programmes, the Kyoto Protocol enables them to cut their emissions through three flexible mechanisms – namely, the Clean Development Mechanism (CDM), joint implementation and emissions trading (see Box 2.3).

Despite already contributing to emissions reductions globally, the flexible mechanisms have also been criticized. For instance, CDM has been criticized for simply moving emission reduction activities and their socio-economic and environmental impacts to where it is cheapest to make them, which normally means a shift from developed to developing countries.[29] Also, the CDM is not necessarily able to deliver the promised development dividends to the host country.[30] Emissions trading has been critiqued for allowing developed countries to earn emissions reduction credits primarily

Box 2.3 Flexible mechanisms under the Kyoto Protocol

The three flexible mechanisms of the Kyoto Protocol are as follows:

1. *Emissions trading* allows developed countries that exceed their target emissions to offset them by buying 'credits' from countries that stay below their emission targets. Emission quotas were agreed with the intention of reducing overall emissions by developed countries by 5 per cent of the 1990 levels by the end of 2012. For the five-year compliance period from 2008 until 2012, countries that emit less than their quota will be able to sell emissions credits to countries that exceed their quota.[a] In 2010, the value of the global carbon market was estimated to be worth a staggering US$144 billion.[b]
2. The *Clean Development Mechanism (CDM)* – which has been operational since 2006 – enables emission reduction projects in developing countries to earn certified emission reduction credits, which can then be traded or sold. These credits can be purchased by developed countries to achieve a twofold purpose: to meet their own emissions reduction targets under the Kyoto Protocol and to assist other countries in achieving sustainable development through climate change mitigation.[c] CDMs have registered an astounding growth, with over 5000 projects in the pipeline as of August 2010.[d]
3. *Joint implementation* allows developed countries to invest in emissions reduction activities in other developed countries. A developed country can thus earn emission reduction units from an emission reduction or emission removal project in another developed country, which can be counted towards meeting its Kyoto target.[e] A total of 243 joint implementation projects were in the pipeline as of 1 November 2009.[f]

Transactions by parties to the Kyoto Protocol under the above three flexible mechanisms are tracked and recorded through an international transaction log.[g] The log monitors the compliance of transactions with the rules of the Kyoto Protocol and may reject entries where this is not the case. Between 1 November 2008 and 31 October 2009, a total of 225,119 transaction proposals were submitted to the international transaction log.

Sources: a UNFCCC, undated q; b World Bank, 2010b; c UNFCCC, undated m; d CD4CDM, undated; e UNFCCC, undated n; f Gilbertson and Reyes, 2009; g UNFCCC, undated l

through trading rather than through cutting their domestic emissions. It also encourages developed nations to avoid their obligation to develop pollution reduction innovations to enable developing countries to increase production while limiting pollution.[31]

In an effort to create a framework of action for the period after the end of the current commitment period of the Kyoto Protocol in 2012, the Bali Road Map was adopted in 2007 during COP-13 to finalize a binding agreement in 2009 during COP-15 in Copenhagen, Denmark. However (and as was the case with the negotiations within both the UNFCCC and the Kyoto Protocol, and despite two years of advance work initiated by the Bali Road Map), little progress was made during two weeks of negotiations in Copenhagen. With time running out, the US forged the Copenhagen Accord, a 'non-binding' agreement that all but a handful of parties accepted. While the Copenhagen Accord succeeded in forging agreement on the need to address climate change, it is viewed as a major compromise that emerged due to the failure of countries to agree on a binding agreement to govern emissions reduction in the post-Kyoto period.

In contrast, the latest meeting, COP-16 in 2010 (Cancún, Mexico) has been dubbed a 'beacon of hope' that has restored faith in international climate change negotiations. While an agreement for the post-Kyoto period was not reached, the adoption of the 'Cancún Agreements', a package of decisions on adaptation and mitigation targets, implementation and funding, has managed to ebb some of the pessimism that emerged following COP-15. In addition to encouraging countries to push their emissions reduction targets over and above the commitments within the Kyoto Protocol, the Cancún Agreements establish mechanisms such as the Green Climate Fund, the Cancún Adaptation Framework and the Climate Technology Centre and Network to strengthen climate change action.[32]

The next Conference of the Parties will take place in 2011 (28 November to 9 December in Durban, South Africa) and an attempt to forge a binding agreement for the post-2012 period will once again be made. However, it remains uncertain whether the international community will be able to reach a legally binding agreement to replace the Kyoto Protocol. The continued delay in reaching such an agreement is expected to have serious negative consequences for global emissions reduction efforts.[33]

Despite its significance as the main binding agreement between parties, the Kyoto Protocol has been criticized on a variety of grounds. Some argue that it imposes high burdens on developed countries, while others suggest that it provides ineffective incentives for participation and compliance. Yet others point out that it creates modest short-term climate benefits while failing to provide a long-term solution. Indeed, numerous alternatives to the protocol have been suggested to address these shortcomings.[34] The existence of a set of initiatives parallel to the Kyoto Protocol is a sign of the fragmented nature of the international climate change framework and has led to an extensive debate on how to continue the negotiation of future treaties. The majority of policy proposals still support a universal framework of climate governance, while other recent proposals implicitly create the possibility of further institutional fragmentation of this framework (e.g. starting a bottom-up process in which countries would put on the table acceptable measures in line with national circumstances).[35]

OTHER CLIMATE CHANGE ARRANGEMENTS

Although international climate change negotiations between national governments remain crucial, the last two decades have witnessed the multiplication of other regional, national and local (e.g. city) mechanisms and actors responding to the climate challenge. These include initiatives of multilateral and bilateral entities, sub-national tiers of government, grass-roots groups, private enterprises, NGOs and individuals. This section describes the role of these in curbing GHG emissions (mitigation) and in climate change adaptation. Furthermore, it examines the levels at which these actors operate and outlines some of the actions, initiatives and instruments that they have developed and implemented to date.

It remains uncertain whether the international community will be able to reach a legally binding agreement to replace the Kyoto Protocol

International level

A number of actors are actively developing strategies for climate change adaptation and mitigation at the international level, including the United Nations, multilateral and bilateral agencies. These initiatives are mostly designed to support the implementation of the commitments of the Kyoto Protocol as the main international treaty for climate change. Although a multitude of international actors are currently active in responding to climate change, many of their strategies, programmes and actions have evolved in isolation from each other. The lack of a clear division of responsibilities between the numerous international actors has led in some cases to overlapping functions, conflicting mandates and blurred objectives, and in other cases to constructive collaboration.[36] In turn, this has implications for the extent to which city authorities are able to make use of international funds and programmes to implement local adaptation and mitigation initiatives.

The UN has embarked on an initiative to ensure better coordination of its response to climate change

■ The United Nations

The United Nations is one of the key climate change actors at the international level. In addition to its work through the UNFCCC and the IPCC described earlier, a number of its programmes and other entities are contributing to the global response to climate change. Since 2007, the UN has embarked on an initiative to ensure better coordination of its response to climate change. Towards this end, five focus areas were defined and convening UN entities identified for each focus area (see Table 2.2). Some additional cross-cutting areas were also identified, including climate science and knowledge and public awareness.[37] This approach is intended to minimize duplication of activities across various entities, thereby making the UN's work on climate change more effective and efficient.

UNEP is one of the organizations which has played a pivotal role in action on climate change, having jointly

Table 2.2

Focus areas for a coordinated United Nations response to climate change

Focus area	Convening United Nations entities
Adaptation	High-level Committee on Programmes of the Chief Executive Board of the United Nations
Technology transfer	United Nations Industrial Development Organization (UNIDO) and United Nations Department for Economic and Social Affairs (UNDESA)
Reduction of emissions from deforestation and degradation (REDD)	United Nations Development Programme (UNDP), the Food and Agricultural Organization (FAO) and the United Nations Environment Programme (UNEP)
Financing mitigation and adaptation action	UNDP and the World Bank group
Capacity-building	UNDP and UNEP

Source: UN, 2008

established the IPCC with the World Meteorological Organization (WMO) in 1988 and actively engaged with adaptation and mitigation efforts since then.[38] In addition to a wide range of activities on the urban environment, UNEP is also implementing climate change-related activities within the context of cities through its Campaign on Cities and Climate Change. This campaign aims to enable cities to fruitfully engage in the global climate debate and reduce their GHG emissions.[39]

UN-Habitat is well positioned to address climate change issues specifically within the urban context

The WMO – which is the UN specialized agency for weather, climate, hydrology and related environmental issues – has led the process of generating scientific evidence and knowledge on climate change trends and has been the principal provider of the information underlying the IPCC's assessment reports (see Box 2.1). The WMO has also been issuing 'annual statements on the status of the global climate' to document extreme weather events and provide a historical overview of climate variability.[40]

Box 2.4 UN-Habitat's Cities and Climate Change Initiative

Launched in 2008, the Cities and Climate Change Initiative (CCCI) seeks to promote collaboration between local governments and their associations and partners on climate change-related topics, enhance policy dialogue between local and national governments on addressing climate change, support local governments in addressing climate change impacts while reducing greenhouse gas (GHG) emissions, and foster awareness, education and capacity-building for the implementation of climate change policies and strategies.

CCCI initially helped four pilot cities in Asia, Africa and Latin America to carry out climate change assessments. These cities already are at risk of natural disasters. In Esmeraldas (Ecuador), for example, more than half the population live in areas at risk of floods or landslides, while in 2006 two typhoons hit Sorsogon City (the Philippines), destroying some 10,000 homes. Climate change will only exacerbate those vulnerabilities in the 21st century. CCCI currently plans to help those cities deepen their assessments in priority areas, develop climate change strategies and action plans, mainstream findings into ongoing planning processes, and build capacity. At the same time, CCCI has been expanding to include five new cities in Africa in 2009 (Bobo Dioulasso, Burkina Faso; Mombasa, Kenya; Walvis Bay, Namibia; Kigali, Rwanda; and Saint Louis, Senegal) and nine new cities in Asia and the Pacific in 2010 (Batticaloa and Negombo, Sri Lanka; Kathmandu, Nepal; Ulaanbaatar, Mongolia; Pekalongan, Indonesia; Port Moresby, Papua New Guinea; Lami City, Figi; Apia, Western Samoa; and Port Vila, Vanuatu).

CCCI also is developing capacity-building tools to help cities access carbon finance or to develop climate change plans, drawing on local experiences. Finally, CCCI is taking lessons that it has captured through its local-level work, and disseminating and applying them globally. For example, the recent experiences of Negombo (Sri Lanka) in determining a baseline for its GHG emissions are helping to inform the next iteration of the International Standard for Determining Greenhouse Gas Emissions for Cities (see Box 2.5).

Source: UN-Habitat, 2009b

As the agency with a mandate to foster sustainable urbanization, the United Nations Human Settlements Programme (UN-Habitat) is well positioned to address climate change issues specifically within the urban context. In 2008, UN-Habitat launched its Cities and Climate Change Initiative to enhance the adaptive capacities and responsiveness of local governments in developing countries to climate change, as well as to support their efforts at reducing greenhouse gas emissions (see Box 2.4).

Different UN entities have also been collaborating in the area of climate change. A case in point is the joint establishment of the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD) in 2008 by UNEP, UNDP and the Food and Agriculture Organization (FAO).[41] Furthermore, UN agencies frequently implement climate change activities jointly with a number of partners outside the UN system. One example is the collaboration between UN-Habitat, UNEP and the World Bank to establish the International Standard for Determining Greenhouse Gas Emissions for Cities, a common standard for measuring emissions from cities (see Box 2.5).[42]

The UN has also been playing a leading role in terms of disaster risk management, which is fundamental to climate change adaptation efforts. The International Strategy for Disaster Reduction (UNISDR), which was adopted in 2000, is a system of partnerships between local, national, regional and international organizations with the overall objective of supporting global disaster risk reduction. UNISDR functions as the United Nations focal point for the coordination of disaster reduction. It is also tasked to mobilize political and financial commitments to implement the Hyogo Framework for Action 2005–2015, the main international agreement which lays out principles and priorities for global disaster risk reduction action, though it is not legally binding.[43] The 'urban agenda' is receiving greater attention in the work of the UN on disaster issues, with the UNISDR launching a campaign on Making Cities Resilient: My City is Getting Ready in 2010 to urge mayors and local governments to commit to making their cities more resilient to disasters, including those related to climate change.[44]

On the whole, the UN has been performing a crucial role in steering and coordinating climate change action internationally. It has also been at the forefront of generating scientific knowledge on climate change to support international negotiations and evidence-based policy-making. The initiative to harmonize the work of various UN entities on

climate change since 2007 is expected to further consolidate the organization's leading role in guiding the global response to climate change.

Other multilateral organizations

Other multilateral institutions are playing an increasingly important role in climate change adaptation and mitigation at various levels. For instance, although it was thought that climate considerations were marginal for multilateral development banks in the past, this has been changing in recent years.[45] The World Bank Group is one such actor that has been reinforcing its engagement with climate change issues (see Box 2.6). This includes working directly on climate change issues within the urban context. The World Bank Institute is implementing city-focused climate change activities specifically in four areas: South–South learning between cities; city-level networks and knowledge platforms; knowledge exchange and structured learning; and customized support to selected cities.[46] Furthermore, under its Carbon Finance Assist Programme, which aims to enhance the capacity of developing countries to engage fully with the flexible mechanisms of the Kyoto Protocol (see Box 2.3), the World Bank has further initiated a twinning initiative for climate change knowledge-sharing between cities and a Carbon Finance Capacity Building programme for emerging megacities.[47] This programme seeks to promote the role of carbon finance for sustainable urbanization and poverty reduction.[48] In addition, in 2009, the World Bank established a Mayors' Task Force on Urban Poverty and Climate Change during COP-15 in Copenhagen, Denmark, and intends to prepare a *Mayor's Handbook on Adaptation*.[49]

The regional development banks are also key multilateral actors responding to climate change. In 2007, the Asian Development Bank established the Clean Energy Financing Partnership Facility to enhance energy security and to abate climate change in developing member countries. Potential investments under this facility include those related to developing and promoting clean energy technologies, including for low-income groups. By 2010, the funds for this facility had reached US$44.7 million.[50] In 2009, the Inter-American Development Bank launched the Sustainable Energy and Climate Change Fund with a total annual contribution of US$20 million. The fund aims to support sustainable energy initiatives and innovations, as well as responses to climate change in Latin America and the Caribbean.[51] Elsewhere, the European Investment Bank, whose lending activities focus mainly on EU member states, has been a key player in supporting climate change responses through mitigation, adaptation, research, development and innovation, technology transfer and cooperation, and support for carbon markets.[52]

The OECD is another multilateral organization which has been working on climate change issues for almost three decades, particularly on economic and policy analysis. With respect to climate change issues in cities, the OECD aims to support climate-sensitive local and regional development policies. Accordingly, it has published a number of reports on this subject analysing the linkages between climate change and urban development.[53] The organization intends to continue its work on climate change in the urban context with a focus on the impacts of green growth and the effect of urban spatial form on GHG emissions.[54]

In sum, multilateral actors are playing an increasingly important role in supporting climate change responses. They have especially become a prominent source of financial and technical assistance for climate change action in developing countries.

Box 2.5 International Standard for Determining Greenhouse Gas Emissions for Cities

Introduced in March 2010, the International Standard for Determining Greenhouse Gas Emissions for Cities seeks to establish a common standard for measuring emissions from cities. In addition to emissions generated within urban areas, the standard also measures emissions generated outside urban boundaries that are driven by urban-based activities. This includes the following:

- out-of-boundary emissions from the generation of electricity and district heating which are consumed in cities (including transmission and distribution losses);
- emissions from aviation and marine vessels carrying passengers or freight away from cities; and
- out-of-boundary emissions from waste that is generated in cities.

Rather than attributing the responsibility for emissions to local governments, the standard seeks to illustrate the extent to which the urban economy is carbon dependent. Accordingly, emissions from the generation of power for consumption in cities, from city-bound aviation and marine transport, and from waste generated in cities are included. Furthermore, standardized reporting will help cities to benchmark themselves.

Source: UNEP et al, 2010

Box 2.6 Climate change initiatives at the World Bank

Some of the major climate change activities at the World Bank during recent years include the following:

- In 2005, the Clean Energy Investment Framework was created to accelerate clean energy investments in developing countries. The framework functions as a collaborative endeavour between multilateral development banks and countries to identify investments needed to accelerate the transition to a low-carbon economy and support adaptation programmes.
- In 2008, a Strategic Framework was prepared to guide the World Bank's work on climate change issues with a focus on the following six action areas: supporting climate actions in country-led development processes; mobilizing additional finance; facilitating the development of market-based financing mechanisms; leveraging private-sector resources; supporting the development and deployment of new technologies; and enhancing policy research, knowledge and capacity-building.
- In 2008, the Climate Investment Fund was launched with pledges of US$10 billion from ten donor countries to fund the demonstration, deployment and transfer of low-carbon programmes to developing countries. There are two main funds under this initiative – namely, the Clean Technology Fund for activities related to the power sector, transport and energy efficiency; and the Strategic Climate Fund to support pilot approaches with the potential for scaling up. The latter focuses on key areas of relevance to climate change mitigation in cities, including energy efficiency in buildings and industry.

Sources: World Bank, undated b; UNCTAD, 2009; Climate Investment Funds, undated

■ Bilateral organizations

A number of bilateral initiatives to address climate change have emerged over the past few years, although less attention has been given to financial flows emanating from these initiatives.[55] For instance, one of the largest funds of this type is Japan's Cool Earth Partnership, established to support climate change mitigation and adaptation, as well as access to clean energy in developing countries for the period of 2009 to 2013. The fund is worth US$10 billion, with the bulk of it (80 per cent) allocated for activities related to the reduction of GHG emissions rather than adaptation. Another such fund is the UK's Environmental Transformation Fund – International Window, launched in 2008 to support development through environmental protection and climate change adaptation in developing countries. US$1.6 billion was made available for this fund. The International Climate Protection Initiative of Germany, launched in 2008, is a mechanism for financing climate change projects and is funded from the sale of emissions certificates. The focus is on developing, newly industrializing and transition countries. Since 2008, 181 projects worth a total of €354 million have been launched.

A number of bilateral initiatives to address climate change have emerged … although less attention has been given to financial flows emanating from these initiatives

The EU, another major bilateral actor, works on climate change issues mainly through the Global Climate Change Alliance, an initiative launched in 2007 to support, through direct financial and technical assistance, adaptation and mitigation activities mainly in the least developed countries and the small island developing states. The alliance also seeks to strengthen dialogue between these countries and the EU on climate change issues in the context of international negotiations.[56] The EU earmarked an initial €90 million for the work of the alliance between 2008 and 2010.[57] The work of the alliance is organized around five priority areas – namely, adaptation; reducing emissions from deforestation and degradation; enhancing the participation of developing countries in CDMs; promoting disaster risk reduction; and mainstreaming climate change into poverty reduction strategies.[58]

Even climate champions such as the UK and Germany face challenges complying with their carbon reduction targets

While bilateral funds such as the ones described above are actively supporting climate change responses in developing countries, most are considered to be part of donors' official development assistance. Questions have arisen as to whether this is the best approach for bilateral assistance and whether traditional development aid agencies are best placed to dispense such funds. Furthermore, some of the funds are loans that need to be repaid by recipient countries rather than grants.[59]

■ Regional (supra-national) initiatives

Arrangements for climate change action have also been emerging at the regional level. One example is the Asia-Pacific Partnership on Clean Development and Climate. Launched in 2006, this is a partnership between seven major Asia-Pacific countries (Australia, Canada, China, India, Japan, the Republic of Korea and the US), all of which are among the world's top GHG-emitting countries. These countries are cooperating to respond to the challenge of increased demand for energy and the related problems of air pollution, energy security and climate change.[60] The partnership differs from the UNFCCC and the Kyoto Protocol in its focus on voluntary approaches and technological cooperation, rather than on binding emissions targets.

Another example, the European Emissions Trading Scheme, became operational in 2005 and is the largest multinational GHG emissions trading scheme in the world, involving 25 countries. It is designed to assist countries to meet their emission reduction commitments under the Kyoto Protocol. The scheme limits the amount of CO_2 that can be emitted from large industrial facilities, such as power plants and carbon-intensive factories. It covers almost half (46 per cent) of the EU's CO_2 emissions. Countries are allowed to trade amongst themselves and in validated credits from developing countries through the CDM of the Kyoto Protocol.[61] The first phase of the scheme ran from 2005 to 2007, and the second runs from 2008 to 2012. Because all EU member states have ratified the Kyoto Protocol, the second phase of the scheme was designed to support the Kyoto mechanisms and compliance period. The scheme is expected to account for around two-thirds of the overall emissions reductions which the EU plans to achieve by 2020.[62] However, there has been some concern that the entirety of the emissions reductions required in the second phase could be met through various activities outside of the EU itself instead of through domestic reductions.[63]

National level

The sustained attention of policy-makers, scholars and the media to climate policies at the international level has led them to focus less on other levels of intervention, such as the national level.[64] National governments have the primary responsibility for signing international agreements, curbing GHG emissions and responding to climate-related disasters. So far, their actions have focused mainly on mitigation efforts in a few energy-intensive sectors (e.g. energy, transportation and the built environment); but adaptation actions have recently gained growing attention.

Some countries such as the US and China have been relatively less supportive of international climate policies, but have established rather robust national climate change initiatives. Other countries such as the UK and Germany have been key promoters of climate policies and have introduced an array of policies to achieve long-term reductions. For instance, Germany has an integrated set of 'ecotaxes' to foster alternative energy development and to discourage fossil fuel consumption. The UK has designed a mixed set of regulatory and taxation mechanisms (e.g. a levy on carbon-based electricity generation) that supports energy-efficient and renewable energy programmes.

Yet, even climate champions such as the UK and Germany face challenges complying with their carbon reduction targets. For instance, by 2004 it was clear that the UK's Climate Change Programme, introduced in 2000 to meet the country's Kyoto target, would not achieve its mitigation targets because GHG emissions had been growing at 2 per cent annually from 2002.[65] A review of the programme was thus launched and a revised programme introduced in 2006. Furthermore, national mitigation strategies as well as adapta-

tion and disaster management plans often omit urban areas[66] and lack an in-depth understanding of the relevant social science necessary to achieve an integrated assessment of the linkages between climate change and development,[67] and to undertake that assessment in such a way that stakeholders participate effectively and meaningfully.

Developing countries still lag behind developed countries in terms of climate change action, although an increasing number are introducing national programmes of action on climate change. For instance, in 2008, India introduced its first National Action Plan on Climate Change outlining a number of core missions running through to 2017.[68] According to the plan, the country aims to dramatically increase the use of solar energy and enhance energy efficiency, including within the context of urban areas. In this respect, the plan aims to make 'habitat sustainable through improvements in energy efficiency in buildings, management of solid waste and modal shift to public transport'.[69] Mexico's Climate Change Programme aspires to achieve 50 per cent reductions in greenhouse gas emissions by 2050, while also seeking to reduce the vulnerability of human and natural systems to the effects of climate change during this period.[70] China's National Climate Change Programme states that 'China will achieve the target of about 20 per cent reduction of energy consumption per unit GDP by 2010, and consequently reduce CO_2 emissions'.[71] It also outlines a number of actions and targets to enhance adaptation to climate change, including through protecting ecosystem resources such as grasslands, forests and water reserves.[72]

Generally, there has been greater focus on mitigation than adaptation responses in developing countries, although the latter will be strengthened vis-à-vis the National Adaptation Programmes of Action (see Box 2.2). Furthermore, while developing programmes of action clearly demonstrate 'intent' to take action on the part of developing countries, numerous constraints may hinder the achievement of mitigation and adaptation targets, as elaborated upon in Chapters 5 and 6 of this Global Report.

State/provincial level

National governments are not able to meet their international commitments for addressing mitigation and adaptation without localized action. This is not only because GHG emissions originate in activities and processes taking place at the sub-national level (e.g. states/provinces, municipalities and urban centres), but also because many impacts of climate change are locally felt. Already, sub-national governments at the state/provincial level are playing an increasingly important role in climate change mitigation and adaptation. For instance, local authorities in the Federal District of Mexico City have developed important efforts to curb its GHG emissions. One of these is the Mexico City government, which has prepared the Mexico City Climate Action Programme for the period of 2008 to 2012. The programme aims to reduce greenhouse gas emissions, as well as vulnerability to the impacts of climate change, while strengthening adaptation.[73] Policy networks, political leaders and research groups have been critical in launching a climate agenda. Nevertheless, this has not been enough to push effective policies. Policy-making has been constrained by two sets of institutional factors: the problem of fragmentation in local governance and lack of institutional capacity.[74]

The US offers an example of the multiple interactions between state/province and national tiers of government.[75] In the absence of federal leadership, state (and local) government efforts have become a form of 'bottom-up governance' on climate change issues in the US. With its Global Warming Solutions Act of 2006, California was the first state in the US to introduce enforceable legislation to curb GHG emissions (see also Box 5.18). As per this bill, state-wide emissions are to be reduced to 1990 levels by the year 2020.[76] The State of Washington introduced a similar bill in 2008, and even went further to identify emissions limits up to 2050.[77]

A number of other initiatives across different US states have also emerged. For instance, the Regional Greenhouse Gas Initiative is a market-based initiative involving ten north-eastern and mid-Atlantic states to cap GHG emissions from the power sectors by 10 per cent by 2018.[78] Another similar initiative is the US Mayors Climate Protection Agreement, which has been signed by hundreds of mayors across the country. The agreement encourages mayors to work towards achieving the Kyoto Protocol targets through local action and to urge their state and the federal government to introduce policies for GHG emissions reductions.[79] The Urban Leaders Adaptation Initiative, whose partners represent nine US counties and cities (and the city of Toronto in Canada), aims to assess and project climate change impacts and support its partners in mitigation and adaptation activities.[80] The initiative is aimed at serving as a resource for local governments and as a means to empower local communities to develop and implement climate-resilient strategies.

Developing countries still lag behind developed countries in terms of climate change action

National governments are not able to meet their international commitments for addressing mitigation and adaptation without localized action

Local/city level

Although the Kyoto Protocol does not explicitly identify a role for cities and local governments in responding to climate change, city-level actors are actively participating in climate strategies, projects and programmes. These include local authorities, community-based organizations, the private sector, the academic sector and individuals. Local governments, for instance, have held municipal leadership summits parallel to the four COPs of 1993, 1995, 1997 and 2005. Since 2005, the 'local government and municipal authorities constituency' has operated as an observer in the UNFCCC negotiations.[81] Indeed, 'compared to national politicians, city leaders seem willing and able to take action to protect their cities against these threats and to help make a global difference'.[82]

Depending on their national contexts and histories, city authorities can have a considerable level of influence over both GHG emissions and adaptation to climate change, as elaborated upon in detail in Chapters 5 and 6 of this Global Report. In addition, they are increasingly becoming involved in international city networks, which represent a

Box 2.7 Major international city networks and initiatives on climate change

ICLEI (Local Governments for Sustainability) was previously known as the International Council for Local Environmental Initiatives. Created in 1991, it is an association of more than 1200 local governments from 70 countries who are committed to sustainable development. ICLEI has worked with cities worldwide on climate change through its urban CO_2 Reduction Campaign, Green Fleets Campaign and its Cities for Climate Protection Campaign (CCP Campaign). Local governments participating in the CCP Campaign commit to undertake and complete five performance milestones, as detailed in Box 5.1.[a]

The Large Cities Climate Leadership Group, also known as the *C40* (and originally as the C20), was created in 2005 with the main goals of fostering action and cooperation on reducing GHG emissions, creating policies and alliances to accelerate the uptake of climate-friendly technologies. C40 is composed of cities from all world regions.[b]

The *Clinton Climate Initiative* was launched in 2005 by the William J. Clinton Foundation to create and advance solutions to the core issues driving climate change. In collaboration with governments and businesses around the world, the initiative focuses on three strategic programme areas: increasing energy efficiency in cities; catalysing the large-scale supply of clean energy; and working to stop deforestation. In 2006, the initiative became the delivery partner of the C40 to assist in the delivery of urban mitigation projects. The initiative launched the Climate Positive Development Program in 2009 to support 'climate positive' development in 17 urban locations across six continents. Nearly 1 million people are expected to live and work in these developments when they are complete.[c]

Founded in December 2005, the *World Mayors Council for Climate Change* has more than 50 members from all of the world and seeks to promote policies addressing climate change and its local impacts; to foster the international cooperation of municipal leaders on achieving relevant climate, biodiversity and Millennium Development Goals (MDGs); and to have a say in the design of effective multilateral mechanisms for global climate protection.[d]

United Cities and Local Governments (UCLG) represents and defends the interests of local governments globally. In 2009, more than 1000 cities in 95 countries were direct members of UCLG.[e] It is involved in the Partnership for Urban Risk Reduction, an ad hoc coalition of international organizations with the following objectives:

- promote worldwide awareness campaigns about risk reduction in regions regularly affected by natural disasters;
- build capacity at the local level to foresee and manage risks through the transfer of technical know-how to local actors and decision-makers; and
- set up a global platform for local authorities on disaster risk reduction.[f]

The *Climate Alliance* is an association of cities and municipalities in 17 European countries that have developed partnerships with indigenous rainforest communities. Since 1990, when it was founded, around 1500 cities, municipalities and districts together with more than 50 provinces have joined the alliance. NGOs and other organizations have also joined as associate members. Its aim is to preserve the global climate through a twofold mechanism: the reduction of GHG emissions by developed countries and the conservation of forests in developing countries. The hope is that the former will be achieved through an exchange of information on best practices and by providing recommendations, aids and tools for local climate change policies; while the latter will be achieved through the organization of campaigns and political initiatives on the conservation of the tropical rainforests and the defence of indigenous rights, and by raising awareness of the political situation and living conditions of the indigenous peoples in Amazonia.[g]

The *Asian Cities Climate Change Resilience Network* is an initiative of the Rockefeller Foundation in partnership with other entities such as academic, non-governmental, governmental, international, regional and national organizations.[h] The network seeks to catalyse attention, funding and action on building climate change resilience for poor and vulnerable people in Asian cities. In order to accomplish this, the network is in the process of testing and demonstrating a range of actions to build climate change resilience in India, Viet Nam, Thailand and Indonesia. Lessons from these interventions will be used to support climate change resilience-building in other urban areas of the region.

The *Covenant of Mayors* is a mechanism intended to encourage mayors of cities in EU countries to significantly reduce their GHGs. Accordingly, signatories to the covenant enter a formal commitment to go beyond the target to curb their CO_2 emissions by at least 20 per cent by 2020, as already set by the EU's Climate Action and Energy Package. About 2000 cities in 42 countries were signatories to the covenant by end of 2010. Within one year of signing the covenant, cities are expected to prepare a Sustainable Energy Action Plan indicating how they intend to meet their commitments.[i] Energy Cities, the European association of more than 1000 cities and towns, created in 1990, plays a leading role in the implementation of the covenant.[j]

Sources: a ICLEI, undated; b C40 Cities, undated; c Rosenzweig et al, 2010; a Clinton Foundation, undated; d World Mayors Council on Climate Change, undated; e Prasad et al, 2009; f United Cities and Local Governments, undated; g Climate Alliance, undated; h Rockefeller Foundation, 2010; i EU, undated; j Energy Cities, undated

City authorities can have a considerable level of influence over both GHG emissions and adaptation to climate change

form of multilevel environmental governance across national boundaries with the involvement of multiple governmental, private-sector, non-profit and other civil society stakeholders. International city networks – associations between cities at the international level – have been found to be important in developing the capacity of municipalities because 'they facilitate the exchange of information and experiences, provide access to expertise and external funding, and can provide political kudos to individuals and administrations seeking to promote climate action internally'.[83] In São Paulo, Brazil, for instance, participation in international municipal networks was seen as import for two key reasons. First, they provided the opportunity to 'join the international task force against climate change … bypassing the nation-state with its lack of both binding international obligations and lack of national limits upon GHG emission'.[84] Second, such networks were an important source of personal motivation, offering individuals opportunities to engage with broader debates and keeping them 'passionate about the topic'.[85]

The number of these networks has been on the rise during recent years, as illustrated in Box 2.7. A number of the city networks for climate change have global membership, while others such as the Climate Alliance and the Asian Cities Climate Change Resilience Network have membership which is restricted to certain world regions. While some of the networks have been functional since the early 1990s, others have been launched only recently. In general terms, most city networks focus on climate change mitigation, although adaptation has been receiving greater attention during recent years.

National city networks have also been important in developing municipal capacity in countries where national governments have not taken action to address climate change – for example, the Partners for Climate Protection programme in Canada, ICLEI's CCP Australia programme and the US Mayors Climate Protection Agreement. Such networks have offered political support, additional funding (paradoxically often derived from national government) and a means of sharing information. In the case of the US Mayors Climate Protection Agreement, 'city representatives often cited a moral imperative to help other cities by sharing information on how best to address climate change … of city solidarity', while 'friendly competition to be the greenest city also served to further amplify engagement … engagement to address climate change … spread as cities promoted themselves (and were promoted by policy actors), competed with each other, and inspired other cities to go green'.[86]

However, networks have had an uneven impact, with evidence suggesting that they are more important in developing the capacity of those municipalities that are already leading responses to climate change, and that while the political support and knowledge transfer functions that such networks perform is valuable, 'in the absence of the financial and technological resources to execute programmes, the power of knowledge can be limited'.[87] In effect, networks appear to be most important for those with a degree of existing capacity to act, leading to a virtuous circle where additional resources and support can be accessed. However, for those without the capacity to access such networks in the first place, such initiatives may do little to build capacity to respond to climate change and, in effect, may serve to concentrate resources and attention on cities that are already leading the response to mitigating climate change.

In addition to city authorities, individuals, households and community-based organizations and other local actors have an important role to play in both international climate change negotiations and city-level mitigation and adaptation activities. These actors are recognized non-governmental constituencies in the UNFCCC negotiations and processes (see Box 2.8). As key emitters, the behaviour of these actors may directly result in the success or failure of mitigation efforts. Their actions may also be helpful in facilitating coping responses and in the integration of climate-risk reduction, in emergency responses to climate hazards and in development planning. Any efforts that local actors make to support mitigation, adaptation or emergency preparedness, however, first needs to be made possible by the existence of infrastructural support and regulative incentives. For instance, as illustrated by Dhaka, Bangladesh, and Lagos, Nigeria (see Boxes 6.1 and 6.2), if not supported by broader (governmental) policies and investments, the responses of local actors can merely reduce rather than prevent impacts. Manizales, Colombia, and Ilo, Peru, provide examples of how community-level actors can implement effective responses.[88] In these cities, community-based organizations have worked together with local authorities and the academic sector to become vehicles for more inclusive urban governance, and have implemented actions to prevent the spread of low-income populations in dangerous sites. Although these actions were not directly aimed at addressing climate change risks, such pro-poor and pro-development policies can enhance adaptive capacity and resilience to climate hazards.

Box 2.8 Non-governmental constituencies of the UNFCCC

Non-governmental organizations admitted as observers to the sessions of the United Nations Framework Convention on Climate Change (UNFCCC) have been grouped as follows:

- business and industry non-governmental organizations (BINGOs);
- environmental non-governmental organizations (ENGOs);
- farmers and agricultural non-governmental organizations;*
- indigenous peoples organizations (IPOs);
- local government and municipal authorities (LGMA);
- research and independent non-governmental organizations (RINGOs);
- trade union non-governmental organizations (TUNGOs);
- women and gender non-governmental organizations;*
- youth non-governmental organizations (YOUNGOs).*

A focal point is appointed for each constituency to:

- provide a conduit for the exchange of official information between their constituents and the UNFCCC secretariat;
- assist the UNFCCC secretariat in ensuring an effective participation appropriate to an intergovernmental meeting;
- coordinate observer interaction at sessions, including convening constituency meetings, organizing meetings with officials, providing names for the speakers list and representation at official functions;
- provide logistical support to their constituents during UNFCCC sessions; and
- assist the UNFCCC secretariat in realizing representative observer participation at workshops and other limited-access meetings.

Note: * Recognized on a provisional basis pending final decision on their status by COP-17 (28 November–9 December 2011).

Sources: UNFCCC, undated o, undated p

Although they are a necessary component of successful climate change actions, grassroots actors should not be idealized. In some cases, their extensive involvement in these efforts can make things more difficult.[89] Sometimes, for instance, local associations are closely related to the state, or hold private or sectarian interests that distort local action. Bringing about change through grassroots efforts is perhaps most problematic in settlements within countries that have experienced strong centralized control. As documented in projects aimed at enhancing local capacity to respond to floods and other hazards in Guyana and Viet Nam,[90] the attempt by the international community to modify urban governance through funding community-sponsored development projects runs the danger that local elites or state agents will hijack the benefits of grassroots funding.

Networks … are more important in developing the capacity of those municipalities that are already leading responses to climate change

NGOs are also actively seeking to engage with climate change issues, as exemplified by the Climate Action Network, a network of around 500 NGOs working to promote climate change mitigation.[91] However, while NGOs are plentiful in large cities, they tend to be less common or even absent from smaller urban settlements. Where present, local NGOs are well placed to produce, accumulate and transfer climate change knowledge. As partners in develop-

ment projects aimed at reducing emissions, capturing carbon and reducing risk, they are cost effective, increase transparency and accountability to beneficiaries, and strengthen inclusive governance. However, by increasing their accountability to upper levels of governance, NGOs can lose their flexibility and power to contest the decisions of governments and powerful interests. This can distance them from grassroots partners, reduce inclusiveness and horizontal accountability, and, thus, undermine climate change mitigation and adaptation efforts. On the other hand, when they can maintain independence, NGOs can enhance climate change policy efforts by providing a channel for feedback between the grassroots level and urban government or international civil society actors.[92]

In addition to the leading role of the IPCC in consolidating scientific knowledge to inform policy making, researchers around the world have been generating and disseminating climate change information including specifically in relation to cities. A case in point is the Urban Climate Change Research Network (UCCRN), an international group of researchers with 200 members from 60 cities globally.[93] UCCRN aims to provide climate change information and data specifically for urban decision makers and published its first assessment report on climate change and cities in 2011.[94] The Urbanization and Global Environmental Change project of the International Human Dimensions Programme, established in 2005, is another initiative researching the interactions between environmental change and urban processes.[95]

Partnerships between public, private, civil society and other actors are becoming critical in building urban capacity to respond to climate change

The private sector also has an important role to play in efforts aimed at curbing GHG emissions – for example, through producing more efficient vehicles and utilities, creating technologies for alternative energy, and constructing controlled wastewater treatment plants.[96] A growing number of private-sector companies are also considering how to mitigate emissions through transforming their own work practices. For instance, the Carbon Disclosure Project, established in 2000, has been reporting on GHG emissions from some of the world's largest companies. In 2010, this project collected data from 4700 of the world's largest corporations, on their GHG emissions, the risks and opportunities related to climate change they faced, and strategies for managing them. This process was supported by 534 investors with assets worth US$64 trillion.[97]

Mechanisms within the international climate change framework … do not indicate a clear process by which urban areas and actors may participate

With regard to adaptation to climate change, the private sector has been subject to comparatively little attention, although it is playing a key role in defining investments in climate-proofing infrastructures, energy utilities and other urban sectors. Some specialized investment entities are already taking positions around climate-related risks via investments in reinsurance companies, in resource prices such as oil and gas with the potential to be affected by hurricanes, and through participation in alternative risk-transfer products (e.g. insurance-linked securities such as 'catastrophe bonds' and 'weather derivatives').[98] A key concern is that privatized actions in the area of adaptation may present a potential conflict of interest with the public good. The role of private security firms and privatized healthcare during emergency periods, for instance, requires greater study, with potentially profound implications for governance in urban risk management and disaster response. Nevertheless, as recently emphasized by the executive director of the UNFCCC:

> *Traditional thinking would have us believe that adaptation is the exclusive ambit of the public sector. This is false on two levels: (1) business needs to adapt itself, and (2) adaptation holds investment opportunities for the private sector.*[99]

Indeed, urban capacity to address climate change is increasingly shaped by the presence of more formalized collaboration between public and private actors. Partnerships between public, private, civil society and other actors are becoming critical in building urban capacity to respond to climate change. For instance, in November 2010, R20 – Regions of Climate Action, an innovative coalition was launched to support clean technologies, climate resilient projects, green investment and also influence national and international policies. The coalition includes sub-national government members from developed and developing countries as well as organizations and individuals from the private sector, academia, national governments, international organizations and civil society.[100]

THE POTENTIAL OF THE INTERNATIONAL CLIMATE CHANGE FRAMEWORK FOR LOCAL ACTION

This section briefly reviews the opportunities and challenges posed by the existing international governance framework for local action. It also discusses the existing mechanisms that urban areas could potentially take advantage of, what constraints exist to the use of these mechanisms by urban actors, and explains, briefly, some possible ways in which these constraints could be addressed.

A key factor constraining urban actors' use of mechanisms within the international climate change framework is the fact that these mechanisms are primarily addressed to national governments and do not indicate a clear process by which urban areas and actors may participate. The related international structure for climate change financing, in particular, has been described as 'diverse and complex, and not primarily designed for local governments'.[101] The funding mechanisms of the UNFCCC discussed earlier in this chapter (see Box 2.2) can be used to finance projects within urban areas, but they are only accessible for urban actors through their national governments. Even though national governments represent the interests of their urban populations in international discussions on allocating responsibility for climate change mitigation, and in developing international funding mechanisms and institutions to support adaptation, getting urban priorities moved up on national agendas can be problematic, at best. For instance,

although National Adaptation Programmes of Action have been prepared for developing countries under the Least Developed Countries Fund, there have been few initiatives for adaptation at the sub-national level.[102]

Similarly, emissions trading currently takes place between countries and groups of countries or tends to target particular industries, thereby offering limited possibilities for actions at the urban level. For instance, the European Emissions Trading Scheme targets carbon-intensive factories and power plants by capping the amount of CO_2 that they emit. While some of these facilities are certainly located within urban areas, and it may be safe to assume that a large percentage of their output serves urban needs, local authorities are not generally in direct control of these activities. Of course, some exceptions exist, where, for instance, an urban centre owns a public utility, such as one for electricity generation.

In contrast, CDM offers significant potential for urban projects in developing countries in such sectors as transportation, waste and the building industry. Indeed, a recent study shows that it is one of the international financing mechanisms that city authorities are most aware of. However, urban CDM-based projects account for only 8.4 per cent of the total number of CDM projects registered with the UNFCCC in 2009. Most of these were related to solid waste, with only two projects related to transport. Furthermore, the majority of the urban CDM projects are concentrated in a few countries – namely, Brazil (36 per cent), China (14 per cent), Mexico (5 per cent) and India (2 per cent).[103]

A number of reasons have been identified for the small proportion of CDM projects being urban based. First, the responsibility for climate change action is perceived to lie with national rather than local governments. Second, city authorities are already overwhelmed by immediate local challenges and have difficulty justifying climate change-related projects and expenditures. Third, the financial resources required for climate change action (e.g. introducing energy-efficient technology and equipment) may be absent in developing countries. Fourth, the high transaction costs associated with project development and approval by authorities has been identified as an additional constraint.[104] Additional barriers to expanding the use of CDM in urban areas are considered in greater detail in Chapter 5 (see section on 'Financial resources').

The joint implementation mechanism is very similar to CDM, but it applies only between developed countries.[105] Since most of the joint implementation projects are in countries with economies in transition and emissions reduction activities are generally more expensive in these countries compared to similar activities in developing countries, the joint implementation mechanism has been used far less than the CDM.[106] The use of joint implementation by urban actors has, therefore, also been very limited.

A further major challenge for local authorities to take advantage of the international climate change framework to implement climate responses locally is that they are often overwhelmed by competing priorities. Besides coordinating policy efforts with organizations and actors at the national and state/provincial levels to address an array of non-climate-related developmental and environmental issues, they now need to deal with a multitude of issues centring on climate-related mitigation, adaptation, development, and disaster preparedness and response. While coping with a myriad of competing priorities within their boundaries, they also need to explore ways in which they can better connect to multiple levels of action and information on climate change, and know how their issues fit into the larger picture of regional, national and international climate change issues. In addition, mismatches exist between climate and local policy-making timeframes. Given the fact that many of the cause-and-effect relationships are long term and potentially irreversible, they require planning that goes beyond the tenure, the administrative power and even the lifetime of most current decision-makers and other stakeholders.

A further major challenge for local authorities to take advantage of the international climate change framework…is that they are often overwhelmed by competing priorities

Despite the above challenges, local authorities can coordinate efforts with national and state/provincial authorities to make use of financial resources offered under the UNFCCC to invest in local mitigation initiatives which offer high mitigation potentials. These include investments in the areas of transport, energy generation, waste management and the like. Local urban authorities and actors can also take advantage of existing networks and organizations that focus specifically on enhancing local climate change action at the city level. Urban authorities could get support from the UNFCCC to finance adaptation projects, not only through their national governments, but also through their participation in various city networks. For instance, the Federation of Canadian municipalities is working with ICLEI through their Cities for Climate Protection Campaign (see Box 2.7). A total of 180 Canadian municipalities are engaged in assessing and reducing GHG emissions through the campaign.[107] Several initiatives also offer opportunities for urban authorities to learn from and share climate change best practices and lessons (see Box 2.7).

Urban authorities could get support from the UNFCCC to finance adaptation projects… through their participation in various city networks

Urban authorities may also try to benefit from initiatives of multilateral and bilateral organizations seeking to enhance the capacity of developing countries to take part in and take advantage of international climate change discussions and the resulting instruments and mechanisms (see Box 2.7). For instance, The World Bank's Carbon Finance Assist Programme seeks to enhance the capacity of developing countries to engage with the flexible mechanisms of the Kyoto Protocol.[108] Similarly, the Climate Alliance aims to enhance the participation of developing countries in CDMs. UNEP's Campaign on Cities and Climate Change explicitly seek to support the engagement of cities in international climate change negotiations and forums.

Local authorities can also seek to harmonize climate change interventions with existing development interventions and concerns. For instance, mitigation can be integrated within local development concerns such as energy security and infrastructure provision. Adaptation measures can serve and be integrated not only within disaster risk reduction, but also within components of the development agenda such as land-use planning and access to water, sanitation and housing. For instance, existing coping actions such as community savings networks might be combined with insurance mechanisms sponsored by NGOs.

CONCLUDING REMARKS

During the last few decades, climate change has gained importance as a major 21st-century challenge partly due to the consolidation of scientific evidence of the contribution of human activities to global warming. Knowledge – whether generated by scientific communities or brokered by the media, scientific entrepreneurs or NGOs at different levels (from the international to the local) – has been a fundamental factor shaping climate action at all levels. However, the move from knowledge to action is not straightforward. The political mechanisms by which individuals, groups, organizations and governments translate the scientific knowledge of climate change into concrete actions have played a critical role in this regard.

The UNFCCC and the Kyoto Protocol are the key elements of the overarching framework adopted by world governments to guide climate change responses globally. Although the adoption of the Kyoto Protocol was hailed as a significant milestone and has enabled substantial emissions reductions since, the failure to reach a legally binding agreement for the period after the end of the protocol's commitment period in 2012 is seen as a major failure of international climate change negotiations.

Local action is indispensable for the realization of national climate change commitments agreed through international negotiations

The UNFCCC and its Kyoto Protocol coexist with a multitude of parallel initiatives and frameworks operating at different sectors and spatial levels. Even if national governments are leading negotiations of climate change agreements at the international level, mitigation and adaptation activities are being implemented by numerous other actors at the regional, sub-national (e.g. state/provincial) and local levels. The sustained attention of policy-makers, the scientific community and the media to climate policies at the international level has mainly led them to overlook these other equally important levels of climate intervention.

Local action is indispensable for the realization of national climate change commitments agreed through international negotiations. Yet, the international framework described in this chapter presents both challenges and opportunities for climate change action at the local city level. Most of the mechanisms within the international climate change framework are addressed primarily to national governments and do not indicate a clear process by which local governments, stakeholders and actors may participate. Furthermore, local authorities can quickly be overwhelmed by competing priorities and therefore may not actively pursue opportunities offered by the international governance framework. Thus, in practice, mitigation and adaptation actions have been by-products of policies designed to address more pressing local problems or problems for which there is more pressure by interested parties. The overall complexity of the international climate change framework – as well as the multiplicity of related actors and mechanisms – may further prevent city authorities from benefiting from available opportunities. Also, administrative structures, party politics, political timetables, individual ambitions, inertias, and many other institutional and political constraints need to be overcome, thus requiring a broader-based institutional capacity for climate action. Its absence has deterred key mitigation and adaptation efforts. Yet, in some cases it has become another source of opportunity for state and local actors to fill a leadership gap.

Despite the challenges, the multilevel climate change framework briefly described in this chapter does offer opportunities for local action at the city level. While the proportions remain low, urban-based emissions reduction projects are being implemented through some of the mechanisms of the UNFCCC (e.g. the CDM). There is also great potential for expanding such projects given the role of urban areas in contributing to GHG emissions.[109] In addition, today, more urban authorities than ever before participate in international city networks for climate change adaptation and mitigation. These urban actors have developed a more aggressive approach, seeking to secure the economic competitiveness of their cities and to get a local voice in international negotiations and organizations.

The crux of the challenge is that actors of climate change at all levels – including governments, NGOs and civil society that are, more often than not, preoccupied with immediate and often localized interests and priorities – need to move within short timeframes to guarantee long-term and wide-ranging global interests, which can seem remote and unpredictable at best. The hope is that a wave of actions from local actors centring their work at the local level, where all the impacts of climate change will ultimately be felt, will join together to create the momentum to build broad-based support for mitigation and increase adaptive capacity in the areas and populations that are most vulnerable to the effects of climate change.

NOTES

1 Biermann et al, 2009, p31.
2 Betsill and Bulkeley, 2007; Alber and Kern, 2008; Biermann et al, 2008.
3 ICLEI, 2010.
4 UNFCCC, undated a.
5 UNFCCC, undated b.
6 UN, 1992, Article 3. See also CISDL, 2002.
7 De Lucia and Reibstein, 2007.
8 UN, 1992.
9 UNFCCC, undated c.
10 UNFCCC, undated d.
11 UNFCCC, undated d.
12 UNFCCC, undated e.
13 UNFCCC, 1995.
14 UNFCCC, 1996.
15 Bodansky, 2001.
16 See section entitled 'The Kyoto Protocol' below.
17 GEF, undated.
18 Bodansky, 1993, cited in Gupta and van Asselt, 2006.
19 Gupta and van Asselt, 2006, p84.
20 Biermann et al, 2008.
21 UNFCCC, undated r.
22 UNFCCC, undated k.
23 See previous section on 'The United Nations Framework Convention on Climate Change'; UNFCCC, undated e.
24 UNFCCC, undated l.
25 UN, 1998.
26 After Australia's ratification of the protocol in 2007, the US is the only developed country not to have ratified the Kyoto Protocol.
27 UN, 1998.
28 Bulkeley and Betsill, 2003.
29 Gilbertson and Reyes, 2009.
30 Disch, 2010, p55.
31 Richman, 2003.
32 UNFCCC, 2010.
33 Beccherle and Tirole, 2010.
34 Bodansky, 2001; Aldy et al, 2003.
35 Biermann et al, 2008.
36 Held and Hervey, 2009.
37 UN, 2008.
38 UNEP, undated a.
39 UNEP, undated b.
40 WMO, 2007.
41 UN-REDD, undated.
42 UNEP et al, 2010.
43 UNISDR, undated a.
44 UNISDR, undated b.
45 Sohn et al, 2005.
46 World Bank, undated a.
47 World Bank, 2009a.
48 CFCB, undated.
49 World Bank, 2010d.
50 ADB, undated.
51 Inter-American Development Bank, 2007.
52 European Investment Bank, 2010.
53 For example, see OECD, 2010.
54 OECD, 2009.
55 Atteridge et al, 2009.
56 GCCA, undated a.
57 European Commission, 2009; GCCA, undated b.
58 GCCA, undated c.
59 Bird and Peskett, 2008.
60 Asia-Pacific Partnership on Clean Development and Climate, undated.
61 Parker, 2006. See also Box 2.2.
62 European Commission, 2009.
63 Gilbertson and Reyes, 2009, p42.
64 Rabe, 2007.
65 Department of Energy and Climate Change, undated.
66 Bulkeley and Betsill, 2003; Pelling, 2005; Satterthwaite et al, 2007a.
67 Satterthwaite et al, 2007a; Romero Lankao, 2007b; Moser, 2010.
68 Pew Center on Global Climate Change, 2008.
69 Pew Center on Global Climate Change, 2008.
70 Sandoval, 2009.
71 People's Republic of China, 2007.
72 People's Republic of China, 2007.
73 Secretaría del Medio Ambiente del Distrito Federal, 2008.
74 Romero Lankao, 2007b.
75 Rabe, 2007; Wheeler, 2008; see also Pew Center on Global Climate Change, undated.
76 California Solutions for Global Warming, undated.
77 Department of Ecology, State of Washington, undated.
78 Regional Greenhouse Gas Initiative, undated.
79 The United States Conference of Mayors, 2008.
80 Centre for Clean Air Policy, undated.
81 ICLEI, 2010, p15. See Box 2.8.
82 Rosenzweig et al, 2010.
83 Bulkeley et al, 2009, p26; see also Collier, 1997; Bulkeley and Betsill, 2003; Bulkeley and Kern, 2006; Granberg and Elander, 2007; Holgate, 2007; Kern and Bulkeley, 2009.
84 Setzer, 2009, p10
85 Setzer, 2009, p10.
86 Warden, 2009, p8.
87 Gore et al, 2009, p22.
88 See the section on 'Adaptation planning and local governance' in Chapter 6.
89 Pelling, 2005.
90 Pelling, 1998.
91 CAN, undated.
92 Pelling, 2005.
93 Rosenweig et al, 2010.
94 Rosenweig et al, 2011.
95 Rosenweig et al, 2010; IHDP, undated.
96 IPCC, 2007a.
97 PricewaterhouseCoopers, 2010.
98 Wilbanks et al, 2007.
99 Figueres, 2010.
100 Office of the Governor, California, US, undated.
101 ICLEI, 2010, p79.
102 ICLEI, 2010.
103 ICLEI, 2010.
104 World Bank, 2010a; Clapp et al, 2010.
105 See Box 2.3.
106 Gilbertson and Reyes, 2009.
107 Federation of Canadian Municipalities, 2009.
108 See the section on 'Other multilateral organizations' above.
109 See Chapter 3.