assignment of tasks can be properly targeted unless the needs and abilities of cities have been fully integrated during the development of conventions and multilateral environmental agreements.

Additionally, the valuable work which cities are already carrying out in addressing mitigation and adaptation can only strengthen and improve global policy-making negotiations if a sharing of information is encouraged at all levels. This includes better consultation and strategic thinking between national and local governments, more research on cities and climate change globally and locally as well as collection of disaggregated data on the contribution of cities to climate change.

Climate change is already part of daily life – now measures to combat it at the local level must receive full recognition and support. With the cooperation and support of partners at all levels, including the United Nations, future actions in cities to reduce emissions and adapt to change will be key to global

The Local Government Climate Roadmap

Started in December 2007, the Local Government Climate Roadmap is a two-year strategy to work for a strong and comprehensive post-2012 global climate agreement that will recognize the key role cities have in climate protection and effectively implementing global policy. Main components of the process are to mobilize governments, promote regional instruments, develop a common participatory position, establish a Local Government Delegation, organize Local Government Sessions and interact continuously with the international policy process. The Local Government Climate Roadmap is conducted by the following actors:

ICLEI – Local Governments for Sustainability is a global network of more than 1,000 cities, towns, countries and their associations working on sustainable development and acts as International Roadmap's facilitator.
www.iclei.org

United Cities and Local Governments (UCLG) represents the interests of local governments on the world stage.
www.cities-localgovernments.org/uclg

Metropolis is the World Association of Major Metropolises, whose mission is to promote international cooperation and exchanges among local and metropolitan governments.
www.metropolis.org

C40 Climate Leadership Group represents a group of the world's largest cities committed to tackling climate change.
www.c40cities.org/

World Mayors Council on Climate Change (WMCCC) is an alliance of local governments which fosters international cooperation and advocates for effective policies in climate protection.
www.iclei.org/index.php?id=7225

More information on this roadmap is available via
www.iclei.org/climate-roadmap

© UNEP/Still Pictures

Information and Support

United Nations Environment Programme (UNEP)
www.unep.org
UNEP aims to provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations.
UNEP-supported initiatives of particular relevance to cities and climate change include the following:

- Sustainable Buildings and Construction Initiative (SBCI) www.unepsbci.org
- Partnership for Clean Fuels and Vehicles (PCFV) www.unep.org/pcfv
- Climate Neutral Network (CN Net) www.unep.org/climateneutral
- Road Design and Finance for Safety, Sustainability, and Accessibility www.unep.org/urban_environment/NMT_Roads

United Nations Human Settlements Programme (UN-Habitat)
www.unhabitat.org
UN-Habitat's mandate is to promote socially and environmentally sustainable human settlements development and the achievement of adequate shelter for all.
Several initiatives address the role of cities in climate change:

- Sustainable Urban Development Network (SUD-Net) www.unhabitat.org/sudnet
- Cities and Climate Change Initiative (CCCI)
- Sustainable Cities Programme (SCP) www.unhabitat.org/scp
- Localizing Agenda 21 (LA21)

Intergovernmental Panel on Climate Change (IPCC)
www.ipcc.ch
The IPCC assesses the scientific, technical and socio-economic information on climate change, its potential impacts and options for adaptation and mitigation.

The World Bank
www.worldbank.org/climatechange
The World Bank incorporates considerations of climate change into all of its development operations.

Global Environment Facility (GEF)
www.gefweb.org
The GEF supports activities that protect the global environment, including efforts to combat climate change. It is also the United Nations body that operates the Least Developed Countries Fund, Special Climate Change Fund, and a potential future Adaptation Fund under the United Nations Framework Convention on Climate Change.

Cities Alliance
www.citiesalliance.org
The Cities Alliance is a global coalition of cities and their development partners committed to scaling up successful approaches to poverty reduction.

United Nations Framework Convention on Climate Change (UNFCCC)

The UNFCCC is the foundation of global efforts to combat global warming. Its ultimate objective is the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic [human-induced] interference with the climate system.

The Kyoto Protocol to the UNFCCC, ratified by 184 countries and entered into force in 2005, contains legally binding emissions targets for 37 industrialized countries and the European Community. For these Annex I countries, emissions must be reduced between 2008 and 2012 to a level which is, on average, 5 per cent less than 1990 levels.

At the upcoming 15th Conference of the Parties to the UNFCCC (COP 15) in Copenhagen in December 2009, world leaders will come together to seal the deal on a comprehensive global framework for the post-2012 period.

For more information, visit:www.unfccc.int.

This brochure is published by UNEP and UN-HABITAT to raise awareness and strengthen initiatives within cities regarding urban-global linkages. With mandates drawn from the UN-HABITAT-led initiative 'Local Capacities for Global Agendas', established as one of the partnership implementation commitments of the World Summit for Sustainable Development (WSSD), the Millennium Development Goals and UNEP's Bali Strategic Plan, both UNEP and UN-HABITAT work to integrate local level perspectives into global policies. Both agencies emphasize the important role of cities at the national, regional and global levels.

Brochures are also available on Cities and Biodiversity, and Cities and Coastal Zone Pollution.

June 2009

For further information, please contact
United Nations Environment Programme (UNEP)
Division of Technology, Industry and Economics
15 rue de Milan
75441 Paris Cedex 09 France
Tel: +33 1 4437 1450
Fax: +33 1 4437 1474
E-mail: unep.tie@unep.fr
www.unep.org

United Nations Human Settlements Programme (UN-HABITAT)
P.O. Box 30030, GPO 00100 Nairobi, Kenya
Tel: +254-20-625404
Fax: +254-20-623715
Email: SUD-Net@unhabitat.org
www.unhabitat.org

Climate Change
The Role of Cities

involvement
influence
implementation

UN-HABITAT UNEP

Climate change is a global phenomenon. Rising global temperatures will result in disturbed weather patterns and a rise in sea level. Urban centres are strongly affected by climate change. However, cities are also a key contributor to climate change, as city activities are a main source of greenhouse gas emissions. If global efforts to address climate change are to be successful, they will need to integrate city requirements and environmental management capacities. Only with a coordinated approach and actions at the global, regional, national and local levels can success be achieved. Many cities are taking the lead to reduce their impact on the global climate.

Local capacities for global agendas

© US Government

Solar panels on the US-Mission building in Geneva

Sustainable Building and Construction

Using energy in more sustainable and efficient ways can have a major impact on mitigating climate change. One of the ways to use energy more efficiently is through sustainable building and construction.

Harare, Zimbabwe, came up with an innovative ventilation system, based on the self-cooling mounds of African termites. The Eastgate Centre, a shopping centre and office block in downtown Harare, has been designed to be ventilated and cooled entirely by natural means. It stores heat in the day and during the evening and night the warm internal air rises and is vented, drawing in denser cool air at the bottom of the building. This 'passive' cooling system replaces the artificial air-conditioning entirely. Compared to conventional buildings, the Centre decreased energy use by 10 per cent, saving 3.5 million dollars because no air-conditioning system had to be implemented.

www.inhabitat.com/2007/12/10/building-modelled-on-termites-eastgate-centre-in-zimbabwe

Global climate change and cities

Climate change has severe impacts worldwide, both on rural areas and urban centres. Extreme weather conditions threaten human health and productivity, with natural disasters, such as flooding, wildfires and cyclones becoming more frequent. More than half of the world's population lives within 60 kilometres of the sea, and three quarters of all large cities are located on the coast. Melting ice caps will result in a rise in sea levels which will threaten coastal infrastructure, while the thawing soil will destabilize infrastructure in cities situated on permafrost. The provision of water, sanitation and energy will all be affected. Climate change causes alterations in the natural habitat, which facilitate the spread of vector-borne diseases, such as malaria and dengue fever. Climate change also affects local and regional weather patterns that can impact upon agricultural outputs and may result in food shortages in cities. People living in slums, without adequate urban infrastructure, are particularly vulnerable and will be amongst those that suffer the most from the adverse effects of climate change.

Rising temperatures coincide with increased energy use for cooling. Loss of green cover in cities, in the form of parks, trees and agricultural land, raises urban temperatures, as well as contributing to climate change.

Cities and climate change: a two-way relationship

Estimates vary, but due to the concentration of production and consumption patterns, cities are said to account for more than half of global greenhouse gas emissions and for about two-thirds of global energy use. The transport sector accounts for 24 per cent of total carbon dioxide emissions, of which 74 per cent is from road transport. By 2050, the passenger vehicle fleet is expected to triple in size. Almost two-thirds of the world's motor vehicles will be found in non-OECD countries, mostly in cities of the developing countries. Vehicle emissions not only contribute to climate change, but also to local and regional pollution problems through the emission of carbon monoxide, lead, sulphur oxides and nitrogen oxides.

The energy used for public lighting and industrial, commercial and building consumption is another main source of emissions. Industry is responsible for 43 per cent of the global carbon dioxide emissions from fossil fuel combustion, while the building sector is responsible for 30 per cent of greenhouse gas emissions globally, with 80-90 per cent emitted during building use and 10-20 per cent during construction. In addition, a reduction in the amount of green cover in urban areas reduces a city's ability to reabsorb carbon dioxide, and poor waste management releases chlorofluorocarbons (CFCs) and gases, such as methane, into the atmosphere.

Transport

Sustainable road transport solutions in a city require better planning and infrastructure to help reduce unnecessary commutes and reliance on private vehicle use. Providing residents with efficient, viable alternatives through public transport and non-motorized transport facilities can lead to a better modal mix within a city and energy savings. In addition, lowering vehicle emissions through the promotion of cleaner fuels coupled with cleaner technology will lower both carbon dioxide and non-carbon dioxide emissions, as will policies and incentives to move people out of cars and onto mass transit (for example, congestion pricing, road pricing).

In answer to growing congestion and pollution, the City of Istanbul started to plan and build a Bus Rapid Transit (BRT) line 'Metrobus' in 2004. The first 30 kilometre corridor built in 2005-2008 already transports more than 500,000 passengers per day. In 2008 a new line was added. Separated from vehicle traffic, the bus line is operated on a special lane which reduces waiting and travel times.

The operation of the Metrobus cuts significant amounts of carbon dioxide each year that would otherwise be emitted from a conventional bus system by providing efficient public transport for more people.

www.embarq.org/en/project/istanbul-metrobus

© PIA Foundation

Cities vary in size, economic situation, geographic location, and access to resources within the country, as well as internationally. Therefore, each city's specific local conditions must be taken into account when determining the most appropriate policies for that particular city. Nevertheless, it is clear that despite the numerous differences, the future of cities must be based on sustainable consumption and production.

How cities contribute to solutions

In both mitigation and adaptation, cities have a crucial role to play in managing the unavoidable and avoiding the unmanageable. Cities, where the majority of the world's population resides, are vital actors in addressing climate change. Well-planned, compact cities can be highly resource-efficient and lead to lower greenhouse gas emissions per person. Cities, as centres of expertise and innovation, can invest in greening sectors, such as transport, buildings and waste management, creating jobs and supporting long-term economic growth. Also, as major decision-makers in the flow of goods and services, cities can be leaders in creating demand for environmentally-friendly products and sustainable consumption.

As illustrated, many cities around the world have already set out on the path of sustainable development. They carry out a vast range of activities related to increased energy efficiency, improved air quality and public health. City efforts to diminish traffic or to improve traffic flow, and to reduce private vehicle use, by providing viable options in public transport and non-motorized transport, are just some local authority actions that are making a measurable difference to greenhouse gas emissions. Cities are also recognizing that energy consumption in buildings can be cut by an estimated 30 to 50 per cent through zero- to low-cost measures with proven and commercially available technologies, such as solar water heating, adequate insulation, double glazed windows and improved architectural designs for heating or cooling.

The list goes on: from waste to energy schemes, cleaner production techniques, and green procurement to improved storm water collection, disaster risk management, and the relocation of vulnerable slums, cities carry out a vast range of activities, contributing solutions to both mitigate and adapt to climate change. In doing so, cities are highlighting the critical role they play in successfully implementing climate change policies.

Infrastructure

Sorsogon City lies on a small strip of land between the Pacific Ocean and the South China Sea in the Typhoon belt in the South of Luzon Island in the Philippines. The low-lying city centre, as well as a number of informal settlements, is nestled just behind a seawall, erected to protect them from storm surges. However, the two major typhoons of 2006 destroyed large parts of the seawall.

UN-HABITAT's **Cities and Climate Change Initiative** selected Sorsogon as one of its pilot cities because of its exceptional vulnerability to climate change. The city is currently developing a plan to rehabilitate the seawall and will benefit from technical assistance to ensure that the construction is done in an eco-efficient manner.

It is envisaged to support the residents in the informal settlements with techniques that would allow them to take down the house, in case of a typhoon warning, and to reassemble it after the typhoon. Eventually the resettlement of the populations along the coast may be inevitable. The city is setting land aside and will be starting consultations with the affected populations to ensure a people friendly process.

© UN-HABITAT/Bernhard Barth

Waste

The three Rs – reduce, reuse and recycle – are key to any city's waste management policy. Cities can reduce emissions of greenhouse gases such as methane, save energy, and improve land-use planning by avoiding the need for large landfills or other disposal facilities. Cities are even taking another step forward by utilizing waste as a resource.

The Municipality of Thungsong in Thailand collects organic wastes from the fresh market stall owners, after which they are grounded, mixed with molasses and composted. This produces 3,000 litres of liquid detergent and 1,000 kilograms of ground fertilizer every month, providing the municipality with an estimated annual income of US$1,200 from their sale.

Aside from establishing a Materials Recovery Facility, the municipality has also initiated successfully hazardous waste management and organic fertilizer production from household sewage and livestock manure.

The carbon offsets from the organic fertilizer production is estimated at 29 tonnes of equivalent carbon dioxide. The organic fertilizer replaces unhealthy chemical fertilizers, and the detergent produced is used to clean the market floor.

www.iclei.org/fileadmin/user_upload/documents/SEA/CCP_Projects/Tungsong.pdf

© UNEP/Still Pictures

Networking

Cities can take part in local government associations in order to speak with one voice on a global platform. United Cities and Local Government (UCLG) is the global voice of cities and the main local government partner of the United Nations, spearheading the United National Advisory Committee of Local Authorities.

City networks provide local authorities with support, and with a forum for the exchange of information with other cities. The Cities for Climate Protection (CCP) campaign - operated by ICLEI - Local Governments for Sustainability - has a membership of more than 700 local governments around the world. It provides cities with tools and assistance for policies and quantifiable implementation measures on emission reductions, better air quality and more liveable cities.

The Local Government Climate Roadmap is a process started by global local government associations, which advocates a strong and comprehensive post-2012 climate agreement. It emphasizes the critical role of cities in implementing climate change policies (see box on the next page).

National governments can use their cities' experiences to improve global policies for climate change. Participation in intergovernmental meetings allows concrete experiences from the city level to feed into and inform global policies. With the coordinated input of local authorities, global agendas are better prepared to respond to urban needs and to take advantage of urban strengths.

Global support for local actions

United Nations programmes such as United Nations Environment Programme (UNEP) and United Nations Human Settlements Programme (UN-HABITAT) also manage networks, such as the Climate Neutral Network (CN-Net) and the Sustainable Urban Development Network (SUD-Net), respectively. Participation is garnered from a wide range of stakeholders, building on the global network of United Nations programmes (see box on the next page). The Cities and Climate Change Initiative (CCCI) supports cities in developing countries to enhance climate change mitigation and adaptation through advocacy, policy dialogue, capacity development, pilot initiatives and networking. In addition, UNEP and UN-HABITAT have a Joint Partnership Framework whereby environmental and urban perspectives are better incorporated in both agencies' work at the local, national and global level on issues such as climate change.

Developing and utilizing planning tools such as City Development Strategies (Cities Alliance), Poverty Reduction Strategy Papers (International Monetary Fund, United Nations Development Programme, World Bank), and Local Adaptation Plans of Action (LAPAs) based on National Adaptation Plans of Action (NAPAs) can assist cities in integrating climate change issues into policies. Also, by participating in UNEP's Global Environment Outlook (GEO) in cities, local authorities can ensure that such issues are included in local and national development strategies from the start. Furthermore, there are a range of tools and activities for city-level greenhouse gas inventories and vulnerability assessments.

In addition to tools for better planning and policies, funding opportunities also exist for cities. In particular, the Global Environment Facility (GEF) is the body that operates the funds arising from the United Nations Framework Convention on Climate Change (UNFCCC). The need for the urban sector to be a primary recipient for funds is growing at the GEF as it undergoes revision of focus areas, which are currently underway. Furthermore, climate change mitigation and adaption measures will have to be integrated in the existing housing and urban infrastructure financing mechanisms.

UNEP Climate Neutral Network &
UN-HABITAT Sustainable Urban Development Network

The Climate Neutral Network (CN Net) is the initiative of UNEP that promotes national, regional and global action and involvement in climate neutrality at all levels of society. Based on an interactive website, the CN Net gives participants a platform to present their strategies in climate neutrality to the world, providing visibility and inspiring others.

Today, the Climate Neutral Network numbers among its participants, countries, cities, major international companies, United Nations agencies and leading Non-Governmental Organizations. They are the trailblazers on the route to zero emission economies, communities and businesses. Some of the city members are Växjö in Sweden which has decided to become a 'Fossil Fuel Free" City and Rizhao, China, where close to 100 per cent of urban housing has solar heaters.

UN-HABITAT's **Sustainable Urban Development Network (SUD-Net)** is an innovative network of global partners, which focuses on promoting inter-disciplinary approaches to sustainable urban development. SUD-Net's goal is to build the capacities of national governments, and strengthen the role of decision-makers of local authorities and other urban players, in order to facilitate the sustainable development of the natural environment and of livable, productive and inclusive cities.

Sustainable Urban Development Network's current focus is on five priority themes: governance; urban planning; environmental planning and management; urban economy; and education, training and research. The entry points identified for implementing the above themes are: decentralization, climate change, local economic development and the Habitat Partner University initiative respectively.

Conclusion

Climate change is both a local and a global problem, and requires action at all levels, including the city level, if it is to be addressed effectively. Strong linkages between the local, national, regional and global levels are essential if cities are to receive the support they need, in particular through adequate funding, to be able to carry out the climate change activities assigned to them. However, neither this support nor the