ADDRESSING URBAN ISSUES IN NATIONAL CLIMATE CHANGE POLICIES

CITIES AND CLIMATE CHANGE INITIATIVE

POLICY NOTE NO. 3

UN HABITAT
FOR A BETTER URBAN FUTURE

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3. Consider reflecting risks that will increase with climate change in urban land use plans.

4. Improve standard building codes and regulations by incorporating broadly applicable resilience considerations (including climate resilience). Consider the affordability and local context of such requirements.

5. (a) Prioritize investments in systems that reduce the risks of natural disasters faced by human settlements. Maintain such systems. (b) Build the resilience of systems that provide basic urban services, including by protecting critical facilities. (c) In such infrastructure-based approaches to reducing risks and building resilience, take into account changing conditions.

6. As part of a system-wide approach, fully consider and adopt when feasible ecosystem-based approaches to building the resilience of human settlements and protecting them from natural disasters.

7. Pay specific attention to the needs of the most vulnerable groups in developing responses to climate change.

8. As part of an integrated strategy to build resilience, encourage urban agriculture through land use planning and complementary programmes.

9. Harmonize policies that address climate change adaptation with other relevant policies, with particular attention to those that guide disaster risk reduction.

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GENERAL / CROSSCUTTING

16. (a) Explicitly recognize that local authorities can help national governments to implement policies and achieve targets for addressing climate change. (b) While respecting local autonomy, vertically integrate local (and other sub-national) authorities' initiatives into nationally-led efforts.

17. (a) Try to minimize the administrative burden imposed on local authorities by new climate change related mandates. (b) When appropriate, differentiate responsibility by different categories of local authority.

18. Provide adequate resources to local authorities to support new mandates.

19. Provide an adequate enabling environment for local authorities to take action.

01 INTRODUCTION

The present Note is addressed primarily to decision-makers and stakeholders in the Global South engaged in developing national climate change policies[1]. We define such policies in the present context as high-level documents that set forth in a consolidated manner a country's approach both to mitigating greenhouse gas emissions and adapting to climate change[2]. More specifically, this Note seeks to help those teams to address a relatively narrow topic in the context of those policies: how their countries should deal with climate change in *urban* areas, and to empower *local authorities* as key actors in that effort[3].

It is important to address climate change in urban areas. Cities emit a high proportion of the world's greenhouse gases, while many of the people who are vulnerable to the effects of global warming are concentrated in urbanized areas.

These issues are by no means confined to developed countries. Some of the world's fastest-growing cities and an increasing number of its mega-cities, with corresponding emissions, are located in the Global South. Meanwhile, vulnerability is often compounded among the South's urban poor due to interlocking factors such as lack of secure tenure, inadequate housing, location of homes in hazard-prone areas, a dearth of options for livelihoods, limited access to basic services and so on. If we thus accept that the front lines of addressing climate change often pass through urban areas, we should also

1 The present Note was prepared by UN-Habitat's Cities and Climate Change Initiative (CCCI). It is offered per UN-Habitat's 22nd Governing Council's Resolution on Cities and Climate Change (GC 22/3, 2009), which called on the Agency to 'expand the range of [its] capacity development approaches' vis-à-vis cities and climate change.

2 Such documents are thus distinct from National Adaptation Plans (NAPs), National Adaptation Programmes of Action (NAPAs) and Nationally Appropriate Mitigation Actions (NAMAs): terms that have arisen from processes of the UN Framework Convention on Climate Change (UNFCCC) and whose development at the country level has attracted varying degrees of international support. Those documents focus on either adaptation or mitigation but not both, and may offer more detail on the priority measures to be taken than would an overarching policy document. However, in addition to those UNFCCC-derived documents, a number of countries have felt impelled to develop overarching national climate change policies – the primary focus of the present paper. (Some of the present recommendations, however, may be relevant to other policy processes.)

3 The present document thus does not pretend to offer comprehensive guidance on the preparation of such policies, but rather advice on a much more circumscribed subject.

recognize that local authorities typically play a central role in urban management and, therefore, should be empowered to as key actors in this emissions-reducing and resilience-building effort.

Our recommendations are based in part on a survey of more than 20 countries that already have developed national climate change policies, virtually all within the past several years. From those documents we have extracted best practices on how policy-makers around the world are paving the way for effective mitigation and adaptation action in urban areas and providing for the engagement of local authorities in those efforts. These best practices accompany the recommendations and are presented in blue boxes. (To understand the full context for these excerpts, see our database of national climate change policies, at: *www.unhabitat.org/ccci.)*

In making these recommendations we are motivated by the hope that sound high-level policies will be embodied in laws, regulations, guidelines and programmes and, in turn, that these intermediary steps will lead to action and positive results on the ground[4]. Indeed it is important for decision-makers to frame policies with such eventual outcomes in mind. To that end, below we complement our recommendations with a set of examples of the sorts of local emissions-reducing and resilience-building actions to which we hope our policy prescriptions will lead. These are in orange boxes.

We hope that these quotations from actual policies and real-world examples will embolden the drafters of climate change policies to incorporate such measures into their own policies. At the same time we acknowledge that not all recommendations will be appropriate in every circumstance. Policy-makers, therefore, should consider whether the recommendations offered apply to their specific country context.

We also recognize that some approved policies are never implemented or enforced, or if they are that they produce undesirable and unintended side effects. Therefore, we also recommend after-the-fact monitoring of policy implementation to provide for later adjustment as needed.

Below we present our recommendations for policies to address climate change in urban areas, and empower local authorities as key actors in such efforts, grouped as follows: (1) climate change adaptation and resilience, (2) mitigation of GHG emissions and (3) general/cross-cutting issues, including regarding the important topic of multi-level governance.

4 Conversely, national policies that are silent on urban issues or the role of local authorities will not encourage but actually may thwart local level action.

02 CLIMATE CHANGE ADAPTATION AND RESILIENCE

RECOMMENDATION 1

(A) PROHIBIT NEW DEVELOPMENT IN AREAS SUBJECT TO *HIGH* RISK OF NATURAL DISASTERS. FIND APPROPRIATE USES FOR SUCH LANDS. (B) RESPECT HUMAN RIGHTS PRINCIPLES WHEN SEEKING TO ASSIST COMMUNITIES ALREADY LIVING IN SUCH AREAS.

Guiding development away from areas that are at high risk of natural disasters (see Box 1), and towards suitable lands, is one of the most cost-effective ways of reducing such risks[5].

Box 1. National Policy Excerpt– Nepal: National Climate Change Policy

(Approved on 17 January 2011)

'Prohibit the development of human settlements in climate-vulnerable areas (landslide-prone areas, flood-prone river banks, etc.)' *(p. 9)*.

If implemented effectively, such a policy can revolutionize the laws and regulations that guide local practice. Just introducing the concept of risk into land use or spatial planning represents a radical innovation in a number of countries, particularly in the Global South.

At present the laws in a number of countries do not support risk-based land use planning. In Uganda, for example, laws call for buffer zones of a standard width adjacent to rivers, 100 metres wide for major rivers and 50 metres for minor rivers; within those zones certain economic activities are prohibited. Unfortunately, such standard-width delineations do *not* adequately reflect flood risk, as the width of floodplains varies greatly according to local topography and other conditions and so is not of a standard dimension. Flood hazard zones, on the other hand, *do* reflect risk: they typically define lands at risk of inundation during a flood with a certain return period, for example of 100 years, and may vary greatly in width. Thus implementation of Recommendation 1 above could trigger a major shift in land use laws, regulations, plans and outcomes on the ground.

5 For discussion of vulnerability cost curve and a sample application, see ECA Working Group, 2009. *Shaping Climate-Resilient Development: A Framework for Decision-Making,* pages 30-32 and 99.

Implementing this recommendation begins with an identification of key hazards, and a policy decision as to what should be considered as high risk. For example, in the case of inundation, what would be the return period of such a flood – 50, 100, 200 years? And should such a decision be made at the national level or else locally, in consultation with stakeholders aware of local realities and priorities?[6]

Implementing the present recommendation aslo would involve mapping out which lands lie within a given hazard zone (see Box 2). It is important to note that the present recommendation presumes a certain level of in-country technical expertise. Therefore, before moving ahead with such a policy prescription, decision-makers may wish to consult with relevant local professional organizations and others to ensure that a minimal level of in-country experience exists to support this recommendation[7]. Additionally, because of the costs involved in mapping such hazards, strict application of this proscriptive approach may be appropriate mainly in areas that are on the brink of becoming urbanized rapidly. Effective implementation also involves preventing encroachment in high-risk areas. One such approach involves identifying more appropriate uses for such lands, such as parks or urban agriculture (see below), and promoting use of that land accordingly.

Box 2. National Policy Excerpt– Pakistan: National Climate Change Policy
(Approved in September 2012)

'Undertake hazard mapping and zoning of areas before construction' *(p. 70)*.

The present recommendation deals primarily with lands that have not been previously urbanized such as peri-urban areas. In some ways regulating such lands is relatively easy, at least politically: comparatively few residents might be affected. The much harder challenge is how to deal with people already living in high-risk areas, often in informal settlements or other poor communities.

In many cases the best solution involves helping such communities to build their resilience while remaining *in situ* (see Recommendation 6). Relocating communities that live in high risk areas to appropriate lands could be considered as a last resort, using participatory processes (see Box 3), bearing in mind relevant human rights principles[8]. More generally, urban managers should ensure that low-income groups have sufficient access to affordable, suitably-located land that provides for social cohesion and integration – long-term goals appropriate for other policies that promote sustainable development, including in the urban context.

6 Estimates of a flood return period typically reflect historical patterns and are considered to represent current conditions. However such patterns are dynamic. For discussion of flood hazard maps that reflect *future* conditions, such as under the impact of global warming, see discussion under Recommendation 3, below.

7 Only under special circumstances, including perhaps during formulation of National Adaptation Plans, should officials draw upon international experience as necessary to undertake such mapping. For an example of a private company responding to South Africa's requirements for flood hazard mapping, a sign that adequate local capacity to implement those provisions likely does exist in that country, see *http://www.aed.co.za/*.

8 See for example Displacement Solutions, *The Peninsula Principles: On Climate Displacement Within States, August 2013. www.displacementsolutions.org.*

Box 3. Local Example – Colombia: Participatory relocation in Manizales

A view over Manizales, Colombia, shows the steep slopes that make the city vulnerable to landslides © Wikimedia Commons/Octavio Andres Gonzalez Estrada

Manizales has a population of around 343,000 and is located in the central part of Colombia. The municipality is characterized by steep slopes, high rainfall of approximately 2,000 mm per year and is exposed to the risks of landslides, flooding and earthquakes.

Through a collaborative Agenda 21 process known as BioPlan that involved communities, government, NGOs and universities, Manizales relocated low-income settlements from sites at risk from floods and landslides to nearby low-risk areas. The former settlements were converted to eco-parks, which added valuable green space to the city. To prevent resettlement in high-risk areas the government identified new areas suitable for urban expansion. Cities Alliance reports: 'Today action plans to decrease poverty in the city and to reduce the social and territorial segregation of people displaced by violence are being implemented' *(Cities Alliance, 2007, p. 102)*.

Source: *(UN-Habitat, 2012).*

RECOMMENDATION 2
IN AREAS OF *MEDIUM* RISK OF NATURAL DISASTERS, CONSIDER CURTAILING OR APPLYING HIGHER BUILDING STANDARDS TO NEW DEVELOPMENT.

The goal of this Recommendation is to permit at least certain types of development to occur where it would be reasonably safe with additional safeguards – not to prohibit new development totally, as was the case with the previous Recommendation.

As in the previous Recommendation, implementing the present policy would begin with a hazard mapping exercise. In addition to defining high-risk areas where new development would be prohibited, planners could also delineate medium-risk areas where at least some development would be permitted but where higher building standards, appropriate sub-division regulations and other measures would apply (see Box 4). Again, implementing the present policy recommendation would involve a political decision as to what constitutes reasonable risk for development. At the same time, regulations and programmes should support *in situ* upgrading and renovation of existing buildings so as to increase resilience.

Box 4. Sub-national Example – Australia: Queensland's response to 2010-11 Floods

Central Brisbane, Australia, during the 2010-11 Queensland Flood. This event prompted changes to land-use planning and building codes in the State © Wikimedia Commons/ Rae Allen

In the summer of 2010 and 2011 the state of Queensland in North-Eastern Australia experienced devastating floods affecting more than three-quarters of its area. In response to the floods Queensland implemented new floodplain recommendations; these are outlined in the document *Measures to support floodplain management in future planning schemes.* Recommendations begin by dividing land use into three categories reflecting different risk levels: generally intolerable, tolerable and broadly acceptable. Then it is recommended that the flood risk within the latter two categories be treated through a combination of land use planning and any of the following measures: structural or natural mitigation, building controls, emergency management procedures, insurance and community awareness/education programmes *(Queensland Reconstruction Authority, 2012)*.

RECOMMENDATION 3
CONSIDER REFLECTING RISKS THAT WILL INCREASE WITH CLIMATE CHANGE IN URBAN LAND USE PLANS.

The world is changing and climate risks are correspondingly dynamic. Whereas the previous two recommendations dealt with *current* levels of risk, some policy-makers have begun to think about how risks will increase or decrease in the *future* as the planet warms, and how this should affect land use planning and regulations (see Box 5 and Box 6).

Box 5. National Policy Excerpt – South Africa: National Climate Change Response White Paper
(Approved in October 2011)

'Ensure that land-use zoning regulations are enforced and that urban land-use planning *considers* the impacts of *climate change* […] when considering settlements and infrastructure development proposals.' *(p. 22; italics added)*

Box 6. National Policy Excerpt– Namibia: National Climate Change Policy
(Approved in November 2011)

'Rural and urban development should *consider* potential impacts of *climate change* on such development and hence this should inform and influence the designs of infrastructure, location of such development and so on. For instance, new settlements should not be built in flood-prone areas or too close to the sea in view of predicted sea level rise due to *climate change*, or design of roads and materials used should consider how *climate change* will affect durability of such roads.' *(p. 26; italics added)*

In contrast with engineers (see Recommendation 5 below), to date land use planners generally have been more reluctant to explicitly incorporate climate change projections into flood hazard maps and land use regulations. The reasons for this vary – from the difficulty of downscaling regional projections to a sufficient degree of accuracy, to fear of legal action from property owners who may consider that their development rights have been unreasonably abridged, to downright climate scepticism (see Box 7). But for whatever reason, at present policies that call for reflecting climate change projections in land use plans and regulations should provide for flexibility in application – hence the use of the word 'consider' in the South African and Namibian policies excerpted above.

The translation of these policies into laws and regulations then can be fleshed out subsequently as land use planners grow more confident in downscaled projections and strengthen their responses to climate change. UN-Habitat will monitor developments in this area.

Box 7. Sub-national Example – United States: State of North Carolina

North Carolina is located in the Southeast of the United States of America and is home to approximately 9.3 million people. Approximately two-thirds of the population lives in urban areas. Data from the Center for Operational Oceanographic Products and Services shows the current rate of sea-level rise on the North Carolina coast ranges from 2.07 mm (+/-0.40 mm) to 4.59 mm (+/-0.94 mm) per year *(Center for Operational Oceanographic Products and Services, 2013)*.

Despite such scientific findings, in 2012 the State of North Carolina passed legislation that restricted planning regulation to using historical sea-level rise data (i.e., that does not incorporate climate change predictions) for the following four years. The legislation stated that the Coastal Resources Commission and the Division of Coastal Management of the Department of Environment and Natural Resources shall not define rates of sea-level change for regulatory purposes prior to July 1, 2016. *(General Assembly of North Carolina, 2012)*

Also one must note that, in addition to changes to the climate being brought about by global warming, alterations to the built environment also may be relevant to planning decisions. Over time, for example, extensive development in upper water catchments may significantly affect runoff coefficients in urban areas downstream[9]. This in turn would affect the extent and duration of localized flooding, with planning implications.

RECOMMENDATION 4

IMPROVE STANDARD BUILDING CODES AND REGULATIONS BY INCORPORATING BROADLY APPLICABLE RESILIENCE CONSIDERATIONS (INCLUDING CLIMATE RESILIENCE). CONSIDER THE AFFORDABILITY AND LOCAL CONTEXT OF SUCH REQUIREMENTS.

In some circumstances decision-makers should strengthen building standards that are applicable within a much broader territory (see Box 8) – not just define higher standards that should prevail within special hazard zones per the earlier Recommendations.

More stringent standards can address hazards that affect broad areas of a given country, including hazards arising from increased precipitation (including snow) expected from climate change (see Box 9). Such standards can be applied to virtually all new construction; existing buildings can be upgraded at the time when major renovations occur[10].

Box 8. National Policy Excerpt – Indonesia: National Action Plan Addressing Climate Change

(Published in November 2007)

'Information on climate change such as temperature rise, changes in the processes of evaporation, humidity and water content should be integrated into design, code and physical infrastructure standards…. Building design should consider the ability to cope with tropical storm, high rainfall intensity and drought' *(pp. 69-70)*.

Box 9. Sub-national Example – Canada: Snow loads on buildings in Northwest Territories

'Recent studies by the Government of the Northwest Territories (NWT) in Canada's Arctic indicate that approximately 22 per cent of the public access buildings in the NWT - schools, hospitals and medical centres, community centres - have been found to be at risk of collapse from changing (increasing) snow loads.

Approximately 10 per cent of these buildings have been retrofitted since 2004, while another 12 per cent are currently (2010) under snow load 'watch' status.

Until studies on the changing snow loads and their expected trends can be completed, the Territorial Government has increased all existing ground snow loads in the National Building Code of Canada by a factor of 20 per cent for their Territorial Building Code – a bottom-up adaptation measure that could be considered as equivalent to use of a 20 per cent Climate Change Adaptation Factor.'

Source. *(Auld, et al., 2010)*

9 Maputo, Mozambique, for example, suffers from frequent flooding following high intensity rainfall events. This is being exacerabted by the sealing of surfaces, both in the upper water catchments as well as in the settlement itself. This sealing affects water runoff. (Petersen, 2012).

10 For a parallel recommendation on improving building standards from the perspective of mitigating greenhouse gas emissions, see Recommendation 12, below.

Box 10. Local Example – Cuba: Affordable, resilient housing in Havana

Hurricanes pose a perennial threat to Cuba. Havana, Cuba's capital and the Caribbean's largest city, has made a priority of reducing risk. The city developed one of the first early warning systems for hurricanes in the Caribbean. Instructors teach schoolchildren to clear drains of leaves and other obstructions in anticipation of a storm, and to take other precautions such as pegging and tying down loose tiles and weighing down roofs with bags of grain.

As in many low-income cities, Havana does not have the financial, human or physical resources to rebuild houses and other critical infrastructure to hurricane-proof standards on a large scale. Instead, the city has adopted a strategy of 'alternative, progressive, evolving' homes, where one conventional room doubles as a 'safe' room.

The idea is to encourage residents to make a small part of their house more resistant to the impacts of a hurricane, with the aim of strengthening the entire structure's resistance over time according to building design standards that are also being evolved. Using cement made from the ashes of sugar cane and other local materials, which are typically provided by the government, residents are slowly making improvements to their homes by, for example, building concrete bathrooms that act as a separate structure, with their own, reinforced ceilings and roofs. Such safe rooms are designed to protect inhabitants and valuable belongings, as well as for food storage.

Source: *Surviving the Storm,* part of *Hot Cities,* broadcast by the BBC and produced by Rockhopper TV. *http://www.rockhopper.tv/films/detail/hot-cities-surviving-the-storm (Summers, 2009)*

When considering higher building standards as a way to increase resilience, one should bear in mind the affordability of such measures. Building practices that are traditional or indigenous to an area typically reflect local conditions and, as such, may be both more resilient and more affordable than are certain newer, imported building technologies. With attention, policy-makers can also provide for innovative and affordable approaches to increasing the resilience of housing in an affordable manner (see Box 10).

RECOMMENDATION 5

(A) PRIORITIZE INVESTMENTS IN SYSTEMS THAT REDUCE THE RISKS OF NATURAL DISASTERS FACED BY HUMAN SETTLEMENTS. MAINTAIN SUCH SYSTEMS. (B) BUILD THE RESILIENCE OF SYSTEMS THAT PROVIDE BASIC URBAN SERVICES, INCLUDING BY PROTECTING CRITICAL FACILITIES. (C) IN SUCH INFRASTRUCTURE-BASED APPROACHES TO REDUCING RISKS AND BUILDING RESILIENCE, TAKE INTO ACCOUNT CHANGING CONDITIONS.

In many instances additional risk-reducing infrastructure – levees or polders, sea walls and so on – is required to reduce risks to acceptable levels (see Box 11). Advocating for such investments is important, to help ensure that they are indeed planned, financed and built. Otherwise, given competing priorities, such investments run the risk of being deferred from year to year and never constructed – sometimes with tragic consequences. Likewise, it is important to think in terms of comprehensive *systems* of protection – not piecemeal infrastructure facilities (see Box 12).

Box 11. National Policy Excerpt – Fiji: National Climate Change Policy
(Approved in January 2012)

'The urban development and housing sector can adapt to climate change through initiatives in the following areas: […] flood control through: diversion channels; the building of weirs, cut-off channels, retarding basins and dams; and river-improvement activities such as channel widening, dyke construction and river-bed excavation' (p. 65).

Box 12. Local Example – United States: Lessons from Hurricane Katrina and New Orleans

An aerial view of flooding in New Orleans, USA, a day after the levees failed. On 29 August 2005, storm surge from Hurricane Katrina caused 53 different levee breaches in greater New Orleans.

In 2005 Hurricane Katrina made landfall in Louisiana and Mississippi. 'In New Orleans, the approximately 5 metre surge overtopped and breached sections of the city's 4.5 metre levees, flooding 70 to 80 per cent of the urban area, and 55 per cent of the city's properties. The majority of the 1,101 people that died in Louisiana related to the floods were from vulnerable groups such as the poor and elderly. There were 1.75 million private insurance claims, costing in excess of US$40 billion, while total economic costs are projected to be significantly in excess of US$100 billion. In New Orleans alone, flooding of residential structures caused between US$ 8-10 billion in losses" (Romero Lankao, 2008, pp. 36-37)

A complex series of policy, engineering, decision-making, institutional and governance problems contributed to this catastrophe – but a lack of prioritization of flood control measures and a corresponding deferral of funding certainly played a key role. The American Society of Civil Engineers (ASCE) found: 'At the time of Hurricane Katrina, segments of the levee system were not yet complete, or the top elevations had not been raised to the authorized protective levels' (American Society of Civil Engineers, 2007, p. 22). This was despite the fact that tests and modeling exercises carried out in the 1980s and 1990s revealed the potential for failure in the extant flood control system. However, 'the consequence of failure –

continues on page 11

catastrophic loss of life – did not seem to be acknowledged' by decision-makers (American Society of Civil Engineers, 2007, p. 62).

A related problem was as follows: 'The south-east Louisiana hurricane protection system was planned, designed, and constructed over four decades without a system-wide approach or integration with land use, emergency evacuation, or recovery plans…. The hurricane protection system… is a system in name only. In reality, it is a disjointed agglomeration of many individual projects that were conceived and constructed in a piecemeal fashion' *(American Society of Civil Engineers, 2007, p. 63)*.

The concept of feasibility is key to the present recommendation. As a basis for decision-making, analysts should assess and compare the feasibility of a broad range of possible alternatives to reducing risk, again within the context of a systemic approach. Alternatives to building expensive new facilities include better managing *existing* facilities so as to increase their effectiveness[11]. Analysts also should consider ecosystem-based alternatives to traditional engineering approaches (see Recommendation 6). Moreover, decision-makers should consider the full economic benefits of these various alternatives, not just those positive impacts that can be monetized. Furthermore, economists should weigh not only the up-front costs of investment, but also the discounted life-cycle costs of operating, maintaining, renewing and ultimately replacing facilities – and also bear in mind the costs and implications of inaction. Also analysts should use modified or multi-criteria feasibility frameworks in order to avoid bias against the poor. For example, the quantifiable benefits in terms of property values of protecting a small number of deluxe vacation homes from storm surge may well exceed those of safeguarding a much larger informal settlement[12]. Finally, where protection is simply not feasible, as suggested above and as a last resort consider relocating communities that live in very high risk areas.

Looking beyond the more limited, reactive concept of risk-reduction, policies should also call for building the *resilience* of systems that provide basic urban services. This could begin by identifying what existing facilities should be considered critical; that is, essential for continuity of basic services during (or at least for priority restoration immediately after) a natural disaster. Superstorm Sandy revealed the vulnerability of certain critical facilities in New York City (see Box 13). National-level policy-makers can provide a limited amount of guidance on the question of what sorts of facilities are essential, either within the context of the climate change policy itself (see Box 14) or in follow-on guidelines, such as on the appropriate siting of critical new facilities (see Box 15).

11 The City of Barcelona has succeeded in such efforts; see *(Valdes i Lopez, Fernandez-Armesto, & Raventos i Fornos, 2013)*.

12 For such reasons, when considering various approaches to adaptation, Durban, South Africa, for example, has used a modified cost-benefit approach that took into consideration the number of people impacted. See *http://eau.sagepub.com/content/25/1/139.abstract.* Also see discussion of Recommendation 7, below.

Box 13. Local example – USA: Calls for reducing the vulnerability of critical facilities in New York City in the wake of Superstorm Sandy

The 13th West Street electricity substation in Manhattan, USA, which was flooded during Hurricane Sandy in 2012.
© Wikimedia Commons/Beyond My Ken

Superstorm Sandy hit the eastern seaboard of the United States on 29 October 2012. Analysts estimate that it caused damages in the US in excess of US$68 billion.

In addition to more general damage, Sandy hit critical facilities in New York City. As Sandy approached, workers erected temporary barriers around the 13th Street Con Edison electrical substation in Manhattan. Those barriers would have been sufficient to protect that critical facility from a storm surge of up to 3.8 metres. When the surge topped out at 4.3 metres, however, sea water overwhelmed the equipment, and 250,000 customers lost power in lower Manhattan. Such power outages in turn compromised the ability of other key facilities, including five New York hospitals which were unable to shelter in place during the storm. Some of those hospitals had located their back up generators in basements, where they were put out of action by the flooding.

Meanwhile, in contrast to the 13th Street sub-station, which forms part of a centralized grid, the experience of Co-Op City during Sandy shows the value of a decentralized model of resilience. This housing development in the Bronx is served by a microgrid – a small independent grid that can operate either as part of the central grid, or else independently for an extended period of time. During the storm, the Co-Op City microgrid continued to provide electricity to 60,000 residents, while outages plunged neighboring areas into darkness.

In the wake of such events, analysts have begun to assess critical systems. Arup, RPA and Siemens, for example, have assessed the metropolitan electrical grid for New York City. They have offered stakeholders and decision-makers three alternative action plan scenarios to build the system's resilience, each with its attendant benefits and costs: do nothing, protection only, and full grid resilience.

Sources: *(New York City, 2013), (PlaNYC, 2013), (Siemens, 2013), (Siemens, 2013)*

Box 14. National Policy Excerpt – Kenya: National Climate Change Response Strategy

(Published in April 2010, and operationalized through the National Climate Change Action Plan launched in March 2013)

'Strengthening disaster preparedness by increasing the number of well equipped (equipment, medication and material) *health facilities*, constructing dams and dykes in flood prone areas' (p. 57; italics added).

However, again a more comprehensive, systems-based approach to building resilience is generally preferable. Such a perspective can lead planners to consider fundamentally new solutions, such as (at least in some cases) developing smart grids and micro-grids instead of relying on more traditional, centralized networks (see Box 13). The private sector can help authorities to define alternative packages of improvements that achieve different levels of resilience at various costs (again see Box 13) (New York City, 2013). This sort of scenerio-based analysis is conducive to informed consultation with stakeholders (including tax- and rate-payers) and decision-making.

Box 15. Implementation Example – United Kingdom (UK): Definitions of essential, vulnerable and water-compatible land uses

In the UK, risk analysts in the Department of Communities and Local Government assigned land uses and facilities to one of five categories. The underlying concept is that, when considering which uses to allow in (and which to prohibit from) zones affected by various degrees of flood risk, planners should reflect on the degree to which those uses are to be considered essential and vulnerable. They should then seek to locate the most essential or vulnerable land uses in the safest places possible. A sample of the land uses and facilities included in each category of essentiality/vulnerability are as follows:

Essential Infrastructure: Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk and strategic utility infrastructure, including electricity generating power stations and grid and primary substations

Highly Vulnerable: Emergency response infrastructure, basement dwellings, mobile homes and installations requiring hazardous substances consent

More Vulnerable: hospitals, health and community services, landfill sites

Less Vulnerable: Retail and commercial properties, agricultural land, water and sewerage treatment

Water-compatible Development: flood control infrastructure, docks, marinas, water -based recreation and amenity open spaces.

Sources: *(Jha, Bloch, & Lamond, 2012, p. 320)*

Box 16. Local Example – Climate-proofing road infrastructure in Federated States of Micronesia

A view of the coastline of the Island of Kosrae, Micronesia © Wikimedia Commons/ Matt Kieffer

The completion of a missing link in the circumferential road around the island of Kosrae used climate change scenarios to develop projections of the likelihood of extreme rainfall events in the future. The Asian Development Bank used such projections to recommend an increase in the drainage capacity to cope with larger future hourly rainfall levels. Analysts demonstrated that the increased costs entailed by such improvements would be paid back within 15 years due to lower maintenance and repair costs for the road. (Asian Development Bank, 2005).

A grant from the Global Environment Facility helped to pay for the incremental costs of adapting this road segment. Project designers included the project "Adapting coastal road designs to take into consideration the impacts of climate change" within the Global Environment Facility-supported Regional-Pacific Adaptation to Climate Change Project, which ran from 2008 to 2012. The South Pacific Regional Environment Programme and United Nations Development Programme (UNDP) implemented the project, while the Kosrae Island Resource Management Authority served as coordinator and the Department of Infrastructure and Transportation as implementing agency. *(Adaptation Learning Mechanism, 2009)*

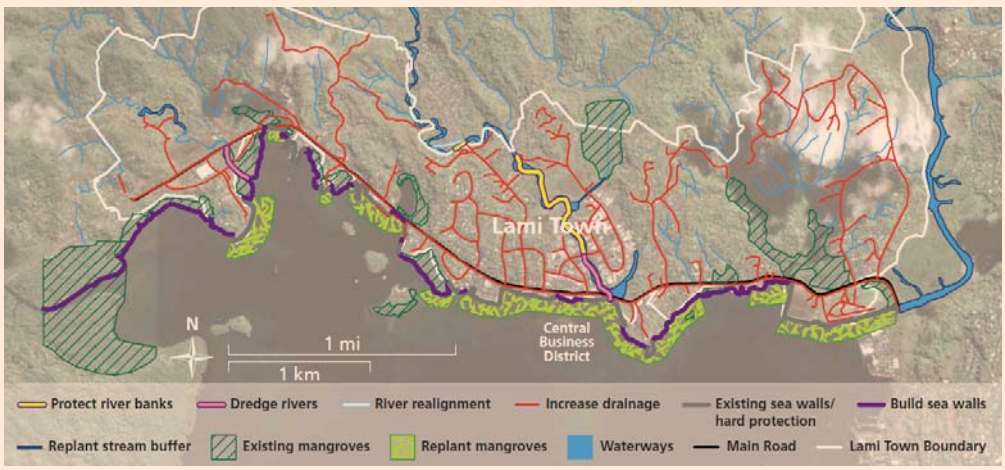
As noted, engineers have begun to reflect on projections regarding changing conditions in the design of systems and individual facilities. In some cases this may involve dimensioning facilities such as stormwater drainage channels to meet expected future peak rainfall events, rather than merely accommodate current peaks (see Box 16). Also, as noted above, alterations to the built environment such as development in upper water catchments that affects runoff coefficients, also may be relevant to infrastructure design. Whatever the cause of change, it is often more cost-effective over the lifetime of facilities to make such investments when it is being constructed, rather than defer costly alterations for later[13].

13 See (World Bank, 2010)

RECOMMENDATION 6
AS PART OF A SYSTEM-WIDE APPROACH, FULLY CONSIDER AND ADOPT WHEN FEASIBLE ECOSYSTEM-BASED APPROACHES TO BUILDING THE RESILIENCE OF HUMAN SETTLEMENTS AND PROTECTING THEM FROM NATURAL DISASTERS.

Ecosystems can help to reduce risk from natural disasters and otherwise support urban resilience; this represents an important category of ecosystem service (see Box 17). National climate change policies can enjoin urban/regional planners and managers to protect existing ecosystems and incorporate such systems into strategies for adapting to climate change (see Box 18 and Box 19).

Box 17. Local Example – Fiji: Minimizing damages from hazardous physical events in Lami Town



A map of Lami Town, Fiji, showing a mix of the conventional engineering and ecosystem options identified and evaluated by the team © Secretariat of the Pacific Regional Environment Programme

Lami Town, the capital of Fiji, comprises a mix of formal and informal settlements with a total population of approximately 20,000. The elevation of Lami Town ranges from 10m to 150m above sea level.

With support from the United Nations Environment Programme (UNEP), analysts undertook a comparative study of four sets of adaptation actions, ranging from pure ecosystem-based to pure engineering adaptation options, with two scenarios involving a mix of ecosystem-based and engineering adaptation options. Ecosystem based options include mangrove planting and reducing coral extraction, while engineering options include building seawalls and increasing drainage. Estimated benefits across the options ranged from FJ$ 8.00 to FJ$ 19.50 for every Fijian dollar spent. Results were based on a 20-year time horizon and included avoided damages to businesses, households and service costs. Overall, the highest ratio of benefit to cost was for ecosystem maintenance. However, when alternatives were considered for different parts of the Town in a more fine-grained analysis, the study authors recommended a mixture of ecosystem and engineering options as the most appropriate for reducing risk. *(Rao, et al., 2012, p. 16)*

Box 18. National Policy Excerpt– South Africa: National Climate Change Response White Paper
(Approved in October 2011)

'Encourage and develop water-sensitive urban design to capture water in the urban landscape and to minimize pollution, erosion and disturbance. […] Ensure that […] urban land-use planning considers the impacts of climate change and the need to sustain *ecosystem services* when considering settlements and infrastructure development proposals.' *(pp. 21-22; italics added)*.

Box 19. National Policy Excerpt– Fiji: National Climate Change Policy
(Approved in January 2012)

'The urban development and housing sector can adapt to climate change through initiatives in the following areas: […] catchment management, including reforestation, land-use control, protection of wetlands and soil conservation' *(p. 65)*.

Explicit policy guidance on this topic is important, otherwise decision-makers with traditional engineering backgrounds but limited environmental education may not fully consider such approaches. In other words, an unexamined bias towards conventional engineering solutions may prevail. However, conventional engineering solutions by no means eliminate risk – even very expensive, state-of-the-art investments, as recent events tragically show[14]. For this reason even the Netherlands – for centuries a champion of efforts to reclaim land and prevent flooding through manmade works – has recently moved closer to a build with nature approach *(http://www.ecoshape.nl/)*.

What do ecosystem-based approaches encompass? These can be natural areas such as mangrove forests that provide services to communities (see Box 17). Or these can be new facilities that work *with*, rather than combat, natural processes and cycles (particularly water cycles), such as grassed waterways (see Box 20 and Box 21). Broader definitions of such approaches, such as those that encompass traditional forms of agriculture, may be equally valid.

Box 20. Local Example – Brazil: Natural waterway preservation in Curitiba

Curitiba is the capital of the Brazilian state of Paraná with a population of approximately 1.8 million. In Curitiba floodplains have been converted into parks through land swap schemes. Within these floodplains, instead of canalization of the waterways, the natural conditions have been preserved and the adjoining land has been converted to green areas to help minimize damage should flood waters breach the natural banks. *(Campbell, 2009)*

14 On 11 March 2011, an earthquake and tsunami inflicted severe damage along 600 km of coastline in Japan. The disaster killed more than 27,000 people and destroyed or damaged more than 202,000 homes and other buildings. Analysts estimate that the event caused between US$195 and 320 billion in direct economic losses – not including losses of US$58-71 billion associated with damages to the Fukushima nuclear power plant. A total of 8500m of breakwaters collapsed during this event, including a recently-completed facility in Kamaishi City, the world's deepest breakwater, constructed at a cost of US$1.5 billion. While an earthquake triggered this tsunami, the lesson that not even expensive, state-of-the-art engineering solutions can completely eliminate the risk of natural disasters applies equally well to extreme events such as cyclones and storm surge that will be exacerbated by a changing climate.

Box 21. Local Example – Uganda: Proposals for integrated flood management for Kampala

Flooding in Kalerew, in Kampala, Uganda © UN-Habitat/Nicholas Kajoba

In an effort to help Kampala Capital City Authority to better manage its chronic flooding problems, UN-Habitat's CCCI has supported development of a city-wide strategy for integrated flood management. As part of this effort the implementing team has proposed establishing, where possible, grassed waterways with natural embankments as secondary channels, in lieu of the narrow channels called for by the city's 2002 Drainage Master Plan. They estimate that, if fully implemented, such facilities would reduce runoff by 25-29 per cent, with a corresponding reduction in flooding in the central valley. *(UN-Habitat, 2010)*

Again, the concept of feasibility lies at the heart of the present recommendation. And again, when tallying the benefits of ecosystems one should consider and quantify when possible, not only those that reduce risk and build resilience, but other positive impacts as well, such as the sequestration of greenhouse gases and the protection of biodiversity. Economists are devising new tools to more fully capture such benefits[15].

At the same time one must recall that, when comparing alternative solutions, ecosystems operate much differently from conventionally engineered facilities. And, in turn, the benefits conferred by, say, a mangrove forest versus a levee or polder in terms of flood risk reduction may well vary markedly, depending on the strength of the flood event in question. For such reasons, integrated plans to reduce the risk of natural disasters to specific human settlements may well end up proposing some combination of conventional engineering and ecosystem-based solutions, along with other measures (see Box 17).

15 For background see the global initiative The Economics of Ecosystems and Biodiversity *(http://www.teebweb.org/)*. For one example of such a tool, the i-Tree Eco model, see *www.itreetools.org/eco/*. Also see additional caveats regarding feasibility analysis noted above under Recommendation 5.

RECOMMENDATION 7
PAY SPECIFIC ATTENTION TO THE NEEDS OF THE MOST VULNERABLE GROUPS IN DEVELOPING RESPONSES TO CLIMATE CHANGE.

Reducing vulnerability and building resilience goes beyond just minimizing the *exposure* of people and assets to natural disasters, which is the main thrust of the previous recommendations. It also involves looking more deeply into the root causes of the vulnerability experienced by the poor and marginalized: lack of secure tenure, absence of a social safety net, dependency on a narrow range of low-paying livelihoods, limited access to resources, lack of food and energy security and so on (see Box 22). By their very nature, however, many of these more deeply rooted causes are hidden or difficult to quantify; additionally, the poor or marginalized often lack a seat at the table in political decision-making and thus the means to give adequate voice to

Box 22. Local example – Senegal: A two-pronged approach to reducing vulnerability in St. Louis

A traditional fishing boat in St Louis, Senegal. Many of the residents of this coastal city are heavily reliant on the fishing industry for their livelihoods © Wikimedia Commons/ Finn-DE

St Louis is a low-lying city with more than 250,000 inhabitants built in the delta of the Senegal River. An in-depth analysis of the climate change related hazards and vulnerabilities of the city and its population identified two poor neighborhoods as particularly vulnerable to flooding and the impacts of climate change. A UN-Habitat implemented project, supported by the Government of Japan, adopted a participatory planning approach, including undertaking a livelihoods and a willingness-to-pay survey, in order to gain a more nuanced perspective of vulnerability. The survey brought into sharp relief the community's heavy dependence on the fishing industry, which is subject to both climatic and man-made pressures.

A two-pronged approach to addressing this vulnerability was implemented. Firstly, the most vulnerable families were selected for resettlement. In April 2013, UN-Habitat transferred the responsibility for the administration and management of 68 newly built houses constructed for such families to the municipality. Secondly, resilience building activities were undertaken with the remaining families in the community, including livelihoods training. *(UN-Habitat, 2013)*

their needs[16]. To attempt to overcome at least some of those entrenched obstacles, national climate change policies should explicitly call for attention to the most vulnerable (see Box 23).

Box 23. National Policy Excerpt– Ecuador: National Strategy for Climate Change 2012-2015

(Published in April 2012)

'Take action in order to guarantee the *access of the most vulnerable groups to resources* contributing to strengthening their capacity to respond to the impacts of climate change' *(p. 50, italics added)*.

Policies can begin to pinpoint some of the most vulnerable groups that are being disproportionately threatened by global warming. In addition to the urban and rural poor, vulnerable groups may include women and children (see Box 24 and Box 25). Other groups such as the aged, sick or physically challenged also may be adversely affected (see Box 26 and Box 27).

Box 24. Example – Gender disparity in disaster impacts in India

'The research evidence emphasizes the social construction of gendered vulnerability in which women and girls are often (although not always) at greater risk of dying in disasters, typically marginalized from decision making fora, and discriminated and acted against in post-disaster recovery and reconstruction efforts' *(Houghton, 2009; Sultana, 2010)*.

'Women are not vulnerable through biology (except in very particular circumstances) but are made so by societal structures and roles. For example, in the Indian Ocean tsunami of 2004, many males were out to sea in boats, fulfilling their roles as fishermen, and were thus less exposed than were many women who were on the seashore, fulfilling their roles as preparers and marketers of the fish catch. However, the women were made vulnerable not simply by their location and role, but by societal norms which did not encourage survival training for girls (for example, to swim or climb trees) and which placed the majority of the burden of child and elder care with women'. *(IPCC, 2012, p. 81)*

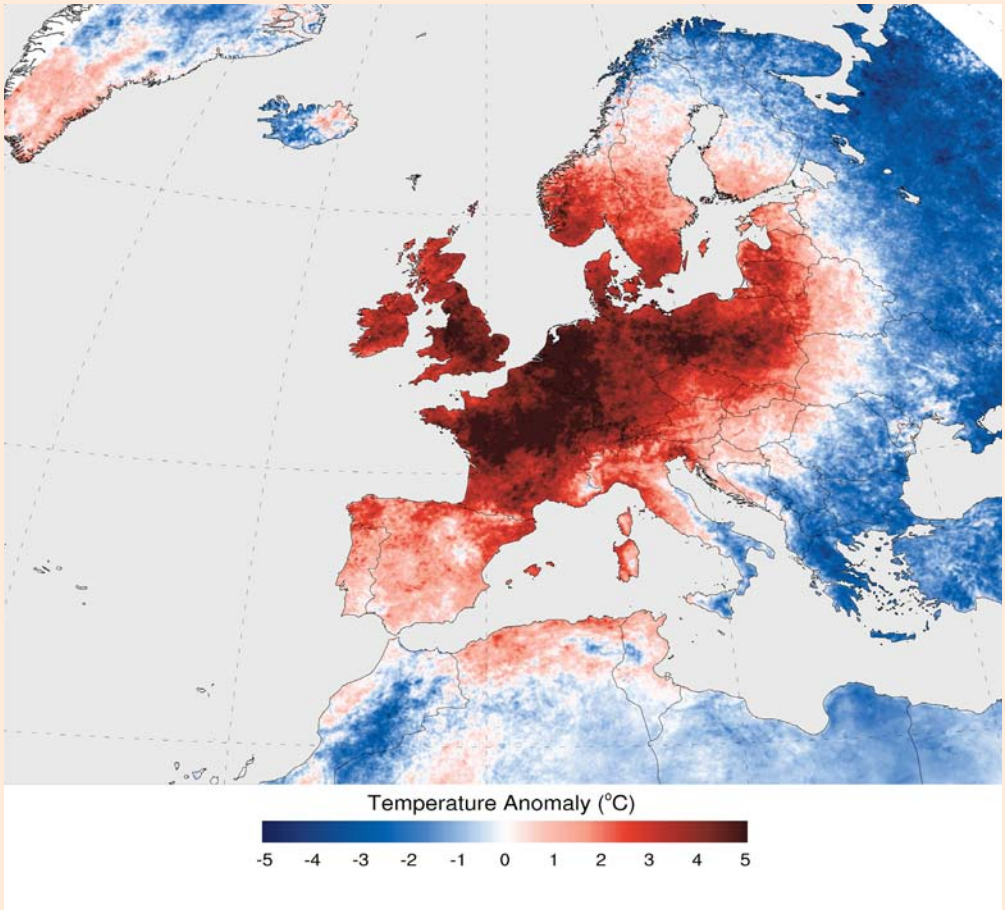
Box 25. National Policy Excerpt– Pakistan: National Climate Change Policy

(Approved in September 2012)

'Policy objective 3: To focus on pro-poor, gender sensitive adaptation […]' *(p. 2)*.

16 Moreover, even looking more narrowly at *exposure* to natural disasters, the assets of the urban poor may be systematically undercounted due to the nature of conventional cost-benefit analyses: the home of a poor family is likely to be worth much less in dollars than the home of an affluent household – and even this example assumes that the poor family actually owns the house and land where they live. Further discussion see Recommendation 5.

Box 26. Example – Western Europe: Heat waves of 2003 and 2006



An image of Europe that depicts the heat wave of July 2006, expressed as the degrees to which land surface temperature in that month exceeded the typical levels for July during the 2000-2012 period (Derived from Modis Terra data) © Wikimedia Commons/Giorgiogp2

European heatwaves of 2003, and 2006 struck the elderly disproportionately. 'The combination of anomalously high temperatures over most of Western Europe and the associated drought induced a number of health, ecological, societal and economic impacts (Munich Re, 2004; UNEP, 2004). By far the most important one was the excessive elderly mortality recorded in several countries across Europe. […].'' (García-Herrera, Díaz, Trigo, Luterbache, & Fischer, 2010, p. 283). In August 2003, for example, the heatwave in France caused more than 14,800 deaths; around 60 per cent of which occurred in persons aged 75 and over *(Confalonieri, et al., 2007, p. 297)*

Box 27. National Policy Excerpt– South Africa: National Climate Change Response White Paper

(Published in October 2011)

'Special needs and circumstances – [Among other principles, South Africa's climate change response will consider] ...the special needs and circumstances of localities and people that are particularly vulnerable to the adverse effects of climate change, including vulnerable groups such as *women* and especially poor and/or rural women; *children*, especially infants and child-headed families; the *aged*; the *sick*; and the *physically challenged*.

Uplifting the poor and vulnerable – Climate change policies and measures should address the needs of the *poor* and *vulnerable* and ensure human dignity, whilst endeavouring to attain environmental, social and economic sustainability' *(p. 11; italics added).*

One result of such a policy should be to direct a high proportion of adaptation actions towards the basic needs of the most vulnerable, rather than just building, for example, sand retention structures to protect the seaside homes of the affluent. In many cases this attention to the needs of the marginalized may involve designing programmes that empower and support locally-led action, such as that shown in Box 28.

Box 28. Local Example – Indonesia: Community-based early warning system in Jakarta

Children in flood waters after torrential rains in the neighborhood of Kampung Melayu, Jakarta, Indonesia © Wikimedia Commons/Kate Lamb

'In Kampung Melayu, one of the oldest and largest slums in Jakarta, residents have responded to an increase in the severity and frequency of flooding by developing an early-warning flood system. Neighbourhood and village heads receive SMS messages on their mobile phones from floodgate areas upriver when the water level is getting high. They can then spread the news in the community by broadcasting from the minaret of the local mosque, so that residents can prepare for the coming inundation.' *(Baker, 2012, p. 91)*

RECOMMENDATION 8
AS PART OF AN INTEGRATED STRATEGY TO BUILD RESILIENCE, ENCOURAGE URBAN AGRICULTURE THROUGH LAND USE PLANNING AND COMPLEMENTARY PROGRAMMES.

Urban agriculture, a growing contemporary movement, builds community resilience in various ways. Firstly, it adds to food security and helps to diversify the income of poor families. Secondly, by permitting and even encouraging such activities in flood-prone areas, it can be used as a strategy to keep people from building in those zones – a soft approach to enforcing restrictive land use regulations (see Recommendation 1). Finally, depending on circumstances, urban agriculture may well confer co-benefits, including reduced greenhouse gas emissions through increased consumption of locally grown produce with fewer vehicle-miles required to transport produce from farm to table, increased biodiversity and so on.

Planners can encourage urban agriculture on appropriate lands through enlightened spatial planning, as well as complementary programmatic measures (see Box 29 and Box 30). Likewise, implementers can promote rooftop gardening in more heavily urbanized areas.

Box 29. National Policy Excerpt– Ecuador: National Strategy for Climate Change 2012-2015
(Published in April 2012)

Local authorities should address the negative impacts of climate change in urban settlements, in part through 'incentivizing urban agriculture.' *(p. 29)*

Box 30. Local Example – Tanzania: Urban agriculture and spatial planning in Dar es Salaam

Policy-makers have integrated urban agriculture considerations into various policies and by-laws in Tanzania, particularly in Dar es Salaam where urban agriculture was formally recognized as a land use in the Strategic Urban Development Plan of 1992. 'In Dar es Salaam, urban agriculture has been developed and promoted as an income earner as well as a food source at the subsistence or household level. Food security was a national concern following droughts in the 1970s and 1980s, and the government supported urban agriculture in a bid to encourage households to be self-sufficient. One challenge has been to regulate the largely informal urban agricultural activities so that natural systems such as river valleys and wetlands are not compromised.' *(UN-Habitat, 2012, p. 24)*

RECOMMENDATION 9
HARMONIZE POLICIES THAT ADDRESS CLIMATE CHANGE ADAPTATION WITH OTHER RELEVANT POLICIES, WITH PARTICULAR ATTENTION TO THOSE THAT GUIDE DISASTER RISK REDUCTION.

As noted earlier, when devising policies drafters must be aware that considerable overlap exists between measures taken to adapt to climate change and those that seek to reduce the risk of natural disasters and otherwise build resilience. This is as it should be. Indeed, through influential statements such as the Rio +20 Declaration (*A Call to Action*) and the IPCC's *SREX report*[17], both of 2012, the global community has

17 IPCC. 2012. *Managing the risks of extreme events and disasters to advance climate change adaptation*.

called loud and clear for these two, at times divergent communities to come together and harmonize their language and proposals.

At a minimum such harmonization may mean that policy-makers should ensure consistency and cross-referencing between climate change policies and risk reduction (as well as resilience-building) policies (see Box 31)[18]. Moreover, to counteract the centrifugal forces that can arise if two different and potentially competing bureaucracies are set up to address adaptation and risk reduction, respectively, they should pave the way for coordination mechanisms (see Box 32). More generally decision-makers should harmonize climate change policies with other policies.

Box 31. National Policy Excerpt– Indonesia: National Action Plan Addressing Climate Change
(Published in November 2007)

'The adaptation agenda to address climate change should be linked to the National Action Plan on Reduction of Disaster Risk' *(p. 29)*.

Box 32. National Policy Excerpt– Solomon Islands: National Climate Change Policy 2012-2017
(Approved in June 2012)

'The close relationship between the disaster risk reduction and climate change adaptation agendas requires good coordination and integration to minimize duplication and maximize synergies' *(p. 20)*.

18 Countries may develop such policies, as well as National Disaster Management Action Plans, within the context of International Disaster Risk Reduction frameworks. Incidentally, the recommendations set forth in the present Policy Note should be fully consistent with the Priorities for Action set forth in the UN International Strategy for Disaster Reduction's (UNISDR's) *Guide for Implementing the Hyogo Framework for Action by Local Stakeholders* (UNISDR, 2010), the Essentials set forth in *How to Make Cities More Resilient: A Handbook for Local Government Leaders* (UNISDR, 2012) and so on.

03 MITIGATION OF GREENHOUSE GAS EMISSIONS

Urban areas emit a large proportion of the world's greenhouse gases. This share is increasing. For example, the International Energy Agency estimates that the proportion of energy-related global greenhouse gas emissions that urban areas account for will rise from around 67 per cent today to 74 per cent by 2030 (International Energy Agency, 2008). But, by the same token, with concerted effort cities can make a substantial contribution to global reductions in emissions.

National climate change policies can prompt reductions in urban emissions in several ways. The first three recommendations below (Nos.10-12) address those urban services and sectors that, given current technologies, afford the most significant opportunities for reducing emissions. Then the remaining three recommendations (Nos.13-15) promote coordinated, multi-sectorial action.

RECOMMENDATION 10
PROMOTE LOW CARBON MOBILITY.

Globally, the transportation sector accounts for roughly 13 per cent of the greenhouse gas emissions (measured in tons of carbon dioxide equivalent, or tCO_2e) caused by humans (IPCC, 2007). Cities can help to reduce those emissions by promoting low carbon mobility solutions.

Policies that pave the way for investments in public transportation represent one approach (see Box 33). Provisions for regulatory measures such as congestion pricing schemes in city centers also can help to manage travel demand, curb the use of private passenger vehicles and reduce emissions (see Box 34). Likewise, policies should encourage non-motorized transport, in the form of walking and bicycle riding (see Box 35).

Box 33. National Policy Excerpt– India: National Climate Change Policy

(Adopted in December 2008)

'Mass transport options including buses, railways and mass rapid transit systems and so on are the principle option for reducing energy use in the urban transport sector, and mitigating associated greenhouse gas emissions and air pollution'. Measures include 'Establishing mechanisms to promote investments in development of high capacity public transport systems (e.g., offer equity participation and/or viability gap funding to cover capital cost of public transport systems)…' *(pp. 30-32).*

Box 34. National Policy Excerpt– Kenya: National Climate Change Policy

(Published in April 2010, and operationalized through the National Climate Change Action Plan launched in March 2013)

'…Creating awareness and possibly carpooling policies through punitive taxes and charges, such as road and fuel levies to reduce unnecessary travel' *(p. 63).*

Box 35. National Policy Excerpt– Indonesia: National Climate Change Policy

(Published in November 2007)

'There is a need to construct sidewalk[s] and bike roads[s] as well as plant shading trees along the road to persuade the community to use non-motorized vehicles and walking' *(p. 70)*.

One promising approach to encourage urban dwellers to leave their cars at home involves bus rapid transit systems. Bus rapid transit can yield similar benefits to a subway system but at a fraction of the cost. While transportation planners pioneered this approach in Latin American cities such as Bogotá, Colombia, specialists have successfully replicated it in other regions, including Africa (see Box 36).

Box 36. Local Example – Nigeria: Bus Rapid Transit 'Lite' in Lagos

A bus travels along a dedicated Bus Rapid Transit lane in Lagos, Nigeria © Ibidun Adelekan 2011

Lagos is a burgeoning mega-city with an estimated population of 21 million. In this city, faced with more than its fair share of urban governance challenges, the launch of a simple bus rapid transit (BRT) system represents a recent success story.

A growing population, a poorly-maintained road network and rising incomes (the latter leading to rising car ownership) has led to a significant increase in traffic congestion in Lagos. Instead of adding more roads, the existing road network was adopted to accommodated a BRT. The BRT system includes 22 km of dedicated lanes with 85 per cent of them being physically demarcated by 400 mm high curbs or separated by road markings. The acceptance of the BRT scheme was facilitated through the involvement of different stakeholder groups, public education and by encouraging the best drivers of large buses to retrain to become 'pilots' of the BRT buses. It is estimated that the BRT system carries 25 per cent of all commuters along the 22 km route, while accounting for just 4 per cent of vehicles. The BRT system has led to reductions in transit times and a 13 per cent reduction in urban transport carbon dioxide emissions. *(UN-Habitat, 2012, pp. 38-42)*

RECOMMENDATION 11
REDUCE THE PRODUCTION OF SOLID WASTE, AND IMPROVE MUNICIPAL SOLID WASTE MANAGEMENT TO REDUCE GREENHOUSE GAS EMISSIONS.

At a global level the management of solid waste (as well as wastewater) accounts for around 3 per cent of anthropogenic CO_2e emissions (IPCC, 2007). In particular, these sectors release methane, one of the most potent of the greenhouse gases. Policies should encourage reduced production of solid waste and call for improved management of it, a service typically provided at the municipal level, by stimulating improvements throughout an *integrated* waste management cycle[19] (see Box 37). As stated in the IPCC Fourth Assessment Report, 'The mitigation of GHG emissions from waste must be addressed in the context of integrated waste management' (Bogner, et al., 2007); IPCC, 2011, p.587-588).

Some policy-makers have learned to regard the waste stream (or at least a portion of it) as a potential asset, rather than a liability – a paradigm shift (see Box 38). Engineers can, for example, extract energy from landfills (see Box 39). Recyclers can produce compost from biomass waste. To this end, programmes can reward the source separation of household waste (see Box 40).

Box 37. National Policy Excerpt– Laos: Strategy on Climate Change of the Lao PDR
(Approved in March 2010)

'Mitigation options include:

- ✓ Upgrading solid waste collection services for full coverage of the major urban centers and neighborhoods, so as to avoid greenhouse gas releases from open burning and decomposition
- ✓ building recycling facilities in order to reduce the amount of wastes to be disposed in landfills
- ✓ composting organic contents to manufacture organic fertilizers
- ✓ effectively managing sewage sludge removed from the domestic tanks and slurry removed from the waste treatment plants
- ✓ constructing new landfill facilities that can capture methane
- ✓ if financially viable, retrofitting the existing landfills' *(p. 15).*

Box 38. National Policy Excerpt– Rwanda: National Strategy on Climate Change and Low Carbon Development
(Approved in October 2011)

'Rwanda is failing to take advantage of a highly valuable resource: its municipal, agricultural and industrial waste. Various low-cost value-adding activities, such as composting or reuse and recycling, can turn formerly low value goods into high value resources. Rwanda will apply these processes to not only develop another resource stream… but also to lower the inputs required by its systems, thus reducing the energy requirement and therefore urban systems' climate impact' *(p. 74).*

19 Such a cycle can be built on three elements, reduce, reuse and recycle, with waste-to-energy being a potential fourth element.

Box 39. Local Example – South Africa: Gas to energy in Durban

Durban Solid Waste has worked with the World Bank to establish two local Landfill Gas to Electricity Projects (LG2EP). The first, a pilot project at Mariannhill, consists of a single one Megawatt (MW) engine, and takes in an average of 450 tons of refuse per day. The project currently has 13 vertical wells and six horizontal wells but the number of wells and engines will expand as more waste is deposited. The second landfill site, Bisasar Landfill, is one of the largest in South Africa: it consists of six 1 MW engines and one 0.5 MW engine, with capacity for an additional engine. Bisasar takes in 3500 tons of refuse per day, peaking at 5000 tons. The project currently has 77 vertical wells and 77 horizontal wells.

The LG2EP project is the second registered Clean Development Mechanism (CDM) project in South Africa. To date, the project has generated electricity worth South African R48 million and, over the 21-year lifetime of the project, it is expected to contribute 3.8 million tons of CO_2e emissions reductions (Strachan, no date) *(UN-Habitat, 2012, pp. 33-35)*

Box 40. Local Example – Brazil: Encouraging resource efficient waste management and local food consumption amongst the urban poor in Curitiba

A family obtains produce at a distribution station, as part of Curitiba's Green Exchange Program

In 1991 Curitiba (see Box 20) introduced the Green Exchange – a scheme to encourage the poor to recycle waste in return for food produce or bus transport tickets. The Green Exchange now has over 80 distribution points where four kilograms of recyclable material can be traded for one kilogram of local and seasonal produce.

Curitiba recycles two-thirds of its household waste – one of the highest rates in the world. At the same time, the Green Exchange delivers benefits such as better nutrition and the creation of livelihoods. The scheme was built on existing recycling services in the city that encouraged the employment of the socially disadvantaged. *(UN-Habitat, 2012, pp. 49-52)*

In addition to transportation and solid waste management, potential also exists in other urban service sectors for reducing greenhouse gas emissions. Policies should enjoin urban managers to actively look for such additional opportunities (see Recommendation 13, below).

RECOMMENDATION 12
PROMOTE ENERGY- AND RESOURCE-EFFICIENT BUILDINGS AND HUMAN SETTLEMENTS.

Scientists estimate that residential and commercial buildings account for 8 per cent of the world's greenhouse gas emissions that are brought about by human activity (IPCC, 2007). Builders can achieve substantial reductions in those emissions through design, both traditional and innovative, that reduces energy demand, uses appropriate materials and so on. Moreover, a number of the measures that can make buildings more efficient are financially viable in the sense that the long-term (discounted) savings achieved should substantially outweigh the upfront costs (McKinsey & Company, 2009).

Urban managers can take a direct approach to making a city's building stock more energy- and resource-efficient, by better managing municipal buildings and/or administering a retrofitting programme (see Box 41). They can also indirectly influence the quality of buildings through their control of the building permitting process (see Box 42).

Box 41. Local Example – Bulgaria: renovation of multi-family buildings in Sofia

An apartment block in Sofia, Bulgaria, before and after renovation © UN-Habitat

Following the transition from a socialist regime, 97 per cent of Bulgaria's 3.7 million dwellings had become privately owned by 2007. Many of these were in a poor state of repair, with an energy performance typically 2.5 times lower than the prescribed national minimum standard that made it costly for residents to heat their homes. Bulgaria's *Demonstration Project for the Renovation of Multi-family Buildings,* developed in partnership between the United Nations Development Program and the Bulgarian Ministry of Regional Development and Public Works, began in 2007 to address this poor energy efficiency in apartment buildings.

'Buildings in the project were selected on a needs basis for a package of energy efficiency upgrades, including the installation of insulation, replacement of doors and windows, sealing of air gaps and renovation of facades and public areas. Residents were brought together in homeowners' associations to contribute their

continues on page 31

time and labour, and a combination of loans and subsidies were offered to enable homeowners to repay the cost of the upgrades from the savings on their energy bills. By February 2011, 1,063 households in 27 multifamily buildings had been upgraded, resulting in an estimated 8.5 megawatt hours of energy savings to February 2011 and reduced CO_2 emissions of 2.2 tons per annum. The project has created 219 [permanent] jobs… and has resulted in improved comfort levels, lower energy bills and greater community cohesion.' *(UN-Habitat, 2012, p. 18)*

Box 42. Local Example – Brazil: a building code that promotes energy efficiency in São Paulo

The rooftops of high and low-rise buildings in São Paulo, Brazil © Wikimedia Commons/Roger Wollstadt

In São Paulo, water heating is estimated to account for 40 per cent of the city's electricity consumption. In 2007 an ordinance was included in the municipal building code that requires new residential, commercial and industrial buildings to install solar hot water heating systems to cover at least 40 per cent of the energy used for heating water. The regulation applies to all new buildings with four or more bathrooms and buildings (new or existing) that have large additional hot water needs such as swimming pools or industrial uses. Small residential buildings are not required to install solar hot water but are required to have the infrastructure in place to enable future installation. Non-compliance with the regulation can lead to the withdrawal of the building permit. *(ICLEI, 2013)*

Because of this vast potential for reducing emissions, national climate change policies should encourage energy- and resource-efficient building, particularly in urban areas. Policies can call for a regulatory approach to improving the building stock (see Box 43). Additionally programmes can effectively complement regulations: training activities, for example, can help builders to more quickly embrace new, unfamiliar technologies (see Box 44). Green mortgages represent another innovative programmatic approach to facilitate the uptake of eco-technologies in buildings. To date, a housing fund in Mexico has signed more than 900,000 green mortgages[20].

Box 43. National Policy Excerpt– Rwanda: National Strategy on Climate Change and Low Carbon Development

(Approved in October 2011)

'Rwanda will adopt a national low energy building standard, enshrined in the building codes, to produce the necessary behavior change in the industry, without costly intervention in the sector by the state. These standards will be built around systems, such as passive housing principles that are technically appropriate, have minimal upfront costs, and little or no operational costs. Such systems take advantage of direct solar gain… The recovery of grey water and rainwater should also be inserted into the building codes to support water efficiency and conservation… Efficient technologies, such as solar hot water… will be championed over inefficient systems…' (p. 74).

Box 44. National Policy Excerpt– India: National Climate Change Policy

(Adopted in December 2008)

In addition to continuous updates to energy norms and building energy codes, programmatic measures are also required: 'Builders and developers need to be trained and made aware of the options to save energy in new constructions. There is a need to create comprehensive integrated programmes at universities and other professional establishments to impart such training for designing and constructing low-energy buildings' (p. 26).

RECOMMENDATION 13

(A) PROMOTE THE DEVELOPMENT OF COMPACT URBAN FORMS WHILE PROVIDING FOR ADEQUATE SERVICE PROVISION. (B) RELATE SPATIAL DEVELOPMENT PATTERNS TO TRANSPORTATION NETWORKS IN A COHERENT WAY.

Urban form affects a city's greenhouse gas emissions. Urban sprawl makes public transportation less viable and promotes dependence on the private automobile. Automobile trips may be lengthened when sprawl is accompanied by single-use zoning, as residents may face longer commutes to work and must travel further afield to obtain basic household goods. Evidence shows that, all else being equal, we can expect that denser urban forms will translate into lower levels of emissions, particularly from transport[21].

20 For description see *www.worldhabitatawards.org*, and search for 'Mexico' under 'Winners and finalists'.

21 See World Bank 2010, p. 210. At the same time, urban patterns must provide for adequate service delivery, such as by providing adequate space for streets and public spaces. Well planned cities can be compact while also providing adequate space for such facilities. They can also of course provide for adequate green space. For further discussion of these topics, see UN-Habitat, 2012, *Urban Patterns for a Green Economy.*

Conversely, promoting more compact urban forms should, over time, act to reduce greenhouse gas emissions; national climate change policies therefore should promote such urban forms and the densification of dispersed settlements (see Box 45). Various strategies exist for promoting urban densification. Fast-growing new cities can encourage high-rise development (see Box 46), or establish an urban growth boundary; more established cities can redevelop brownfields, and so on[22]. Likewise, policies should call for mixed-use development to further reduce automobile dependency, with communities offering housing, basic goods and services and other uses in close proximity (see Box 47).

Box 45. National Policy Excerpt– South Africa: National Climate Change Response White Paper

(Approved in October 2011)

'South Africa will investigate how to leverage opportunities presented by urban densification to… promote behavioral change as part of urban planning and growth management' (p. 21).

Box 46. National Policy Excerpt– Pakistan: National Climate Change Policy

(Approved in September 2012)

'Town planning influences the level of emissions produced by human settlements by changing fuel and consumption patterns…. The Government should… encourage vertical instead of horizontal expansion of urban housing projects' (p. 26).

Box 47. National Policy Excerpt– Rwanda: National Strategy on Climate Change and Low Carbon Development

(Approved in October 2011)

'Low carbon urban systems: … Urban areas need to be efficient users of land through high density buildings, appropriate zoning and mass transit, such as bus rapid transit systems….

'High-density clusters consist of mixed use, co-located urban systems, centered on local services. They promote walkable lifestyles, reducing the need for transport, and therefore energy consumption. Walkable lifestyles, enabled by access to local, neighbourhood services and an attractive public realm (parks, squares and pathways) also have health benefits through increased exercise… It is crucial that transport networks are heavily linked to urban planning through transit oriented developments to maximize the level of access to costly infrastructure' (pp. 25 and 74).

When promoting compact urban form it is essential to integrate land use and transportation planning (see Box 47 and Box 48). Policies therefore should call for land use and transportation plans to be mutually reinforcing. The phrase 'transit-oriented development' (see Box 47) can denote a concerted effort to provide for dense nodes of residential, commercial and employment centers around high-quality public transportation facilities. Transit-oriented development also supports and encourages non-motorized transport. Such provisions can help even high-income cities to retain impressive levels of public transport usage (see Box 49).

22 For an expanded discussion of strategies for promoting compact urban form, see UN-Habitat (2011). *Urban Patterns for a Green Economy: Leveraging Density*.

Box 48. National Policy Excerpt – Fiji: National Climate Change Policy
(Approved in January 2012)

'Government will co-ordinate and integrate transport, energy, land use, economic development, environment and other policies' (p. 59).

Box 49. Local Examples – High level of public transport use in New York City, USA, and Singapore

The bustling Outram Park Station of the Mass Rapid Transit system in Singapore
© Wikimedia Commons/ mailer_diablo

In New York, 36 per cent of commuting trips use public transport. This high proportion of public transport use is a result of a deliberate policy of spatial concentration through high floor area ratios and diversification of land use through mixed zoning. These measures have been combined with progressive removal of street parking and constant improvements to the transit system to encourage increasing public transport use.

Likewise, Singapore has prioritized transit-oriented and compact urban structure with mixed zoning in its long-term development planning. Other incentives for public transport use include high vehicle and fuel taxation measures, parking management, a vehicle quota system and congestion pricing. In Singapore, 52 per cent of commuting trips are made with public transport. In both cities the level of public transport use has been holding steady. *(Bertaud, Lefevre, & Yuen, 2009, pp. 32-39)*

RECOMMENDATION 14
ENCOURAGE LOCAL AUTHORITIES TO ADOPT LOW EMISSION URBAN DEVELOPMENT STRATEGIES AND PLANS.

This recommendation goes beyond the previous prescription to call for comprehensive urban strategies or plans that are centered on an explicit goal of low carbon development. This goal would act as a unifying principle to orient sectorial plans, spatial plans and other measures; a range of activities would be looked at through this lens. Taken seriously, implementing this recommendation would entail determining a city's baseline greenhouse gas emissions, setting targets for reduction over time, measuring and reporting on progress towards milestones, considering the institutional arrangement required to reach goals and so on. Some cities have begun to develop such strategies and plans (see Box 50 and Box 51).

Box 50. Local Example – Jordan: A green growth programme for Amman

A panorama of Amman, Jordan, including Hashimite Square and the ancient Roman Amphitheatre © Wikimedia Commons/ Poco a poco

Amman, Jordan is a rapidly growing city of close to three million inhabitants. Greater Amman Municipality has developed a Green Growth Programme that will help the city to reduce its greenhouse gas emissions and achieve other goals. This Programme includes the following components:

- municipal waste (including the recovery of landfill gas)
- sustainable energy
- urban transport (including a bus rapid transit system)
- urban forestry and agriculture.

(Alhyasat, 2012)

The Programme, which analysts estimate will reduce greenhouse gas emissions by some 560,000 tCO_2e a year during the implementation period (UNEP, 2012), is expected to yield revenues in the carbon market. With the help of the World Bank, the city won the support of the Executive Board of the Clean Development Mechanism for its initiative to receive carbon credits via a 'city-wide programme of activities' (Spors & Ranade, 2011) (Ranade, 2011). This innovative approach allows a given city to receive such credits from emission-reducing activities in various sectors that are part of a unified programme – such as may emerge from an urban low emission development strategy.

Box 51. Local examples – Brazil, India, Indonesia and South Africa: Low emission urban development strategies in pilot cities

South African Municipalities selected for the Urban-LEDS project © ICLEI Africa

With funding from the European Commission, at present UN-Habitat and ICLEI are implementing the Promoting Low Emission Urban Development Strategies in Emerging Economy Countries (Urban LEDS) project. This project is helping pilot cities in Brazil, India, Indonesia and South Africa to develop such strategies. Eventually, it will also develop guidance materials that will help other local authorities to replicate successful experiences. To follow progress, see *www.urban-leds.org*.

In principle low emission urban development strategies can encompass a broad range of both hard and soft approaches. The private sector can advise on certain strategies, including the benefits of new, cleaner technologies – such as bus fleets that run on natural gas. Governmental actions can also tilt industry and consumers towards low carbon behaviour. Even when certain powers lie within their mandates, however, local governments understandably may be reluctant to impose too severe environmental penalties on business and households, for fear of driving them to move to neighbouring jurisdictions. For that reason and others, certain penalties and incentives are best administered by a central government, such as the carbon tax that France plans to levy on fossil fuels based on their greenhouse gas emissions beginning in 2014.

The components of low emission urban development strategies should be identified in part using participatory processes. Planners and stakeholders should prioritize viable projects that yield significant co-benefits as well as benefits for stakeholders including the urban poor. Likewise they should track and report on such benefits – for various reasons, including to build and maintain political support for such projects (see Box 52).

Box 52. Local Example – South Africa: Community reforestation project in eThekwini

As a host city for South Africa's 2010 FIFA World Cup, eThekwini Municipality decided to offset emissions associated with that event through a series of projects. One such project was the Buffelsdraai Community Reforestation Project. Under that initiative, by October 2012 some 284 hectares of land had been replanted to forest habitat.

This reforestation project sought as a primary benefit to offset around 50,000 tCO_2e. However, from the outset planners considered co-benefits when prioritizing, designing and implementing projects. For example, implementers of this project supported unemployed persons in setting up small-scale indigenous tree nurseries at their homes – a livelihoods co-benefit. The municipality reports that, to date, the project has created a total of 24 full-time, 10 part-time, and 340 temporary jobs. At the same time, the project has increased access by two project communities to an adequate food supply by 40 per cent. Other co-benefits include benefits from improved ecosystems and education.

Source: *http://www.durban.gov.za/City_Services/development_planning_management/environmental_planning_climate_protection/Projects/Pages/Buffelsdraai-Community-Reforestation-Project.aspx*

A national climate change policy could encourage cities to develop such low emission development strategies and plans. Before calling for such, however, policy-makers should consult with local stakeholders and investigate how exactly such an exercise would fit in with current planning requirements, to ensure that the policy would not impose an excessive burden on local authorities (see Recommendation 16, below).

RECOMMENDATION 15
ENCOURAGE CITY DWELLERS TO REDUCE THEIR CARBON FOOTPRINTS THROUGH PUBLIC AWARENESS CAMPAIGNS.

National climate change policies can prompt urban managers to mount public relations campaigns, to encourage residents to adopt low-carbon lifestyles (see Box 53). In addition to educating the public about the big picture issue of global warming and the measures required to reduce emissions, successful campaigns also can point out some of the personal benefits of altered behavior, such as the health benefits derived from bicycling instead of driving (see Box 54). Using eco-map technology, the City of San Francisco, USA, has injected a spirit of friendly rivalry into its low carbon campaign: residents can compare their neighbourhood's carbon footprint with those of other communities[23]. In addition to bringing changes in individual behavior, successful campaigns can also shore up political support for low-carbon programmes.

Box 53. National Legal Excerpt– The Philippines: Climate Change Act of 2009

(Approved in September 2009)

'Develop energy-efficient and climate-resilient human settlements [in part] through… public awareness campaigns' *(p. 25).*

23 See *http://www.sfgate.com/green/article/Net-tool-tracks-carbon-footprint-by-ZIP-code-3163990.php.*

Box 54. Local Example – Japan: Public awareness campaigns in Yokohama

'Yokohama's success in waste reduction is attributed to the city's public awareness campaigns and the active participation of stakeholders in the city's '3R' activities (i.e., reduce, reuse and recycle). In 2003, Yokohama launched its G30 Action Plan to reduce waste by 30 per cent by the financial year 2010, using waste quantities from the financial year 2001 as baselines. … The plan … include[d] environmental education and promotional activities, such as 11,000 seminars for neighbourhood community associations to explain waste reduction methods, 470 campaigns at railway stations and 2200 awareness campaigns at local waste disposal points.' In thus emphasizing engagement with neighbourhood associations, the city took advantage of the fact that 80 per cent of the population reportedly participates in such organizations.

'The waste reduction target of 30 per cent was achieved in 2005 and, by 2007, waste had fallen by 38.7 per cent relative to 2001 figures. The reduction in waste from 2001 to 2007 is equivalent to 840,000 tons of CO_2 emissions. The scheme also had economic benefits, including US$23.5 million from selling recyclables and US$24.6 million from electricity generated from waste incineration.' *(UN-Habitat, 2011, p. 100)*

04 GENERAL / CROSSCUTTING

Based on our review of existing climate change policies, we hereby offer several additional recommendations that cut across the categories of adaptation and mitigation. These more general recommendations generally touch upon issues of multi-level governance.

RECOMMENDATION 16
(A) EXPLICITLY RECOGNIZE THAT LOCAL AUTHORITIES CAN HELP NATIONAL GOVERNMENTS TO IMPLEMENT POLICIES AND ACHIEVE TARGETS FOR ADDRESSING CLIMATE CHANGE. (B) WHILE RESPECTING LOCAL AUTONOMY, VERTICALLY INTEGRATE LOCAL (AND OTHER SUB-NATIONAL) AUTHORITIES' INITIATIVES INTO NATIONALLY-LED EFFORTS.

As suggested earlier, some of the most cost-effective measures for addressing climate change – the low-hanging fruit – may well lie within the purview of local authorities. For this reason and others, national governments would do well firstly to acknowledge in their policies the role of local governments in both adapting to and mitigating climate change (see Box 55).

Box 55. National Legal Excerpt– Philippines: Climate Change Act of 2009
(Approved in September 2009)

'The [Philippine Climate Change] Framework recognizes the principle of subsidiarity and the role of local governments as front-liners in addressing climate change' *(p. 6).*

Then, while respecting local autonomy, national governments should integrate local (and other sub-national) authorities' efforts into nationally-led efforts to reduce emissions and adapt to climate change. This may begin with calls for specific local level actions, as in many of the 'national policy' text boxes, above. However, policies can move beyond such calls: they can provide for integrating local authorities into national

planning efforts (i.e., vertical integration)[24], and then capturing and reporting on results as part of consolidated annual reporting[25].

The importance of such provisions is driven home when one recalls the aspiration of a universal climate change agreement covering all countries beginning in 2020. Without plans in place that consider multi-level governance, local governments may well act in a piecemeal, fragmented manner, with more limited results reported only by individual cities; this, in turn, will make it harder for national governments to report progress towards meeting mitigation and adaptation targets.

RECOMMENDATION 17

(A) TRY TO MINIMIZE THE ADMINISTRATIVE BURDEN IMPOSED ON LOCAL AUTHORITIES BY NEW CLIMATE CHANGE RELATED MANDATES. (B) WHEN APPROPRIATE, DIFFERENTIATE RESPONSIBILITY BY DIFFERENT CATEGORIES OF LOCAL AUTHORITY.

Before imposing new mandates on local authorities, policy-makers should consult with those stakeholders and jointly consider ways to try to ease the administrative burden caused by such requirements. When appropriate policies can, for example, *encourage* rather than require cities to undertake certain actions.

One issue involves considering whether policies should require local authorities to prepare stand-alone climate change action plans, as implied in Box 56, or not. Preparing stand-alone plans may have advantages, such as providing for clearer linkages to national climate change efforts, identifying projects suitable for climate finance, considering the relationship between adaptation and mitigation actions and so on. But another approach, appropriate in some circumstances, is to seek to mainstream new requirements into existing obligations, rather than establishing parallel processes that lead to new stand-alone documents whose relationship with existing plans is not well articulated with existing plans (see Box 57)[26].

Box 56. National Policy Excerpt– China: National Climate Change Programme

'Local governments at different levels shall enhance the organization and leadership on local responses to climate change, and formulate and implement local climate change programmes as a matter of priority' *(p. 56)*.

24 For insights into engaging local authorities in the process of developing Nationally Appropriate Mitigation Action (NAMA) plans, for example, see GIZ, (2013) Sub-national involvement in NAMA development *[http://www.mitigationpartnership.net/giz-2013-sub-national-involvement-nama-development]*. Likewise, earlier calls for municipalities to develop Local Adaptation Plans of Action that would feed into NAPAs represented a similar aspiration for effective multi-level governance.

25 Partners including WRI, ICLEI and C40 have developed a protocol for community-level greenhouse gas emissions that moves toward a standard that is consistent with international norms; this should help pave the way for better integration of local level efforts into national-level reporting. For information see *http://www.ghgprotocol.org/city-accounting*.

26 In this regard it is noteworthy that, of 894 cities in 21 Asian countries that were recently surveyed, only 29 (three per cent) had stand-alone climate change plans. Other cities surveyed, however, had adopted local policies related to climate change. (Cities Development Initiative, 2012).

Box 57. Implementation Example – The Philippines: Efforts to rationalize and streamline requirements for local planning

A local street in Sorsogon, Philippines, after heavy rain. Early pilot work by UN-Habitat's Cities and Climate Change Initiative in Sorsogon helped to inform the Government's approach to supporting climate action by local government units © UN-Habitat/Joselito Derit

In early 2009, the Philippines passed its groundbreaking *Climate Change Act* into law. This law carves out a substantial role for local authorities in adapting to and mitigating climate change. One of its provisions is for local government units to prepare and regularly update Local Climate Change Action Plans (Section 14).

Initial implementation of this provision took place within the context of a multi-year process to consolidate a disparate group of local-level planning requirements that had accumulated over time. Officials consolidated these requirements into two major planning tools: the Comprehensive Land Use Plan and the Comprehensive Development Plan. Bearing in mind this effort, the Department of the Interior and Local Government developed guidelines to mainstream climate change planning into those two principal tools, rather than require a new stand-alone plan. In 2011 and 2012, the Department of the Interior and Local Government undertook training of trainers, tested the new requirements in three pilot Local Government Units, and then rolled them out to more than 50 Local Government Units. *(Kehew, Kolisa, Rollo, Callejas, Alber, & Ricci, 2013)*

Policy-makers also should consider *differentiating* responsibility amongst different types or categories of local authorities. Such differentiated responsibility could reflect, on the one hand, the population size of the municipality. In general, larger cities may possess greater administrative capacity than smaller towns, emit greater quantities of greenhouse gases and so on. On the other hand, differentiated responsibility could acknowledge that the impact of climate change will affect various areas of the country in very different ways. Such a recognition of differentiated vulnerabilities and responsibilities could be left more general in an initial policy, to be clarified later (see Box 58), or else more specifically defined such as for municipalities in low-lying coastal zones, in arid areas and so on.

Box 58. National Legal Excerpt– Mexico: General Law on Climate Change
(Entered into force in August 2012)

'… The municipalities most vulnerable to climate change, in coordination with the states and the federal government, should rely on an urban development program taking into account the effects of climate change' *(p. 42).*

RECOMMENDATION 18
PROVIDE ADEQUATE RESOURCES TO LOCAL AUTHORITIES TO SUPPORT NEW MANDATES.

As a general principle of good governance, national policies should avoid imposing new unfunded mandates upon local authorities. Therefore, national climate change policies should provide for adequate resources for local authorities to fulfill new climate change-related responsibilities[27]. This can take the form of direct grants, such as with Sweden's Climate Local Investment Programme; subsidies for employing municipal climate managers such as Germany's National Climate Initiative; soft loans, as called for in the Philippines' Climate Change Act of 2009, or other means (GIZ, 2013). Of course, the specific fiscal or financial instruments used should fit the need and circumstances. Likewise policy-makers can provide for fiscal mechanisms that reward effective local action (see Box 59)[28], and systems to monitor the proper use of scarce public resources.

Box 59. National Policy Excerpt– South Africa: National Climate Change Response White Paper
(Approved in October 2011)

'The fiscal mechanisms to support local government capital and operating expenditures currently do not incentivize municipalities to mainstream effective climate change responsibilities into local government activities. National Treasury will lead a process to re-examine the current fiscal measures and the appropriate incentives to adaptation and mitigation measures by local government' *(p. 46).*

27 Local officials are exploring this topic in the Local Government Roadmap (Phase 2) process, launched in Nantes, France in September 2013; see *www.iclei.org/climate-roadmap.*

28 For an interesting example of such a fiscal incentive from an OECD country, see Section 20.1 of the Pacte climat Luxembourg *(http://www.pacteclimat.lu/).*

RECOMMENDATION 19
PROVIDE AN ADEQUATE ENABLING ENVIRONMENT FOR LOCAL AUTHORITIES TO TAKE ACTION.

An adequate enabling environment goes beyond providing local authorities with the legal right/responsibility to act and providing resources. It also involves sensitizing local officials (and other stakeholders) as to climate change issues, and building their capacity to fulfill new mandates. Among other benefits, such measures will promote increased local ownership, the emergence of local champions, and coordinated and effective climate action.

As a basis for providing such capacity-building, this measure may entail developing guidelines or a toolkit to help local officials take appropriate action (see Box 60).

Box 60. National Policy Excerpt– South Africa: National Climate Change Response White Paper
(Approved in October 2011)

'Programmes to build capacity for local and provincial governments' climate response strategies will be prioritized, and a climate change toolkit will be prepared for provincial and local government practitioners' (p. 37).

An adequate enabling environment also involves ensuring that local stakeholders receive relevant information on the topic, in a form that is readily digestible, understandable and usable. Such relevant information can include downscaled climate change scenarios, good examples of local climate action, practical information on sources of additional support and so on. The engagement of informed stakeholders represents a precondition to effective local-level action to address climate change.

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Your feedback on the present Policy Note, including whether you found this reference useful while preparing national climate change policies, is welcome and would be appreciated. Upon request, UN-Habitat's Cities and Climate Change Initiative (CCCI) can also comment on such policies currently under development. Please contact us via Jayne Kimani at *jayne.kimani@unhabitat.org*, or visit our webpage at *www.unhabitat.org/ccci*.

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Top: Children in flood waters after torrential rains in the neighborhood of Kampung Melayu, Jakarta, Indonesia © Wikimedia Commons/Kate Lamb

Middle: Flooding in Kalerew, in Kampala, Uganda © UN-Habitat/Nicholas Kajoba

Bottom: Flooding the Chiangmai city. An unidentified elderly man holding a bicycle through the flood on September 30,2011 in Chiangmai Thailand © Shutterstock

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