



Close to home: subnational strategies for climate compatible development

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Making site models, India

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Executive summary

The battle for climate compatible development will be won or lost at the subnational level: in provinces, districts and cities. National governments depend on subnational actors to implement climate policies. What is more, innovation in climate compatible development can flourish at the subnational level when the appropriate legal and policy conditions are created.

Climate compatible development at the subnational level is characterised by distinct challenges:

- Subnational institutions and leaders face intense local pressure to act on the negative impacts of climate extremes and disasters.
- People's expectations for subnational authorities to respond may be out of sync with the powers and resources they have available.
- Higher levels of scientific uncertainty about future climate trends at the local level (than at larger scale) can make it difficult to know if investments are 'climate-proof'.
- Different subnational governments and agencies may struggle to coordinate with each other, making it harder to respond effectively to climate change and forge long-term solutions.
- The scale and pace of urbanisation in many developing countries, including unplanned settlements and the informal economy, magnify these challenges.

Subnational actors also have particular opportunities to pursue climate compatible development:

- Subnational actors often have a sound understanding of climate trends in their area, based on first-hand experience and local and indigenous knowledge.
- Subnational decision-makers have a better sense than national decision-makers of solutions that are effective in the local context. They also know how to communicate the case for action effectively to local stakeholders.
- Subnational actors have greater ability to mobilise local resources for implementation, including people's time and knowledge.
- Integrating climate and development approaches requires a great deal of coordination among individuals and institutions, but it is exactly at the subnational level that such examples of integration across sectors is likely to happen, and can lead the way for integration at higher levels of governance.

Effective strategies for subnational climate compatible development respond to these challenges and build on these opportunities. Such strategies:

- use flexible modes of decision-making available at the subnational level to go beyond national mandates for climate compatible development and innovate solutions.
- raise the awareness of climate 'champions' in subnational government and bolster their climate leadership.
- build a strong case for action through effective, locally relevant communications about climate change impacts and the benefits of low-carbon, climate-resilient development.
- mobilise local expertise and support including in-kind resources, and forge alliances among civil society, businesses, researchers (including climate scientists), government decision-makers and civil servants.
- secure additional resources from outside the locality where necessary.

CDKN's and ICLEI's experience demonstrates that these strategies yield good results at the subnational level. However, the scale of the global climate challenge is huge. Alone, individual subnational initiatives do not achieve enough. It will take a global transformation in the way that society approaches development if we are to achieve a low-carbon, climate-resilient future. Successful subnational climate compatible strategies must be rapidly scaled up and scaled out to meet this challenge.

1. Why is climate compatible development important at the subnational level?

The battle for climate compatible development – mitigating climate change and managing its impacts, while achieving human development – will be won or lost in provinces, districts and cities. CDKN's mission is to improve the lives of the poorest and most vulnerable to climate change, an increasing number of whom live in towns and cities. Another 800 million people are set to join them in Africa alone, by 2050.³

Many national governments are striving to tackle climate change by passing climate legislation, setting national targets and developing climate action plans. In its 2013 report, the Global Legislators Organisation for a Balanced Environment (GLOBE International) recorded 33 countries that had enacted national climate legislation, of which 21 are not members of the Organisation for Economic Co-operation and Development (OECD), and this trend continues in 2014.⁴

To be effective, national climate policies and plans need local implementation. Often, this happens through a multi-tiered structure of provincial and city governments, and a combination of public and private actors. These subnational actors are key players in meeting national goals.

Progressive subnational actors can also, for their part, play an important role in driving country-wide responses to climate change. Successful pilot initiatives can then be scaled out and adapted for use elsewhere, becoming the seed for potentially transformational change at a far greater scale.⁵ Collectively, this multitude of initiatives can and should build momentum towards an ambitious global climate deal.

The 19th Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC CoP19) in Warsaw, Poland in 2013 made an effort to harness this momentum for change when it marked the first UNFCCC Cities Day. This high-profile event recognised the importance of subnational leadership on climate change. CoP19 President Marcin Korolec said: "[Cities] are crucial in our effort to tackle climate change. Cities are responsible for 75% of carbon emissions and 60–80% of energy consumption, while occupying only 2% of the Earth's land. So if we solve the problem of emissions in cities, we have already tackled climate change."⁶

This Working Paper provides tangible examples of opportunities seized, challenges encountered and successful strategies designed for climate compatible development by subnational actors across Africa, Asia, and Latin America and the Caribbean. Based on learning from CDKN's programme, and augmented by experience from the ICLEI network and others, the paper explores the following questions:

- What are the distinct challenges to, and opportunities for, progressing climate compatible development at the subnational level?
- How have subnational actors responded to these challenges and risen to these opportunities to achieve climate compatible development? What strategies and measures have they developed? To what extent does the design and implementation of local initiatives depend on national and international policies and actions, including finance?
- To what extent can lessons learned at the subnational level be scaled up to inform national and international programmes and policies? To what extent can they be scaled out and adopted by subnational actors in comparable situations, elsewhere? In so doing, what is the potential of subnational action on climate compatible development to contribute to transformational change?

2. What is distinctive about subnational climate compatible development?

Climate compatible development at the subnational level has particular characteristics. It is distinct from climate compatible development at the *national* level; and it is also distinct from *conventional* development processes. Here, we use 'subnational' to describe everything from rural districts to large cities, reflecting the diverse range of initiatives in the CDKN-ICLEI learning programme, on which our analysis is based.

2.1 Challenges

Many challenges for climate compatible development are particularly acute at the subnational level:

- **Subnational institutions and leaders face intense pressure to act in the face of negative climate impacts.** They are typically communities' first port of call for relief and recovery following extreme weather events such as heat waves, flooding, drought and storm surges. In addition, the impacts of such

events may undo the development gains of recent decades, damaging people's health and well-being, livelihoods, assets and infrastructure.^{7,8} Subnational actors, especially local governments with limited funds, see first-hand the imperative of building climate resilience into their investment decisions.

- **People have high expectations for subnational authorities to respond to climate change.** These expectations may be out of sync with the official powers and resources that authorities have at their disposal. There is often disparity between the need for political and financial authority, resources and capacity to respond to climate-related challenges at the subnational level, and the actual power, resources and capacity available. This may result from incomplete or imperfect devolution of power or lack of 'vertical integration' – that is, a lack of effective allocation of responsibilities and coordination among administrative levels. This can limit local authorities' options for action. For example, at present it is especially difficult to access climate finance⁹ at the city and subnational level in many countries.
- **Information about historic climate trends for a subnational area may be poorly recorded by scientists.** When historic climate data are missing, there are particularly high levels of uncertainty about future climate trends – because making future projections relies on using good data from the past. Depending on the area of the country concerned, the term 'subnational' may refer to a vast territory (e.g. a Chinese province) or a tiny one (e.g. a district in a small island state). Climate projections may be down-scaled to a certain subnational scale; however, scientific certainty is highly variable and depends on the ability to match climate models against reliable climate records – which are missing in many developing countries. This lack of scientific data can make it particularly hard to build the business case locally for climate-related investments. On the other hand, where weather and climate-related impacts are already keenly felt, such justification for investment may not be required. Scientific expertise may instead be deployed to project the geophysical and socioeconomic impacts of extreme events such as flooding, where these are observed to be increasing in frequency and intensity.
- **Subnational governments and agencies may struggle to coordinate among each other.** Lack of coordination makes it harder to respond effectively to climate change and forge long-term solutions. Local authorities typically face the challenge of 'horizontal integration' – that is, needing to cooperate effectively across jurisdictional boundaries to address broader environmental problems. Some natural resources, such as water, flow across political and administrative boundaries, and actions taken in one jurisdiction can affect the resources in another. For instance, action (or lack of action) to manage flooding in one district may affect the neighbouring one. People, goods and services move across boundaries with knock-on effects for economic and social activity. Further challenges arise when the policies and actions of different subnational entities are not well integrated. For example, most cities sit within a district and a province; responsibilities may be confused among agencies in these different administrative layers.
- **Subnational leaders are overwhelmed by the 'day job' of immediate service delivery.** Pressing development needs are the reality for leaders in developing countries, especially in rapidly growing urban areas. Political pressure from the electorate, too, is likely to focus on short-term concerns. Many of the greatest climate change impacts will emerge only years from now. The carbon footprint of investment decisions made now will affect people's lives from the mid-21st century onward. It is difficult for leaders to justify spending time and resources on longer-term planning without explicit popular support for such a vision.
- **Huge investment is needed in developing country infrastructure.** Many of the relevant investment decisions will be made at the subnational level. Of the total infrastructure that will be required in African cities by 2050, for example, 60% remains to be built.¹⁰ In terms of both adapting to climate change and enhancing countries' future competitiveness, it is vital that such investments do not lock in high carbon emissions and climate vulnerability.

Some issues are particularly pertinent to cities and urban environments:

- **Locations may be particularly climate-vulnerable.** The world's mega-cities are often sited at strategic points on coasts and along major rivers. This increases their vulnerability to climate change and puts trillions of dollars of physical assets at risk of damage.¹¹ A major study by the OECD found that flood- and storm-vulnerable assets in just 10 of the world's megacities could account for 9% of the world's GDP by 2070.¹²
- **The scale and pace of change in cities is particularly challenging.** Many African cities, such as Kampala, the capital of Uganda, are doubling in size every 10 years. Much of this growth stems from unplanned settlements, with associated growth in informal economies.¹³ This poses a problem for conventional development – even more so for long-term strategic planning for climate resilience.

- **Cities are characterised by their density and sheer number of people.** More than half the world's population already live in towns and cities. This number will swell to almost five billion by 2030, with urban growth concentrated in Africa and Asia. While mega-cities have captured much public attention, most of the new growth will be in smaller towns and cities, which have few resources to respond to the magnitude of change.
- **Inequality is particularly stark in developing country cities.** This poses policy challenges. There is a real need for inclusive growth that offers meaningful opportunities for young people regardless of their socioeconomic background.

2.2 Opportunities

Despite these complex challenges, working at the subnational level presents many distinct advantages for climate compatible development planning and implementation.

- **Subnational actors often have a sound understanding of climate trends in their area based on first-hand experience.** Even in the absence of detailed climate projections for a locality there can be significant climatic variability within a country, which already informs development planning. For example, for large countries with great geographic diversity, such as India and Pakistan, there is a difference between planning for climate-resilient development in a high mountain region characterised by glaciers, versus a low-lying river delta.
- **Subnational decision-makers have a better sense for solutions that are effective in the local context.** Subnational territories have specific socioeconomic and cultural characteristics that may hinder or facilitate change. Subnational decision-makers are often best placed to find the most appropriate solutions. For example, on the Indonesian island of Flores, every year tribal elders conduct ceremonies for the planting and harvesting of crops. They resist changing the timings of these agricultural events, even though the timing of the monsoon is changing. Local non-governmental organisations (NGOs) and local authorities are well suited to working with elders to improve their understanding of changing climate patterns and vulnerability.¹⁴
- **Subnational actors know how to communicate the case for action effectively to local stakeholders.** Measures to address climate mitigation and adaptation are ultimately about behaviour change: whether it is about changing people's transport choices, changing patterns of settlement or consumption, changing food cultivation methods, or changing how energy is generated and used. It is often more effective to communicate with producers and consumers at the subnational level than at the national level. Sometimes it is simply a question of being able to communicate in the relevant local language or dialect.
- **Subnational leaders have greater ability to mobilise local resources for implementation, including people's time and knowledge.** Partnerships that mobilise collective action and draw deeply on human and social capital are more readily available at the subnational level, particularly in circumstances where existing social capital is strong. (Note, however, that since circumstances vary this may not hold for localities where large demographic transitions are taking place, such as significant rural–urban migration.) Subnational leaders have more direct access to local and indigenous knowledge, including ways of adapting to current climate stressors. Much has been written recently about how local and indigenous modes of adaptation will become increasingly inadequate as climate impacts become more severe. However, locally appropriate methods can still lend resilience in the short term.¹⁵
- **The institutional environment at the subnational level often enables climate compatible development to be addressed in a cross-sectoral and integrated way.** At the subnational level, line ministries or departments work in closer physical proximity to each other. They can interact more frequently at the operational level, which helps to overcome some of the 'silo thinking' and segregated action that can occur at national level.
- **Subnational decision-makers are more accessible to climate-affected people.** Subnational government leaders, as well as business and other community leaders, are more accessible than their national counterparts. Whereas national decision-makers can seem distant to communities and difficult to contact, subnational authorities are within reach. They are also often perceived to be more directly accountable to climate-vulnerable people who could benefit from programme interventions. These may include elderly, low-income and certain ethnic groups. However, there is also the risk that discrimination can be even more ingrained at the subnational level than at the national level (e.g. with regard to women and ethnic minorities). Subnational areas may benefit from an actively engaged civil society that challenges local leaders to perform better and defends the rights and needs of those who are most threatened by climate change.

3. Which strategies and measures can enable climate compatible development at the subnational level?

The most promising achievements in subnational climate compatible development exploit the distinct opportunities offered at this level – in other words, those initiatives that have exploited the advantages of working at the subnational level, such as decision-makers' greater access to local knowledge and social capital.

This section presents the authors' interim conclusions on what makes for effective strategies and measures, based on recent experience. We do not provide an exhaustive list of strategies and measures, and many of the project examples given are based on early indications of promise, rather than a long-term record of tracking performance indicators. Furthermore, we do not assess whether a given approach is a *necessary* or *sufficient* condition for successful implementation. We conclude this paper with several questions for reader, including: When are certain strategies vital to achieving results? When are they optional?

3.1 Using flexible decision-making and the ability to innovate at the subnational level to meet and go beyond national mandates

Subnational governments operate in varying legal and policy environments. They are bound by national policy targets, guidelines and incentives. The amount of fiscal, policy and regulatory autonomy that they enjoy varies. Sometimes it even varies between provinces within the same country for historical and political reasons.

National governments may pressure subnational actors to take action on climate compatible development through the enactment of climate legislation and associated economy-wide and/or sectoral action plans. This may carry requirements for policy implementation at the subnational level, through a decentralised administrative framework.¹⁶ The extent to which subnational actors want a rigid national framework for subnational action varies widely, depending on the country context. Some would prefer a hands-off approach. The Nantes Declaration (see Box 11) highlights mayors' and subnational leaders' appetite for strong, supportive national policy frameworks that acknowledge the critical role of subnational areas in responding to climate change. Signatories also call for appropriate targets, standards and flexibility in deploying resources for policy implementation. Colombia strikes this balance: the national plan of action to address vulnerability and enhance the adaptation capabilities of the coastal populations has provided high-level support for local champions' efforts to undertake a vulnerability assessment and develop adaptation plans in the city of Cartagena.¹⁷

Alternatively, national governments may play a more passive role in creating enabling conditions through legal and policy frameworks that implicitly support climate compatible development or, at least, do not undermine it. National governments' willingness to scrap laws and policies that are at odds with climate compatible development is key (see Box 1). In Bolivia, the Law of Mother Earth (Ley de Derechos de la Madre Tierra) provides an enabling environment, through national legislation, for indigenous people to protect their natural and cultural resources. This includes defending natural resources from unsustainable development proposals. Another important point is that national governments should avoid prescriptive policy that constrains the ability of subnational areas to work with local actors – particularly informal economies – to develop innovative solutions, for example social enterprises for municipal services such as waste and energy.¹⁸

In all of these examples, the degree to which national governments provide the legal and policy 'space' for subnational innovation on climate compatible development is a fundamental issue. Enterprising subnational actors could use these frameworks to support climate-friendly schemes.

3.2. Raising awareness of local government champions and bolstering their leadership on climate compatible development

Political support for the multiple benefits of integrating climate change into development is essential to achieve and secure progress – and may require sustained awareness-raising efforts. Once the understanding and commitment of policy-makers is achieved, it is also likely that funds will be allocated from local budgets for climate compatible development.

Climate compatible development is a relatively new concept. Its applicability is not as well understood as it should be in 'conventional' development areas, such as water and sanitation, health, education, housing,

Box 1. The Philippines: National policies must be consistent to deliver real climate compatible development on the ground

The Philippines' national climate legislation is considered advanced compared to other countries. The country's Climate Change Act (2009) established a coordinating body for implementation, the Climate Change Commission, which reports directly to the President – thereby raising climate change adaptation and mitigation to the highest political level. A national mechanism disburses funds for climate resilience to local governments, which allows prioritisation of local needs.

Yet, elements of the overall national development policy framework (e.g. policies governing mineral extraction or forest policy) are at odds with climate compatible development. Have these undermined the potential for low-carbon development and resilience at local level? In the case study 'Mainstreaming climate resilience into government', Lofthouse and Kenny argue that the success of the Climate Change Act will depend to a great extent on policy advances and implementation of legislation within other sectors. They say: "The liberalisation of large-scale mining under the Philippine Mining Act of 1995, the Minerals Action Plan and Government Executive Orders, may have adversely impacted ecosystem protection and conservation. These actions have resulted in more large-scale mining projects, many of which may have taken place with inadequate consultation or without the consent of affected communities. Negative social and environmental impacts on poor communities increase their vulnerability to climate change. The Government continues to promote investment in coal, particularly by foreign investors, countering other mitigation aspects of the Climate Change Act. These conflicts are not addressed by the Climate Change Act, nor the National Climate Change Action Plan."¹⁹

Box 2. Sri Lanka: Local to national policy change will support innovative action in cities

The Western Province is Sri Lanka's most urbanised province. Continued rapid urbanisation poses a series of socioeconomic and environmental problems. Heavy rainfall events result in recurrent flooding and related damages to infrastructure and the wider city economy. In response, the Western Province became the first provincial government to include urban and peri-urban agriculture and forestry in its provincial climate change adaptation action plan.

The projects have been implemented in Kesbewa Urban Council, a fast growing city located 21 km south of Colombo. Currently, agriculture accounts for 32% of Kesbewa's total land use. Home gardens and abandoned paddy lands in low-lying flood zones offer the best potential spaces to be preserved for or converted to urban and peri-urban agriculture. During the past two years, residential areas have sprung up on the paddy land and this trend is expected to increase. As paddy lands are located in low-lying areas and flood zones, houses built here suffer from regular flood damage during periods of heavy rainfall.

Well-maintained and drained paddy areas, in contrast to abandoned paddy lands, function as buffer zones, where water is stored and drainage regulated, thus reducing flood risk in nearby areas. The rehabilitation of paddy fields involves planting more salt-resistant varieties of paddy, alongside the cultivation of vegetables in raised bunds. The initiative to maintain and expand food cultivation in the urban and peri-urban district provides major climate resilience benefits, and contributes to lower greenhouse gas emissions because local food cultivation reduces 'food miles' (i.e. transport-related emissions).

Much of this innovation has occurred at the subnational level. The national policy framework is not directly at odds with what the stakeholders in Kesbewa are trying to accomplish, but delays in national policy implementation are hampering progress. Sri Lanka's national Paddy Act formalises the option of growing short-cycle vegetable crops next to paddy fields. However, a study by the Resource Centres on Urban Agriculture and Food Security concluded that the government lacks a clear implementation plan.²⁰

A policy review revealed three levels of policy where intervention is needed to ensure uptake and scaling up of current successful models in Kesbewa:

- At local level: promoting the integration of urban agriculture into Urban Development Plans and into municipal programmes and budgets
- At provincial level: a proposal for development – with contribution of all stakeholders – of a provincial climate change adaptation action plan
- At national level: revising the Paddy Act in order to promote and support new models and forms of production.

transportation, and industrial and land-use planning. Therefore, it is critical to demonstrate the relevance of climate change to pressing social, economic and environmental problems that affect local communities.²¹ Emphasising the co-benefits of climate action is important in order to make the case to government and business leaders.

Those who seek to influence subnational decision-makers should consider how can they raise awareness and present the case for climate compatible development in a way that enables decision-makers to be bold

in their leadership, and adopt a longer-term vision of climate compatible development in the midst of the competing, shorter-term challenges of their 'day job'.

In the Gorakhpur District of India, the START-CDKN programme helped build local officials' understanding of the urgency, relevance and implications of climate change. It also raised awareness among district decision-makers of the potential benefits of integrating climate change and disaster risk consideration into district development plans. This resulted in increased political buy-in and ultimately, a better outcome for the programme (see Box 3).

In another CDKN-supported project, 'Future Proofing Cities', in Madurai, India, a team of experts worked with local stakeholders and policy-makers to map current and future risks to the city, such as water scarcity and poor infrastructure, particularly in respect to the growing threat of climate change. By focusing on social and economic vulnerabilities and building a community of interested stakeholders to support the process, they have built considerable municipal commitment.²²

3.3 Cultivating sustained buy-in from civil servants

For long-term sustainability of climate compatible development initiatives, it is crucial to cultivate buy-in from civil servants and local technical specialists. Establishing long-term partnerships between research organisations and individuals within government, for example, can help mainstream climate strategies across sectors over time.

One of the foremost lessons learned from the initiative to increase climate-resilience in the coastal city of Cartagena, Colombia, was the importance of improving the technical understanding of climate impacts and the range of climate-resilient development solutions among civil servants in the municipal government. Cartagena is particularly vulnerable to sea level rise. It has many economically and culturally valuable tourist assets that are at risk of permanent flooding in the coming decades. In spite of the city's acute vulnerability and the imperative for action, initial efforts to undertake a risk assessment and develop adaptation guidelines would have floundered had they depended entirely on political leadership, which was in great flux for several years. The key to sustaining buy-in within the city government lay with continuing collaboration among: the José Benito Vives de Andréis Marine and Coastal Research Institute (INVEMAR), which held the relevant scientific data on climate impacts; the local CDKN team, which played a facilitation role; and civil servants (see Box 4).

Box 3. Gorakhpur, India: Enhancing flood resilience by integrating climate adaptation and disaster risk reduction

The Gorakhpur District is recognised as the most flood-prone district in eastern Uttar Pradesh, India. Flooding has become a regular occurrence, putting the lives and livelihoods of local communities at risk. The START-CDKN programme was initiated to incorporate climate change considerations into disaster management planning. The aim of the project was to respond effectively to more frequent and extreme flooding by planning proactively to minimise the loss of life and property damage.

The programme, which was spearheaded by the Gorakhpur Environmental Action Group, has improved understanding of how climate change impacts will be manifested at the subnational level. The programme team presented relevant scientific analysis of climate change projections in a form that conveyed the urgency, relevance and implications of climate change to the district's plans and programmes.²³

The active capacity building of local authorities to deal with climate-related uncertainties contributed to the programme's success. This focused on the reallocation of financing, and also on the co-benefits of climate compatible development that allow local decision-makers to act, even in the face of uncertainty. For example, better understanding of vulnerability issues at the district level, both intra- and inter-departmental, was achieved through shared learning dialogues (SLDs). This is a structured and iterative process of workshops and round table discussions, with each iteration involving various departments, individually and collectively, and conducted in such a way as to develop an appreciation of issues surrounding vulnerability and resilience building. SLDs foster this understanding both within and across departments (horizontally), as well as from departmental to district to state and higher levels (vertically). The process helped officials to identify gaps and opportunities for integrating development programmes with climate-sensitive disaster management. It also nurtured cross-departmental ownership and cooperation.

As a result of the strong buy-in and effective coordination, the programme has gone beyond simply making recommendations, to publishing a climate-sensitive District Disaster Management Plan. The project demonstrates that a suite of effective initiatives led by credible organisations can result in policy change.

Box 4. Cartagena: Placing priority on climate compatible development in the Municipal Development Plan

Cartagena was the first coastal city in South America to produce climate adaptation guidelines, including a city-wide vulnerability assessment and the identification of adaptation options. The 'Guidelines for Adaptation to Climate Change' were published in June 2012, followed by the adoption of an adaptation plan in December 2013. The guidelines themselves were conceived as a planning support tool and clearly reflect local priorities in the city.

A crucial factor in the successful development of the guidelines was the strong partnership among CDKN, the research institute INVEMAR, civil servants, the municipal Chamber of Commerce and other local stakeholders. This alliance managed to gain the buy-in of senior civil servants, who sustained support for the vulnerability assessment and subsequent adaptation plans. In the project's early days, one of the key strategies by INVEMAR and CDKN was to publish the results of the vulnerability assessments in outlets that targeted different groups, such as civil service, academic and political audiences.

The early engagement with civil servants in the development of the guidelines facilitated the mainstreaming of adaptation into municipal planning policy, particularly in land-use and zoning policy. Skilful communication helped to sell the business case for collective action.

A review of the enabling conditions for the successful implementation of climate policies in Buenos Aires, Mexico City and São Paulo reached a similar conclusion: to overcome administrative and political obstacles it is necessary to develop a broader institutional capacity. In these three megacities, political champions have played a key role in the initial adoption of climate change legislation. However, policies have not been implemented uniformly.²⁴

3.4 Building understanding of climate and development challenges through knowledge partnerships

As we have seen from the above examples, cultivating improved understanding among policy-makers and programme leaders is vitally important. However, it is equally important to engage affected communities in discussions with climate specialists about the climate-related hazards and vulnerabilities in a local area. A common understanding of historic trends and future scenarios can provide the foundation for developing climate-resilient and low-carbon plans together.

Among the projects we studied, the most progress in planning for 'future climate-proofed' development was achieved where knowledge partnerships were established among experts both inside and outside affected communities. It is important that local people, who are familiar with recent climate patterns and existing adaptive responses, are recognised as experts in their own right.

These might be termed 'knowledge partnerships'. Most of the cases analysed were distinguished by the presence of bridging institutions, or 'knowledge intermediaries', that helped to demystify and translate concepts of climate impacts, vulnerability and longer-term climate trends and solutions. For example, the Regional Institute for Population Studies at the University of Ghana has played an instrumental role in translating concepts about climate trends and vulnerability for local communities (literally, from English to local languages, as well as by framing technical language in more accessible terms).²⁵ In Ahmedabad, India, international experts and the Indian Institute for Public Health, a well-respected local institution, formed a coalition with city officials. They presented the officials with state-of-art climate and health-related knowledge that spurred political action. In Ahmedabad, government officials and the public had not considered that heat waves require a high amount of preparation, as monsoons and earthquakes do. By sharing information from Europe, the United States of America and elsewhere on heat wave mortality and preparation plans, the experts helped to change stakeholders' perceptions.

The role of bridging institutions or knowledge intermediaries can include:

- **Making climate science accessible to non-specialists** – Scientific knowledge on climate change hazards and the likely impacts at the subnational level often resides with national authorities and agencies. Making it easier for subnational actors to access and understand the relevance of such information in the local context helps them to make more appropriate decisions. How can this be done? The answer lies in finding engaging communications tools and messages that are appropriate to the audience. In the city of Cartagena, Colombia, research partners behind the vulnerability assessment produced effective data visualisations that showed how much of the city's historic and commercial property would be inundated by sea level rise in a matter of decades. They used these to engage business and local government leaders.²⁶

In Ghana and the Philippines, climate resilience programme leaders (from research institutes and NGOs) used theatre and music to get the point across. They also faced inevitable challenges about how much information to convey, and how to communicate the uncertainty inherent in climate projections, but made reasonable decisions based on the principle 'we know enough now to act' to prevent climate-related damages.

- **Ground-truthing climate science in local people's experiences** – Establishing a sound evidence base for climate compatible development is a two-way avenue. Not only do subnational stakeholders benefit from effective communication of current and future climate trends by experts, scientists also benefit from ground-truthing their hypotheses and data in local experience.

In the Alto Cauca district of Colombia, the country's bread basket, an initiative by CDKN, the International Centre for Tropical Agriculture (CIAT) and the Ministry of Environment assessed climate vulnerability in the agriculture sector. Local communities, including indigenous farmers, were involved in an ambitious exercise to measure vulnerability using 100 indicators. This laid the foundation for a comprehensive adaptation plan for the sector.²⁷

Recent work by the African Centre for Cities and CDKN to develop guidelines for climate compatible development in the informal sector of African urban areas has reached a similar conclusion. The guidelines state: "Combining qualitative information from interviews, focus groups, etc. with quantitative information from spatial analysis, time-series analysis, etc. provides a robust basis for planning and assessing climate compatible development interventions. Linking such knowledge sets often requires collaboration between organisations with different expertise, e.g. university-based research units and NGOs operating locally."²⁸

Recognising that the future climate may be quite different from the historic climate, new strategies for development will be required that tax the ingenuity of local stakeholders. This will make knowledge partnerships among local, national and international groups, and climate 'experts' and local 'experts' all the more important. Such partnerships will be central to identifying no-regret and low-regret investments to improve climate resilience in an unknown future climate. In Bolivia, Kate DeAngelis has documented how climate scientists have worked with indigenous communities to understand how they interpret the weather and adapt their agricultural practices to extreme events²⁹ (see Box 5).

3.5 Mobilising support for action through participatory processes

Above we have described how knowledge partnerships among scientists, policy-makers and local people at the subnational level have been important to building a shared evidence base with broad credibility. This forms the basis for subnational action on climate change – whether this is through a vulnerability assessment or another exercise to establish the key issues or problems.

When it comes to moving forward with policy and programme design and its implementation, participatory approaches strengthen plans (e.g. by encouraging the development co-benefits) and enhance local support

Box 5. Bolivia: Scientists and indigenous people share knowledge to better understand climate trends and develop responses

In Bolivia, experience suggests that climate adaptation activities are most effective when indigenous knowledge holders are brought together with social and natural scientists to pool their knowledge.

A group of Bolivian researchers has created a process that integrates science and indigenous knowledge to improve the adaptive capacity of Andean farmers. Traditional methods and indicators that used to be able to predict weather – to a certain extent – have become unreliable in the light of climate change, rendering indigenous populations extremely vulnerable. However, indigenous knowledge and techniques have been merged successfully with scientific methods to support local adaptation action, such as development of early warning systems and new planting techniques. Cooperation leads to climate compatible development approaches being more systematically adopted in the short term, and better sustained in the long run.

However, cooperation and exchange do not come without complications. For example, scientists and indigenous communities must build mutual trust in order to monitor microclimates over many years, which is necessary to fine-tune and ground-truth the climate models.

In the future, Bolivia's mountain areas will experience extreme climatic conditions unlike anything in human memory. Coping with these extremes will require innovation by local farmers and scientists working together.

Box 6. Leh and Barmer, India: Creative communication approaches to facilitate local knowledge exchange

The Leh and Barmer districts of India, although almost opposite in their geographic characteristics, have one thing in common: they both fall within the areas of greatest climate sensitivity, maximum vulnerability and lowest adaptive capacity in India. Leh District, situated in the upper Himalayan region of the country, is one of the largest and most remote districts in India, while Barmer District is situated in the Thar desert of Rajasthan. Both of these districts have experienced extreme climatic events in recent years, such as flash floods that have caused severe damage. Communities living in Leh and Barmer have limited capacity to deal with the additional threats posed by climate change.

Action to address climate change concerns, reduce disaster risk and enhance local adaptive capacities will need to be rooted in local priorities, needs and existing knowledge. This will provide a foundation for creating innovative solutions. The START-CDKN-funded research project has built capacity among local stakeholders and identified pilot projects through a consultative approach.

In Barmer, a group of young local women were trained to run a community radio programme with the support of the local partner NGO Unnati. The launch of the programme enabled the identification of local problems, contextualised by scientific climate knowledge, and gave voice to previously unheard members of the community.

In Leh, the project team established a climate school with a community weather station. This provided local people with local meteorological data and fostered a greater understanding of the relationship between climate trends and local livelihoods.

In addition, the project partner Seed Empowerment and Economic Development Society (SEEDS), studied climate-related extreme weather crises affecting local communities in the high mountain region of Changthang, Leh. They documented the study in a short film and launched an emergency appeal. These communications were broadcast across multiple channels and as a result, Changthang received aid via a national humanitarian network.

The experiences in both Leh and Barmer clearly show the importance of effective communication between climate experts and local populations to develop a sustainable approach to adaptation and disaster risk reduction that is embedded in a traditional knowledge base.

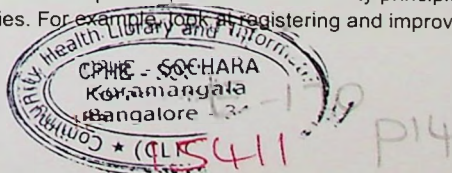
for delivery. The city of Chiang Mai, Thailand, provides an example from the low-carbon development arena (see Box 8). A review of enabling conditions for effective climate policies in Latin American cities: "higher levels of environmental community activism and engagement will support stronger climate policies".³⁰

In Maputo, Mozambique, the project 'Public Private People Partnership for Climate Compatible Development' (4PCCD) created opportunities for dialogue among government institutions, business and communities. Local communities were consulted about their experiences and, through this exchange, became fully engaged in the implementation of agreed priority actions (see Box 9). This demonstrates how participatory planning can mobilise local in-kind resources to 'stretch' existing government budgets.

In Sri Lanka, a programme supported by Resource Centres on Urban Agriculture and Food Security aims to reduce food miles and improve the climate resilience of the food system through urban agriculture. It brings together farmers, NGOs, community organisations, local and international specialists, and government agencies. The programme design is guided by the outcomes of pilot and demonstration activities and impact monitoring. Local partners were trained to carry out this work. The case study's authors report: "finding a common language and interest among researchers and policy-makers proves at times difficult, but is crucial to facilitate uptake of the results of pilot activities".³¹

The recent initiative jointly led by the African Centre for Cities and CDKN, referred to earlier in this paper, involved an exchange of experience among cities in Ghana, South Africa, Tanzania and Uganda. Based on this exchange, the partners drafted principles for climate compatible development in Africa's unplanned urban settlements. The project demonstrated that harnessing local support is a factor in achieving early, tangible results. Harnessing this local initiative and strengthening existing social resilience should be an explicit policy objective, alongside building climate resilience. The report makes specific suggestions on this subject:

"[Urban resilience programmes should] match the selection of technologies and servicing models with local skills to deliver, install and maintain projects, strengthening existing livelihood portfolios rather than creating new competing markets. This might require initial 'up-skilling' and training of trainers, seeking to avoid on-going reliance on outside expertise (linked to affordability principle above) and create local employment opportunities. For example, look at registering and improving



the capability of existing informal food vendors to refrigerate and store fresh food under conditions of increasing heat and humidity, while improving education about nutrition and health, rather than removing informal stalls and forcing people to travel further to large retail chains to access food."³²

3.6 Securing additional resources from outside the jurisdiction

Subnational efforts in climate compatible development depend on the ability to mobilise resources. In terms of public sector funding, it is not enough to have a line for climate change in local municipality budgets. The entire budget needs to be 'climate-proofed', with climate measures integrated into investment decisions and service delivery across sectors. Indeed, such cross-sectoral integration is an indicator of deep local political buy-in.

Prioritisation of limited budgets can be challenging, especially where short-term costs are incurred for longer-term benefits, which seem less tangible. Decision-makers should take care to ensure that budget decisions will improve the lives of the poorest and most climate-vulnerable in the municipality. Citizen-led budgeting, where local people participate in budget decisions, is widespread in countries such as Brazil and, increasingly, in Africa, and can lead to pro-poor decision-making.

Box 7. Ahmedabad, India: Consultation and partnership for heat action plans

In May 2010 the city of Ahmedabad, India, was hit by an extreme heat wave with peak temperatures of 46.8°C, causing numerous incidents of heat-related illnesses and deaths. This sparked action by the local government to protect its citizens more proactively from extreme climate events. A coalition was established that brought together the municipal government, academia, public health and environmental groups to tackle heat-induced health threats by developing an early-warning system and a heat preparedness plan.

The coalition collected local data by conducting vulnerability surveys and facilitating focus groups and round table discussions with both local and international experts and stakeholders. The team interviewed hundreds of members of slum communities and outdoor workers in order to understand citizens' behaviour with regard to heat stress, and to ensure that the most vulnerable communities were properly informed about the dangers of extreme heat. Public health and policy experts contributed to research activities by analysing heat wave response plans from around the world.

These in-depth, participatory methods helped to reveal the most at-risk sections of society, including the most vulnerable work force groups, e.g. traffic policemen. The methods also helped to identify the most effective means of communicating with hard-to-reach, vulnerable people in informal settlements during periods of extreme heat. For example, the city now uses loud-speaker announcements and graphic posters to warn residents about heat exposure during dangerous high temperatures. By using available resources, including the community's eagerness to participate, the project team maximised the adoption of recommendations by local officials and other stakeholders.

These recommendations are now part of a Heat Action Plan and training workshops for target groups, to ensure that the suggested solutions are adopted.

Box 8. Chiang Mai, Thailand: Working with local stakeholders to devise options for low-carbon transportation

Chiang Mai is one of the fastest growing cities in Thailand and serves as an economic and cultural hub for the northern part of the country. The city has recently experienced more intense socioeconomic stresses due to the city's rapid growth and expansion – which is regularly exacerbated by an influx of tourists. The 'Sustainable Urban Tourism' project was initiated to overcome the challenges related to unplanned urban development and lack of integrated transport and land-use planning. It aimed to work towards improved quality of life, environmental sustainability and personal mobility.

Through the project, partnerships were established among researchers, local authorities, private companies, NGOs and local residents, who worked together to design an efficient solution for sustainable urban development. A broad and inclusive stakeholder approach accelerated the project activities by providing stakeholders with access to vital data and information. For example, including tourism service providers such as hotels, restaurants and travel agencies made it possible to gain easy access to data for the calculation of greenhouse gas emissions. Stakeholders were involved at every step, from data collection to prioritisation of mitigation options and identification of policy options. The process led to proposals for a 'green heart' of Chiang Mai, where tourists could use non-motorised transport such as bicycle taxis. These could provide 'green jobs' with environmental and economic benefits for city dwellers.

The participatory process led to increased buy-in and support of the resulting proposal among local residents and a more explicit focus on green jobs than the original proposal.

Box 9. Maputo, Mozambique: Initiating public-private-people partnerships for climate compatible development

In Mozambique's capital, Maputo, a coalition of academia, national government and local communities from one of the city's neighbourhoods developed a project on participatory urban planning for climate compatible development. The main goal was to empower citizens to increase the resilience of their neighbourhoods to climate-related impacts.

The project team realised that while municipalities are key actors in developing and implementing climate policy, the inclusion of local communities helps accelerate this process by tapping into local knowledge and experience. The rationale of the project was to test the partnership model of participatory planning approaches for climate change.

The Participatory Action Plan Development tool was used to develop institutions for climate change governance at the local level and to establish channels of communication among stakeholders from government, business and civil society. One of the intermediary results was the establishment of the Climate Planning Committee (CPC), which supported and strengthened community representation.

The project aimed to identify and mobilise resources and demonstrate how local proposals could be developed and implemented. The CPC identified key actors who could support these proposals or be responsible for delivering some of the proposed interventions. The CPC met with each of these actors, creating networks and initiating dialogue that did not exist prior to the project. As a result, the communities involved became aware of the resources that they had access to, especially human and social capital (local knowledge, time and social relationships), that could help them realise their vision for a sustainable neighbourhood.

Box 10. Ghana: Using innovative methods to link vulnerable communities to government planning

The Regional Institute of Population Studies (RIPS) at the University of Ghana is using the Community-based Risk Screening Tool (CRISTAL) to assess the impacts of climate change in coastal, urban and peri-urban communities. They are working with communities to assess risks posed to livelihoods and assets. The project team is also helping local people better understand these climate-related risks.

The project team started to communicate climate-related risks at the local, district, province and national levels via evidence-based climate change policy round table discussions. Here, stakeholders were brought together to discuss the policy implications of the findings. According to the project leaders, this increased knowledge-sharing and allowed stakeholders to better articulate how they want their environment to look.

The role of community opinion leaders has been critical: the project team from the University of Ghana pinpointed these individuals' roles in mobilising community support and action. The willingness of local people to be involved in the project, and the support of traditional institutions has also been vital in implementing follow-up measures such as simple adaptation steps, and ensuring that these are in line with community priorities.

The project team concluded that it is important to ensure local conditions are taken into account and climate-vulnerable people are consulted when formulating research questions and project objectives. This approach leads to better local ownership and better uptake and scaling up of the research results for development.³³

Local budgets are not enough, in many cases. Many localities have suffered from chronic underinvestment for many years, and arguably, in some cities and districts, most development investment still lies ahead. A key factor for success is subnational actors' ability to access other sources of funding from outside the jurisdiction. This includes national government funding (see Section 3.1), but also a number of other potential sources and mechanisms.³⁴

In the case of the Africa Climate Change Resilience Alliance (ACCRA), some of the most notable successes emerged when district governments assessed local climate vulnerabilities and budgeted for different responses. They then found ways to integrate requests for funding into development plans, which were submitted to the national government. In Rwanda, the government has created a national fund through which international and domestic climate finance can be managed (see Box 12).

Another key factor is how subnational and national governments work together to access incremental funding for climate compatible development from international sources. Only in very few cases are international sources of public funding directed straight to the subnational level (the Global Environment Facility's small scale funding is one example). Public funding for the subnational level needs to be managed by appointed national entities.

At present, the Green Climate Fund is considering its 'modalities' – that is, its procedures for channelling funds. There is a live debate on whether subnational entities should be granted direct access to the Fund. What is clear is that, in order to qualify for funding, cities and subnational municipalities will need a good climate compatible strategy and investment plans authorised by national governments, together with a robust system for measuring performance and benefits. Cities and subnational areas will need to keep in close contact with their national counterparts in order to understand how to access resources from the Green Climate Fund in their country.

The formulation of Nationally Appropriate Mitigation Actions (NAMAs) under the UNFCCC also provides an opportunity for the formulation of investment-ready mitigation plans at the subnational level. A current example is the NAMA for renewable energy, under development in West Nusa Tenggara province of Indonesia with CDKN support.

Mobilising private funding without the backing of the national government is still proving to be a major challenge for medium-to-small subnational entities. This is reflected in the 2013–2015 Nantes Declaration of Mayors and Subnational Leaders on Climate Change adopted in September 2013 (see Box 11 for selected highlights). On the plus side, when national leaders place a priority on climate adaptation and mitigation strategies and plans, and create long-term policy commitments for businesses, this can drive private sector investment.

When subnational governments have some power to set fiscal policies in their jurisdiction, they can take measures to attract private investment in climate compatible development. Or, put another way, when subnational governments have the power to set environmental and social regulations in their jurisdictions, they may therefore have the authority to ensure that infrastructure investments by the private sector are climate compatible (including being sensitive to the needs of the poorest and most climate-vulnerable people). It depends on the degree to which such decisions are devolved from the national level.

Box 11. Climate finance highlights from the Nantes Declaration of Mayors and Subnational Leaders on Climate Change (adopted September 2013)

"We, the Mayors and Subnational leaders of the World, through our partnership in the Local Government Climate Roadmap 2013–2015 and in coordination with the Global Taskforce for Local and Regional Governments for Post-2015 and Habitat III,

In response to global processes:

... Urge national governments, supranational organisations and intergovernmental bodies to ensure that local and subnational governments have the capacity and resources to implement local climate mitigation and adaptation strategies that contribute to national and global efforts and to create enabling structures as well as effective framework conditions that enhance climate cooperation and complementarity between local and subnational governments, including City-to-City, City-Region, City-Rural, City-Business-Citizen, Region-Region and multilevel partnerships ...

In terms of our vision for financing to scale-up local climate action:

... Commit to actively mobilise and prioritise within our own local budgetary schemes the necessary funding required to implement local low-carbon actions and adaptation measures ... and to generate where we can new and innovative sources of funding that can support our low-carbon plans, low emission development plans, biodiversity action plans, our integrated sustainability plans, or other smart city development measures, noting that the development and implementation of these plans can offer a great opportunity for local governments to create local jobs and to respond to the economic crisis ...

... Urge national governments and multilateral development banks, public financing institutions, private funds, philanthropic funds and alternative financing mechanisms to increase the allocation of funding to support local climate action, to enhance access for local and subnational governments to such funding; to support the replication of innovative local solutions on climate financing; as well as to direct finance away from individual projects towards a holistic and integrated sustainable transformation to low-carbon, climate-resilient communities, noting that the principle of common but differentiated responsibilities should be respected in climate finance as well ...

... Call upon national governments, to launch specific windows of funding to directly support local climate action and sustainable urban development within the global finance mechanisms and funds including the Clean Development Mechanism, the Green Climate Fund, the Adaptation Fund and the Global Environment Facility ...

... Invite national governments and intergovernmental bodies to collaborate with the local and subnational governments as appropriate, in the development, implementation and advancement of existing and new market-based mechanisms, taking into account innovative experiences such as in Tokyo, California, Quebec or China."³⁵

Box 12. New Rwandan climate and environment fund merges international and domestic revenues to finance subnational initiatives

Rwanda's national climate and environment fund, known by its French acronym FONERWA, is intended to be the primary vehicle through which Rwanda's climate and environment finance is channelled, disbursed and monitored. In June 2013, FONERWA received £22.5 million (US\$35 million) from Britain's International Climate Fund. The Fund is an instrument to access international climate finance and streamline existing but previously fragmented domestic revenue sources. More than 600 applications were received in the first round, most from district governments and other subnational entities.³⁶

If subnational governments can, for example, lower business tax rates, this can incentivise private sector investment. Cities such as Cartagena are turning the conversation about climate compatible development into one about business competitiveness, so that businesses will want to locate there. Other cities have taken different approaches, for example, setting up city-level carbon trading schemes. The pro-poor element of such policies is fundamental to the outcome: it is quite possible for subnational governments to back private sector investments in favour of the rich. By contrast, well-designed schemes can ensure that the climate-vulnerable poor will benefit. The newly-initiated pilot programme for 'Adaptive Neighbourhoods' in Cartagena is designed with such pro-poor benefits in mind.

3.7 Coordinating policy-making, implementation and delivery across jurisdictions

Successful climate compatible development initiatives at the subnational level are characterised by one or more types of horizontal cooperation. This is perhaps unsurprising, given the cross-cutting nature of climate impacts and the fact that climate compatible development solutions must be cross-sectoral and multi-scale.³⁷

- **Integration across sectors, within the city boundary** – Multiple departments with different responsibilities need to work together to increase an area's climate resilience. This has been clearly demonstrated in Gorakhpur, where the local action group worked with the district disaster management authority to coordinate across drainage, roads, housing, health and power supply departments to improve flood resilience (see Box 3).
- **Bridging the formal and informal economy** – Informal, unplanned settlements will be a large part of cities in developing countries for some time. They are a form of urbanisation in their own right, and often home to the poorest and most climate-vulnerable people. Municipalities need to engage and work with community-led organisations of informal settlements in order to develop appropriate and workable responses. But the opportunity is bigger than this. The informal economy is often home to a city's most innovative and entrepreneurial ideas – which are key to transformative change. Municipalities need to create and preserve space for these social entrepreneurs in the ways they manage services and govern economic growth. In Hout Bay, Cape Town, for example, a waste collection social enterprise operates in synergy with the city's municipal waste contractor. CDKN is currently considering how to work toward climate compatible development in the context of informal settlements in African cities.³⁸
- **Transboundary coordination** – Cities and municipalities are part of broader ecosystems and are affected by drivers of economic, social and demographic change far beyond their borders. In many cases the opportunities for leveraging climate compatible development are in other jurisdictions. For example, flood risk in one municipality is directly affected by drainage, waste management, construction and land degradation due to settlement, agriculture and industry upstream. It is a leap for a municipality to invest money in another jurisdiction to address these issues, and this kind of action will require transformations in markets and political systems. The eThekweni municipality in South Africa is considering how to support improvements to land management practices in the hinterland, because this is a cheaper option than managing the effects on water quality and flood risk within the city. Other payments for ecosystem services (PES) schemes are up and running and illustrate this principle. CDKN contributed funding to the start-up of PES schemes in Bolivia (see Box 13).

4. What measures can accelerate transformative climate compatible development at scale?

Many of the single, subnational initiatives described in this paper have significant potential to enhance livelihoods and economic growth while avoiding emissions and building climate resilience. But their individual achievements are relatively small in the face of the global climate challenge. The Intergovernmental Panel on Climate Change (IPCC)'s Fifth Assessment Report³⁹ asserts that there is now 95% scientific certainty –

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Box 13. Bolivia: Payments for ecosystem services help to clear the water

In Bolivia, deforestation in upper river basins has caused a host of environmental problems, from soil erosion to declining water quality. In addition, greenhouse gases are emitted when the timber is cut faster than it can grow back.

A project by Rare Conservation and Fundación Natura Bolivia, supported by CDKN, has helped landholders from upstream areas to receive payments for conserving forest lands. Their work as environmental stewards is having positive impacts on the global climate. Downstream water users in the river basin directly compensate the landholders, whose conservation efforts upstream improve downstream water quality. These measures are more cost-effective than investing in post-facto water treatment and increased flood defences.

In the increasingly water-stressed Department of Santa Cruz, Bolivia, reciprocal water arrangements (or 'ARA', as they are known in Spanish: *Acuerdos Recíprocos por Agua*) have taken off. ARA are private contracts between members of water cooperatives and landholders in priority catchment areas. Landholders sign contracts that bind them to strict rules of land management: they must conserve the forest, avoid livestock practices that pollute the water, and work to enhance biodiversity. In exchange, they receive in-kind compensation that boosts their incomes and livelihood prospects.

A three-way contract is signed between the water provider, the municipality concerned and the local NGO Fundación Natura Bolivia. The downstream water provider opens a separate bank account into which revenues from a new 'environmental services' tariff are channelled. The local government purchases beehives, fruit tree seedlings, irrigation pipes or other development tools, to be given in compensation for upstream forest conservation, and Natura provides technical support to get the scheme up and running.

Since the first Bolivian ARA was developed in Los Negros, more than 30 municipal governments and water cooperatives across the Andes have joined the movement. More than 40,000 downstream users are now compensating 2,000 upstream families for protecting 70,000 hectares of forested 'water factories'. In the last two years, more than US\$ 350,000 worth of local and donor funds have compensated landowners' conservation efforts with barbed wire, cement, fruit tree seedlings, beehives, beekeeping equipment, plastic piping, water tanks and roofing materials. The ARA schemes are thus unlocking vital resources for upland farmers, who have been increasingly marginalised by their lack of capital.

If owned by local institutions, these schemes can help steer development towards sustainability. "The ARA model does not focus on paying the opportunity cost for conservation, which can be very expensive, but instead focuses on changing social norms," said Maria Teresa Vargas of Natura Bolivia. "New perceptions about the value of forests for society can convince upstream landowners to conserve in return for projects that may not match their full opportunity cost, but which provide them with a livelihood alternative."

greater certainty than ever before – that human activity is contributing to climate change. Without aggressive mitigation action, the world could see an average temperature rise of between 2.6°C and 4.8°C by the end of this century. Such a profound change to the global climate, with deep and unknown effects on ecosystems and economies, would jeopardise hundreds of millions of lives and could tax human ingenuity beyond its limits. The implications of the IPCC's findings on the physical science of climate change are that societies must act expeditiously to build their climate resilience, while aggressively cutting greenhouse gas emissions (in the case of the high-emitting countries) and where possible avoiding unnecessary emissions (in the case of the low-emitting ones).

This context makes it all the more important that national governments should embrace ambitious climate goals, and provide the enabling environment for innovative and appropriate actions at the subnational level. Successful subnational initiatives should be rapidly scaled out and scaled up.

Scaling out is about changing practice in other localities, just as the City of Ahmedabad's Heat Action Plan (see Box 7) has attracted interest among other Indian municipalities to adopt and adapt elements of this approach. Scaling out has been defined as bringing "more quality benefits to more people over a wider geographical area, more equitably, more quickly, and more lastingly".⁴⁰

Scaling out can also happen when a critical mass of demand creates market signals. For example, local authorities may use their combined purchasing power to jointly procure low-carbon and climate-resilient goods and services in key sectors such as energy, construction materials, telecommunications equipment and waste collection services. By combining forces and sending one large signal to the market, this drives innovation and lowers costs at the same time. South Africa is one country that is seeking to achieve this. Demand-led elements were also important in the early scaling out of solar water heating in Barbados.⁴¹

A growing body of literature is identifying the prerequisites for scaling out community-based adaptation and climate compatible development more generally. These factors are discussed at length elsewhere, including in a CDKN companion paper.⁴² In this paper, Gogoi et al. provide evidence of how the following key components have been pivotal to successful scaling out of community-based adaptation in CDKN-supported projects:

- **Documenting evidence and learning** – having a strong monitoring, evaluation and learning framework in place in order to present compelling evidence of achievement, which makes the case for action elsewhere
- **Ensuring the core objective of building adaptive capacity remains** – taking care to retain successful elements of the initial project that emphasised the development of the community's local capacities for adaptation
- **Networks and partnerships as the cornerstone** – linking community practitioners with external organisations, research institutes and businesses (domestic or international) that have the ability to spread good ideas beyond the original project area
- **Finding cost-effective institutional channels and finance mechanisms for scaling out** – looking not only to government schemes and policies as a potential route for scaling out, but also to the private sector, which may offer even more effective networks and capability.⁴³

In addition to scaling out of individual subnational initiatives, some partnership networks are supporting innovations that will allow cities and subnational areas to benchmark progress and attract investment. These initiatives are generating important early experience that could transform emissions profiles, climate resilience and long-term livelihood prospects in these localities, and create the momentum for broader changes in policy and practice. One such initiative is the Global Protocol for Community-Scale Greenhouse Gas Emissions, an initiative of the World Resources Institute, Cities Climate Leadership Group (C40) and ICLEI. It offers a standard methodology for greenhouse gas reporting for cities.⁴⁴

Scaling up means creating the right policy, legal and institutional frameworks for tested solutions that have worked successfully at the subnational level to be adopted at a broader scale. Achieving transformational change (as defined earlier) is often about expanding subnational pilot initiatives to national or even international policies or programmes. In some of the CDKN subnational initiatives studied in this learning programme, success in climate compatible development is measured in emissions avoided, potential lives and livelihoods saved through more climate-resilient development, and green jobs created. Success has in some cases been achieved at a small geographic scale, and the immediate opportunity for scaling up lies in moving from the neighbourhood or district level to the city or province level. Such is the case in Maputo, Mozambique, where project leaders now view the achievements of participatory climate compatible development planning in one neighbourhood as a springboard for generating greater interest and commitment from municipal leaders.

In Colombo, Sri Lanka, positive results from a pilot scheme in urban agriculture and forestry will inform a provincial adaptation plan. In coastal Ghana, the experiences of assessing climate risk in Ada Foah municipality are being shared with provincial and national policy-makers to inform adaptation strategies at those levels. In Ahmedabad, India, a coalition of organisations that developed South Asia's first Heat Health Action Plan (Box 7) has been contacted by other Indian city governments, which are eager to develop their own similar plans.⁴⁵ The Government of Colombia recognises Cartagena as a 'first mover' on coastal resilience and adaptation. It is now looking to incorporate Cartagena's lessons into future iterations of its national adaptation plans. (There is also a degree of 'scaling out' as other Colombian cities are looking to see how they can adopt elements of Cartagena's approach directly.)

One of the most important findings from CDKN's evaluation of its overall programmatic impact is that individual initiatives, however innovative and effective, are rarely successful at scaling out or up unless this has been built into project design right from the beginning. This is a key message if we are to achieve transformational change at scale. The CDKN project on carbon and water footprinting in three Andean cities (La Paz, Bolivia; Lima, Peru; and Quito, Ecuador) provides an example of how this has been done successfully. In La Paz, the municipal government has committed to achieving direct results, and also to demonstrating the impact of the project more widely. As a result, success in one neighbourhood is being used as model for up to 60 similar neighbourhoods. Other South American cities have already contacted the project partners to find out about their activities and experiences and what is necessary to adopt and replicate them.

Box 14. When scaling up depends on funding

Many of the initiatives assessed as part of the CDKN-ICLEI learning programme managed to mobilise significant local resources in support of climate compatible development. However, when it comes to scaling up, attracting additional funding may be a critical factor.

For example, the Public–Private–People Partnership for Climate Compatible Development in Maputo, Mozambique drew on a range of resources beyond public budgets, including human resources and capacity within local communities. The peri-urban agriculture and forestry project in Colombo, Sri Lanka benefitted from local as well as international funding. In both instances, project leaders felt that significant additional, external funding would be required to sustain project efforts into the long term and/or to scale up.

5. Conclusion

In this paper, we have outlined the specific challenges to – and opportunities for – achieving more climate compatible development in towns, cities, districts and provinces across Africa, Asia and Latin America and the Caribbean. We have examined how diverse subnational initiatives have tackled their particular challenges and exploited their many opportunities to achieve progress. In particular, we have noted how successful subnational initiatives have taken advantage of the flexibility to create knowledge partnerships among scientists, policy-makers and communities, and initiate participatory processes to mobilise local knowledge, time and other in-kind resources for implementation.

Pockets of good practice and innovation are not enough. There is an urgent need to scale out and scale up such successful initiatives rapidly, while preserving the elements that make them locally appropriate and therefore effective.

The CDKN-ICLEI partnership provides subnational decision-makers and development practitioners with a diverse network for exchange of knowledge. In our view, such international professional networks are crucial to catalysing the scaling out of best practices. In this spirit, we would like to invite your views on the issues identified in this paper, and to facilitate a better understanding of successful strategies and measures for climate compatible development. Through such exchange and mutual support, we hope to not only accelerate progress in localities, but also to catalyse the broader transformational change that the world needs.

Questions for discussion

- What opportunities and challenges do you see for climate compatible development at the subnational level?
- What types of climate compatible development have you assessed, or been involved with, at the subnational level? Which of these strategies and measures do you consider to have been promising or demonstrably successful?
- What further issues are critical to the achievement of climate compatible development at the subnational level? What is missing from this paper?
- What are the conditions under which success in one area can be scaled out more widely to achieve transformational change at scale?

Please share your experiences by emailing: enquiries@cdkn.org with subject line 'Subnational Working Paper'

Or join the interactive discussion at: <http://www.linkedin.com/company/climate-and-development-knowledge-network>

Table 1. Projects involved in the CDKN learning programme

Project – for more information see www.cdkn.org/projects	Location
Sustainable urban tourism through low-carbon initiatives	Chiang Mai, Thailand and Hue, Vietnam
Understanding flood risk and resilience in eastern India	Gorakhpur, India
Ability of local multi-stakeholder action to catalyse shifts in the programme and policy environment towards mainstreaming DRR and CCA	Leh and Barmer, India
Indian cities project to improve local responses to heat-related health emergencies	Ahmedabad, India
Building climate resilience in Ghana's coastal cities	Ada Foah, Ghana
A Public–Private–People Partnership for Climate Compatible Development in Maputo	Maputo, Mozambique
Building delivery at scale with partners for resilience	Manila, Philippines
Integrating adaptation to climate change into local planning and sectoral management in Cartagena	Cartagena de las Indas, Colombia
Analysing vulnerability: a multi-dimensional approach from Colombia's upper Cauca river basin	Alto Cauca, Colombia
Carbon and water footprinting in three Andean cities	La Paz, Bolivia; Quito, Ecuador; and Lima, Peru
Monitoring impacts of urban and peri-urban agriculture and forestry on climate change adaptation and mitigation	Colombo, Sri Lanka

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18/05/2015*

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The Climate and Development Knowledge Network (CDKN) supports decision-makers in developing countries in designing and delivering climate compatible development. It does this by combining research, advisory services and knowledge-sharing in support of locally owned and managed policy processes. CDKN works in partnership with decision-makers in the public, private and non-governmental sectors nationally, regionally and globally. CDKN is managed by an alliance of organisations: PricewaterhouseCoopers (PwC), Overseas Development Institute (ODI), Fundación Futuro Latinoamericano, SouthSouthNorth, LEAD International and LEAD Pakistan. www.cdkn.org

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Ministry of Foreign Affairs of the Netherlands

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