

FUTURE PROOFING CITIES

Risks and opportunities for inclusive urban growth in developing countries

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Executive Summary

One of the defining challenges of our time is how to reconcile the need for rapid growth and poverty alleviation in many parts of the world with the need to avoid irreversible and costly environmental damage. This is a challenge that will be played out in the world's cities.

More than half of the world's population already live in cities and this is expected to reach 75 per cent by 2050. Cities occupy only two per cent of the earth's land, yet account for 60 to 80 per cent of energy consumption and 75 per cent of carbon emissions. Natural hazards such as flooding and drought, temperature extremes, and tropical cyclone activity already impact cities and these will be exacerbated by climate change. Flooding recently cost Bangkok's economy US\$39 billion and five million people there could be at risk of flooding by 2070.

The growth of cities puts additional pressure on resources and environmental assets such as forests, water, and air that support the needs of their inhabitants. People living in cities are particularly at risk from changes in the price of and disruption in the flow of resources such as energy, water, and food. Around 44 million people – many located in urban areas – were pushed into poverty by food price increases in 2010, and risks to food security are likely to intensify with population pressures, water scarcity, and climate change.

Given that 95 per cent of this urban expansion is projected to take place in the developing world, it is cities in developing countries which will be at the front line of managing this challenge. Over the next 20 years, the urban populations of South Asia and Sub-Saharan Africa are expected to double to over 3.5 billion people.

Cities in the developing world are particularly vulnerable to environmental risks. Our estimates suggest that just in India alone, nearly 70 million people still live in multi-dimensional poverty within the 59 cities with populations in excess of 750,000. This leaves a significant number of people highly vulnerable to the stresses and shocks associated with climate hazards, resource scarcities, and degradation of ecosystems such as forests. These risks will ultimately damage the future economic growth potential of cities and impact on their ability to reduce urban poverty.

Future proofing is about utilising and developing the capabilities of cities to respond to the risks associated with climate change, resource scarcities, and damage to ecosystems in a way that catalyses inclusive urban development.

The central message of this report is that the earlier cities in developing countries take steps to future proof their urban development, the better. There is an important – but closing – window of opportunity for many cities to act now before they are locked into unsustainable and unsuitable development pathways.

Moreover, a strategy based on 'grow first, tackle environmental risks later' is unlikely to be effective given the risks to economic growth and the urban poor from depletion of natural resources, climate change, and global population pressures. We are already witnessing the brake that environmental constraints are having on growth with environmental degradation costing countries as diverse as Pakistan, Nigeria, and Ghana up to 10 per cent of their GDP, and the costs of congestion alone in cities such as Dakar (Senegal) already in excess of three per cent of GDP.

The good news is that city level policies developed to respond to environmental risks can generate wider economic and social benefits as well as environmental ones. Many cities have a degree of autonomy which allows city policymakers to act more nimbly than national policymakers in delivering integrated responses to environmental risks. They can also work closely with regional and national policymakers to create the right policy frameworks for action.

Cities in developing countries are also in a unique position to act to future proof their development. Cities are natural magnets for driving the sort of innovations required to respond to environmental challenges derived from a concentration of people and economic activity which generates a fertile environment for new ideas, technologies, and processes.

5 million

Number of people in Bangkok that could be at risk of flooding by 2070.

20%

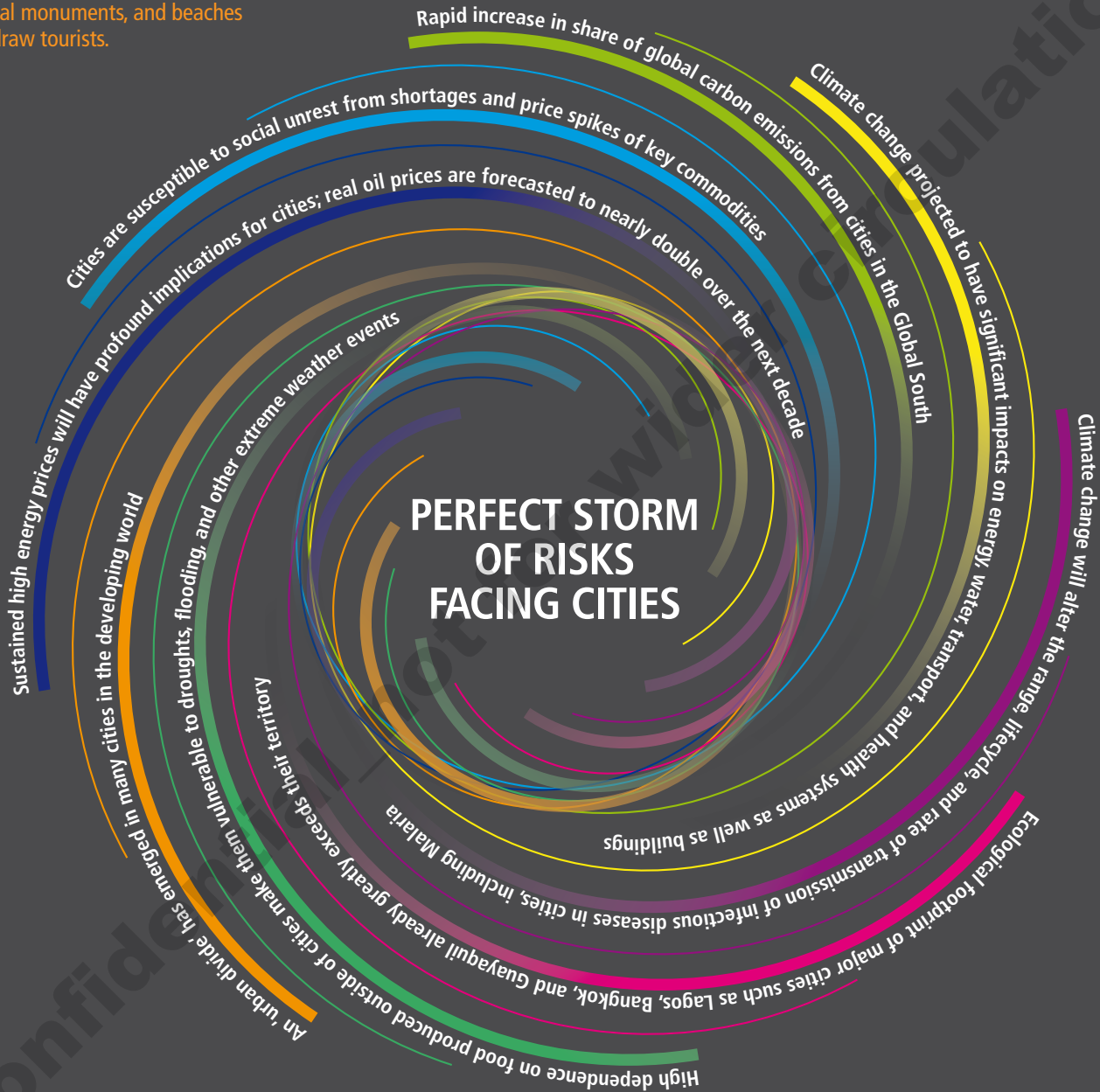
Percentage of repairs due to climate change to the Konkan railway network in western India that facilitates trade and energy services between Mumbai and Mangalore.

17%

Estimated area of Mombasa that could be lost from a 0.3 m sea level rise causing the loss of hotels, cultural monuments, and beaches that draw tourists.

\$418 million

Cost per year of replacing the ecosystem services (e.g. water provision, flood prevention) provided by Durban's network of green open space, 38 per cent of the city's total budget.



44 million

Number of people pushed into poverty by increases in food prices in the second half of 2010, many located in urban areas.

\$39 billion

Economic loss from recent flooding in Bangkok through damage of more than a million buildings and impacts on commerce and industry.

85%

Percentage of Dhaka submerged by recent flooding.

1.9 million

Number of people affected by recent flooding in Manila.

This report is aimed at any organisation or individual with a role in helping shape the cities of the future:

- National and regional government and development agencies need to understand the environmental risks to growth and poverty reduction in cities to target investment and support at those urban areas in greatest need.
- Likewise, national and multinational companies may need to pay further attention to the risks to their investments in cities. This is to better protect and enhance core urban infrastructure assets such as water, energy, and transport systems and to identify new markets for investment.
- Those living and working in cities need to be able to identify the risks facing them and develop solutions which can respond effectively to those risks over the long term.

This report

Atkins and UCL's Development Planning Unit in partnership with the UK's Department for International Development (DFID), have built on our collective work on urban areas and the environment to explore how cities in the developing world might better assess – in a holistic way – the environmental risks relevant to them and the combinations of policies likely to be most effective in promoting inclusive urban development.

This report outlines a five stage future proofing approach to help cities develop programmes of investment which meet their multiple objectives and utilise and build on the institutional capacities they have available.

The foundation for the work has been an integrated assessment of the risks, vulnerabilities, and capacities of 129 cities across 20 countries spanning Asia and Africa, and the development of five urban typologies to group these cities based on the most significant environmental risks they face. This covers cities from across DFID's extensive country footprint with: (i) populations in excess of 750,000 people to allow for collection of available population data from relevant international agencies; and (ii) availability of other comparable data.

This work is intended as a pilot, but to our knowledge it is the first time that typologies have been developed for a significant sample of cities in developing countries, while adopting a holistic approach. These typologies are used to help point the way towards the universe of policy solutions likely to be applicable to different types of cities.

The work was developed to begin to address a number of gaps in our knowledge which are making it more difficult for cities in the developing world to act on the environmental risks relevant to them and to target finance at the interventions likely to have the greatest impact. In particular, there are few integrated assessments of the environmental risks and solutions relevant to cities (especially in the world's poorest countries). The majority of studies focus on measures to address one or two risks such as carbon emissions or flood risks, and provide insufficient attention to issues such as potential resource scarcities in energy, water, and food, and the need to safeguard natural habitats and biodiversity. The overwhelming focus tends to be on risks rather than giving equal attention to identifying opportunities and solutions.

Most policy guidance is also inadequately tailored to the specific challenges facing cities with different characteristics. The guidance that exists typically provides policies to, for example, green a city, without considering their relevance to different cities based on the risks they face and their vulnerability and capacity to respond to risks. Additional attention is also needed to identify which solutions can generate social and economic benefits, alongside environmental ones; this is crucial if cities are to build support among communities and city stakeholders for sustained programmes of action.

A list of over 100 policy options for future proofing are therefore presented. This identifies which policies are likely to be most relevant to different city types. It also identifies how these policies might be integrated, the extent to which they deliver wider social and economic benefits, and how challenging they are to implement given their governance, planning, finance, and delivery requirements. The analysis shows there are a significant number of policies which can balance environmental, social, and economic objectives and can be implemented by most cities. These policies can form the heart of any urban development strategy.

As part of this process, Atkins developed an urban risk database. This allows us to better understand the multiple and interconnected risks facing cities from climate hazards, resource scarcities, and damage to ecosystems. This is combined with metrics capturing the vulnerability of cities to risks and their capacity to respond to risks. It also provides an overview of urban scale and dynamics in terms of city size and ecological impacts, climate and physical geography, and urban form.

The interconnected risks facing cities: five urban typologies

Cities in developing countries face significant risks from climate hazards, resource scarcities, and damage to vital ecosystems. These risks cannot be looked at in isolation: they are multiple, interlinked, and they are growing. The risks relevant to cities also operate at different levels from the global to the regional and local levels.

We have identified five types of cities based on the most significant environmental risks they face:

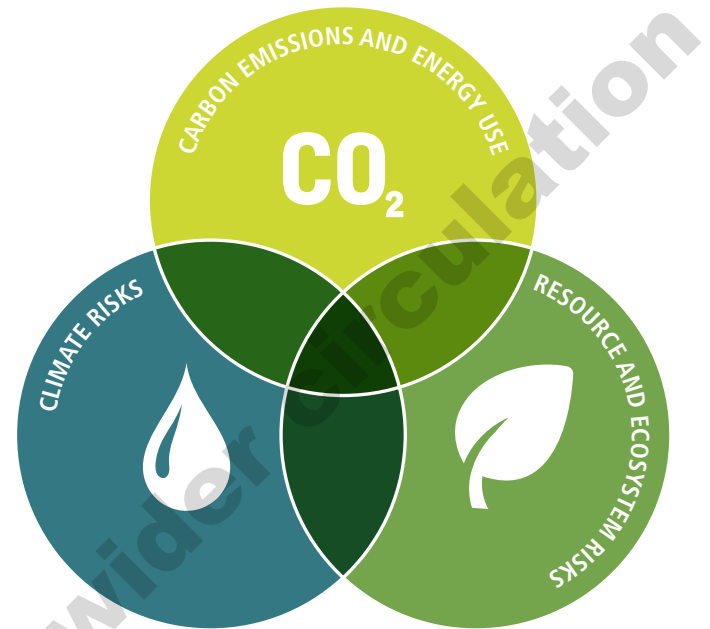
1. Energy intensive cities with significant carbon footprints
2. Cities with major climate hazards
3. Cities with risks to regional support systems (such as water and food systems, and risks to natural habitat)
4. Cities facing multiple risks
5. Cities with a low current risk profile.

Urban types can be a useful way to identify and compare groups of cities with common risk characteristics spanning different geographies. This can facilitate the identification of solutions likely to be applicable to different types of cities. The analysis can also help to pinpoint groups of cities that face the most significant environmental risks and where these risks may intensify over time.

Our analysis found that the most significant group of cities are those that drive or are impacted by multiple environmental risks. This group faces risks across multiple risk categories. These cities are characterised by high energy use and carbon footprints, risks from climate hazards such as flooding and cyclones, and risks to regional support systems such as water, food, and natural ecosystems. This group spans some of the world's largest cities such as Bangkok, Jakarta, Delhi, and Mumbai, to smaller cities such as Guwahati and Bareilly in India. These cities are likely to require action to address risks across a broad front.

For cities with a risk profile focused around one cluster of risks – such as climate hazards or high energy use and carbon emissions – their priority will be to take focused action to tackle those risks. Bangalore, for example, has a high energy and carbon footprint driven by new high rise glass façade developments. Karachi faces significant risks to its water and food systems due to drought and the limited availability of agricultural land in its catchments. And Maputo faces significant risks from flooding due to its geographical location and other factors.

The environmental risks relevant to cities



Few cities have a low risk profile. These are often cities that are currently small, but with significant growth prospects. These cities have a window of opportunity to pursue a development path that supports planned expansion but in a way that minimises the environmental risks to long term prosperity and poverty reduction.

From risk to opportunity: matching policy solutions to different urban types

The report defines policies which can be combined into a portfolio to address the challenges facing different types of cities. A broad set of over 100 policies are outlined to demonstrate the range of solutions that can be used for future proofing.

Cities can make the greatest gains by focusing effort on solutions which address their challenges:

1. **Energy intensive cities with significant carbon footprints.** Particular attention is needed by these cities on policies in the transport, energy, and building sectors to promote the move to a lower carbon, less energy intensive future to save both cost and carbon. For many cities, carbon emissions from transport can account for a significant percentage of carbon emissions and energy use. A greater focus is often needed by these cities on strategic planning to manage their growth and the effective planning of mass transit options such as Bus Rapid Transit and demand management schemes, and many cities could do more to consider the potential for renewable energy generation within their boundaries, and delivering lower carbon buildings.

2. **Cities with major climate hazards.** As well as specific hard infrastructure investments to manage risks such as flooding, attention is needed by these cities to manage climate risks at the strategic level. For example, greater attention to diversifying the urban economy away from climate sensitive sectors, effective management of land in climate vulnerable areas, and public health measures and hazard planning in the event of climate related disasters. Attention should also be given to greening policies and green infrastructure programmes which can be used to tackle climate risks as well as other risks such as carbon emissions.
3. **Cities with risks to regional support systems.** These cities can draw on a wide range of solutions for future proofing as almost all measures which tackle carbon emissions and climate hazards can also respond to resource and ecosystem risks. These include policies as diverse as urban agriculture and building simple latrines. Particular attention should be paid to managing environmental risks in the wider regional catchment of these cities and peri-urban areas, including risks to water and food security, and to biodiverse natural habitats.
4. **Cities facing multiple risks.** Taking action across multiple sectors, harmonising policy responses, as well as striking the balance between long term measures and those focused on immediate disaster risk reduction will be particularly important for these cities, but will be challenging. Cities in this type can look to places such as Bangkok which has experienced the governance, planning, finance, and delivery challenges involved in addressing multiple risks through solutions such as the use of public-private partnerships to promote shifts in behaviours.
5. **Cities with a low current risk profile.** These cities have an opportunity to do things differently by avoiding locking themselves into long lived, poorly adapted development pathways.

Some of the risks cities face, such as climate change, are highly uncertain. This requires cities to use a range of plausible scenarios to assess the uncertainties they face. They can also identify 'low regrets' measures which make sense to do anyway because they deliver wider environmental, economic, and social benefits, and focus on measures which have design flexibility or are not irreversible (e.g. flood defence systems which are portable, flexible, or can be extended as more information on flood risks become available).

Maximising benefits and building momentum for action

Identifying responses with multiple environmental benefits

To maximise the benefit of opportunities for future proofing, cities should look to focus on policies which can respond to multiple environmental risks. Our analysis of policy options shows that a wide range of policies can respond to multiple environmental risks by: (1) reducing carbon emissions and energy use; (2) responding to climate hazards, and (3) helping protect or manage water and food systems and natural habitats. These can be thought of as 'triple-win' or 'win-win' policies in addressing environmental risks. These policies could form part of a core package of policies for all urban types, and can be especially useful for city types facing multiple risks. These can also support cities to address uncertain future risks or secondary risks which might be of less immediate relevance.

The analysis shows that many of these policies are an extension of sound integrated urban planning and infrastructure investment. This includes policies such as mixed use zoning, use of greenbelts, developing mass transit, pedestrian and bike orientated development plans, and prudent land management. This provides an opportunity for cities to build on existing initiatives and good practice in urban planning and combine these with more specific 'triple-win' and 'win-win' policies such as urban greening and tree planting programmes which are often overlooked.

The built environment – especially new development – represents a particularly significant entry point to deliver 'triple-win' benefits, as are policies to improve efficiency of water and waste. Cities such as Bangalore are starting to show how to unlock opportunities in the built environment by combining measures which incorporate rainwater harvesting and grey water reuse, recycling, pollution control, and solar power systems to generate 'triple-win' and 'win-win' benefits. These examples can be instructive for other cities facing similar risks. Other policy solutions in the built environment such as the implementation of solar orientated neighbourhoods and designing slum upgrade programmes to minimise resource use are less widespread and there is significant scope for wider uptake of these approaches in cities which are rapidly growing.

Identifying vulnerability to risk

It is also important that cities look to identify solutions which can address their specific vulnerabilities to environmental risk. Although various groups of cities face common environmental risks, they usually differ markedly in their vulnerability to those risks based on their levels of poverty and inequality, strength of basic services, and urban form.

Our analysis shows that within urban types, the vulnerability of the cities assessed as part of this report to risks varies markedly. In cities facing significant climate hazards (Type 2), for example, cities with a high proportion of people living in poverty and in informal settlements are expected to be hit first and hardest by climate hazards; their residents do not have the assets to protect themselves against the stresses and shocks associated with large scale flooding or cyclones, and poor residents tend to be located in the most vulnerable areas and in poor quality housing. Similarly, in energy and carbon intensive (Type 1) cities with high levels of vulnerability, rising energy prices will have a significant impact on livelihoods of the urban poor who already spend a significant proportion of their income on energy for heating and lighting and in many countries, national policies subsidising energy are unlikely to be sustainable in the medium to long term.

Despite the economic rise of India, our findings demonstrate that several cities such as Jaipur and Patna continue to remain particularly vulnerable to environmental risks, as do many cities across the Democratic Republic of Congo, Nigeria, Sudan, and Malawi such as Kinshasa, Kano, and Khartoum. These cities tend to have high proportions of people living in multi-dimensional poverty and informal settlements with poor access to energy, water, and sanitation, and are likely to be impacted greatest by environmental risks such as flooding, cyclones or rises in the price of energy. Across 59 cities assessed in India, over 48 per cent of the population on average live in multi-dimensional poverty. With a 36 per cent projected increase in population in these Indian cities by 2025, this is likely to increase the proportion of people vulnerable to environmental risks.

In contrast, our analysis shows that cities across countries such as Indonesia, Vietnam, and Ghana such as Jakarta, Ha Noi, and Accra tend to have lower relative levels of aggregate vulnerability to environmental risks. The average proportion of people living in multi-dimensional poverty in the cities of these countries, for example, is only 17 per cent, compared to the 41 per cent across the 129 cities featured in this report. With both lower rates of vulnerability and generally slower projected growth rates it is likely that the impacts of environmental risks could be more easily managed. Cities with the highest numbers of vulnerable people continue to remain in the largest cities in South Asia such as Kolkata, Mumbai, Karachi, and Dhaka. In these four cities alone, over 32 million people live in multi-dimensional poverty which highlights the scale of the challenge.

The capacity of cities to respond to risks

In addition to responding to vulnerabilities, cities should look to solutions which can be realistically implemented with the capacities they have available. These provide an opportunity to help cities build capacity over time by boosting economic development, unlocking resources for investment, and create a focus for capacity building efforts. As with vulnerability, the capacity of cities within urban types varies considerably. The capacity of cities to respond to environmental risks is shaped by a range of 'urban enablers' including the strength of their urban economies and their governance, planning, finance, and delivery systems.

Strong and effective planning systems, for instance, will be critical to the success of cities in responding to current and future challenges given their central role in shaping urban development. Unfortunately, many cities exhibit systemic weaknesses in their integrated and participatory planning capacities. Karachi's planning system, for example, has often been singled out as contributing towards uncontrolled urban sprawl, haphazard development, uneven infrastructure provision, and a polluted urban environment, with little room for citizen engagement.

To respond to environmental risks will require cities to work closely with national and regional government to strengthen their urban governance, planning, finance, and delivery capabilities.

Reducing vulnerability, boosting development, and building capacity

By assessing vulnerability and capacity to act together this can help cities design an appropriate response to the specific challenges they face. For cities such as Maputo with high numbers of people living in multi-dimensional poverty and low levels of capacity, for example, the focus may naturally be on policies which benefit the urban poor, boost basic service delivery and economic growth, and are cheap, simple, and cost effective. Other cities with lower levels of vulnerability and greater capacities to respond to risks may be able to focus on more complex, costly, and capital intensive solutions. Some cities in India and other South Asian countries, for instance, are expected to almost triple their per capita income by 2025, with growth rapidly outstripping population pressures; this is likely to give them greater headroom to respond to environmental risks and infrastructure gaps than cities with weaker growth prospects which may require additional finance to help them plug financing gaps.

There are numerous future proofing policies with significant potential to directly reduce urban poverty and boost short to medium term economic growth. For example, Bus Rapid Transit and improvements to walking and cycling infrastructure provides affordable transport to those on more limited incomes and boosts capital spending, creates jobs, and reduces the cost and efficiency of transport. These policies can help all cities – but especially those with high vulnerabilities and weak urban economies – to build momentum behind future proofing programmes of investment.

There are also a range of future proofing policies that are relatively easy to implement. These include policy solutions such as urban agriculture, micro-generation, improvements to public transport information, and introduction of enhanced bus services. These policies are relatively affordable, do not have substantial governance or planning requirements, and are relatively straightforward to deliver.

The range of measures which are relatively easy to implement is good news for capacity constrained cities. However, capacity constraints should not prevent cities from being ambitious and focusing on more challenging interventions; capacity can be built through the process of policy implementation itself, providing a focus for capacity building efforts.

An agenda for action: recommendations and conclusions

Future proofing should not be seen as an end state, but as a continuous process of better understanding the risks facing cities, the vulnerability and capacity of cities to respond to those risks, and the solutions which will derive economically, socially, and environmentally desirable outcomes.

This report calls for leadership by city stakeholders, regional and national government, international funding agencies, philanthropics, academia, and private sector companies to plan for the long term by acting now to support cities to future proof their development. This will require skills to be leveraged from across the infrastructure, engineering, environment, planning, design, economics, and social science professions to help cities develop solutions at the nexus between urban planning, transport, water, energy, waste, agriculture, ecosystems, and design and architecture.

A significant number of cities in the developing world have already embarked on projects and initiatives aligned with a future proofing approach. Bangalore (India) is introducing a new metro system which has the potential to reduce its energy use and carbon emissions as well as improve mobility, and Karachi (Pakistan) is taking a wide range of steps to reduce its risks to water and food scarcities through measures such as groundwater conservation.

Nevertheless there is still a significant way to go for many cities as the collection of initiatives and projects often miss the impact and potential offered by a more integrated programme and approach to future proofing.

This report has seven overarching recommendations to build on the findings of this report. These are complemented by the more specific findings and recommendations interlaced throughout the report's main chapters.

1. Developing future proofed urban strategies

More needs to be done to support cities to develop future proofed urban strategies i.e. strategies which look to address in an integrated way environmental, social, and economic objectives. Building on sound diagnostic work, more cities should be supported and encouraged to develop integrated strategies and programmes of investment which are future proofed.

A good starting point would be to focus initially on opportunities which generate multiple environmental, social, and economic benefits which tend to be an extension of sound integrated urban planning and infrastructure investment.

Greater use of the future proofing approach outlined in this report could help cities to develop policy portfolios which maximise environmental, social, and economic benefits and which can be implemented given institutional capacities.

2. Unlocking and aligning finance – including climate finance – for future proofing

There is a need to scale up and make finance more easily available to cities, including small and medium sized cities. This needs to be combined with efforts to overcome the market and governance failures which often deter investment in future proofing through the use of financial and non-financial instruments such as feed-in-tariffs to encourage investment into renewable energy generation.

Many cities in the developing world do not have the financial resources to respond to the challenges they face. Karachi, for example, had a 200 per cent gap between revenue and expenditure in 2006. Many cities are therefore dependent on transfers from national government and many cities do not have projects and programmes which meet private sector investment criteria.

International climate finance could play a particularly important catalytic role in helping cities to unlock and implement integrated urban programmes to, for instance, reduce carbon emissions. This could be combined with new funding mechanisms such as dedicated city-focused infrastructure or urban development funds and municipal bonds to raise finance for bankable investment projects. For example, international financing for forest protection (REDD+) could support cities already located in the heart of rainforest basins to develop in a way which prevents the destruction of their forest assets.

Some action is already taking place. The World Bank has committed to making finance – including international climate finance – more easily available to cities. The Asian Development Bank has recently called for a greater focus on the integrated planning and financing of targeted interventions in specific urban regions. In addition, other funding agencies such as the Clinton and Rockefeller Foundations as well as bilateral donor agencies are scaling up their support to cities in the developing world to address environmental risks. These efforts should be welcomed and be given additional focus and attention, with a focus on ensuring finance provided to cities is long term, multi-

sector, and aligned with city-owned future proofed strategies.

International development agencies should also consider reviewing the criteria they use in commissioning urban infrastructure to ensure investments are future proofed.

3. Undertaking urban risk diagnostics

To help plan for the future, cities need to undertake detailed diagnostics of the environmental risks they face. These diagnostics need to include an assessment of vulnerability to risks, capacity to act, as well as an analysis of scale, projected pace of change, and physical geography.

More support is likely to be required to help cities undertake integrated urban risk diagnostics which can be used to mobilise city stakeholders to develop programmes for future proofing. This should build on existing tools and approaches which are being piloted in many cities across the developing world supported by international funding agencies.

4. Strengthening the capacity of urban governance, planning, and delivery systems

Many cities need support to strengthen their capacity to respond to these environmental risks. This project has highlighted the importance of strong governance, planning, and delivery systems in shaping the ability of cities to respond to risks. However, many cities have systemic institutional challenges in these areas, particularly surrounding their ability to mobilise and engage with local communities to inform decision making and the development of solutions.

Whilst progress is being made to reform governance, planning, and delivery systems in some cities' more attention should be given to these issues in the context of escalating environmental risks. This may require cities to explore different governance, planning, and delivery models, such as the use of people-public-private partnerships to overcome constraints in government capacity. The good news is that capacity can be built through the process of developing and implementing future proofing strategies.

5. Improving the data and evidence underpinning city decision making

High quality data is needed to support accurate assessments of environmental risks. Unfortunately, there is a general lack of comparable data on cities, particularly in developing countries, which impacts all stakeholders from municipal authorities to development agencies.

Greater investment is needed by the international agencies to gather data on the risks facing cities, including at a spatially disaggregated level. This should build on existing efforts by the United Nations, World Bank, and other global institutions. Particular attention should be given to gathering data for small and medium sized cities. This data collection effort should be complemented by the development of growth projections which take full account of the impact that environmental risks, including binding resource constraints, may have on future growth.

For cities, greater efforts to track their performance in managing risks such as congestion and air pollution can help them to position themselves as more attractive places to do business.

6. Additional research and improved guidance

In addition to improved data and evidence, additional research and guidance is needed to improve global knowledge of the range of environmental risks relevant to cities in developing countries and what can be done about them. For example, there is little information available on what environmental assets exist and what condition they are in at an urban level. Existing research efforts looking at the environmental challenges facing cities in the developing world should therefore be given renewed vigour and attention.

There is also a need for improved guidance to cities on how they can navigate the complex myriad of information on identifying and managing complex environmental risks. For instance, there is currently limited accessible guidance to help cities identify appropriate indicators of risk, and how to distinguish between the supply and demand of environmental assets, the production and consumption activities impacting environmental risks, ecosystem processes and final ecosystem goods and services, and environmental stocks and flows.

7. Identifying risks to existing and planned investment portfolios

Owners and managers of assets in cities need to pay attention to the risks to their investment portfolios and operations. The risks facing some of the world's fastest growing cities identified in this report could have potentially profound implications for the management and maintenance of core urban infrastructure assets such as water and energy systems, food systems in urban catchments, and transport infrastructure.

Responding to these risks may require steps by asset owners to review existing and planned investment portfolios in light of these risks, embedding different risk metrics in traditional approaches to measuring risk, and investing to future proof infrastructure in cities.

This report has shown that cities in the developing world urgently need to take steps to future proof their development by tackling the environmental risks to their long term prosperity. There is an important – but closing – window of opportunity for cities to take action. This report has shown that cities can take steps to future proof themselves. Not only can they act, but acting will support the creation of cities of the future which are more environmentally, socially, and economically prosperous.

About the project partners

The project was led by Atkins in partnership with the Development and Planning Unit at UCL and the Department for International Development (DFID).



Department
for International
Development

The Department for International Development (DFID)

The Department for International Development (DFID) leads the UK government's fight against world poverty. Through its network of offices throughout the world, DFID works with governments of developing countries, charities, non government organisations, businesses and international organisations, like the United Nations, European Commission and the World Bank, to eliminate global poverty and its causes. DFID's work forms part of a global promise, the eight UN Millennium Development Goals, for tackling elements of global poverty by 2015. DFID's Climate and Environment Department (CED) is helping to establish DFID as a world leader in demonstrating results, impact and value for money from supporting developing countries to tackle climate change. CED's goal is to demonstrate that low-carbon, climate resilient and sustainable development is necessary and achievable.

ATKINS

Atkins

Atkins is one of the world's leading infrastructure and design companies, with the depth and breadth of technical expertise to respond to the world's most complex infrastructure and environmental challenges. These included responding to the increasing rate of urbanisation and the urgent transition to a low carbon economy. Atkins works with municipal authorities, national and regional government, development agencies, private sector companies, and other stakeholders to develop and implement strategic plans and investment projects to shape and manage the future growth of cities. With over 17,000 employees worldwide, Atkins is able to bring together its technical knowledge across a wide range of disciplines such as transport, water, energy, design, architecture, climate science, ecology, planning, and economics to help cities and those investing in them to act upon the long term opportunities and challenges of resource use and a changing climate. Our international work spans Africa, Asia, Europe, the Middle East and North America. Through our 'Carbon Critical' initiative Atkins has developed a range of bespoke tools to reduce the carbon emissions associated with major urban infrastructure programmes including a low carbon Masterplanning tool to reduce city carbon footprints.



UCL

University College London: Development Planning Unit

UCL is one of only three UK universities in the top 20 in the 2011 Shanghai Jiao Tong world rankings, and in the latest research assessment exercise UCL was rated third overall in the UK after Oxford and Cambridge. The Barlett Development Planning Unit (DPU) is internationally recognised for its academic and professional contributions in relation to city development in the developing world in active collaboration with partner institutions and researchers in the Global South. It is concerned with promoting sustainable forms of development, understanding rapid urbanisation and encouraging innovation in the policy, planning and management responses to the economic, social and environmental development of urban areas, giving emphasis to social justice, participatory local governance and poverty reduction. The key distinctive features of the DPU are its commitment to action research and its focus on rapidly urbanising areas in the developing world. The DPU maintains a wide network of partner organisations in Latin America and the Caribbean, Africa and South and Southeast Asia working on sustainable cities.

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